

CPSC Staff Statement on the Toxicology Excellence for Risk Assessment Report, "Flame Retardant Assessment Database" December 17, 2015, rev. January 6, 2016

The report, *Flame Retardant Assessment Database*, presents the findings of research conducted by Toxicology Excellence for Risk Assessment (TERA), in conjunction with the LifeLine Group, under a contract<sup>1</sup> with the U.S. Consumer Product Safety Commission (CPSC). TERA performed this work to organize human exposure information for nine selected flame-retardant chemicals into a database.

The selected flame retardants are:

- Tris(1,3-dichloro-2-propyl) phosphate (TDCPP)
- Tris(chloropropyl) phosphate, mixture of isomers (TCPP)
- Tris(2-chloroethyl) phosphate (TCEP)
- Triethyl phosphate (TEP)
- Triphenyl phosphate (TPP)
- 2-Ethylhexyl 2,3,4,5-tetrabromobenzoate (TBB)
- Di(2-ethylhexyl) tetrabromophthalate (TBPH)
- Tetrabromobisphenol A (TBBPA)
- Antimony trioxide (ATO)

TERA designed a spreadsheet to capture the key relevant concentration and exposure information identified in previous reports (TERA contract task orders 0008 and 0010). The information focused on indoor exposures (primarily indoor air, particulates, household dust, and direct or inferred migration out of products).

This research was completed in support of CPSC staff's work on flame-retardant chemicals to assess potential for exposure from household products, and to prioritize work on specific products and chemicals.

The final report, including a PDF copy of the spreadsheet, will be posted on CPSC's website to keep stakeholders informed of the progress of technical research related to the agency's regulatory activities. A portion of the work presented in the contractor report includes

<sup>&</sup>lt;sup>1</sup> Task order 0015 under contract No. CPSC-D-12-0001, awarded 7/21/2015.

information relevant to staff's ongoing work to understand consumer exposures to certain organohalogen flame retardant chemicals from consumer products, including furniture, mattresses, and electronic products.



# Flame Retardant Exposure Assessment Database

Task Order 15 Contract Number CPSC-D-12-0001

**Final Report** 

December 17, 2015, rev. January 6, 2016

Submitted by Toxicology Excellence for Risk Assessment

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### Contents

Background	. 4
Approach	4
Results	. 7
Reference List for Database	8

## Background

TERA, in conjunction with The LifeLine Group (LLG) organized previously collected exposure data on the flame retardant (FR) chemicals (listed in Table 1 below) into an Excel database. Exposure data collected and reported in previous work for CPSC was captured into a single Excel workbook. Emphasis was placed on data from the indoor environment. The purpose of creating the spreadsheet was to organize key information on data from each study that has potential relevance for assessing indoor exposure to the specified flame retardants. The spreadsheet is to provide a complete and accurate picture of the available data and evaluation of each study's quality and relevance for use in an exposure assessment.

FR Chemical	CASN
Trialkyl phosphates	
Tris(1,3-dichloro-2-propyl) phosphate (TDCPP)	13674-87-8
Tris(chloropropyl) phosphate, mixture of isomers (TCPP)	13674-84-5, 76649-15-5, 76025-08-6, 6145-73-9, 26248-87-3
Tris(2-chloroethyl) phosphate (TCEP)	115-96-8, 29716-44-7
Triethyl phosphate (TEP)	78-40-0
Aromatic phosphates	
Triphenyl phosphate (TPP)	1145-86-6
Brominated flame retardants	
2-Ethylhexyl 2,3,4,5-tetrabromobenzoate (TBB)	183658-27-7
Di(2-ethylhexyl) tetrabromophthalate (TBPH)	26040-51-7
Tetrabromobisphenol A (TBBPA)	79-94-7; 121839-52-9
Inorganic flame retardants	
Antimony trioxide (ATO)	1309-64-4

#### Table 1: Selected FR chemicals for the database

### Approach

We designed a spreadsheet in consultation with the Contracting Officer's Representative (COR) that captures the key relevant data from the previous project reports on exposure information for nine flame retardants (see TERA reports for Tasks 0008 and 0010). As directed by the COR, we focused on indoor exposures (primarily indoor air, particulates, household dust, and direct or inferred migration out of

products) although outdoor air and some other media were captured to provide data for comparisons, as appropriate.

For the studies, relevant information from each study was captured using the column headings in Table 2. The database was initially populated with the information from relevant tables from the final reports of previous task orders. Studies were then reviewed to fill in any missing factual data. Following the data population step, each study was critically reviewed to complete the database entries, in particular evaluating the study quality with regard to relevance, representativeness, precision, and methodology. Qualitatively assessing the studies is important to provide context for the interpretation and use of the data. Table 3 describes the types of information captured for the individual quality descriptors.

Concentration data in other media, such as food and water, from the previous reports are copied into separate tabs for food and water. These studies did not undergo additional analysis or quality evaluation for the database. Similarly, the information from previous reports on biomonitoring studies were captured in separate tabs, with no additional analysis or quality evaluation. No additional literature searches were conducted for this project.

Study Number	First digit is study number and main study entry.
	Each study is further numbered to represent each
	unique combination of study, FR, location, and
	media corresponding to a concentration
	measurement
Reference	Study short citation
Date Study Conducted	Date the study was conducted or the
	measurements were taken
Location (e.g., office, residence, room)	Where the measurement was taken
Chemical	Flame retardant name or abbreviation
Indoor air, outdoor air, dust	Media type
Suspected Source	Any products or conditions that are reported by
	the authors in the geographic area or space
	where the measurement was taken
Study Objective	Purpose or objectives of the study or hypothesis
	tested
Methods	For main study entry, a brief description of
	methods, for subrows, additional details for the
	particular media and/or location
Country (city/region)	Country and city or region(if reported) where the
	measurements were taken
n =	Number of items or locations sampled and
	number of replicates
n comments	Explanation for how "n" was determined
Average	Concentration labeled "average" by study authors
Mean	Concentration labeled "mean" by study authors

Table 2. List of database elements (column headings) and brief description of each.

Median	Concentration labeled "median" by study authors
Lowest	Concentration labeled "lowest" by study authors
Highest	Concentration labeled "highest" by study authors
95th%	Concentration labeled "95 <sup>th</sup> percentile" by study
	authors
Geometric Mean	Concentration labeled "geometric mean" by
	study authors
Units	Concentration units in nanograms (original study
	units in parentheses when not in nanograms)
Standard Deviation	Standard deviation, if given
Detection Frequency	As reported by the study authors
Limit of Detection	As indicated by author
Limit of Detection units	Units in nanograms (original study units in
	parentheses when not in nanograms)
Method Detection Limit	As indicated by author
Method Detection Limit units	Units in nanograms (original study units in
	parentheses when not in nanograms)
Quality – Relevance	See below
Quality – Representativeness	See below
Quality - Precision	See below
Quality – Methodology	See below
Comments	Highlight issues and unique features or related
	references for the publication.

#### Table 3. Quality descriptors used in the database.

/	A.	<u>Relevance</u> : With CPSC's assessment purpose—assessing human exposure in a residential setting—as the guiding principle, the information will be linked to its contribution in assessing
		the exposures to
		• populations or special conditions experienced by the populations (socioeconomic, geographical, age, gender, etc.) with emphasis on life stages
		<ul> <li>locale, as in home, day-care, office, etc.</li> </ul>
		• the physics of the product or media governing potential for release, transfer, binding, accumulation or uptake of the chemicals
		product type
		<ul> <li>prospective relationship to biomonitoring data</li> </ul>
		• other
l	B.	Representativeness: How can the information be applied in terms of
		<ul> <li>chemicals to which it may be applied (all, presumably all, specific ones)</li> </ul>
		relationship to pyrolytic forms of chemicals
		<ul> <li>relationship to degradates or metabolites of parent chemical</li> </ul>
		• geographical, year data were collected, or other situation which favors the application
		of the information to US population assessment purposes
		utility in prospective assessments
		<ul> <li>utility in relation to biomonitoring or other retrospective exposure profiles</li> </ul>
		• other

- C. <u>Precision</u>: This relates to any situation in the publication that limits the data precision. For example, if data were summarized and original data not available or inadequately described for exposure assessment purposes, that precision issue will be pointed out. Issues related to number of measurements or duplicates or other methodology will be pointed out when suggestive of limitations or significant excellence.
- D. <u>Methodology</u>: This relates to any element of the methodology that constrains or limits the application of the information to the exposure assessment.

## Results

The resulting database provides a standardized description of exposure data on nine flame retardants. As an Excel spreadsheet the entries can be sorted to be able to group data by media, location, chemical, or other relevant elements. The tab labeled "ALL CHEMS" presents the data from 108 studies in the database with 745 subrows. Food and water data (reported without additional analysis from previous tasks) can be located under their respective tabs in the same Excel file. Similarly, information on biomonitoring studies is captured in separate tabs for each FR (e.g., TCEP – bio). A list of all the studies cited in the Excel spreadsheet are found in the next section.

In capturing and reporting on these studies, we made the following observations:

- The use of individual flame retardants has changed with time and therefore human exposure and FR concentrations are changing
- Abundant information exists for many of the FRs to construct patterns of residue in multiple environments for the general US population and some subgroups for retrospective and prospective exposure assessments.
- Residue patterns expressed in the literature are derived from evolving methodologies for collection, separation and analysis of the matrices involved in the study. Different geographical and site conditions (rural, urban, proximity to transport lines or mines) and analytical processes make it necessary to consider these variables when constructing residue patterns from multiple studies.
- Abundance and quality of information differs for different FRs.
- Residue measurements for media in which ATO might exist are sometimes reported in the context of Sb residue. Depending on the methodology and subsequent statistical treatment of the data, these values may or may not represent ATO. Some may represent Sb as a consequence of ATO in the media or as a consequence of Sb uses not related to FR use. As data are extracted for use in exposure assessment, the assessor will need to examine each data source for this issue and apply the data accordingly.

#### **Reference List for Database**

The following is a list of references cited in the database.

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### Appendix: Database Sheets

r	escriptio 1 of e elds. NP =	old main ntry line and iference in	Date the study was	Where was measurement taken? E.g., Office		For example, dust, indoor or outdoor air.	Identify any products or conditions that	What was purpose of the study or hypothesis being tested?	In main study entry provide BREF general description of methods. For sub-rows, list specific methods for that media/location.	Country (and F city/region if i available)	trovide all nformatio n on the	Include all info provided - range ( or min	Mean concentration	Median concentration	Lowest concentration	Highest concentration		Geometric average concentration	Concentration units. List in nanograms and	Standard Deviation	List whatever info is available on	Include whatever info authors give or note that they did	Concentration units. List in nanograms and red	Or whatever limit authors report, label it	Concentration units. List in nanostrams and not	See Quality Sheet for explanation	See Quality Sheet for explanation	See Quality Sheet for explanation	See Quality Sheet for explanation	Anything else that we captured in the NOTES column of Tasks 8 and 10 that has not been captured to the left PHIS -
÷	Study Sumber	Reference	Date	Location (e.g. office,	, Chemica	Media (e.g., dust,	Suspected	Study Objective	Methods	Country (city/regi	n = n	Average	Mean	Median	Lowest	Highest	95th%	Geometric	Units	Standard	Detection	Limit of	Limit of Detection	Method Detection	Method Detection	Quality - relevance	Quality - representativenes	Quality- Precision	Quality -	Comments
3		aito et al. 1007	Condu , 2001- 2003	c residence. House (including newly built apartment), office and laboratory	11 orgopho: phate and 14 polybro minated FRs	indoor air) Indoor air, outdoor air, dust	source building materials and electrical appliances See 1.1-1.39	Three objectives: analytical method development; migration rate from interior surfaces and electrical appliances; indoor concentrations in Tokyo houses and offices	See 1.1-1.39	on) Japan, S Tokyo	comments see 1.1- See 1.1- 1.39 1.39	See 1.1- 1.39	See 1.1- 1.39	See 1.1- 1.39	See 1.1- 1.39	See 1.1- 1.39	See 1.1- 1.39	See 1.1- 1.39	See 1.1- 1.39	See 1.1- 1.39	See 1.1- 1.39	See 1.1-1.39	units See 1.1-1.39	Limit See 1.1-1.39	Limit units See 1.1-1.39	See 1.1-1.39	See 1.1-1.39	See 1.1-1.39	See 1.1-1.39	good review of market and regulatory history for different FRs used in Japan from 1993- 2006 THIS IS A MIGRATION STUDY-HOUSE ITEMS TO HOUSE DUST - ALSO OFFICE VAL HOUSE DUST - ALSO OFFICE VERSUS Polybrominated FRs
1	1 1	aito et al., 007	2002	Office	TDCPP	Plastic surface	Computer monitors	Study Migration Rate for PRs in outer casings of electric appliances	Surface wiged with ethanoid and allowed to dry for 10 mms. Solid ethanoids and proposed M bioli check models and the structure of the structure of the structure statistics structure of the structure of the structure statistics structure of the structure of the structure statistics and characteric experiments and ethanois and the structure experiments and the structure of the structure of the structure and the structure of the structure of the structure party-termination from restariations. Myopation structure and the structure of the structure of the log (b) fiber area (b)	Japan, Tokyo	7 computer monitors (manufacture d between 1995-2002)in 1 office building	NR	NR	ND	ND	280	NR	NR	ng/m2/hr	NR	1 of 7 samples	20.8	P8	250	ng/m2/hr	valuable migration rate study	Migration rate for Fib in computer moritors, perhaps electronic devices	Good, individual data reported or ranges reported along with LODO Method Detection Limits and recover rates.	excellent detail of methods, QA, (akculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	
3	2 1	aito et al., 007	2003	House	TDCPP	Plastic surface	TV sets	Study Migration Rate for PRs in outer casings of electric appliances	Source a use a with the based on the second second to dry for 10 CLA $\mathcal{L}$ for all molecular distributions of the second second second second second constant with the own, or carding for 24 bits using a statistics used count. Collected analysis were distributed as the second seco	Japan, Tokyo	8 TV sets (manufacture d between 1989-2001) from 6 houses	NŘ	neik	ND	NR	NR	NŘ	NŘ	ng/m2/hr	NR	0 of 8 samples	20.8	PR	250	ng/m2/hr	valuable migration rate study	Migration rate for PRs in TVIs, perhaps electronic devices	Good, individual data reported or ranges reported along with LODO Method Detection Limits and recover rates.	excellent detail of methods, QA, calculation, sources, all technical details of collection, analysis, calculation of results and sensibivity as well as situational details	
1	3 3	aito et al., 007	2002, Jan Mar	+ House	TDCPP	Indoor air	NR	Monitoring	Sampling used a quarte filter (47 mm) in first stage, and a valid phase extraction disk (EmportM and CLI), 47 mm) the second phase. Filters based in aluminon holder and are passed through at a fiber and the second phase. The second phase is the second analysis sever extractive which sectors and ultrasourie exterctions, ben concentrated with infragen. Concentrated extractive ware analysed by GLPD for organophologate Fih, and GC-ADD for organophologate Fih, and GC-ADD for	Japan, Tokyo	18 houses	NR	NR	ND	ND	0.6	NR	NŘ	ng/m3	NŘ	NŘ	20.8	PE	0.72	ng/m3	market sensitive for types of FRs and products in homes climate sensitive because of open ventiliation systems in buildings	Imited representativeness because of FR market changes, Japanese building materials during these dates and open ventiliation systems	Good, individual data reported or ranges reported along with LODe Method Detection Limits and recover rates.	excellent detail of methods, QA, raiculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	open vertillation systems in houses BUT study conducted Jan-Adach during winters on my site representation of cloud windows. Air exchange not soonn.
1	4 3	aito et al., 007	2002, Jan Mar	- Office	TDCPP	Indoor air	NR	Monitoring	Sampling used a quarte filter (47 mm) in first stage, and a valid phase entraction filter (1990/1997) and C.13, 47 mm) in the social phase. Fifther studied of the social phase filter (1990/1997) entraction (1990/1997) and (1990/1997) entraction (1990/1	Japan, Tokyo	14 Offices	NR	NR	ND	ND	87	NR	NŘ	ng/==3	NR	NŘ	20.8	PE	0.72	ng/m3	market sensitive for types of FRs and products in offices climate sensitive because of open ventilitation systems in buildings	limited representativeness because of FR market changes, Japanese building materials during these dates and open ventillation systems	Good, individual data reported or ranges reported along with LOD- Method Detection Limits and recover rates.	excellent detail of methods, QA, calculation, sources, all technical details of collection, analysis, calculation of results and sensibility as well as situational details	All offices studied were obliged to use free existent materials while contracting the instinut according to the first Services of the service of the service of the services of a offices of the service conducted lan-Abar methods. All eschange not known.
1	5 5	aito et al., 007	2002, Jan Mar	<ul> <li>Outdoor site</li> </ul>	TDCPP	outdoor air	NR	Monitoring	Sampling used a quarts filter (47 mm) in first stage, and a viol phase entraction dio (Empore)TM and CL14, 47 mm) inter-acord phase. Filters based in aluminon holder and ar passed through at 18 ben et al. 19 mm of 20 km of 20 km of 20 km of 20 km of 20 km and 20 km of 10 km of 20 km of 20 km of 20 km and 20 km of 10 km of 20 km of 20 km and 20 km of 20 km of 20 km of 20 km and 20 km of 20 km of 20 km or organophologiale filts and GC-ADD for organophologiale filts and GC-ADD for phyleromisaued filters enderdatts.	Japan, Tokyo	8 outdoor sites	NR	NR	ND	NR	NR	NR	NŘ	ng/m3	NŘ	Not detected in any samples	20.8	P8	0.72	ng/m3	Limited-market sensitive for types of FR and products in homes/offices wenting to outside of structure climate sensitive because of open wentilitation systems in buildings	Imited representativeness because sampling titles because sampling titles near windows and building-not representative of ambient ourdoor air in region, may represent air contiguous to building.	ranges reported along with LOD< Method Detection Limits and recover rates. Cannot discem sampling location or house/office area	encelient detail of y methods, QA, calculation, sources, all technical details of collection, analysis, calculation of results and sensibility as well as situational details	samples taken near ventilizion sites expressing indoor residues onto outside building eres. This outdoor residues represent timing of open window – dimate sensitive s well as degree of indoor eir content. Cannot tell if these sites are outside offices or houses
1	6 5	aito et al., 007	2002	Apartment living room newly built, with wood floor as polyolefine wall as ceiling coverings.	TDCPP nd	Indoor air	NR	Monitoring	Sampling used a quart fiber (Hzr (47 mm)) in first stage, and a viol phase entraction dio (Hzmyoeff M doi C.14, 47 mm) in the accord phase. Filters based in aluminon holder and ar passed through at 16 bene entraction. In the entraction of the state of the entraction and the entraction of the entraction of the entraction entraction. Units of the entraction of the entraction concentration entraction was analyzed by GLPD for organophotopate filter and GLAED for phylorominated filters enforced.	Japan, Tokyo	1 new apartment	NR	NR	13	NR	NR	NR	NŘ	ng/m3	NŘ	NR	20.8	P8	0.72	ng/m3	market sensitive for types of FRs and products in homes climate sensitive because of open ventillation systems in buildings	limited representativeness because of FR market changei, Japanese building materials during these dates and open ventiliation systems	Good, individual data reported or ranges reported along with LOD× Method Detaction Limits and recover rates.	encelient detail of methods, QA, calculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	Air exchange not known.
1	7 5	aito et al., 007	2003	House	TCPP	Plastic surface	TV sets	Study Migration Pate for PRs in outer cavings of electric appliances	Surface arguest with these is and disord to disp for the trans. Sufficient science is a stress of the stress of t	Japan, Tokyo	8 TV sets (manufacture d bitween 1989-2001)	NR	NR	420	ND	1,700	NR	NR	ng/m2/hr	NR	5 of 8 samples	27.2	P8	330	ng/m2/hr	valuable migration rate study	Migration rate for Pits in TVs, perhaps electronic dereces	Good, individual data reported or ranges reported along with LOD- Method Detection Limits and recover rates.	excellent detail of methods, QA, calculation, sources, all tochrical details of collection, analysis, calculation of results ans sensibirity as well as situational details	
		aito et al., 007	2002, Jan Mar	s- house	TCPP	Indoor air	NR	Monitoring	Sampling used a quarte filter (47 mm) in first stage, and a using phase extraction disk (EmporeMI data) (47 mm) in the accord phase. Filters based in aluminom holder and ar passed through at a fiber analysis were extracted with actions and utbiased analysis were extracted with actions and utbiased concretion, then occurred as all millions. Corgosophicabater (Fib. and GC AED for ophylerominated fiame relations.	Japan, Tokyo	18 houses	NR	NR	19	ND	1260	NR	NŘ	ng/m3	NŘ	NŘ	27.2	PE	0.94	ng/m3	Limited-market sensitive for types of FR and products in offices venting to outside of structure climate sensitive because of opin wentillation systems in buildings	imited s representativeness because of FR market changei, Japanese building materials during these dates and open vientiliation systems	Good, individual data reported or ranges reported along with LODe Method Detaction Limits and recover rates.	excellent detail of methods, QA, valculation, sources, all technical details of collection, analysis, calculation of results and sensibitify as well as situational details	Sampling done from Jan - March in Tokyo homes. Air exchange rates unknown, and although vandow ventillation possible, unknown if witdows were opened.
1	9 3	aito et al., 007	2002, Jan Mar	- office	TCPP	Indoor air	NR	Monitoring	Sampling used a quarts fiber fiber (F3 mm) in first stage, and a solid phase entraction disk (Irmport Mb bk C18, 47 mm) in the scood phase. Then shared in alummu holder and ar passed through at at flow and at 10 km inst 0.40 mm (AL and AL and AL entraction), then concentrated with intragen. Concentrated entracts were analyzed by 0.6710 for organopholpate F1s and 0.2420 for organopholpate F1s and 0.2420 for	Japan, Tokyo	14 Offices	NR	NR	6	ND	57.6	NR	NR	ng/m3	NR	NR	27.2	28	0.94	ng/m3	Limited-market sensitive for types of FR and products in offices venting to outside of structure climate sensitive because of open ventillation systems in buildings	limited representativeness bocause of FR market changes, Japanese building materials during these dates and open ventillation systems	Good, individual data reported or ranges reported along with LOD< Method Detection Limits and recover rates.	excellent detail of methods, QA, y calculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	All offices studied were obliged to use fire-esistant materials while contracting the interior according to the fire Services Act in Japan. Sampling done from Jan - March in Tolyo Donese. Are exchange at the winknow, and Although window wentillation possible, unknown if windows were opened.

1.10	Saito et al., 2007	2002, Jan- outdoor site Mar	TCPP	outdoor air	NR	Monitoring	Swepting and a quart filter that (27 mm) is first a sub- tant, and a sub-method. The transmission of the transmission of the transmission of the second phase. Fitters loaded in alternism holders and a passed frequent (a) the transmission of tran	apan, Yokyo 8	outdoor sites	NR	NR	ND	ND	3.1	NŘ	NŘ	ng/m3	NR	NR	27.2	P8	0.94	ng/m3	Limited-market sensitive for types of FR homes/offices wenting to outside of structure climade sensitive because of open ventillation systems in buildings	limited representativeness because sampling titles near windows and building-not representative of ambient ourdoor air in region, may represent air contiguous to building	ranges reported along with LOD- Method Detection Limits and recover tasks. Cannot discome sampling location or house/office area	excellent detail of ry methods, QA, calculation, sources, all bechnical details of collection, analysis, calculation of results and sensitivity as well as situational details	simple taken near ventilation sites expressing indoor residues conto cutide building areas this condoor residues represent timing of open window – climate sensitive a well as degree of indoor air content. Cannot still if these sites are outside offices or houses
1.11	Saito et al., 2007	2002 laboratory	TCPP	Indoor air	NR	Part of QA procedure	Sampling used a quarte fiber fiber (47 mm) in firm tage, and a solid phase extraction dial (Empore/TM Side 14, 87 mm) in the second phase. There loaded in alumitum holder and air passed through at at flow ated of 10 (mins 64 ke 16 k4 ml). Clothcid analytes were extracted with acteone and Utrasmic antaction, then concentrated with manyond by GC-PD for companyon/phage bits and GC-AD for polyforoninated films enderstate.	apan, Tokyo 1	lab, duplicate samples	NR	NR	NI	0.95	0.99	NR	NR	ng/m3	NR	2 out of 2 samples, same lab	27.2	PE	0.94	ng/m3	Part of QA procedure	N/A	N/A	N/A	
1.12	Saito et al., 2007	2001 Apartment living room newly built with wood floor a polyplefine wall a ceiling covering.	TCPP nd nd	Indoor air	Interior surfaces	Merilloring	Sampling used a quarte fiber fiber (47 mm) in firm tage, and a solid phase extraction dial (EmporeTM Dia CL1, 4, 7 mm) the second phase. There loaded in alumitum holder and air passed through at at flow ated 10 U(mins O4 to FL4 AH 3). Clothcoid analytes were extracted with actions and Urbasolic distriction, then constrained with anti-gam. Consemptioned extracts were analyted by GC/PD for ophylhrominade flame retardants.	apan, Tokyo 1	new apartment	NR	NR	55	NR	NR	NR	NR	ng/m3	NR	detected in one house	27.2	PE	0.94	ng/m3	market sensitive for types of PRs and products in homes climate sensitive because of open ventilitation systems in buildings	building materials manufactured during that time period in Japan	Good, Individual data reported or ranges reported along with LOD- Method Detection Limits and recove rates.	excellent detail of methods, QA, yr calculation, source, ail technical details of collection, analysis, calculation of results ains sensibitity as well as situational details	Air eschange rates unknown
1.13	Saito et al., 2007	2003 House	TCEP	Plastic surface	TV sets	Study Migration Rate for FRs in outer casings of electric appliances	Surface any spin with these of and shared to object the time, so that extractions disk properties that they made CLB, 4.7 mm wave placed such that they made constant with thow, and ( $\alpha$ ) credings to 2.4 hm using a statistical state ( $\alpha$ and $\alpha$ ) called at a shared state ( $\alpha$ and $\alpha$ ) called at a shared state of the state of the concentrated with respect. Construction dense was adapted by GC-PD for ( $\alpha$ ) graphical bases for the GCA bb (for an other ( $\alpha$ )) were calculated by the mean of the characterised state of the concentrated with respect. Construction dense the state of the transmitted by the characterised state of the state of the transmitted by the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) were calculated by the amount of thermatic extracted one the surface fiber ( $\alpha$ ), the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of the fiber rate ( $\beta$ ). DDD for ( $\beta$ ) and $\beta$ are calculated by the mean of $\beta$ ) and	xpan, Tokyo 8	TV sets (manufacture d between 1989-2001)	NR	NR	1,400	ND	13,000	NR	NR	ng/m2/hr	NR	5 of 8 samples	19.2	P8	230	ng/m2/hr	valuable migration rate study	Migration rate for FRs in TVs, perhaps electronic devices	<ul> <li>Good, individual data reported or ranges reported doing with LOD- ranges reported doing with ecover rates.</li> </ul>	excellent detail of methods, QA, y calculation, sources, all technical details of collection, analysis, calculation of results ain sensitivity as well as situational details	
1.14	Saito et al., 2007	2002, Jan- house Mar	TCEP	Indoor air	NR	Merilloring	Sampling used a quarte fiber fiber (47 mm) in firm tage, and a solid phase extraction dial (Empore/TM biol C14, 8, 47 mm) the second phase. There loaded in alumitum holder and air passed through at at flow and of 10 (mins for 40 kr (14.4 ml)). Calcited analytic wave extracted with acteors and Utrasmic extraction. How constrained with integration constrained ensume that and of the C4 Min for constrained ensume that and C4 Min for polybrominated flame retardants.	apan, Tokyo 18	houses	NR	NR	13	ND	136	NR	NR	ng/m3	NR	NR	19.2	PE	0.67	ng/m3	market sensitive for types of PRs and products in homes climate sensitive because of open ventillation systems in buildings	limited representativeness because of FR market changes, Japanese building materials during these dates and open vientiliation systems	Good, Individual data reported or ranges reported along with LOD- Method Detection Limits and recove rates.	excellent detail of methods, QA, yr całculation, source, ail technical detailis of collection, analysis, całculation of results and sensibitity as well as situational details	open ventiliation systems in houses BUT study conducted Jan-March during winters ur may informer presentation of closed windows. Ar exchange not known.
1.15	Saito et al., 2007	2002, Jan- office Mar	TCEP	Indoor air	NR	Manitoring	Sampling used a quarte fiber fiber (47 mm) in first tage, and a solid phase extraction dial (EmportM book C14, 47 mm) in the scoord phase. There loaded in aluminum holder and an passed through at at Bow extend to 20 (min 64 kpc 14, 44 ml). Calcitude analyte wave extracted with acteors and Unisotic extraction. Bio-constrained with minipart CaPu for organopholypater This and C2-A20 for organopholypater This and C2-A20 for organopholypater This and C2-A20 for	apan, Tokyo 14	Offices	NR	Neit	13	ND	42.1	NŘ	NŘ	ng/m3	NR	NR	19.2	P8	0.67	ng/m3	Limited-market semilitive for types of Fite and products in offices venting to cutiside of structure climade semilitive because of open ventillation systems in buildings	limited representativeness because of FR market changes, Japanese building materials during these dates and open vientiliation systems	Good, individual data reported or ranges reported along with LOD- Method Detection Limits and recove rates.	excellent detail of methods, QA, yr calculation, sources, all bechnical details of collection, analysis, calculation of results and sensibility as well as situational details	All offices studied were oblight to use fire-existant materials while constructing the interior accounting to the fire Services Act in Japan. Sampling done from Jan- Manch in Tokyb othons. Air exchange rates unknown, and although window weithilding possible, unknown if windows were opened.
1.16	Saito et al., 2007	2002, Jan- outdoor site Mar	TCEP	outdoor air	NR	Monitoring	Sampling used a quarts fiber fiber (47 mm) in first a tage, in 41 solid phase entracion dial (2 mpow/HM solid Cast), 47 mm) in the scored phase. There is based of the score of phase. There is based of the score o	apan, Tokyo 8	outdoor sites	NR	NR	ND	NR	NR	NR	NR	ng/m3	NR	Not detected in any samples	19.2	Pđ	0.67	ng/m3	Limited-market semitive for types of PRo and products in homes/offices venting to outside of structure climabe semisive because of open ventilitation systems in buildings	limited representativeness because sampling sites near windows and building-not representative of ambient ourdoor air in region, may represent air contiguous to building	ranges reported along with LOO- Method Detection Limits and recove rates. Cannot discern sampling location or house/office area	excellent detail of ry methods, QA, calculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	samples taken near ventillation sites expressing indoor residues conto curbade building areas. This condoor modules and the source of the source of the source climate sensitive as well as degree of indoor air context. Clemost tell 11 these sites are outside offices or houses
1.17	Saito et al., 2007	2002 laboratory	TCEP	Indoor air	NR	Part of QA procedure	Sampling used a quarts fiber fiber (47 mm) in first a tage, in 41 solid phase entracion dial (2 mpow/HM solid Cast), 47 mm) in the scored phase. There is based of the score of phase. There is based of the score o	apan, Tokyo 1	lab, duplicate samples	NR	NR	Nit	0.65	0.72	NR	NR	ng/m3	NR	2 out of 2 samples, same lab	19.2	Pđ	0.67	ng/m3	Part of QA procedure	N/A	N/A	N/A	
1.18	Saito et al., 2007	2001 Apartment living room newly built with wood floor a polyolefrine wal a ceiling coverings.	TCEP nd nd	Indoor air	Interior surfaces	Monitoring	Sampling used a quarts fiber fiber (47 mm) in first trage, and a solid phase entraction duit (Empore/IM bioX CLR 47 mm) in the scood phase. There loaded in a latername holder and all passed through at at flow and all yims hold by the (14 km) and (16 km) and and all yims hold by the (14 km) and (16 km) entra thick, then concentrated with intragen. Concentrated entracts wave analysed by QCFD for organophologistics Fis and GC-XDD for polyforminiated flame retardaets.	apan, Tokyo 1	new apartment	NR	NR	12	NR	NR	NR	NŘ	ng/m3	NR	detected in one house	19.2	P8	0.67	ng/m3	market sensitive for types of FRs and products in homes climate sensitive because of open ventillation systems in buildings	building materials manufactured during that time period in Japan	Good, individual data reported or ranges reported along with LOD- Method Detection Limits and recove rates.	excellent detail of methods, QA, yr calculation, sources, all technical details of collection, analysis, calculation of results and sensibility as well as situational details	Air eschange rates urknown
1.19	Saito et al., 2007	2002, Jan- house Mar	ΤΕΡ	Indoor air	NR	Monitoring	Sampling used a quarte fiber fiber (47 mm) in firm trage, and a solid phase extraction disk (Empore/IM bioX CL 8, 47 mm) in the scood phase. There loaded in alumitum holder and air pased through at at flow ated of 10 (mins 64 the (14.4 ml)). Calcited analytes were entracted with atestone and Utrassolic extraction. Bion constrained with mingr 62 ml. Constraints, Bion constraints with mingr 62 ml. Consequences of the start 62	apan, Tokyo 18	houses	NR	NR	2.4	ND	58.2	NR	NR	ng/m3	NR	NŘ	7.6	P8	0.26	ng/m3	market sensitive for types of FRs and products in homes climate sensitive because of open ventilitation systems in buildings	limited representativeness because of FR market changes, Japanese building materials during these dates and open vientiliation systems	Good, Individual data reported or ranges reported along with LOD- Method Detection Limits and recove rates.	excellent detail of methods, QA, yr całculation, source, ail technical detailis of collection, analysis, calculation of results and sensibitity as well as situational details	open ventiliation systems in houses BUT study conducted an Afactehouring winters or may site representation of closed windows. Ar exchange not known.
1.20	Saito et al., 2007	2002, Jan- office Mar	ΤΕΡ	Indoor air	NR	Monitoring	Sampling used a quarts fiber fiber (47 mm) in firm tage, and a solid phase extraction disk (Empore/TM Disk C14, 47 mm) in the scood phase. There loaded in alumnum holdra and air passed through at at flow ated 10 U(mins 62 km (24 mir 4.4 mir 3.2 km)). Catacentration was extracted with actions and Urbassic extraction, then constrained with analyzed by GC+PD for organophologable TM and GC-AED for for programophologable TM and GC-AED for	apan, Tokyo 14	Offices	NR	NR	32	0.44	8.8	NR	NR	ng/m3	NR	NŘ	7.6	PE	0.26	ng/m3	Limited-market sensitive for types of Fib and products in offices venting to outside of structure climate sensitive because of open ventilitation systems in buildings	limited i representativeness because of FR market changes, Japanese building materials during these dates and open ventillation systems	Good, individual data reported or ranges reported along with LOD- Method Detection Limits and recove rates.	encelient detail of methods, QA, ry calculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	All offices studied were obliged to use fire-resistant materials while constructing the interior according to the fire Services Act in Japan. Sampling done from Jan – March in Toliyo homes. All exchange rates unknown, and although window ventillation possible, unknown if windows were optimed.

1.21	Saito et al., 2007	2002, Jan- outdoor s Mar	te TEP	outdoor air	NR	Monitoring	Sensitive quark again the before $(21mm)$ is for the space and any other sensitivity and present sensitivity of the second parameter second parameter sensitivity of the second parameter sensitivity of the second parameter sensitivity of the second parameter second second parameter sensitivity of the second parameter second second parameter second second parameter second	8	outdoor sites	NR	NR	ND	ND	14	NR	NŘ	ng/m3	NR	NR	7.6	P8	0.26	ng/m3	Limited-market sensitive for types of Fi and products in homes/officies veeting i outside of structure climate sensitive because of open ventillation systems in buildings	limited s representativeness because sampling sites o near windows and building-not representative of ambient outroof air in region, may represent air configuous to building	ranges reported along with LOD< Method Detection Limbs and recover rates. Cannot diacem sampling location or house/office area	excellent detail of y methods, QA, calculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	simples taken near ventiliation sites expressing indoor residues not outside building areas this coundoor residues represent turing of open window – dinable sentution as well as degree of indoor air content. Cannot bell if these sites are outside offices or houses
1.22	Saito et al., 2007	2002 laboratory	TEP	Indoor air	NR	Part of QA procedure	sensitive quark spars the fact fact (or more in first sensitive quark start factors fact (E) provide the sensitive factor of the sensitive factor (Sensitive Class CLE (A) cmm) in the second phase. Follows has the sensitive factor of the sense start factor of the sensitive read at 50 million factor of the sensitive factor of the sense of the sense start factor of the sense classification of the sense analyzed by CLE for the segment/builder factor of the SLE for the segment factor of the SLE for the segment/builder factor of the SLE for the segment factor of the SLE for the segment/builder factor of the SLE for the SLE for the segment/builder factor of the SLE for the segment factor of the SLE for the SLE for the segment factor of the SLE for	1	lab, duplicate samples	NR	NR	Nik	0.6	0.67	NR	NR	ng/m3	NR	2 out of 2 samples, same lab	7.6	P8	0.26	ng/m3	Part of QA procedure	N/A	N/A	N/A	
1.23	Saito et al., 2007	2001 Apartmen room new with woo polyolefin ceiling co	t living TEP built, I floor and e wall and erings.	Indoor air	Interior surfaces	Maniltoring	Sampling and a quart fiber filer (47 mm) in first tage, and a static fiber intercept and (Engenerith and Construction) and the static fiber and the static and another model water and a parallel through a fit of meril 42 low fiber in the static and and another the static fiber and the static and and another construction and the static and and another construction and the static and and another construction and the static and and another the static and the static and and another construction and the static and and another paralphorements and CASD for paralphorements and CASD for	1	new apartment	NR	NR	234	NR	NR	NR	NR	ng/m3	NR	detected in one house	7.6	P8	0.26	ng/m3	market sensitive for types of PIs and products in homes climate sensitive because of open ventillation systems in buildings	building materials manufactured during that time period in Japan	Good, Individual data reported or ranges reported along with LOD-r Method Detection Limits and recover rates.	escellent detail of methods, QA, y calculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	Air eschange röfes unknown
1.24	Saito et al., 2007	2002 Office	ТРР	Plastic surface	Computer manitors	Study Migration Rate for PRs in outer casings of electric appliances	Surface wiped with ethanol and allowed to dry for 10 Japan, Tokyo mins. Solid estraction disks (Empowith Disk check CEI), 47 mm) were placed such that the type made constact with theor, wall, or calling for 24 hm using a statistica state course. Collected analysis were entracted with actions and discussive estraction, enter the same association for CEI for the read	7	computer monitors (manufacture d between 1996-2002)	NR	NR	690	ND	20,700	NR	NR	ng/m2/hr	NR	5 of 8 samples	6.8	P8	250	ng/m2/hr	valuable migration rate study	Migration rate for Fits is computer monitors, perhaps electronic devices	n Good, individual data reported or ranges reported along with LOD× Method Detection Limits and recover rates.	excellent detail of methods, QA, y calculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details.	
1.25	Saito et al., 2007	2003 House	TPP	Plastic surface	TV sets	Study Migration Rate for FRs in outer casings of electric appliances	Surface wiped with ethanol and allowed to dry for 10 Japan, Tokyo mins. Solid estraction disks [Errpore/IM Disk check CI3, 47 mm] were placed such that they made contact with floor, wall, or ceiling for 24 hrs using a starieries steel cover. Collected analytes were extracted with active and ultracino. textraction.	8	TV sets (manufacture d between 1989-2001)	NR	NR	330	ND	6,700	NR	NR	ng/m2/hr	NR	2 of 8 samples	6.8	PB	250	ng/m2/hr	valuable migration rate study	Migration rate for Fits i TVs, perhaps electronic devices	<ul> <li>Good, individual data reported or ranges reported along with LOD-</li> <li>Method Detection Limits and recover rates.</li> </ul>	excellent detail of methods, QA, y calculation, sources, all technical details of collection, analysis, calculation of results and	
1.26	Saito et al., 2007	2002, Jan- house Mar	ТРР	Indoor air	NR	Monitoring	Sampling word a quark filter filter (47 mm) in first — Japan, Taiyo Luga, rafa a unit (24 mm) in first — Japan, Taiyo Luga, rafa a unit (24 mm) in the scored phase. Fitters loaded in a dammark mitosia and a passed through at all how rate at 21 m/m in the 24 hr (14 mm). Subschlaft and the score of the s	18	houses	NR	NR	ND	NR	NR	NR	NŘ	ng/m3	NR	Not detected in any samples	6.8	P8	0.24	ng/m3	market sensitive for typps of PIs and products in homes climate sensitive because of open ventillation systems in buildings	limited representativeness because of FR market changes, Japanese building materials during these dates and open ventiliation systems	Good, individual data reported or ranges reported along with IOD- Method Detection Limits and recover rates.	excellent detail of methods, QA, v calculation, sources, all technical details of collection, anilysis, calculation of results and sensibility as well as situational details	open werthalition systems in houses Buff value conducted han Alarch during writers to may infer representation of closed windows. Air exchange not known.
1.27	Saito et al., 2007	2002, Jan- office Mar	трр	Indoor air	NR	Meniltoring	Sensitive quality and them file (or how in file). Sensitive quality and the sensitive shall live here and the sensitive shall live here and the sensitive shall be se	14	Offices	NR	NR	ND	ND	0.86	NR	NR	ng/m3	NR	NR	6.8	P8	0.24	ng/m3	Limited-market semitive for types of FI and products in offices wenting to cutside of structure climate sensitive because of open ventillation systems in buildings	limited s representativeness because of FR market changes, Japanese building materials during these dates and open ventiliation systems	Good, individual data reported or ranges reported along with LOD- Method Detection Limits and recover rates.	excellent detail of methods, QA, y calculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	All offices studied were obliged to use fire-existant materials while constructing the instroir accounting to the fire Services Act in Japan. Sampling done from Jan- Machin Totaylo homes. Are exchange rates unknown, and although window workfallow possible, unknown if windows were optimed.
1.28	Saito et al., 2007	2002, Jan- outdoor s Mar	te TPP	outdoor air	NR	Maniltoring	Sampling and a quart fiber filer (47 mm) in first tage, and a static fiber intercept and (Engenerith and Construction) and the static fiber and the static and another mobile and an appeal through at it for med 420 priors for 24 M (14.4 ms). Calched and apply an ener static and an administration construction and the static and influenzation constructions detection and excellence of party/proministic filmer networks.	8	outdoor sites	NR	NR	ND	NR	NR	NR	NR	ng/m3	NR	Not detected in any samples	6.8	P8	0.24	ng/m3	Limited-market sensitive for types of FI and products in homes/offices venting in outside of structure climate sensitive because of open ventillation systems in buildings	limited s representativeness because sampling sites o near windows and building—not representative of ambient ourdoor air in region, may represent air contiguous to building	ranges reported along with LOD- Method Detection Limits and recover rates. Cannot discens sampling location or hosse/office area	excellent detail of y methods, QA, calculation, sources, all technical details of collection, analysis, calculation of results and sensitivity as well as situational details	simples taken near ventilitation sites expressing indoor residues onto outside building areas this outdoor residues represent timing of open window – dimate sentitue as well as degree of indoor air content. Cannot tell if these sites are outside offices or houses
1.29	Saito et al., 2007	2002, Jan- house Mar	TBBPA	Indoor air	NR	Monitoring	Sampling used a quart fair filter (47 mm) in forg tage, and a stand phase entraction disk (Papenel Ma used (Papenel Ma and Papenel Ma) and the phase of Ma and the phase of the phase of the phase and a disk (Papenel Ma) and the phase and a disk (Papenel Ma) and the phase and a disk (Papenel Ma) and the phase and the phase of the phase of the phase of the phase and the phase of the phase of the phase of the phase and the phase of the phase of the phase of the phase and the phase of the phase of the phase of the phase of the phase and the phase of the phase of the phase of the phase of the phase and the phase of the phase of the phase of the phase of the phase and the phase of	18	houses	NR	NR	ND	NR	NR	NR	NR	ng/m3	NR	Not detected in any samples	173	P8	1.2	ng/m3	market sensitive for types of FBs and products in homes climate sensitive because of open ventiliation systems in buildings	limited representativeness because of FR market changes, Japanese building materials during these dates and open ventilation systems	Good, individual data reported or ranges reported along with LOD- Method Detection Limits and recover rates.	excellent detail of methods, QA, y calculation, sources, all technical details or collection, anilysis, calculation of results and sensibisity as well as situational details	open ventilation systems in houses BUT study conducted Jan Alach Adving winders una system representation of closed windows. Air exchange not known.
13	Saito et al., 2007	2002, Jan- office Mar	TBBPA	Indoor air	NR	Meritoring	Sampling used a quart fiber filer (47 mm) in first tage, and a start fiber filer (47 mm) in first and tage of the start fiber file (19 mport/H and 19 mm) in the start fiber of the start fiber and a start fiber of the start fiber of the start and a start fiber of the start fiber of the start construction of the start the start fiber of the start construction of the start fiber of the start construction of the start fiber of the start construction of the start of the start construction of the start of the start of the start construction of the start of the start of the start construction of the start of the start of the start party domains of the start of the start of the start of the start party domains of the start start of the start of the start of the start start of the start of the start start of the start of	14	Offices	NR	NR	ND	NR	NR	NR	NR	ng/m3	NR	Not detected in any samples	173	P8	1.2	ng/m3	Limited-market sensitive for types of FI and products in offices wenting to cutside of structure climate sensitive because of open ventillation systems in buildings	limited a representativeness because of FR market changes, Japanese building materials during these dates and open ventiliation systems	Good, individual data reported or ranges reported along with LOD- Method Detection Limits and recover rates.	excellent detail of methods, QA, y calculation, sources, all technical details of collection, anilysis, calculation of results and sensitivity as well as situational details	All offices studied were obleged to use fire existant materials while constructing the interior accounting to the fire services Act in Japan. Sampling done from Jan- Manh in Tokybo mones. Air exchange rates unknown, and although window windows were opened.
1.31	Saito et al., 2007	2002, Jan- outdoor s Mar	te TBBPA	outdoor air	NR	Merilaring	Sampling used a quart fiber filer (47 mm) in fort tage, and a stand plane anticide tab (Lingwork). A space Tablyo table and the standard standard standard standard standard and standard standard standard standard standard standard standard standard standard standard Consorted standard standard standard Consorted standard standard standard Consorted standard standard standard Consorted standard st	8	outdoor sites	NR	NR	ND	NR	NR	NR	NR	ng/m3	NR	Not detected in any samples	173	P8	12	ng/m3	Limited-market sensitive for types of FI and products in homes/officies vesting 1 outside of structure climate sensitive because of open ventillation systems in buildings	limited s representativeness because sampling sites o near windows and building-not representative of ambient ourdoor air in region, may represent air configuous to building	ranges reported along with LOD- Method Detection Limits and recover rates. Cannot discens sampling location or hose/office area	encellent detail of y methods, QA, calculation, sources, all technical details of collection, analysis, calculation of results and sensibitify as well as situational details	samples taken near ventilitation alles expressing indoor residues onto outside building areas. This outdoor residues represent timing of open window – climate sensitive aveil a degree of indoor air content. Cannot tell if these sites are outside offices or houses
1.32	Saito et al., 2007	2001 Apartmen room neu with woo polyolefin ceiling co	t living TDCPP ly built, f flore and e wall and erings.	Surface of vamished phywood and polyolefine covering	floor, wall, ceilin	g Study Migration Rate for Pits from building materials to interior surfaces	Sorfices wiped with effected and advanced to dry for 30 Japan. Toking mice, a visc expected and the (Employed Wild Indust ender a visc expected and the second second advanced to the second second advanced advanced ender a visc expected advanced ender a visc expected advanced enders a visc expected enders and enders advanced enders a visc enders of the second enders and enders advanced enders advanced enders advanced enders advanced enders advanced enders advanced enders advanced enders advanced enders advanced enders advanced enders	1	new apartment	NR	NR	ND	NR	NR	NR	NR	ng/m2/hr (migration)	NR	Not detected in any samples	20.8	P8	250	ng/m2/hr (migration)	valuable migration rate study	Migration rate for Fils i similar building materials	n Good, Individual data reported or ranges reported along with LOC- Method Detection Limits and recover rates.	excellent detail of methods, QA, y calculation, sources, all technical details of collection, analysis, collection, analysis, calculation of results and sensitivity as well as situational details	

1.33	Saito et al., 2007	2002	laboratory	TCPP	Surface of floor	floor	Part of QA procedure	policy wind with the share of adjuster to the first Singler, The second	kyo 1	lab, duplicate samples	NR	NŘ	NR	ND	ND	NŘ	NŘ	ng/m2/hr (migration)	NR	Not detected in any samples	27.2	P8	330	ng/m2/hr (migration)	Part of QA procedure	N/A	N/A	ΝΆ
1.34	Saito et al., 2007	2001	Apartment living room newly built, with wood floor a polyclefine war ceiling coverings.	TCPP nd nd	Surface of varnished phywcod and polyolefine covering	floor, wall, ceiling	Study Migration Rate for FRs from interior surfaces	address were also the thread and phases the target $M$ is signed. The second s	kyo I	nëw apartment	NR	NŘ	ND	NR	NR	NR	NŘ	ng/m2/hr (migration)	NR	Not detected in any samples	27.2	P8	330	ng/m2/hr (migration)	vakuable migration rate study	Migration rate for FRs in similar building materials	Good, individual data reported or ranges reported along with LOD-( Method Detection Limits and recove rates.	excellent excellent of excellent, QA, y clustering, Savers, all excellent of collection, and/yak, the collection, and/yak, the excellent of collection, and/yak, excellent of collection, and/yak, excellent of collection, and excellent of collection, and and excellent of collection, a
1.35	Saito et al., 2007	2002	laboratory	TCEP	Surface of floor	floor	Part of QA procedure	Solver were achieved as the Manuel and Appendix the Var by the SD segment. The second	kyo I	lab, duplicate samples	NR	NŘ	NR	ND	ND	NR	NŘ	ng/m2/hr (migration)	NR	Not detected in any samples	19.2	P8	230	ng/m2/hr (migration)	Part of QA procedure	N/A	N/A	N/A
1.36	Saito et al., 2007	2001	Apartment living room newly built, with wood floor ar polyclefine wall ar ceiling coverings.	TCEP nd	Surface of varnished phywood and polyolefine covering	floor, wall, ceiling	Study Migration Rate for Pfts from building materials to interior surfaces	Surface apped with influence and advense to day for 20 separs, The means to advence to advence the set of the	kyo 1	new apartment	NR	NR	ND	NR	NR	NR	NR		NR	Not detected in any samples	192	PE	230	ng/m2/hr (migration)	valuable migration rate study	Migration rate for FRs in similar building materials	Good, individual data reported or ranges reported along with LOD-1 Method Detection Limits and recover rates.	excellent detail of methods, (a) excellent (a) e
1.37	Saito et al., 2007	2002	laboratory	TEP	Surface of the floor	Floor	Part of QA procedure	solves were also that show a displayer bar of $p_{\rm eff}$ . Jugan, Ti, et al. (i.e., i.e., i.e.	kyo 1	lab, duplicate samples	NR	NR	NR	ND	ND	NR	NR	ng/m2/hr (migration)	NR	Not detected in any samples	7.6	PE	50	ng/m2/hr (migration)	Part of QA procedure			
1.38	Saito et al., 2007	2003	Apartment living room newly built, with wood floor a polyclefine ward ceiling coverings.	TEP nd	Surface of polysilefine covering	Wall	Study Migration Rate for PRs from building materials to interior surfaces	Solve where do the Musel and Alexandra Tor for 50 Jungs, The Souris Work Souris (Souris Charlow The Departshift Data Annual Charl, C et any large placed and the Huge Placed Data Souris (Souris Charles) and the Souris (Souris (Sou	kyo 1	new apartment	NR	NŘ	130	NR	NŘ	NŘ	NŘ	ng/m2/hr (migration)	NR	1	7.6	P8	90	ng/m2/hr (migration)	vakuable migration rate study	Migration rate for PRs in similar building materials	Good, individual data reported or ranges reported along with LOD-4 Method Detection Limits and recove rates.	excellent excellent excellent, CA, y calculation, Sources, all excellential excellent excellential excellenti
1.39	Saito et al., 2007	2501	Apartment living room newly built, with wood floor ar polyolefine wall ar ceiling coverings.	TEP nd nd	Surface of polyolefine covering	Ceiling	Study Migration Rate for PRi form building materials to interfor surfaces	Solicitor and water with the share of all parts of the strap for $T_{\rm eff}$ aligner, Tett. CLA, of one planes that the share that the share of the second solution of the share mask constraints with the single and planes planes that the share mask constraints with the share and planes the share share share the share s	kyo 1	new apartment	NR	NŘ	160	NR	Nik	NR	NR	ng/m2/hr (migration)	NR	1	7.6	16	30	ng/m2/hr (migration)	valuable migration rate	Migration rate for Pits in similar building materials	Good, individual data reported or ranges reported dong with LOC Method Detection Limits and recover rates.	newhere the share of methods to the second second second second regulation of the second second second second second second second second second second collaboration of second second second second second second second second second second second second s
2A	Bradman et al 2012,	L, NR	Child care centers	тсер, тосур, тав тарн	Outdoor air	NR	<ol> <li>Measure critaminants in air and dust in Early Childhoos tid facilitiss in Monterey and Alamedia Counties, CA. 2) estimate potenzial health risks associated with these levels</li> </ol>	See 2A.12A.12 Wind Gene 2A.12A.12 Kinn Collect	See 24.1 24.12	- See 2A.1- 2A.12	See 2A.1-2A.12 S	ee 2A.1-2A.12 Se	ee 2A.1-2A.12 1	See 2A.1-2A.12 S	ee 2A.1-2A.12 S	ee 24.1-24.12 S	iee 2A 1-2A 12	See 2A.1-2A.12 Se	ie 2A.1-2A.12	See 2A.1. S 2A.12	iee 2A.1-2A.12	See 2A.1-2A.12	See 2A.1-2A.12	See 2A.1-2A.12	Good for quantitative exposure assessment to young children and extrapolation to gener population.	Concludes that pattern or of contaminants and Phis in Early Childhood al Centers is similar to patterns of other indoor environments such as schools and residences.	Mean, SD, Min, Max, SD, 25th mediax, 75th, 90th, 95th Kiles reported.	hachdin, charlandin, fan ypport, armannen and maknifylig diada en al maknifylig spectra, mar canadara fan harviner, forsgi armannen and spectra armannen and spectra arhytika and spectra. All harviner for blan arhytika and spectra armannen and spectra arhytika and spectra armannen armannen armannen arhytika and spectra armannen armannen arhiteka armannen armannen armannen arhetika armannen armannen armannen arhetika armannen armannen armannen arhetika armannen armanne
2A.1	Bradman et al 2012	L, NR	Child care centers	TCEP	Outdoor air	NR	see 2A	Outdoor air was pulled using SKC Universial XR Pumps United St chucked before and after sampling with a Gillbrator California air flow califerator around outdoor olive outdoomen	ates, 14	facilities	NR	0.72	0.19	-MDL	1.6	NR	NR	ng/m3	0.54	50%	NR	ng/m3	NR	ng/m3	see 2A	see 2A	see 2A	see 2A
2A.2	Bradman et al 2012	L, NR	Child care centers	TDCPP	Outdoor air	NR	see 2A	Outdoor air was pulled using SKC Universial XR Pumps. United St Checked before and after sampling with a Gilibrator California air flow calibrator around outdoor play equipment.	ates, 14	facilities	NR	0.72	0.32	0.06	4.41	NR	NR	ng/m3	1.2	100%	NR	ng/m3	NR	ng/m3	see 2A	see 2A	see 2A	see 2A
2A.3	Bradman et al 2012	L, NR	Child care centers	тав	Outdoor air	NR	see 2A	Outdoor air was pulled using SKC Universial XR Pumps. United St checked before and after sampling with a Giliterator California air flow calibrator around outdoor play equipment.	ates, 16	facilities	NR	0.14	<mdl< td=""><td>-MDL</td><td>1.53</td><td>NR</td><td>NR</td><td>ng/m3</td><td>0.39</td><td>12.50%</td><td>NR</td><td>ng/m3</td><td>NR</td><td>ng/m3</td><td>see 2A</td><td>see 2A</td><td>see 2A</td><td>see 2A</td></mdl<>	-MDL	1.53	NR	NR	ng/m3	0.39	12.50%	NR	ng/m3	NR	ng/m3	see 2A	see 2A	see 2A	see 2A
2A.4	Bradman et al 2012	L, NR	Child care centers	тарн	Outdoor air	NR	see 2A	Outdoor air was pulled using SKC Universal XR Pumps United St checked before and after sampling with a Gilibrator California of these exiliances and attense of a concentration of the concentration	ates, 16	facilities	NR	0.3	<mdl< td=""><td>-IMDL</td><td>4.02</td><td>NR</td><td>NR</td><td>ng/m3</td><td>0.39</td><td>12.50%</td><td>NR</td><td>ng/m3</td><td>NR</td><td>ng/m3</td><td>see 2A</td><td>see 2A</td><td>see 2A</td><td>see 2A</td></mdl<>	-IMDL	4.02	NR	NR	ng/m3	0.39	12.50%	NR	ng/m3	NR	ng/m3	see 2A	see 2A	see 2A	see 2A

245	Bradmar 2014	etal, NR	Child care centr	ers TCEP	Indoor air	Building material upholestered furniture, electronics, and foarn napping equipment	i, see 2A	Singly are calculated over 1-15. The start children mergeneric at the CFL his clinical size angular system can be calculated in the clinical size angular start calculated angular calculated angular start start calculated angular start calculated angular start provide the clinical size of the clinical start calculated physical tasks of the clinical start calculated angular start calculated angular start calculated angular start physical start (start calculated angular start) angular at start (start calculated angular start) angular start	United States, California	39	facilities	NR	2.69	0.91	NR	15.34	12.94	NR	ng/m3	1.09	65%	NR	NR	NK	NR	Very relevant to exposure assessments for children in US	relationships to environmental media available in chiden's environments.	Extensive detail provided for all data.	Excellent, extensive deta on all methodology aspects, sampling, comparisons to other studies, sampling, anialytical and computational.	The average attendence per facility was 64 children (page 4 - A20), Soveniy also persons of the children was 3-years dat, 15% was 3-years, and 5% was able to the second second second second second each day, was a second second second second second second second second match days and the second second second Se
24.6	Bradmar 2014	et al., NR	Child care cent	ers TDCPP	Indoor air	Building material upholestered fumiture, electronics, and foam napping	l, see 2A	See 2A.5	United States, California	39	facilities	NR	0.59	0.53	NR	1.99	1.25	NR	ng/m3	0.36	90%	NR	NR	NR	NR	See 2A.5	See 2A.5	See 2A.5	See 2A.5	See 2A.5
2A.7	Bradmar 2014	et al., NR	Child care cent	ers TBB	Indoor air	Upholstered furniture and foam napping equipment	see 2A	See 2A.5	United States, California	40	facilities	NR	0.58	<mdl< td=""><td>NR</td><td>16.23</td><td>2.29</td><td>NR</td><td>ng/m3</td><td>2.6</td><td>15%</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 2A.5</td><td>See 2A.5</td><td>See 2A.5</td><td>See 2A.5</td><td>See 2A.5</td></mdl<>	NR	16.23	2.29	NR	ng/m3	2.6	15%	NR	NR	NR	NR	See 2A.5	See 2A.5	See 2A.5	See 2A.5	See 2A.5
24.8	Bradmar 2014	et al., NR	Child care cents	ers TBPH	Indoor air	Upholstered furniture and foam napping equipment	see 2A	See 2A.5	United States, California	40	facilities	NR	0.23	<mdl< td=""><td>NR</td><td>5.39</td><td>0.99</td><td>NR</td><td>ng/m3</td><td>0.87</td><td>17.5%</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 2A.5</td><td>See 2A.5</td><td>See 2A.5</td><td>See 2A.5</td><td>See 2A.5</td></mdl<>	NR	5.39	0.99	NR	ng/m3	0.87	17.5%	NR	NR	NR	NR	See 2A.5	See 2A.5	See 2A.5	See 2A.5	See 2A.5
24.9	Bradmar 2014	et al., NR	Child care cents	ers TCEP	Dust	Upholstered furniture and foam napping eduloment	see 2A	See 2A.5	United States, California	39	facilities	NR	935.9	319.1	NR	6834.9	6750.7	NR	ng/g	1580.2	100%	NR	NR	NR	NR	See 2A.5	See 2A.5	See 2A.5	See 2A.5	See 2A.5
24.10	Bradmar 2014	et al., NR	Child care cents	ers TDCPP	Dust	Upholstered furniture and foam napping equipment Usholstered	see 2A	See 24.5	United States, California	39	facilities	NR	6189.4	2265	NR	70931	36927	NR	ng/g	12710.5	100%	NR	NR	NR	NR	See 2A.5	See 2A.5	See 2A.5	See 2A.5	See 2A.5
24.12	2014 Bradmar	untal NR	Child care cents	ers TBDH	Dust	furniture and foam napping equipment Unbolstared	ue 74	See 24.5	California	10	facilities	NR	4811	132.9	NR	7,489,70	1790 3	NR	ngig	1191.9	100%	NR	NR	NR	NR	See 2A.5	See 2A.5	See 2A.5	See 2A.5	See 2A.5
	2014					fumiture and foam napping equipment			California							.,			-9-6							See 2A.5	See 2A.5	See 2A.5	See 2A.5	See 2A.5
28	Bradman 2014	etal, NR	Child care cent	ага ТСЕР, ТОСРР, Т ТВРН	Indoor air an: 88, dunt	Building materia upholestored famiture, electronics, and foam napping equipment	<ol> <li>This is published version of 2A, Bradman et. Al. 2012. Extensive detail presented in original document</li> </ol>	500 XL XL X	United States, States, California	See 28.1- 28.8	See 28.1-28.8 See 2	28.1-28.8 54	ee 28.1-28.8 S	iee 28.1-28.8 S	ee 28.1-28.8	See 28.1-28.8	See 28.1-28.8	See 28.1-28.8	ies 28.1-28.8 5	ee 28.1-28.8 S	ee 28.1-26.8	See 28.1-28.8	See 28.1-28.8	See 28.1-28.8	See 28.1-28.8	Very relevant to exposure assessments for children in US	relationships to environmental media available in chidenen's environments.	Extensive detail provided for all data	<ul> <li>Excellent, externize detail on all matheology aspects, sampling, comparisons to other studies, sampling, analytical and computational.</li> </ul>	This is the published service of 2.8. The average materializes part facility we 4.4 children (magnet $\sim$ 4.2002). So works you could be a service of the abstrace were 3.4 years that the 2 were of laws of the service 3.4 years in the 1.4 years of 1.5 years (3.5 years) and 3.5 were the days, which some speeching up to 0.6 h could days, depending on the warbher. Thirdy serves parcent of a share speeching on the second $\lambda_{\rm p}$ and the speeching speech of $\lambda_{\rm p}$ and $\lambda_{\rm p}$ (3.5 years) $\lambda_{\rm p}$ (3.6 years) $\lambda_{\rm p}$
28.1	Bradmar 2014	et al., NR	Child care cent	ers TCEP	Indoor air	Building material upholestered furniture, electronics, and foarn napping equipment	i, Sev 28	Sample were collected one of -coll when choleson events were real test of the CD. The should wait instruction system used a single collary wave between the should be trainers as the local cash fold face filters and an unitide single and with fold face filters and was public of 4 (Jimm conto two induction) are -dama an unitide single and the local case filters and the sample and the local case in the single single single single sample and the local case is a single single single single particle signation of the PUI gives in a cashes in a calcu- paction signature and the local case is to calcu- paction signature and the local case is to calcu- paction signature and the local single there for signature and the local single single single single single bloc coal gives that single the PUI.	United States, California	39	facilities	NR	2.69	0.91	NR	15.34	12.94	NR	ng/m3	1.09	65%	NR	NR	NR	NR	See 28	See 28	See 28	See 28	
28.2	Bradmar 2014	et al., NR	Child care cent	ers TDCPP	Indoor air	Building material upholestered fumiture, electronics, and foam napping	l, See 28	See 28.1	United States, California	39	facilities	NR	0.59	0.53	NR	1.99	1.25	NR	ng/m3	0.36	90%	NR	NR	NR	NR	See 28	See 28	See 28	See 28	
28.3	Bradmar 2014	et al., NR	Child care cents	ers TBB	Indoor air	eduloment Upholstered furniture and foam napping	See 28	See 28.1	United States, California	40	facilities	NR	0.58	<mdl< td=""><td>NR</td><td>16.23</td><td>2.29</td><td>NR</td><td>ng/m3</td><td>2.6</td><td>15%</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 28</td><td>See 28</td><td>See 28</td><td>See 28</td><td></td></mdl<>	NR	16.23	2.29	NR	ng/m3	2.6	15%	NR	NR	NR	NR	See 28	See 28	See 28	See 28	
28.4	Bradmar 2014	et al., NR	Child care cent	ers TBPH	Indoor air	Upholstered furniture and foam napping	See 28	See 28.1	United States, California	40	facilities	NR	0.23	<mdl< td=""><td>NR</td><td>5.39</td><td>0.99</td><td>NR</td><td>ng/m3</td><td>0.87</td><td>17.5%</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 28</td><td>See 28</td><td>See 28</td><td>See 28</td><td></td></mdl<>	NR	5.39	0.99	NR	ng/m3	0.87	17.5%	NR	NR	NR	NR	See 28	See 28	See 28	See 28	
28.5	Bradmar 2014	et al., NR	Child care cents	ers TCEP	Dust	Upholstered furniture and foam napping equipment	See 28	See 28.1	United States, California	39	facilities	NR	935.9	319.1	NR	6834.9	6750.7	NR	ng/g	1580.2	100%	NR	NR	NR	NR	See 28	See 28	See 28	See 28	
28.6	Bradmar 2014	et al., NR	Child care cents	ers TDCPP	Dust	Upholstered fumiture and foam napping equipment	See 28	See 28.1	United States, California	39	facilities	NR	6189.4	2265	NR	70931	36927	NR	ng/g	12710.5	100%	NR	NR	NR	NR	See 28	See 28	See 28	See 28	
28.7	Bradmar 2014	et al., NR	Child care cents	ers TBB	Dust	Upholstered fumiture and foam napping equipment	See 28	See 28.1	United States, California	39	facilities	NR	1062.3	362.4	NR	14,812	6557.9	NR	ng/g	2510.1	100%	100%	NR	NR	NR	See 28	See 28	See 28	See 28	
28.8	Bradmar 2014	et al., NR	Child care cents	ers TBPH	Dust	Upholstered furniture and foam napping equipment	See 28	See 28.1	United States, California	39	facilities	NR	431.1	132.9	NR	7,489.70	1299.3	NR	ng/g	1191.9	100%	NR	NR	NR	NR	See 28	See 28	See 28	See 28	
3	Markkun	d et NR a	Houses, Work (daycare, hosp radio and test) and particle factories laboratory), Put particle factories (prince, Unetwork) partices (hotol), prince, universi labora, library, dance hall, furniture shop, bowling alley)	TCEP Rad, le ss, blic hty	Indoor air	Bullding materia fumiture, comsumer products (such as accustic celling), uphohtered fumiture, wall coverings, floor polyhing/chloride filtor coverings).	<ol> <li>Purpose of the stativy exp in investigate levels, exposure and passible sources of 12 GPs in Indice at and to compare previously reparched for the same levels of the level previously reparched for the same levels of the same levels of the same levels of the same levels of the same levels of the same levels of the same levels of the same levels of the same levels of the same levels of the same levels of the same levels of the same level of the same levels of the same leve</li></ol>		Sweden	See 3.1- 3.13	See 31-3-13 See	3.1-3.13 5	ier 3.1-3.13	5ee1.1.13 :	kee 3.1-3.13	See 3.1.3.13	See 3.1-3.13	See 3.1.3.13	See 3.1.3.13	keliji :	iee 1.1.3.13	See 11-3.13	See 1.1.1.1	5ee 3.1-3.13	See 3.1.3.13	Good relevance to general public Swedshi study with metavance to exposure to OP a in public and downaic ari/dust for most countries with initial building materials and consume products.	Relevant to these chanicals, this era and smat countries with similar products and smatch of the second of the exposure opportunity of the product of the population group give downedic areas. Study weishifty is repose opportunity of differen population group give of baldings and construction or use of space.	Earch numbers of samples represented the difference spaces and high variability births the constraintion sequencing for atoms takes as a dominial group and considered over descriptionality quantitative varies sequences.	Convelations drawn between dust measuremotis and allo contentrations drawn a year Jater may be dynamics of the spaces, use of materials in those dynamics of the spaces, use of materials in those drawn and the spaces well allo mather and states, useful mumber of states, useful mumber of states, useful mumber of the spaces were loss for some compounds without ends of other vanishies rates and other vanishies rates and other vanishies were loss for some compounds without and other vanishies were loss for some compounds without ends other vanishies were loss for some compounds without ends other vanishies were loss for some compounds with all some the some	analistis novak of bis aud of bi- ananis potenti an aldağı anandı ada kanın potenti al svalaş anandı ada kanın potenti al svalaş anandı ada kanın yakın biş biş tüştür politikleri
3.1	Marklun al., 2005	det NR	House	TCEP	Indoor air	Building material furniture, consumer products (such a acoustic ceilings, upholstered furniture, wall coverings, floor polish and polyvinyichloride filoor coverines).	i, See 3.0 5	Samples collected on solid-phase estruction (3Pt) courns connected to a stationary pump and placed an hight consequenting the the sharing rate of people. Approximately 1.2 m (31.0-3.2 m) of air we pumped through the sampler at a flow of ~3.5 (min for ~10 hr using a luboratory vaccoum pump.	Sweden s	2	Duplicate samples from 2 houses	NR	NR	NR	0.4	3	NR	NR	ng/m3	NR	NR	0.15	ng/m3	NR	NR	See 3.0	See 3.0	See 3.0	See 3.0	

3.3	Marklund et al., 2005a	NR	Work (daycare, TCEP hospital, radio and textile shop, office, plastics factories, laboratory)	Indoor air	Building material furniture, consumer products (such as acoustic ceilings, upholstered furniture, wall coverings, floor polish and	, See 3.0	Samples collected on solid-phase extraction (SPI) course connected to a stationary pump and placed at height concessioning to the breating rane of people. Approximately 1.2 m (21,0.2 m)) of air wo pumped through the sampler at a flow of "2.5 (m) for "10 hr using a laboratory vaccuum pump.	Sweden i is is	8 buildings, duplicate smaples	NŘ	NŘ	NR	0.7	730	NR	NR	ng/m3	NŘ	NŘ	0.15	ng/m3	NR	NR	See 3.0	See 3.0	See 3.0	See 3.0
3.4	Markland et al., 2005a	NR	Public places (hotel, TCEP prison, university lobby, library, dance hail, forniture shop, bowling alley)	Indoor air	polytoptuktione filtor coverinati, Building material furniture, consumer products (such as acoustic ceilings, upholitered furniture, wall coverings, floor polish and polytoptubristed	, See 3.0	Samples collected on solid-phase entraction (JPI) courses connected to a statisticary pump and placed at a hight concessioning to the breating rans of people. Approximately 1.2 m (21,0-22 m)) of air wo pumped through the simpler at a flow of "2.5 (high for "10 hr using a laboratory vaccoum pump.	Sweden I I I I I I I I I I I I I I I I I I I	7 buildings, duplicate smaples	NR	NR	NR	2	590	NR	NR	ng/m3	NR	NR	0.15	ng/m3	NR	Nit	See 3.0	See 3.0	See 3.0	See 3.0
3.5	Marklund et al., 2005a	NR	House TCPP	Indoor air	filsor coverinas). Building material furniture, consumer products (such as acoustic ceilings, upholitered furniture, wall coverings, filsor polish and polyvinylchloride	, See 3.0	Samples collected on solid-phase entraction (SP1) courses connected to a stationary pump and placed at hight consequenting to the statistic grane of people, Approximately 1.7 m (21.0-3.7 m)) of air wo pumped through the sampler at a flow of ~2.5 limit for ~10 hr using a laboratory varicum pump.	Sweden I Isi Is	2 Duplicate sumples from 2 houses	NR	NR	Nit	38	210	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 3.0	See 3.0	See 3.0	See 3.0
3.6	Markland et al., 2005a	NR	Work (daycare, TCPP hospital, radio and teodie shop, office, plastics factories, laboratory)	Indoor air	filoor coverinasi. Building material furnitore, consumer products (such as acoustic ceilings, upholistered furnitore, wall coverings, floor polish and polyvinyichioride	, See 3.0	Samples collected on solid-phase extraction (DP) countria connected to a stationary pump and placed people Approximately 1.7 mil (12-37 mil) of air wo pumple Approximately 1.7 mil (12-37 mil) of air wo pumpet through the sampler at a flow of "2-3 l/mil for "10 hr using a laboratory vaccuum pump.	Sweden is	8 bulidings, duplicate smaples	NR	NR	NR	27	160	NR	NR	ng/m3	NR	NR	NR	NR	NR	Nit	See 1.0	See 10	See 3.0	See 3.0
3.7	Marklund et al., 2005a	NR	Public places (hotel, TCPP prison, university lobby, library, dance hall, furniture shop, bowling alley)	Indoor air	Hoor coverinatio. Building material furniture, consumer products (such ais acoustic ceilings, upholistered furniture, wall coverings, floor polish and polyviny/chioride	, See 3.0	Samples callested on solid-phase antonion (SPI) common connected to a stationory promy and placed at a height corresponding to the breathing zone of people. Approximately 1: 7 mt (10.25 mt) of air wo pumped through the sampler at a flow of "2.5 l/mt for "10 hr using a laboratory vaccuum pump.	Sweden is	7 buildings, duplicate smaples	NR	NŘ	NR	69	570	NR	NR	ng/m3	NR	NR	NER	NR	NR	NR	See 3.0	See 3.0	See 1.0	See 3.0
3.8	Marklund et al., 2005a	NR	House TDCPP	Indoor air	moor covernance. Building material furniture, consumer products (such ai acoustic ceilings, upholstered furniture, wall coverings, floor polish and polyvinyichioride	, See 3.0	Samples collected on solid-phase extraction (DPT) courses connected to a stationary purpose at a hight corresponding to the breathing conce of people. Approximately 2 $\sim$ 70 (1.2-2) $\sim$ 70 / of air vor purposed through the sampler at a flow of $^{+2.5}$ (Jmin for $^{-10}$ hr using a laboratory vaccuum pump.	Sweden is s	2 Duplicate samples from 2 houses	NR	NER	NR	-0.5	40.5	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 3.0	See 3.0	See 3.0	See 3.0
3.9	Marklund et al., 2005a	NR	Work (daycare, TDCPP hospital, radio and textile shop, office, plantiss factories, laboratory)	Indoor air	moor covernance. Building material furniture, consumer products (such ais acoustic ceilings, upholitered furniture, wall coverings, floor polish and polyvinylchloride	, See 3.0	Sample collected on solid-phase extraction (DPI) courses connected to a stationary purpose at a height corresponding to the breathing zone of people. Approximately 1 2 m (10.25 2 m M) of air vor pumped through the sampler at a flow of "25 (Jimi for "10 hr using a laboratory vaccuum pump.	Sweden is	8 bulidings, duplicate smaples	NR	NR	NR	<0.2	150	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 3.0	See 3.0	See 3.0	See 3.0
3.10	Marklund et al., 2005a	NR	Public places (hotel, TDCPP prison, university lobby, library, dance hall, construct shop, bowling alley)	Indoor air	filoor coverinati). Building material furniture, consumer products (such as acoustic ceilings, uphobstered furniture, wall coverings, floor polish and polyvinyichloride	, See 3.0	Samples collected on solid-phase extraction (PPI) countria connected to a statisticary pump and place means Approximately 1.7 m (10.25 m 201) of air way pumple Approximately 1.7 m (10.25 m 201) of air way pumped through the sampler at a flow of "2.5 (m) for "30 hr using a laboratory vaccuum pump.	Sweden i is	7 buildings, duplicate smaples	NR	NŘ	NR	<0.2	6	NR	NR	ng/m3	NŘ	NŘ	NR	NR	NR	NR	See 3.0	See 3.0	See 3.0	See 3.0
3.11	Marklund et al., 2005a	NR	House TPP	Indoor air	filoor coverinals. Building material furniture, consumer products (such as acoustic ceilings, upholitered furniture, wall coverings, floor polish and polyviny/chloride	, See 3.0	Samples collected on solid-phase extraction (DPI) counts connected to a stationary pump and placed at height conceptioning to the transition grane of people, Approximately 12 m (21.6.2.2 m (2) data we people through the samples at a flow of "2.0 (min for "10 hr using a laboratory vaccoum pump.	Sweden is	2 Duplicate samples from 2 houses	NR	NR	NIL	40.3	8.8	NR	NR	ng/m3	NR	NR	NR	NER	NŘ	Nit	See 3.0	See 10	See 10	See 3.0
3.12	Marklund et al., 2005a	NR	Work (daycare, TPP hogipital, radio and teodie shop, office, plastics factories, laboratory)	Indoor air	filoor coverinas), Building material furniture, consumer products (such as acoustic ceilings, uphohtered furniture, wall coverings, floor polish and polyviny/chioride	, See 3.0	Samples collected on solid-phase entraction (SPI) course connected to a stationary pump and placed an hight concessioning to the branching cannel proper, Approximately 1.2 m (21,0-32 m)) of an we pumped through the sampler at a flow of "2.5 (m) for "10 hr using a luboratory vaccuum pump.	Sweden is	8 bulidings, duplicate smaples	NR	NR	NIK	0.7	23	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 3.0	See 10	See 10	See 3.0
3.13	Marklond et al., 2005a	NR	Public places (hotel, TPP prises, university lobby, litrary, dance hall, continue shop, bowing alley)	Indoor air	filoor coverinas), Building material furniture, consumer products (such ais acoustic cuilings, upholstered furniture, wall coverings, floor polish and polyvinyichioride	, See 3.0	Samples collected on solid-phase extraction (SPI) counts connected to a stationary pump and placed an height composing to the barowinity gaves of a height composing to the barowinity gaves of pumped through the ample at a flow of ~2.5 (ms for ~10 hr using a laboratory vaccuum pump.	Sweden is	7 bulidings, duplicate smaples	NR	nek	NIL	-0.1	18	NR	NR	ng/m3	NR	NR	NR	NR	NR	Nit	See 3.0	See 3.0	See 10	See 3.0
48	Bergh et al., 2011a	NR	Houses, day care TCEP, centers, work TDCPP, TJ places	Indoor air, di	titoor coverinas).	The main aim of this study was to determine typical concentrations an concentration ranges of targeted phosphate and phthalate eaters in both air and settled dust in indoor environments frequently occupied by humans.	5ee 44.1-4418 d	Sweden, Sockholm	See 4A.1- See 4A.1- 4A18 4A18	See 4A.1-4A18	See 4A.1-4A18	See 4A.1-4A18	See 4A.1-4A18 5	ee 4A.1-4A18 S	ee 44.1-44.18	See 4A.1-4A18	See 4A.1-4A18 5	See 44.1-4418	See 4A.1- 4A18	See 4A.1-4A18	See 4A.14A18	See 4A.1-4A18	See 4A.1-4A18	Relevant for quartitative exposure assessment for genera population and salect subpopulations	Sampling sites from northern climates in I buildings and environments characteristic for Nord countries.	Mean, Median, Min/Max given for samples at each site.	n Contemporary methods for sampling and analysis.
4A.1	Bergh et al., 2021a	NR	Day care centers TCEP	Indoor air	NR	see 4A	Air stampling was conducted by using an AC powere pump (DOS 1.30A.13, RNF Meedinger, Finitory, emerging) to aim wair through a commension provide the stampling of the stampling of the stampling rag antiopopy) slica adsolvers(). The six samples were collected diricity aptivate houses, the sampling eight house, in the private house, the sampling eight neuron is the house apen. No installation adjacent does in the house apen. No installation different and a six stampling and the sampling information and a sampling exploriments continued as usual and sampling exploriments.	d Sweden, Sockholm	10 Day care centers	NR	47	25	7.8	230	NŘ	NR	ng/m3	NR	neit	NR	naR	NŘ	NI	See 4A	See 44	Sae 4A	See 4A

44.2	Bergh et al <sub>o</sub> 2011a	NR	Work places	TCEP	Indoor air	NR	see 4A	Al sampling use conducted by online and A gowend Senders provide 2012 2012 ACM Productory Protogo Conduction Germany 10 data that at through a community and that at through a community of the sample of the sample and that and the sample of the sample of the sample of the wave conducted along days darks house, the sample registromes in the protocol as control and the sample registromes in the protocol as control and the sample of the same through the sample of the allow of the same transmission of the sample of the same through the sample of the allow of the same transmission of the sample protocol as the same transmission of the sample of the same transmission of the sample of the allow of the same transmission of the sample of the allow of the same transmission of the sample of the protocol as and the sample of the sample of the protocol as and the same transmission of the same transmission protocol as an and the same transmission of the same transmission protocol as and the same transmission of the same transmission of the same transmission of the same transmission of the same transmission of the same transmission of the same transmission of the same transmission of the same transmission of the same	10 Work plac	is NR	21	10	ND	140	NR	NŘ	ng/m3	NR	NŘ	NR	NR	NR	NİL	See 4A	See 4A	See 4A	See 4A
48.3	Bergh et al., 2011a	NR	Houses	TCEP	Indoor air	NR	see 4A	Al sampling sectors and the local sectors and sectors	10 Houses	NR	83	4.8	ND	28	NR	NR	ng/m3	NR	NŘ	NR	NER	NR	Nit	See 4A	See 4A	See 4A	See 4A
48.4	Bergh et al., 2011a	NR	Day care centers	TDCPP	Indoor air	NR	500 <b>4</b> A	Ar sampling uses conducted by origin and Cayman Senten program (2022). 2023 AND Reinderger, Privage Garmany by down that an through a community day of some that an through a community day of the sentence of the sentence of the sentence of the maximum of the sentence of the sentence of the end of the sentence of the sentence of the sentence and performance of the sentence of the sentence and performance of the sentence of the sentence and performance of the sentence of the sentence of the sentence of the sentence of the sentence of the end performance of the sentence of the sentence of the constructed of the sentence of the sentence of the sentence of the sentence of the sentence of the sentence of the sentence of the sentence of the sentence of the sentence of the sentence of the constructed of the sentence of the sentence of the sentence of the constructed of the sentence of the sentence of the sentence of the constructed of the sentence of the sentence of the sentence of the constructed of the sentence of the	10 Day care centers	NR	67	ND	ND	30	NR	NR	ng/m3	NŘ	NR	NR	NR	NER	NR	See 4A	See 4A	See 4A	See 4A
48.5	Bergh et al., 2011a	NR	Work places	TDCPP	Indoor air	NR	see 4A	Al sampling was conducted by only an AC powerd power (2012) and AC to Mandanger, Mandan Garanago 16 also also also alter attravega is assessment ally and an anaportal sampling and an anaportal sampling an anaportage all calculated and the anaportal algorithm of the anaportal sampling and anaportal algorithm of the anaportal sampling is the algorithm of an anaportal sampling is the algorithm of an anaportal sampling is the algorithm of an anaportal sampling is the control and sampling exploration by a sampling and anaportal sampling exploration and anapolity applicant on any other anaportal sampling exploration control and a sampling exploration assessments and anaportal sampling exploration and anapolity applicant on any other anaportal sampling and an any other anaportal sampling exploration as an anaportal sampling exploration as an anaportal sampling exploration and anapolity applicant on any other anaportal sampling exploration as an an anaportal sampling exploration as an an anaportal sampling exploration and anapolity applicant on any other anaportal sampling exploration as an an a	10 Work plac	is NR	24	28	ND	73	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 4A	See 4A	See 4A	See 4A
44.6	Bergh et al., 2011a	NR	Houses	TDCPP	Indoor air	NR	see 4A	Al sampling was conducted by only an AC powerd power (2012) and AC to Mendanger, Mendang Garanago Isa dawa Bu at Principal Samomerushy and an antipower (2014) and an antipower (2014) may an antipowery of adaptional to many the antipower collected during dynamics languages was collected during dynamics languages and power (2014) and antipower (2014) and antipower adjuster during in the boson open. In subalitates and power of a simulation of the antipower control and a simulation of a sampling and control and a simulation of a sampling and control and a simulation of a sampling and control and a simulation of a sampling a sampling power of the sampling and antipower of the control and a simulation of a sampling a sampling and control and a simulation of a sampling a sampling and control and a simulation of a sampling a sampling power of the sampling and the sampling and control and a simulation of the sampling and control and a sampling and and the sampling and control and the sampling and control and the sampling control and the sampling and control and the sampling and control and the sampling and control and the sampling and control and co	10 Houses	NR	31	ND	ND	17	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 4A	See 4A	See 4A	See 4A
44.7	Bergh et al., 2011a	NR	Day care centers	TPP	Indoor air	NŘ	see 4A	Al samples aux conducted by only an AC powerd power (2024). 2024. Not Reinderger, Network Generating 16 data in through a community and an anopyre of the samples of the samples are an anopyre of the samples of the samples are considered and the samples of the end power of the samples of the samples and power of the samples of the samples and power of the samples of the samples and power of the samples of the samples of the samples of the samples of the samples and power of the samples of the samples and power of the samples of the samples of the samples of the samples of the samples and power of the samples of the samples of the samples of the samples of the samples control and sample in a sample of the samples of the control and sample in a sample of the samples.	10 Day care centers	NR	0.1	ND	ND	0.9	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 4A	See 4A	See 4A	See 4A
44.8	Bergh et al., 2011a	NR	Work places	трр	Indoor air	NR	500 <b>4</b> A	Ar sampling us as concluding by only an 4C powerd Section, program (2022). 2023. A DN Pendanger, Prolong. Social Vani Germany) is draw the air through a community of any analysis of any the air through a community of the analysis of the air through a section (2014). The air through a explosion of the air through a section (2014) and (	10 Work plac	rs NR	8.6	ND	ND	27	NR	NR	ng/m3	NŘ	NR	NR	NR	NER	NR	See 4A	See 4A	See 4A	See 4A
48.9	bergh et al., 2011a	NŘ	Houses	трр	Indoor air	NR	500 AA	As sampling as a conclusibly invalues of a conversible proving (2004). 220-140. (Not Readuper, Franciso, Socialization Garmany) to down the air through a community and the sample of the sampling of the sampling and the sampling of the sampling and the sampling explorient may placed in a control (action with all exploration than placed and sampling exploration than placed and sampling exploration than placed and sampling to the allow and day care control, waveling allows allows and day care control, waveling table and an other sampling allows allows and day care control, waveling allows allows and day care control, waveling allows allows and day care control, waveling allows allows and the sampling allows and the sampling allows and the sampling allows and the sampling allows allows and the sampling allows and allows	10 Houses	NR	02	ND	ND	8.0	NR	NŘ	ng/m3	NR	NR	NR	NER	NR	NİL	See 4A	See 4A	See 4A	See 4A
4A.10	Bergh et al., 2011a	NR	Day care centers	TCEP	Dust	NR	see 4A	Dust samples were collected at ach sampling site Sweden, alter air sanging. Dust was collected, on prewaighed Sochholm colladore filter, from the topid Doshohanea, coaboarde, deak, and/or casing of windows and doors at sites 25 and above the flow 25 surpring was above and the start participation of the sampling was styrema-acrylonolitik holders inserted in a polycorporter north (formationation). Marrier AB, storema-acrylonolitik holders inserted in a polycorporter and (formationation). Marrier AB, storema-acrylonolitik holders in serted in a polycorporter and (formationation).	10 Day care centers	NR	51000	30000	2500	150000	NR	NR	ng/g (Mean: 51; Median: 30; range: 2.5-150 µg/g)	NR	NR	NR	NR	NR	NİL	See 4A	See 4A	See 4A	See 4A
44.11	Bergh et al., 2011a	NR	Work places	TCEP	Dust	NŘ	see 4A	No for a standard model or to instant and office bott simplify were collected at adx simplify gives. Seeden, where at simplify, Duri we collected, or preverghes Sockholm collabore films, Sock and the size of batchink with doors at least 0.8 m above the fors. Simplify gives performed with the filters monted in a paymorphier model formaniaterian Material 48, Ba 24, Southead (Edministerian Material 48, Ba 24, Southead (Edministerian Material 48, Ba 24), Southead (Edministerian Materian M	10 Work plac	is NR	36000	6700	1300	260000	Nit	NR	ng/g (Mean: 36; Median: 6.7; range: 1.3- 260 µg/g)	NR	NR	NR	NR	NR	NR	See 4A	See 4A	See 4A	See 4A
4A.12	Bergh et al., 2011a	NR	Houses	TCEP	Dust	NŘ	see 4A	Duct samples were collected at each sampling bin after at immpling. Duri was collected, on provegled Sochholm collaboat Binter, from the top of bootshare, condoorda, deals, and/or caraing of windows and doors all text at a backow the floor. Sampling was approved a second text and the same of the same approved and the collected formative text and a phylographyme model formative text and an appropriate physical formative text and an appropriate physical formative text and an appropriate physical formative text and an appropriate physical formative text and an appropriate physical formative text and an appropriate physical text and the same text and appropriate physical formative text and appropriate physical text and the same text and text and approprise physical text and text and text and	10 Houses	NR	7600	2100	ND	33000	NR	NR	ng/g (Mean: 7.6 Median: 2.1; range: ND-33 µg/g)	NR	NR	NR	NR	NR	Nit	See 4A	See 4A	See 4A	See 4A

4A13	Bergh et al., 2011a	NR	Day care centers	TDCPP	Dust	NŘ	see 4A	Dust samples were collected at each sampling site after air sampling. Dust was collected, on preweigher collabole filters, from the tops of bootshewie, coupboards, detais, and/or catings of windows and down at least of a makow the filtors. Sampling was sample-anytointific holders inserted in a polycropylene nocel (Korimitabiken). Material AB, Ba' ktas, Swideh) attachet to the instate nocativ of an An ARD 84 Ad Instati ai tength vacuum cleaner.	Sweden, d Sockholm	10 Day care centers	NR	28000	9100	3900	150000 N	t NR	ng/g (Mean: 28; Median: 9.1; ningi: 3.9- 150 µg/g)	NR	NŘ NŘ	NR	NR	NI	See 4A	See 4A	See 4A	See 4A		
4A.14	Bergh et al., 2011a	NR	Work places	TDCPP	Dust	NR	see 4A	Dust samples were collected at each sampling sile after air sampling. Dust was collected, on preweigher collaboler filters, relation the top of possible/level, and the sample samples of the sample samples and drawn at least 0.8 m above the floor. Surveilerg was reformed with the filters mounted in styrem-acylositzifie holders insured in a polymorpisme mode (Driminablashing Material AB, Ba' last, swinche) attachet to the instain enzaite of an An AABD 840 Mol and attain strength vacuum Geisenre.	Sweden, d Sockholm	10 Work places	NR	30000	17000	3300	91000 N	R NR	ng/g (Mean: 30; Median: 17; range: 3.3-91 µg/g)	NR	NR NR	NR	NR	NR	See 4A	See 4A	See 4A	See 6A		
44.15	Bergh et al., 2011a	NR	Houses	TDCPP	Dust	NR	see 4A	Dust samples were collected at each sampling site after air sampling. Dust was collected, on preweigher collaboles filters, from the tops of postbolenes, in the sample samples of the sample samples and doon at least 0.8 m above the floor. Sampling was reformed with the filters mounted in stypes—acylositethe holders insured in a polycorpositere noced (Criminabiania). Material AB, Be 'last, Sawdeh) attached to the inske noculo dia Ato ARD 8.04 million and collisita iterapity assum cleaner.	Sweden, d Sockholm	10 Houses	NR	12000	10000	2200	27000 N	t NR	ng/g (Mean: 12; Median: 10; range: 2.2-27 µg/g)	NR	NR NR	NR	NR	NIK	See 4A	See 4A	See 4A	See 4A		
44.16	Bergh et al., 2011a	NŘ	Day care centers	TPP	Dust	NR	see 4A	Dast simpler sere collected at ach sampling plu altarias filters, from microsoft at ach sampling plus altarias filters, from microsoft absoluters, cophoands, delsk, and/or casting of windows and doon at least 0.8 m above the floor. Sampling was performed with the filters mounted in styness-acylositzithe holders insured in a polycropylene nocellic (Driminalishking Material A), Ba' lista, Sweden) attached to the instain enzaite of an Alta ADB 200 Altaria its instrement cours diesense.	Sweden, d Sockholm	10 Day care centers	NR	3500	1900	300	17000 N	t NR	ng/g (Mean: 3.5; Median: 1.9; sangs: 0.3- 17 μg/g)	NR	NR NR	NR	NK	NR	See 4A	See 4A	See 4A	5ee 4A		
4A17	Bergh et al., 2011a	NŘ	Work places	TPP	Dust	NR	see 4A	Dast simpler sere callected at ach smaller glue behr alt sampler. Dut sets collected, an presexpha- calizon filters, from the tops of boothahers, copbanals, desks, and/or casting of windows and doon at least 0.8 m above the floor. Sampling was performed with the filters mounted in stynem-acrylositzithe holders insured in a polycropylers no calle (Driminalkarking Material AB, Be 'last, swischi) attachet to the instain enzaite of an Alto ABD 804 of ustains' terming was more listense.	Sweden, d Sockholm	10 Work places	NR	8800	5300	900	32000 N	t NR	ng/g (Mean: 8.8; Median: 5.3; nangs: 0.9- 32 μg/g)	NR	NR NR	NR	NK	NR	See 4A	See 4A	See 4A	5ee 4A		
44.18	Bergh et al., 2011a	NR	Houses	ТРР	Dust	NR	see 4A	Dast amplies were collected at ach sumplies glue after all amplies. Due taiss collected, an preweight collators filters, from the tops of boothahers, cophoands, disks, and/or casing of windows and doon at least 0.8 m above the floor. Sarrepling was performed with the fibrar mounted in typesm-acylositatile histofers insured in a polycorpositere no code (Driminkalkinki, Material AB, Ba' Ista, Swideh) attachet to the instake nocatio dan Abo ABD 840 foldstalia isterght oraum cleaner.	Sweden, d Sockholm	10 Houses	NR	105000	1200	100	4200 N	t NR	ng/g (Mean: 106; Median: 1.2; nange: 0.1- 4.2 µg/g)	NR	NR NR	NR	NR	NI	See 4A	See 4A	See 4A	5ee 4A		
45	Bergh et al., 2011b	2006- 2007, winter	Apartments	TEP, TCEP, TPP	Indoor air	building materials	The major aims of this study were: (i) to investigate the possible correlation between levels of OPEs and phthalates within multi- storay buildings with high and low prevalence of	See 48.1	Sweden, : Sockholm	See 48.1 See 48.1	See 48.1	See 48.1	See 48.1	See 48.1 5	iee 48.1 See 4	8.1 See 48.1	See 48.1	See 48.1 Se	e 48.1 See 48	1 Sec 48.1	See 48.1	See 48.1	General exposure assessment in multi- story buildings as per building characteristics in Stockholm.	Representative of multi building environments in cold environments.	MDR, mean, median, min-max reported for each analyte in n samples, reported for different groupings by building reputation" a high or low risk for health syndrome	Contingenzary analysis of constations to baself methodology for syndromes not considered as part of this collections, analyses. review. s.		
							sick obtaining symptom, (i) to investigate intra and inter building venetions, (iii) association of levels of OPEs and phthalates with building charactentics, and (iv) to identify potential sources and the air levels of organophosphate and phthalate esten in indoor environments.																					
48.1	Bergh et al., 2011b	2006- 2007, winter	Apartments	тсер	Indoor air	building materials	sex building symptoms, and leter building vorkstoms, (18) association of levels of OPEs and photaletes with building characteristics, and (19) association photaletes with building characteristics, and (19) as and the air levels of photalete with building characteristics, and (19) as a levels of photalete exists, and and photalete exists, and photalet	Ar sampling was conducted by using an AC powers pump (2023. 1.2.0.1.2), KM Hoskerger, Frankrag, available using draws enterties (1991) enterties (1991) available using draws enterties (1991) enterties (1991) an antiopersy (10) academent (1).	Sweden, Sockholm	22 Low risk for sick building syntrome [2- apartments per taig]	NR	10	4	ND	170 N	t Nit	ng/m3	NR	NR NR	NR	1.0	ng/m3	See 48	See 48	See 48	5au 43		
48.1	Bergh et al., 2011b Bergh et al., 2011b	2006- 2007, winter 2006- 2007, winter	Apartments	тсер	Indoor air Indoor air	building materials building materials	act exampl symptoms, and there holding in variations, (1)) association of levels at OFAs and phalases with building and the air kival's potential sources and the air kival's phalase exten in indoor environments. see 48	Ar sampling was conducted by using an AC powers pump (DE2.13.14.18, eff. Mr. hadrogen, Friedrag, a Geometry of an date task free gas a connected pro- tocol of the second second second second second second maj antioperary tike advoctived.	Sweden, Sockholm Sweden, Sockholm	22 Low risk for sick building ynfrome [2- aparteents sick building ynfrome [2- aparteents	NR I NR	10	4	ND	170 N 230 N	t Nit t Nit	ng/m3 ng/m3	NR	NR NR NR NR	NR NR	1.0	ng/m3 ng/m3	See 48 See 48	See 48 See 48	5ee 48 5ee 48	See 42		
48.1	Bergh et al., 2021b Bergh et al., 2021b Bergh et al., 2021b	2006- 2007, winter 2006- 2007, winter	Apartments Apartments Apartments	TCEP TCEP TCEP	Indoor air Indoor air Indoor air	building materials building materials building materials	tet to immediate intro unit inter building verlation, (ii) association di inter building verlation, (iii) association di investo di Otta and phobales with building and the ait investo di and the ait investo and the ait investo	Ar sampling as a solution by using an AC powers Generacy) is due to be a through a conversion, available solution by a solution (32), and the solution generacy) is due absolution (32). See 48.1	Sweden, Sockholm Sweden, Sockholm Sweden,	22 Low risk for sock building registransis, per tridg) 23 registransis resk building resk building rest blidg) per tridg) 3 Multi-scienced buildings (45	NR NR NR	20 20 20	4 4 4	ND ND	170 N 210 N 230 N	t NR t NR	ng/m3 ng/m3 ng/m3	NR NR	NR NR NR NR NR NR	508 508	1.0 1.0 1.0	ng/m3 ng/m3 ng/m3	See 48 See 48 See 48	See 48 See 48	500-68 500-68 500-68	500 43 500 43		
48.1	Bargh et al., 2011b Bargh et al., 2011b Bargh et al., 2011b Bargh et al., 2011b	2006- 2007, winter 2006- 2007, winter 2006- 2007, winter 2006- 2007, winter	Apartments Apartments Apartments Apartments	TCEP TCEP TCEP TEP	Indoor air Indoor air Indoor air Indoor air	bulding materials bulding materials bulding materials bulding materials	en la sine di tete bullang and inter bullang and inter bullang and inter bullang and inter bullang di tete bul	Ar sampling was conducted by oning an AC powers pump (IR23.13.14.15, eff. Modegard, rolling, a consolid to do the strong at consolidation mg animoparysi kilo advoctived; 5 see 48.1 5 see 48.1	Sweden, Sockholm Sweden, Sockholm Sweden, Sockholm	22 Low risk for reference. 7 Part of the second second second second reference of the second second second second reference of the second second second second second reference of the second second second second second second second second s	NR NR NR NR	20 20 20 20	4 4 4	ND ND ND	170 N 230 N 230 N	t NR t NR t NR	ng/m3 ng/m3 ng/m3 ng/m3	NR NR NR	NR NR NR NR NR NR NR	58 18 18 18	1.0 1.0 1.0 0.12	ng/m3 ng/m3 ng/m3 ng/m3	See 43 See 43 See 43	500 48 500 48 500 48	500 48 500 48 500 48	100 48 100 48 100 48		
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48.1	Borgh et al., 202130 Borgh et al., 202130 Borgh et al., 202130 Borgh et al., 202130 Borgh et al., 202130 Borgh et al., 202130	2006- 2007, winter 2006- 2007, winter 2006- 2007, winter 2006- 2007, winter 2006- 2007, winter	Apartmants Apartmants Apartmants Apartmants Apartmants	тар тар тар тар тар	Indoor air Indoor air Indoor air Indoor air Indoor air	bulding materials bulding materials bulding materials bulding materials bulding materials	D) Dampington from Application of Applicationo	AF sampling was conducted by using an AC powers pump (2023, 13.04, 14, 60 Mandanger, reduce), and an antiparticle of the same set of the same set and antiparticle of the same set of the same	Sweden, Sockholm Sweden, Sweden, Sweden, Sweden, Sweden, Sweden, Sweden, Sweden, Sweden, Sweden,	<ol> <li>Jacobski for Schuler, gestennet, gestennet, gestennet, gestennet, gestennet, gestennet, gestennet, haldtig (d).</li> <li>sich kalding gestennet, haldtig (d).</li> <li>sich kalding gestennet, haldtig (d).</li> <li>law rich ky schuler, d).</li> <li>law rich ky schuler, d).</li> <li>law rich ky schuler, d).</li> <li>law rich ky schuler, d).</li> <li>sich kaldtig (d).</li> <li>sich kaldtig</li></ol>	NR NR NR NR NR	20 20 20 20 20 28 24	4 4 5 4	ND ND 0.84 <0.18	170 N 230 N 230 N 210 N 300 N	с ля с ля с ля с ля с ля	دائریم دوراست دوراست دوراست دوراست	NIK NIK NIK NIK NIK	RR NR RR NR RR NR RR NR RR NR	88 88 88 88 88 88	1.0 1.0 0.12 0.12 0.12	ng/m3 ng/m3 ng/m3 ng/m3 ng/m3	500 40 500 40 500 40 500 40	500 a 500 a 500 a 500 a 500 a	50+45 50+45 50+45 50+45	i ua 42 i ua 42 i ua 42 i ua 42		
48.1	Bergh et al., 2013b Bergh et al., 2023b Bergh et al., 2023b Bergh et al., 2023b Bergh et al., 2023b Bergh et al., 2023b	2006- 2007, witter 2006- 2007, witter 2006- 2007, witter 2006- 2007, witter 2006- 2007, witter 2006- 2007, 2006- 2007, 2007, 2007, 2007, 2007, witter 2007, witte	Apartments Apartments Apartments Apartments Apartments Apartments	тар тар тар төр төр	Indoor air Indoor air Indoor air Indoor air Indoor air	bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials	IPD to many series of the seri	Ar sampling was conducted by oring an AC powers pump (DR21.13A.18, dR M hasheger, Fraher, G. Generators I do at the strengt a common offer maj antinopergri silica aductived. See 48.1 See 48.1 See 48.1 See 48.1 See 48.1 See 48.1 See 48.1	Sawden, Sockholm Sockholm Sockholm Sockholm Sawden, Sockholm Sawden, Sockholm	12         Low risk for rest building und house 1/2           13         regin risk for rest building und house 1/2           14         regin risk for rest building und house 1/2           15         regin risk for rest building und house 1/2           16         regin risk for rest building und house 1/2           17         regin risk for rest building und house 1/2           18         regin risk for rest building und house 1/2           19         regin risk for rest building und house 1/2           12         regin risk for rest building und house 1/2           12         regin risk for rest building und house 1/2           12         regin risk for rest building und house 1/2	NR NR NR NR NR NR NR	10 10 10 18 14 <11	4 4 4 5 4	ND ND -0.84 -0.18 ND	170 N 230 N 230 N 300 N 300 N	ч жа ч жа ч жа ч жа ч жа	രു/താ നു/താ നു/താ നു/താ നു/താ നു/താ	NR NR NR NR NR NR	NR NR NR NR NR NR NR NR NR NR NR NR	44 44 44 44 44 44 44 44 44 44 44 44 44	10 10 0.12 0.12 0.12 0.12	ngim 3 ngim 3 ngim 3 ngim 3 ngim 3 ngim 3 ngim 3	500 40 500 40 500 40 500 40 500 40	500 43 500 43 500 43 500 43 500 43	500 48 500 48 500 48 500 48 500 48	5 un 43 5 un 43 5 un 43 5 un 43 5 un 43		
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48.1	Borgh et al., 20113 Borgh et al., 2013 Borgh et al., 2013 Borgh et al., 2013 Borgh et al., 2013 Borgh et al., 2013 Borgh et al., 2013 Borgh et al., 2013	2005- 2007, witter 2005, 2007, witter 2007,	Apartments Apartments Apartments Apartments Apartments Apartments	тар тар тар тар твр твр твр твр	ludua de ludua de ludua de ludua de ludua de ludua de ludua de ludua de ludua de	bubiling materials bubiling materials bubling materials bubling materials bubling materials bubling materials bubling materials bubling materials	De benegeten per benegeten sedens, priese anderen, priese anderen, priese anderen, priese anderen, priese anderen, priese anderen, priese and beneren, and ben	Ab sampling was conducted by only an Ab parents party IRUX 13.13.14, for Mesharger, finding, d memory to the the star through a commention of the memory to the the star through a commention of the star star through the starter of the starter of the star starter of the starter	Sandan, Sackholm Sackholm Sackholm Sackholm Sackholm Sackholm Sackholm Sackholm Sackholm Sackholm	<ol> <li>Lear nh ling querientes</li> <li>angen che della querientes</li> <li>angen che della angen che della angen che della angen che della che della angen che della che della angen che della che della angen che della che della angen che della che della angen che della che della angen che della che della angen che della che della angen che della che della angen che della che della angen che della che della che angen che della che angen che della che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che della che angen che della che della che angen che della che della che angen che della che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che della che angen che della che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che angen che della che della che angen che della che della che angen che della che della che angen che della che della che angen che della che della che angen che della che della che angen che della che della che della che angen che della che della che della che della che angen che della che della che della che della che angen che della che della che della che della che angen che della che della che della che della che angen ch</li></ol>	20. 20. 20. 20. 20. 20. 20. 20. 20. 20.	20 20 30 41 41 41 41 41 41	4 4 4 5 4 61 61 61	10 10 0.44 -0.33 10 10 10 10	170 N 230 N 230 N 300 N 300 N 22 N 25 N	с ля с ля с ля с ля с ля с ля с ля	രു/ത രു/ത രു/ത രു/ത നു/ത	NA NA NA NA NA NA NA	5.5 NR 7.6 NR 7.6 NR 7.6 NR 7.6 NR 7.6 NR 7.6 NR 7.6 NR	64 64 64 64 64 64 64 64 64 64	19 10 19 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	Entiga Entiga Entiga Entiga Entiga Entiga Entiga	500 40 500 40 500 40 500 40 500 40	500 di 500 di 500 di 500 di 500 di 500 di	5an 48 5an 48 5an 48 5an 48 5an 48			
48.1	المورية حذ بار .           الموري	2006- 2007, 2007, 2006- 2007, 2006- 2007, 2006- 2007, witter 2006- 2007, witter 2006- 2007, witter 2006- 2007, witter	Apatements Apatements Apatements Apatements Apatements Apatements Apatements Apatements	тар тар тар твр твр твр твр твр твр твр твр твр тв	indoor de indoor	bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials	De besegnen de la construction d	Ar sampling was conducted by oxing an AC powers pump (RE21.13A.13, GM Hasheger, Fraher, G. Gamman, Ho & Har Har (Hare) & commonly (C1 m) anisopropri silea adactive). See 48.1 See 48.1	Sondon, Sockolon	<ol> <li>Lew rich für wertweistigt</li> <li>affen für die Schuldung wertweistigt</li> <li>affen für die Schuldung wertweistigt</li> <li>affen für die Schuldung wertweistigt</li> <li>Lew richt die bestängt och die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt</li> <li>Lew richt die wertweistigt&lt;</li></ol>	00 00 00 00 00 00 00 00 00 00 00 00 00	9 9 9 9 9 9 9 9 9 9 1 1 1 1 1 1 1 1 1 1	4 4 4 5 4 4 4 4 4 1 4 1 4 1 4 1 4 1 4 1	N0 N0 0.54 0.51 N0 N0 N0 N0 N0 N0 N0 N0 N0 N0 N0 N0 N0	170 N 210 N 210 N 300 N 300 N 12 N 25 N 25 N	а ля а ля а ля а ля а ля а ля а ля а ля	ng/m3 ng/m3 ng/m3 ng/m3 ng/m3 ng/m3 ng/m3 ng/m3	NR NR NR NR NR NR NR NR NR NR	NR NR NR NR NR NR NR NR NR NR NR NR NR NR NR NR	00 00 00 00 00 00 00 00 00 00 00 00 00	10 10 0.12 0.12 0.12 0.12 0.13 0.13 0.13 0.14 0.14 0.14 0.14 0.14 0.14 0.14 0.14	د العالية د الماليمانيمانيمانيمانيمانيمانيمانيمانيمانيمان	544 43 544 545 544  544 545 5455 54555 5455555555	500 G 500 G	5443 5443 5443 5443 5443 5443 5443 5443	2 m 42 2 m 42 3 m 42		
48.1 4C	السوراء حذ بالـ           السوراء حذ بالـ	2005- 2007 / 2005- 2005- 2005- 2005- 2005- 2007, withder 2005- 2007, withder 2005- 2007, withder 2005- 2007, withder 2005- 2007, 20,	Apartments Apartments Apartments Apartments Apartments Apartments Apartments Apartments Apartments	тар тар тар тр тр тр тр тр тр тр тр тр	ludios di Indios di	bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials bulding materials	Dis Dismogrammen im and stark hulfing and and and and and and and and	Ar sampling was conducted by using an AC powers pump (PD2.13.14.15, eff. the darger, refuel, a conservation of the the the three part a conservation of the regularized states of the three part of the three parts regularized states of the three parts of the three parts is an eff. 1 is a eff. 1 is a eff. 1 is a eff. 1 is a eff. 1 is a eff. 1 is a eff. 1 is a eff. 1 is a eff. 1 is a eff. 1 is a eff. 1	Sandan, Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan Sachan	<ol> <li>Low risk for representations of the standing representation of the standing represt representation of the standing representation of the stand</li></ol>	00 00 00 00 00 00 00 00 00 00 00 00 00	20 20 20 20 20 20 20 20 20 20 20 20 20 2	4 4 4 5 4 4 4 4	10 10 0.4 0.1 0.1 10 10 10 10 10 10 10 10 10 10 10 10 10	170 N 230 N 210 N 300 N 300 N 12 N 25 N 4C14C4 See 4C	ч ля ч ля ч ля ч ля ч ля ч ля ч ля ч ля	ന്റേ/m3 ന്റേ/m3 ന്റെ/m3 ന്റെ/m3 ന്റെ/m3 ന്റെ/m3 ന്റെ/m3 ന്റെ/m3 ന്റെ/m3	508 508 508 508 508 508 508 508 508 508	NR NR NR NR NR NR NR NR NR NR NR NR NR NR NR NR NR NR	04 04 04 04 04 04 04 04 04 04 04 04 04 0	10 10 0.12 0.12 0.12 0.12 0.12 0.12 0.13 0.13 0.14 0.1 0.14 0.14 0.14 0.14 0.14 0.14	دمليه دملي دمليه دملي دمليه دمليه دمليه دمليه دمليه دمليه دمليه دمليه دملي دملي دملي دملي دملي دملي دملي دملي دملي دملي دملي دملي دملي دملي دملي دملي دملي دمل دملي دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم دمالم د د د د د د د د د د د د د		500 43 500 400 40 500 400 500 br>500 400 500 400 500 500 400 500 500 500 400 500 500 500 500 500 500 500 500 500	50 43 50 44 50 40 50 40 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 500	5 oo 43 5 oo 4		
4C.2	Bergh et al., 2012	Purchased d standard sar	ust TEP	dust	SRM 2585 Standard	4C	SRM 2585 organic contaminants in house dust was obtained from the National Institute of Standard and	Sweden, d Sockholm	7	NR	-MDL	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	70	ng/g (0.07 µg/g)	See 4C	See 4C	See 4C	See 4C	
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4C.3	Bergh et al.,	Purchased d	ust TDCPP	dust	SRM 2585	4C	Technology. SRM 2585 organic contaminants in house dust was abtrined from the National Institute of Standard and	Sweden,	9	NR	2300	NR	NR	NR	NR	NR	ng/g (2_3 µg/g)	280	NR	NR	NR	690	ng/g (0.69 µg/g)	See 4C	See 4C	See 4C	See 4C	
4C.4	Bergh et al., 2012	Purchased d	ust TPP	dust	SRM 2585 Standard	4C	Technology. SRM 2585 organic contaminants in house dust was obtained from the National Institute of Standard and	Sweden,	7	NR	1100	NR	NR	NR	NR	NR	ng/g (1.1 µg/g)	100	NR	NR	NR	60	ng/g (0.06 µg/g)	See 4C	See 4C	See 4C	See 4C	
				to do so ob			Technology.	a sociality																all the desides of the				
5	Carlsson et al., 1997	VR Schook, day office buildi	cares, TCEP, ng TCPP,TP	Indoor air, Poutdoor air	NR	Identify the occurrence i organophosphates in indoor air from common work environments (office building,day care center, 3 schools)	2f See 5.1-5.10	Sweden	See 5.1- See 5.1-5.10 5.10	See 5.1-5.10	See 5.1-5.10	we 5.1-5.10 5	ee 5.1-5.10 5	See 5.1-5.10 5	ee 5.1-5.10	See 5.1-5.10	See 5.1-5.10	See 5.1-5.10	See 5.1-5.10	See 5.1-5.10	See 5.1-5.10	See 5.1-5.10	See 5.1-5.10	Limited value for prospective exposure assessment. Good for retrospective or comparisons with bicmonitoring where body loading occurred during this ara	No unique features.	Limited utility for creating distribution. Mean and CV for "up to 4 samples" for each site given.	<ul> <li>Methodology circa 199: without MS/MS techniques. Internal standards used, NIST standards not yet available.</li> </ul>	An other by Destaining, M. Maddahena, B. R., Singer, G. Kodogion, A.T., McKono, T.E., Indoor pollutants erritted by office aquipment: Answise wo reported data and information needs. Vol. 2013, 2003 from the original TERA/Lifine TCEP report.
5.1	Carlsson et al., 1997	uit Schools	TCEP	Indoor air	NR	see 5.0	Stationary air sampling performed with a personal sampler with a 25-mm binder-free A/E borosilicate	Sweden	3 4 duplicate measures at	NR	NR	NR	18	250	NR	NR	ng/m3 (range of mean values)	NR	NR	NR	NR	NR	NR	See 5.0	See 5.0	See 5.0	See 5.0	
5.2	Carlsson et al., 1997	VR Day care	TCEP	Indoor air	NR	see 5.0	elass fiber fiber and two PUF plazs. Stationary air sampling performed with a personal sampler with a 25-mm binder-free A/E borosilicate	Sweden	each location 1 4 duplicate measures	NR	144	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 5.0	See 5.0	See 5.0	See 5.0	
5.3	Carlsson et al.,	NR Office buildi	ngs TCEP	Indoor air	NR	see 5.0	glass fiber filter and two PUF plags. Stationary air sampling performed with a personal samplar with a 25-mm binder.free A/F hornvillrate	Sweden	1 4 duplicate	NR	NR	NR	11	9.9	NR	NR	ng/m3 (range of mean values)	NR	NR	NR	NR	NR	NR	See 5.0	See 5.0	See 5.0	See 5.0	
5.4	Carlsson et al.,	¥R.	TCEP	Outdoor air	NR	see 5.0	elass fiber filter and two PUF plazs. Stationary air sampling performed with a personal	Sweden	2 samples;	NR	d	NR	NR	NR	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 5.0	See 5.0	See 5.0	These samples are for	
	1997						sampler with a 25 mm bindler-free A/L borountcate glass fiber filter and two PUP plugs.		outside one office building and one school																		method continuation purpose: ONE OUTDOC SAMPLE OUTSIDE OFFIC BLOG, ONE OUTSIDE SCHOOL: ONE SAMPLE EACH for "all OP ester" BOTH <1ng/m3 were confirmatory for assuming inide source FRs, not outside ambie air contamination.	98. 27 1 1 0 0 0 0 0
5.5	Carlsson et al.,	un School	TCPP	Indoor air	NR	see 5.0	Stationary air sampling performed with a personal complex with a 21 mm binder from AN incomplexite.	Sweden	3 4 duplicate	NR	NR	NR	<lod< td=""><td>41</td><td>NR</td><td>NR</td><td>ng/m3 (range</td><td>NR</td><td>NR</td><td>0.5</td><td>ng/m3</td><td>NR</td><td>NR</td><td>See 5.0</td><td>See 5.0</td><td>See 5.0</td><td>See 5.0</td><td></td></lod<>	41	NR	NR	ng/m3 (range	NR	NR	0.5	ng/m3	NR	NR	See 5.0	See 5.0	See 5.0	See 5.0	
5.6	Carlsson et al.	NR Day care	TCPP	Indoor air	NR	see 5.0	elass fiber filter and two PUF plaze. Stationary air sampling performed with a personal	Sweden	each location 1 4 duplicate	NR	NR	NR	2.9	34	NR	NR	ng/m3 (range	NR	NR	0.5	ng/m3	NR	NR	See 5.0	See 5.0	See 5.0	See 5.0	
5.7	1997 Carlsson et al.,	vR Offices	TCPP	Indoor air	NR	see 5.0	sampler with a 23-mm binder-free A/E borosilicate elass fiber filter and two PUF plazs. Stationary air sampling performed with a personal	Sweden	1 4 duplicate	NR	NR	NR	1.4	34	NR	NR	of mean values) ng/m3 (range	NR	NR	0.5	ng/m3	NR	NR	See 5.0	See 5.0	See 5.0	See 5.0	
5.8	1997 Carlsson et al.,	with School	TPP	Indoor air	NR	see 5.0	sampler with a 23-mm binder-free A/E borosilicate glass fiber filter and two PUF plugs. Stationary air sampling performed with a personal	Sweden	3 4 duplicate	NR	NR	NR	<lod< td=""><td>0.8</td><td>NR</td><td>NR</td><td>of mean values) ng/m3 (range</td><td>NR</td><td>NR</td><td>15</td><td>ng/m4</td><td>NR</td><td>NR</td><td>See 5.0</td><td>See 5.0</td><td>See 5.0</td><td>See 5.0</td><td></td></lod<>	0.8	NR	NR	of mean values) ng/m3 (range	NR	NR	15	ng/m4	NR	NR	See 5.0	See 5.0	See 5.0	See 5.0	
5.9	1997 Carlsson et al.,	VR Day care	TPP	Indoor air	NR	see 5.0	sampler with a 25-mm binder-free A/E borosilicate elass fiber filter and two PUI plazs. Stationary air sampling performed with a personal	Sweden	measures at each location 1 4 duplicate	NR	<100	NR	NR	NR	NR	NR	of mean values) ng/m3 (range	NR	NR	2.5	ng/m5	NR	NR	See 5.0	See 5.0	See 5.0	See 5.0	
5.10	1997 Carlsson et al.,	VR Offices	TPP	Indoor air	NR	see 5.0	sampler with a 25-mm binder-free A/E borosilicate glass fiber filter and two PUI plugs. Stationary air sampling performed with a personal	Sweden	measures	NR	NR	NR	0.4	0.7	NR	NR	of mean values) ng/m3 (range	NR	NR	35	ng/m6	NR	NR	See 5.0	See 5.0	See 5.0	See 5.0	
	1997						sampler with a 25-mm binder-free A/E borosilicate elass fiber filter and two PUF plazs.		measures								of mean values)											
6A	Staaf and Ostman, 2005a, b	NR Private hom garage, offic workshop, s health care I health care I	es, car, TCEP,TE e, TDCPP, econs, acilities	9, Indoorair 199	Building materials, fumiture, electronics, upholstery, carp	The objective was to monitor the concentrations of organophosphorus triesters to gain knowledge about the occurrence of these compounds with respect to absolute concentrations and concentrations and indoor environments.	5ee 6A.1-6A.20	Sweden, Stockholm	ee 6A.1- 6A.20 6A.20	See 6A.1-6A.20 S	iee 6A.1-6A.20 Se	e 64.3-64.20 Se	e 6A.1-6A.20 Se	e 6A.1-6A.20 Se	e 6A.3-6A.20 Se	ee 6A.1-6A.20	See 6A.1-6A.20 S	ee 6A.1-6A.20	Sec 6A.1- 1 6A.20	See 6A.1-6A.20	See 6A.16A.20	See 6A.1-6A.20	See 6A.1-6A.20	Relevant to consideration of source materials and site conditions by Inference. Relevant to normal commercial living environments including public spaces, domestic spaces, transportation	Swedish study relevant to most general living environments for OP Fits of that era. Retrospective exposur assessments and comparisons to estimates of body load Relevant to consideration of source materials by inference.	Few samples per site and condition limit confidence is concentration wakes. Good site/condition descriptions for each value importar to infer confidence to value. Much inference, bias, suggestion inherent throughout work. Egoour estimate very rough and simplistic.	Good focus on detailing factors that influence variation: humidity, ventiliation, type of site particles, inside vs outside air. But, fee samples per sike/condition limits quantification.	Notes outdoor wir taeled and rowlin were cit rights arguing sources of Operant from outdoor
6A.1	Staaf and Ostman, 2005a	NR Private hom	es TEP	Indoor air	Building materia fumiture, electronics, upholstery	ils, See 6.0	samplers were placed at a height of about 0.5 meters about the flocit. In private horners they were placed in the centre of the flat/floor leaving all doors to other rooms open to let all circulate firely. Ari samples were collected at the air circulate firely. Ari samples ontaining an animopropy situa plase plase (25 mg. 1 ml)	is Swieden, n Stockholm is I).	10 houses and apartments (construction between 1876- 2004), 5 parallel samples from	NR	NR	Nit	1	21	NR	NR	ng/m3	NR	NR	NR	NR	NR	Nik	See 6A	See 6A	See 6A	See 6A	
6A.2	Staaf and Ostman, 2005a	NR Car	TEP	Indoor air	NR	See 6.0	Samples were collected in the breathing zone of the driver, having the sampling pump outside the vehicle and the tables through the slightly lowered window into the samplers. Stationary sampler with 5PE cartridge containing an amingeropy! silica phase (25 mg, 1m). Sampling was done with the ventilation fan set to operate in "normal" mode.	Sweden, e Stockholm	each location 1 Car (manufacture d 2003), 5 parallel samples from each location	NR	NR	220	NR	NR	NR	NR	ng/m4	NR	NR	NR	nek	NR	NR	See 6A	See 6A	See 6A	See 6A	
6A.3	Staaf and Ostman, 2005a	un Garage, sub car, buses	way TEP	Indoor air	NR	See 6.0	Sampling was done in the two buses and the subway car while turned off with no ventilation. Sampling was also callected from the garage where the buses and subway car were packed overright. Stationary sampler with SPE cartifies contairing an aminopropyl silica phase (25 mg. 2 ml).	y Sweden, Stockholm	6 I subway car (manufacture d 2003), 2 buses (manufacture d 1997 and 2003), 5 parallel	NR	NR	NR	1	56	NR	NR	ng/m5	NR	NR	NŘ	NR	NR	NR	See 6A	See 6A	See 6A	See 6A	
68.4	Staaf and Ostman, 2005a	NR Office	TEP	Indoor air	Furniture, upholstery, carpet, computers, printers, copy machines	See 6.0	Office and store facilities were investigated during the right with reduced ventilation and no personnel present. Stationary sampler with SPE cartridge containing an aminopropyl silica phase (25 mg, 1 ml)	Sweden, Stockholm I).	samples from each location 3 5 parallel samples from each location, computers turned off during	NR	NR	NR	1	2	NR	NR	ng/m6	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 6A	
6A.5	Staaf and Ostman, 2005a	VR Workshop (I printing pre waste disma	takery, TEP si, e- ntling)	Indoor air	NR	See 6.0	Office and store facilities were investigated during the right with reduced ventilation and no personnel present. Stationary sampler with SPE cartridge containing an aminopropyl silica phase (25 mg, 1 ml)	Sweden, Stockholm I).	sampling 3 5 parallel samples from each location	NR	NR	NR	1	23	NR	NR	ng/m7	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 6A	
6A.6	Staaf and Ostman, 2005a	uit Stores (elect bicycles, clor carpets)	ronics, TEP thes,	Indoor air	NR	See 6.0	Office and store facilities were investigated during the right with reduced ventilation and no personnel present. Stationary sampler with SPE cartridge containing an aminopropyl silica phase (25 mg, 1 ml)	Sweden, Stockholm I).	4 S parallel samples from each location	NR	NR	NİL	1	19	NŘ	NR	ng/m8	NŘ	NR	NR	NR	NŘ	NİL	See 6A	See 6A	See 6A	See 6A	
6A.7	Staaf and Ostman, 2005a	NR Health care I	laolity TEP	Indoor air	fumiture, upholstery, computer	See 6.0	Sampling during daytime with normal ventilation and working activity. Stationary sampler with SPE cartridge containing an aminopropyl silica phase (25 mg, 1 ml).	d Sweden, Stockholm	3 S parallel samples from each location; 2 examisation rooms without computers and 1 doctor	NR	NR	NR	7	23	NR	NR	ng/m0	NR	NR	NR	heik	NR	NI	See 6A	See 6A	See 6A	See 6A	
									office with 4 desks and computers (turned off)																			
64.8	Staaf and Ostman, 2005a	NR Private hom	es TCEP	Indoor air	Building materia fumiture, electronics, upholistery	ils, see 6.0	samplers were placed at a height of about 0.5 metres about the float. In private heres they were glaced to the centre of the blace head place to a coher recoms spen to it the art circulate head, place to a servent. Stationary aught with 0.4 candidge containing as aminopropil slice phase (25 mg. 1 ml)	is Sweden, n Stockholm s	office with 4 disks and computers (turned off) were sampled. 10 houses and apartments (construction between 1876- 2004), 5 parallel samples from egrin lovati-	NR	NER	NR	1	115	NR	NR	NR	NR	NR	NR	tek	NR	NR	See 6A	See 6A	See 6A	See 6A	

64.10	Staaf and NR Ostman, 2005a	Garage, subway car, buses	TCEP Indoor ai	NR	see 6.0	Sampling was done in the two buess and the subway car while turned off with no ventilation. Sampling uses also collected from the parage where the buess and subway car wave parked overright. Stationary sampler with 5% carding containing an aminopropyl silica phase (25 mg, 1 ml).	Sweden, 6 Stockholm	I subway car (manufacture d 2003), 2 buses (manufacture d 2097 and 2003), 5 parallel samples from	NR	320	NR	NR	NR	NŘ NŘ	NR	NR	NR	NR	NR	NR	Nit	See 6A	See 6A	See 6A	See 6A
6A.11	Staaf and NR Ostman, 2005a	Office	TCEP Indoor ai	Fumiture, upholitery, carpet, computers, printers, copy machines	see 6.0	Office and store facilities were investigated during the right with reduced ventilation and no personed present. Satisfancy sampler with SPC carridge containing an aminopropyl silica phase (25 mg, 1 ml).	Sweden, 3 Stockholm	each location S parallel samples from each location, computers turned off during	NR	NR	NR	6	870	NR NR	NR	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 6A
6A.12	Staaf and NR Ostman, 2005a	Workshop (bakery, printing press, e- waste dismantling)	TCEP Indoor ai	NR	see 6.0	Office and store facilities were investigated during the right with reduced ventilation and no personnel present. Stationary sampler with SPE cartridge containing an aminopropyl silica phase (25 mg. 1 ml).	Sweden, 3 Stockholm	samplina 5 parallel samples from each location	NR	NR	NR	3	29	NR NR	NR	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 6A
6A.13	Staaf and NR Ostman, 2005a	Stores (electronics, bicycles, clothes, carpets)	TCEP Indoor ai	NR	see 6.0	Office and store facilities were investigated during the night with reduced ventilation and no personnal present. Stationary sampler with SPE cartridge containing an aminopropyl silica phase (25 mg, 1 ml).	Sweden, 4 Stockholm	5 parallel samples from each location	NR	NR	NR	11	56	NR NR	NR	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 6A
6A.14	Staaf and NR Ostman, 2005a	Health care facility	TCEP Indoor ai	Fumiture, uphohter, computer	see 6.0	Sampling during dispiten with normal ventilation and working activity. Satistancy sampler with SPC 1: cartridge containing an aminopropyl silica phase (23 mg, 1 ml).	Sweden, 3 Stockholm	S parallel samples from each location; 2 examination rooms without computers and 1 doctor office with 4 desks and computers (turned off)	NR	NR	Nit	9	350	NR NR	NR	NR	NR	NR	NR	NR	Nik	See 6A	See 6A	See 64	See 64
6A.15	Staaf and NR Ostman, 2005a	Car	TDCP9 Indoor ai	NR	see 6.0	Samples were collected in the breathing zone of the 1 driver, having the sampling pump outside the vehicle and the tubes through the sightly lowered window into the samplers. Stationary sampler with 5PC carridge containing an annisoposyl sills phase (25 mg, 1 mG). Sampling was done with the ventilation flas set to operate in "normal" mode.	Sweden, 1 Stockholm	whe samples 1 car (manufacture d 2003), 5 parallel samples from each location	NR	NR	Nit	ND	5	NR NR	ng/m3	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 64
6A.16	Staaf and NR Ostman, 2005a	Electronic dismantling facility	TDCPP Indoor all	NR	see 6.0	Office and store facilities were investigated during the right with reduced ventilation and no personnel present. Stationary sampler with SPE cartridge containing an aminopropyl silica phase (25 mg, 1 ml).	Sweden, 3 Stockholm	5 parallel samples from each location	NR	NR	NR	ND	7	NR NR	ng/m3	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 6A
6A.17	Staaf and NR Ostman, 2005a	Private homes	TPP Indoor ai	NR	see 6.0	samplers were placed at a height of about 0.5 metres above the floor. In private hornes they were placed in 5 the centre of the flag/hoor levaler gild dons to other rooms open to let the air circulate freely. Ar samples were collected during diagrime with no persons present. Stationary sampler with SPE cartridge	Sweden, 10 Stockholm	houses and apartments (construction between 1876- 2004), 5 parallel	NR	NR	NİK	ND	NR	NR NR	ng/m3	NR	NR	NR	NR	NR	Nit	See 6A	See 6A	See 6A	See 6A
6A.18	Staaf and NR Ostman, 2005a	Transport (car and garage)	TPP Indoor ai	NR	see 6.0	consuming an ammopropy suice prove (z) mil- Samplies were collected in the breathing zene of the driver, having the sampling zene possible the which and the tables through the slightly (owened window into the samplers. Stationary sampler with SPE cartridge containing an aminopropyl silica phase (25 mg, 1 mil). Sampling was done with the ventilation fan set to operation in "normal" mode.	Sweden, 2 Stockholm	each location a car (manufacture d 2003) and the garagae, 5 parallel samples from each location	NR	NR	Nit	1	3	NR NR	ng/m3	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 6A
6A.19	Staaf and NR Ostman, 2005a	Offices	TPP Indoor ai	NR	see 6.0	Office and store facilities were investigated during the right with reduced ventilation and no personnel present. Stationary sampler with SPE cartridge containing an aminopropyl silica phase (25 mg, 1 ml).	Sweden, 3 Stockholm	5 parallel samples from each location, computers turned off	NR	NR	NİL	ND	NR	NR NR	ng/m3	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 6A
								during																	
6A.20	Staaf and NR Ostman, 2005a	Workshop (bakery, printing press, e- waste dismantling)	TPP Indoor ai	NR	see 6.0	Office and store facilities were investigated during the right with reduced ventilation and no personnel to present. Stationary sampler with SPE cartridge containing an aminopropy silks phase (25 mg, 1 ml).	Sweden, 3 Stockholm	during sampling 5 parallel samples from each location	NR	NŘ	NR	ND	17	NR NR	ng/m3	NR	NR	NR	NR	NR	NR	See 6A	See 6A	See 6A	See 6A
6A.20 68	Staaf and NR Ostman, 2005a Staaf and NR Ostman, 2005b	Workshop (bakary, printing press, e- waste dismantling) electronics dismantling facility and Lecture halls	TPP Indoor ai	NŘ NR	see 6.0 The objective of this study was to develop an validate a fast and simpl method for sampling and analysis of organic pollutants in indoor air with focus on organophosphate esters.	Office and same facilities were investigated during the sight with reductive world lines and so personse meets. Stationary and and the same of the second containing an armospropyl site phase (25 mg. 1 ml). See 63.163.1	Sweden, 3 Stockholm Sweden, See 68 Stockholm 68.3	during sampling 5 parallel samples from each location 1- See 68.1-68.2	NR See 68.1-68.2	NR See 68.1-68.2	NR See 68.1-68.2 Se	ND	17 See 68.1-68.2 Se	NR NR 16 68.1-68.2 See 68.1	ng/m3	NR 5ee 68.1-68.2	NR See 68.1-68.2	NR See 68.1-68.2	NR See 68.1-68.2	NR See 68.1-68.2	NR See 68.148.2	See 6A Limited use for quantitative exposure assessment but excellent presentation for consideration of methodologies as employed by other researchers.	See 6A Quantifies efficiency of use of SPE Cantridges in sampling methodologi used here and will be useful to consider othe studies.	See 6A United data presentation for analytic measurements. Perclaion and detail a simul at parametern demonstrating rethodology features.	See 6A Illustration of use of SPE Mathematicity Papers are of SPE carriliges to sampling Carriliges andromes, and as networks and datas- ay methodalogy.
6A 20 6B 68.1	Staaf and NR Ottman, 2055a Staaf and NR Ottman, 2055b Staaf and NR Ottman, 2005b	Workshop (bakery, printing press, e- waste dismantling) electronics dismantling facility and Lecture halls electronics dismantling facility and Lecture halls	TPP Indoor al TCEP Indoor al TCEP Indoor al	NR NR NR	see 6.0 The objective of this study was to develop any withold as fast and simpl method for samplique and patitures in indoor air analysis of organic patitures in indoor air with foca on organophosphate esters.	Office and stare facilities are nonsignated during the right of the during of the starting as an empropring instantion of the starting of the starting of the starting on a monophysical star phase (25 mg ± 2 mg). See (8.1-6.2)	Sweden, 3 Stockholm See 68 Stockholm 68 Stockholm 2 Sweden, 2	during sampling 5 parallel samples from each location 1 - See 68.1-68.2	NR See 68.1-68.2 : NR	NR See 68.1-68.2	Nit See 68.1-68.2 Se Nit	ND ee 68.1-68.2 :	17 See 68.1-68.2 Se	NR NR 16 68.1-68.2 See 68.1 NR NR	ng/m3 58.2 See 68.1-68.2 ng/m4	NR 5ee 68.1-68.2 NR	NR See 68.1-68.2 NR	NK See 68.1-68.2 NK	NR See 68.1-68.2 NR	NR See 68.1-68.2 NR	NR See 68.148.2 NR	See 6A Limited use for quantitative exposure assessment but secollent presentation for consideration of methodologies of employed by other researchers. See 6B	See 6A Quantilias efficiency of use of SPE Cantridges in sampling mathodologi used here and well be used to consider othe studies. See 68	See GA Unribed data presentation for analytic measurements. Protoion and data methodology features.	See GA Bucketsleep of the Anthondology Papers and 9 M contridges for sampling Development of an extension of an extension of extension of an extension of an extension of an extension of a set of a se
68.20 68 68.1 68.2	Staaf and NR Ottman, 2005a Staaf and NR Ottman, 2005b NR Ottman, 2005b	Workshop (bakery, printing press, e- waste dismanting) electronics dismanting facility and Lecture halls electronics dismanting facility and Lecture halls	TPP Indoor al TCEP Indoor al TCEP Indoor al	NR NR NR	see 6.0 The objective of this study was to develop an mothed for sampling and analysis of organic pultures in indexe pultures in index pultures index pultures in index pultures in index pultures in index	Office and dater lacifies are in howing and daring the right on that date and tables as in a parsonic present. Substancy analysis will be charged continge an emergency dist phase (5 mg z = 4). Set (81-16) 2 An SPI carlinge containing as antiograph dist, and an analysis of the set of the set of the analysis of the set of the set of the set of the angeographical between A. We as bound the angeographical between A. We as bound the angeographical between A. We as bound the angeographical between A. We as bound the angeographical between A. We as bound the angeographical between A. We as bound the angeographical between A. We as bound the angeographical between A. We as bound the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical between A. We as bound to the angeographical angeographical	Sweden, 3 Stockholm See 66 Stockholm 68.3 Sweden, 2 Stockholm 2 Stockholm 2	during sampling 5 parallel arrgise from each location each location computen and 1 without computen and 1 without computen and 1 without computen and 1 without	NR 5ee 48.148.2	NR See 68.1-68.2 NR NR	NR See 68.168.2 Se NR NR	ND ee 68.1-68.2 : ND ND	17 5ee 681-68.2 Se 3 1	NR NR 663.1-68.2 See 68.1 NR NR NR NR	ng/m3 58.2 See 68.1-68.2 ng/m4 ng/m5	NR 2 See 68.1-68.2 NR NR	NR See 68.148.2 NR NR	NR See 68.1-68.2 NR NR	NR See 68.1-68.2 NR NR	NK See 60.1-60.2 NK	NR See 68.148.2 NR	See 6A Limited use for quantitative exposes excellent presentation methodologies as omologied by other researchers. See 68	See 6A Oceantilles efficiency of use of 94° Carridges ampling methodologi used here and well is used to consider other studies. See 68 See 68	See 6A Linched data presentation for anhybr anned at parameters demonstrating anned at parameters demonstrating methodology features.	See 6A Restrictions of any GMM Machine of SMC any adaptition the restriction of any Constraints the restriction of any Constraints the restriction of any Constraints the restriction of any Constraints See 6B
68.20 68 68.1 68.2 7	Starland NA Comun, 2005a NA Colman, 2005a NA Colman, 2005b NA Starland NA Starland NA Starland NA Automotive NA	Workshop (halary, printing pres, e, used domarching) description d	1799 Indoor al 1CEP Indoor al 1CEP Indoor al 1CEP Indoor al	NR NR NR NR polyarethane fearms in applicition paperioris electronic equipment	us c. 2 The definition of the	Office and datar facilities are nonsignated damage the right of the database and any extension of the carried constraints of the entropy of the second secon	Sondrin, 3 Sondrin, See 63 Sondrin, 2 Sondrin, 2 Sondrin, 2 Sondrin, 2 Sondrin, 5 Sondrin, See 7.3	Enrormer S parallel samples from each location and backing litecture hall with computers and samples litecture hall samples litecture hall with computers and samples litecture hall samples litecture hall with computers and samples litecture hall samples litecture br>hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples litecture hall samples hal	NR See 68.1-68.2 : NR NR See 7.1-7.5	NR See 68.148.2 NR NR See 7.1.7.5	NI See 61.149.2 Se NI NI See 7.17.5 S	ND ** 68.1-68.2 1 ND ND 5ee 7.1-7.5	17 See 68.1-68.2 Se 3 5ee 7.1.7.3 S	NR NR * (8.1.48.2) 5+* (8.1) NR NR NR NR 5+* 7.1.7.5 5+* 7.1	ng/m3 88.2 See 68.1 48.2 ng/m4 ng/m5 7.5 See 7.1-7.5	NR 2 See 68.1-68.2 NR NR	NR 5ee 63.148.2 NR NR 5ee 7.1-7.5	NR See 68.1-68.2 NR NR See 7.1-7.3	NE See 68.1-68.2 NE NE See 7.3-7.3	NR See 6.1-64.2 NR NR See 7.1-7.3	NR See 68.148.2 NR NR See 7.1-7.5	See GA Linking and an off maintained as a second as	See 6A Conservations of the Conservations analysis of the Conservations and the and of the Conservations and the constraint of the and the constraint of the See 6B Conservations of possible associations of possible as	See 6.4 Linked days serverstation for analysis and a granular days and a granular days inducting it shows . See 6.8 Linked - Single sample for such of parameters	Se 6A bucketer en unité of la la la la la la la la la la la la la
64.20 68 68.1 68.2 7	Stadient N Stadient Stadient S	Workshop (balancy, printing press, etc.) and domained the domained the domained and scheme the domained the domained and scheme faith and sche	179 Indor al 1629 Indor al 1629 Indor al 1799 Indor al 1629 Indor al	NR R NR NR NR NR NR NR NR NR	us 2.9	Offse and start leafing ware investigated damp in right in this data of relations and a systematic structure. Shoring on relations of the fact damp in the system of the s	Sender, 3 Socialization See 61 Sender, 2 Socialization 2 Socialization 2 Socialization 3 Socialization 2 Socialization 2 Socia	dening dening Sparate Sparate Sparate sch Sector sch Sector sch Sector Sparate sch Sector Sparate Sp	NR See 68.3-69.2 : NR NR See 7.3-7.5	NR See 61.1-65.2 NR NR See 7.1-7.5	NR 500 68.1 68.2 50 NR 500 7.1.7.5 5	ND ND ND ND ND	17 5ee 68.1 48.2 5 1 5ee 7.1 7.3 5 9.4	NR NR 1931 (1932) 544 (1931) NR NR NR NR NR NR	ng/m3 68.3 See 68.1-48.2 ng/m4 ng/m5 7.5 See 7.1-7.5 ng/m3	NK 2 See 61.168.2 NR NR See 7.1.7.3	NR 5ee 60.140.2 NR NR 5ee 7.1.7.5	NR See 68.148.2 NR See 7.1-7.3	NI 540 68.1 68.2 NI 540 7.3 7.5 540 7.3 7.5	NR See 65.1 66.2 NR See 7.1 7.5	NI 500 (8.148.2 NI NI 500 7.1.7.5	See GA Hondersdamen and an offer see approximate of the second ee 6A Outsette ender setter s	See &A Linkle damage and the second of the second and a provide second on the second of the second approximation of the second of the See &A See &A Linkle 4 - Segin second or second of more different inductions of second of providence inductions of second of See 7.0	Sea 64       Indexingence ranging of control of the sea of t	
64.20 68 68.2 7 7.1	Standard, 2005 A. Scaland, 2005 A. Scaland, 2005 A. Scaland, 2005 A. Standard, 2005 A. Hartmann M. Automatik A. National A. Automatik	Vorbaheng (pakare, private generation) and externation and exceeded the second and	TCP Index al TCP Index al TCP Index al TCP Index al TCP Index al TCP Index al	NR NR NR NR NR Polycorebuse classification classifi	we st .0         The spin set of storage sto	Offse and stars lacking and single and stars lacking and stars lac	Senden, 3 Socialization See 61 Senden, 2 Socialization 2 Socialization See 7.3 Socialization See 7.3 Socialization See 7.3 Socialization See 7.3 Socialization See 7.3 Socialization See 7.3 Socialization See 7.3	barg barg Sparati sensitive sensitive sensitive sensitive licelari licelari licelari licelari licelari licelari and barbad and barbad sensitive and barbad sensitive and barbad sensitive and barbad sensitive and barbad sensitive and barbad sensitive and barbad sensitive and barbad sensitive and barbad sensitive and barbad sensitive sensitive and barbad sensitive sensitive and barbad sensitive sensi	56 56 (13. 14.2 56	NR See 61.148.2 NR See 7.1-7.3	NR See 66.146.2 Sa NR NR See 7.17.3 S	ND ND ND ND See 7.1.7.5 ND	27 3 1 5 see 7.3 7.5 5 5 4 5 4	NE NE 10.1.40.2 See 05.1 NE NE NE NE NE NE NE NE	ng/m3 84.1 See 68.1.68.2 ng/m3 7.5 See 7.1.7.5 ng/m3	53 1 10 03 06 3 50 7 3 5 3 50 7 3 5 3 50 7 5 5 50 7 5 50 7 5 50 7 5 50 7 5 50 7 5 50 7 5 50 7 5 50 7 5 50 7 5 50 7 5 50 7 5 50 7 50 7	53 54 (13. 45.2 54 7.3.3 54 7.3.3 54 7.3.3	58 68.1 48.2 58 68.1 48.2 58 7.1 - 7.3 0.35	500 51682 500 683 682 500 583 682 500 583 683 500 583 682 500 580 583 682 500 580 580 500 580 580 580 500 580 580 580 500 580 580 580 500 580 580 580 500 580 580 580 580 580 500 580 580 580 580 580 580 580 580 580	NR See 61.5 66.2 NR See 7.1.7.3 NR	NI See 68.148.2 NI See 7.1.7.3 NI	See 4. Instead of the second	See 6.4 Anatomic of the second secon	See 6.4. Under demonstrations, Practicito de adapté instructions, Practicito de adapté instructions, Practicito de data see 6.8. See 6.8. Londo - Seage auroja for each of more de- Seage auroja for each of more de- Seage auroja for each of more de- Seage auroja for each of more de- Seage auroja for each of more de- Seage auroja for each of see 7.8. See 7.8.	See 6.4       Insurging integration of the sector of the sect
64.20 68 68.2 7 7.1 7.2	Start and to the start and to the start and to the start and the star	Workshop (paker, printing press) - and demonstration and demonstration and determined demonstration (paker) determined de	TCP     Indust all       TCIP     Indust all       TCIP     Indust all       TCIP     Indust all       TCIP     Indust all       TCIP     Indust all       TCIP     Indust all       TCIP     Indust all       TCIP     Indust all       TCIP     Indust all	NI NI NI NI NI NI NI NI NI NI NI NI NI N	w t.2       The draw to th	Offse and stars labeling users have spreading and spreadin	Senden, 3 Socialization, 540 61 Socialization, 2 Socialization,	barg barg Sparata sens barata and barata sens barata and barataa and barataaa and barataa and bar	60 54:41.41.2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	84 94 96 1. 1 48. 2 10 10 10 10 10 10 10 10 10 10 10 10 10	30. 30.001.01.01.01 10. 10. 10. 10. 10.	ND ND ND SSEP 7.3.7.5 ND 6.1 NR	27 3 3 5 5 6 8 8 8 7 8 7 8 7 8 8 8 8 8 8 8 8 8 8 8	NK NK NG 63.66.2 64 66.1 NK NK NK NK NK NK NK NK	ng/m3 18.2 See 60.140.2 ng/m3 ng/m3 ng/m3	00 100 100 100 100 100 100 100	83 849 (43.44.22 93 93 849 7.3.73 93 93 93 93 94 94 94 94 94 94 94 94 94 94 94 94 94	88 500 68.1 48.2 NR 800 7.1 7.3 0.35 0.35	NI See 68.1 68.2 NI NI See 7.1.7.5 ng/m3	NR See 61. 44.2 NR NR See 7.3.7.3 NR	м See 68.148.2 м м See 7.1.7.5 м м	See GA Linkersteining for specific spe	Se 6.4 Andrew Service	See 6.3 Understandingen, Parkelin of english parkelinking fortunes. See 6.8 See 6.8 Under S-Singto sample for each of marging fortunes. See 7.0 See 7.0	State       Insufficient of the state of the

7.5	Hartman al., 2004	n et NR	Electronic store	s TCEP	Indoor air	polyurethane foams in upholitery and plastics in electronic equipment	See 7.0	The air samples were collected on polyurethane for plags (PUTs) at a sampling rate of 41/min taken for 8th each, with the exception of the behater and electronics store 3 right samples with 6 and 34h of sampling time, respectively. The air stakes were placed to that they would be in the approximate breaking zone of people who would occupy those states.	am Switzerland, Zurich	3 1 store sampled 2 stores sampled	NR mce,	NR	NR	22	22	NR	NR	ng/m3	NŘ	NR	0.15	ng/m3	NR	Nit	See 7.0	See 7.0	See 7.0	See 7.0	
8	Fromme 2014a	et al., 2011 2012 (Now er to May)	- Daycare center	s TCEP	Indoor air, du	at NR	The aim was to investigate exposure to certain OPs to characterise exposure of vulnerable subjects of the population.	5m 1145 4 -	Germany, Bavaria, Berlin and North Rhine- Westphalia	See 8.1-8.5 See 8.1-	5 See 8.1-8.	5 See 8.1-8.5	See 8.1-8.5	See 8.1-8.5	See 8.1-8.5	Sec 8.1-8.5	Sec 8.1-8.5	See 8.1-8.5	See 8.1-8.5	Sec 8.1-8.5	5ee 8.1-8.5	See 8.1-8.5	See 8.1-8.5	See 8.14.5	Relevant to US childre < Spears in day care settings (significant percentage) Same analyses likely in US children as in these German children	n Relevance of dust and air measurements and absorption as indicates by urise metabolites. Perspective on comparison to analyte in air and dust, and perspective on percen- contributis to overall exposure from all possible sources. Also notes body load of OP even at this age.	N/A 4 5	Excellent: As per Fromme 2013 - both gaseous and particulate measurements. Excellent: use of Standard SIMI 2515 for validation of methodology1.0D = 1/2 LOD Good statistic with consideration of age and location variables	Ghildren provided a urine sample to cornelises with index at and dust samples. Urine multichelis sue de at conservations with the multiplen measures of a second second second second second relative controllution of exposure at day care to overall exposure
8.1	Fromme 2014a	rt al., 2011 2012 (Now er to	- Daycare centers	s TCEP	Indoor air	NR	see 8.0	Gaseous and particulates sampled with glass fiber filter followed by a PUF plog. A GGP sampler was used with a constant air flow of 3.5 L/min over anonymiately 6 hours	Germany, Bavaria, Berlin and North Bhine,	63 constru betweer 2011	ed NR 1885-	2.2	<0.20	<0.20	33	75	NR	ng/m3	NR	11	NR	NR	NR	NR	See 8.0	See 8.0	See 8.0	See 8.0	
8.2	fromme 2014a	May) et al., 2011 2012 (Now er to May)	- Daycare centeri	s TCEP	Dust	NR	see 8.0	ALK dost filter mounted on a sampler connected to vacuum cleaner, vacuumed for 5-10 minutes	Westphalia a Germany, Bavaria, Berlin and North Rhine- Westphalia	63 construi between 2012	ed NR 1885-	1,350	400	100	8,300	4,900	NR	ng/g Mean: (1.35 mg/kg) Median: (0.40 mg/kg) Bangs: (0.1.8.3 mg/kg) 95th: (4.9 mg/kg)	NR	63	NR	NR	NR	NIK	See 8.0	See 8.0	See 8.0	See 8.0	
9	Fromme 2014b	etal., NR	House	ter, tep Terpa	i, Dust	Electronic devices, upholatery, carpet, insultatic board	<ol> <li>Methodology comparison using GC-MS vs LC-MS/MS analysis. 2 on Determination of some BTRs is house dust to ge an indicator of the use of these chemicals in Germany and to assess the daily nondetary exposure to these subtances via the ingestion of dust.</li> </ol>	5ee 12.13.3 2) 24 2	Germany	See 9.1-9.3 See 9.1-	3 See 9.1-9.	5 See 9.1-9.3	See 9.1-9.3	See 9.1-9.3	See 9.1-9.3	Sec 9.1-0.3	Sec 9.1-0.3	See 9.1-9.3	Sec 9.1-9.3	Sec 9.1-9.3	See 9.1-9.3	See 9.1-9.3	See 9.1-9.3	See 9.1-0.3	Good for Metodology standards, and values reported relevant to general population in as well as Germany. Using intake default fr contact and or ingust will be relevant to toddlers.	Good for method compurison and consideration of US methods used in other papers. an,	Geod comparison of results from bot methods presented. But for dust instate calculations, median and 320 percentilia reported for dust communption from CA/SM mtHole LL(AMS, whicheven higher using median or 35% percentil IPA default values. Details of all analyse dust concentration values incomisteming reported, sometimes only for medial levels and net for all compoond. Details of instale parameters not presented.	Sampling from household vaccum as par Cermins sampling guidelines, but not vuideated against Dust Standard. Good t assessment of GC vs LC analytical systems400 analytical ious reporting is text with little use of labits or good presentation of result but, duta could be important for setting up BFRs dut consentration value distributions.	
9.1	Fromme 2014b	et al., NR	House	TBB	Dust	NR	See 9.0	Collected bags of vacuum cleaners regularly used in the house.	Germany, (Southern)	20 none	NR	4.2	<3.0	3	13.6	12.5	NR	ng/g	NR	*	3	ng/g	NŘ	NR	See 9.0	See 9.0	See 9.0	See 9.0	
9.2	Fromme 2014b	etal, NR	House	тарн	Dust	NR	See 9.0	Collected bags of vacuum cleaners regularly used in the house.	and Munich Germany Munich	20 none	NR	436	343	25	2,274	811	NR NR	ng/g	NR NR	20	1.5 NR	ng/g	NR NR	NR	See 9.0	See 9.0	See 9.0	See 9.0	
10	2014b Hutter et 2013	al., NR	Elementary sch	ools; TCEP	Indoor air PM10, PM2.5	NR S	Quratify indoor pollutin in elementary schools to explore the influence of indoor air pollution on health and cognitive performance.	the house.	Austria	See 10.1- See 10.1 10.5	10.5 See 10.1-3	5 See 10.1-10.5	5 See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	See 10.1-10.5	Young school children general populations of similar societies (including US).	in Useful for creating concentration distribution in dust are particulates in air.	Results for 36 samples reported as mean, max, min > LOQ for Dust and 9 PLoud P2.5 Provides detail for in creating distribution. Focus on few variables with multiple samples improves use quantitatively.	Good: Collection methods over durable e periods at multiple sites and over multiple seasons and 2 rooms pe building. Better than most strategies for	cognitive measurements made but not considered here.
10.1	Hutter et 2013	al., Sprin and f	g Elementary sch iall	ools; TCEP	Indoor air PM10	NR	see 10	Glass filter attached to Digital High Volume sample for PM2.5 and 10	r Austria	36 36 samp classroo 9 school	is, 2 NR is for	NR	141,000	<lod< td=""><td>4,700,000</td><td>NR</td><td>NR</td><td>ng/g Median: (141 mg/kg)</td><td>NR</td><td>35</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 10.0</td><td>See 10.0</td><td>See 10.0</td><td>samolina See 10.0</td><td></td></lod<>	4,700,000	NR	NR	ng/g Median: (141 mg/kg)	NR	35	NR	NR	NR	NR	See 10.0	See 10.0	See 10.0	samolina See 10.0	
10.2	Hutter et 2013	al., Sprin and f	g Elementary sch iall	ools; TCEP	Indoor air PM2.5	NR	see 10	Glass filter attached to Digital High Volume sample for PM2.5 and 10	r Austria	Spring a fall: PM 36 36 samp classroo 9 school	d is, 2 NR is for	NR	522,00	<lod< td=""><td>11,000,000</td><td>NR</td><td>NR</td><td>Range: (<lod- 4.700 ma/ka) ng/g Median: (522.0 mg/kg)</lod- </td><td>NR</td><td>35</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 10.0</td><td>See 10.0</td><td>See 10.0</td><td>See 10.0</td><td></td></lod<>	11,000,000	NR	NR	Range: ( <lod- 4.700 ma/ka) ng/g Median: (522.0 mg/kg)</lod- 	NR	35	NR	NR	NR	NR	See 10.0	See 10.0	See 10.0	See 10.0	
10.3	Hutter et 2013	al., Sprin and f	g Elementary sch all	ools; TDCPP	Indoor air PM10	NR	see 10	Glass filter attached to Digital High Volume sample for PM2.5 and 10	r Austria	Spring a fail: PMC 36 36 samp classroo 9 school Soring a	d 5 is, 2 NR is for d	NR	90,000	<lod< td=""><td>4,200,000</td><td>NR</td><td>NR</td><td>Hange: (<lod- 11.000 ma/kal ng/g (Mean: 90 µg/m3; Range: <lod-4200 µa/m3)</lod-4200 </lod- </td><td>NR</td><td>35</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 10.0</td><td>See 10.0</td><td>See 10.0</td><td>See 10.0</td><td></td></lod<>	4,200,000	NR	NR	Hange: ( <lod- 11.000 ma/kal ng/g (Mean: 90 µg/m3; Range: <lod-4200 µa/m3)</lod-4200 </lod- 	NR	35	NR	NR	NR	NR	See 10.0	See 10.0	See 10.0	See 10.0	
10.4	Hutter et 2013	al., Sprin and f	g Elementary sch iall	ools; TDCPP	Indoor air PM2.5	NR	see 10	Glass filter attached to Digital High Volume sample for PM2.5 and 10	r Austria	fall: PM 36 36 samp classroo 9 school	) is, 2 NR is for	NR	164,000	29000	16,000,000	NŘ	NR	ng/g (Mean: 164 µg/m3; Range: 29-	NR	35	NR	NR	NR	NR	See 10.0	See 10.0	See 10.0	See 10.0	
10.5	Hutter et 2013	al., Sprin and f	g Elementary sch all	ools TCEP	Dust	NR	see 10	Sampled classrooms in spring and fall; School personnel used industrial vacuum cleaner to provid dust samples.	Austria le	Spring a fail; PMC 36 samp classroo 9 school Spring a fail; PMC	d 5 rs, 2 NR rs for d 5	NR	2,500	<600	35,000	NR	NR	ng/g Median: (2.5 μg/m3) Range: (<0.6-35 μg/m3)	NR	36	NR	NR	NR	NİL	See 10.0	See 10.0	See 10.0	See 10.0	
n	Yang et a 2014	l., 2013 FebJ	i, Offices Apr	TCEP, TO TDCPP, T	P, Indoorair p	common office fumiture and electronic products	Collected suspended particles with different diameters in offices and analyzed the levels and characteristics of 10 OPFRs on the particles and preliminary exposur assessments were	Sampling device was placed near the center of the room, and sampling took place at 1 m above the ground. All adjacent doors were closed, but the windows were open, to simulate common condition during working bours. An Anderson eight-stage nonvabile catacity impacts with a back-op filter were employed to collect size segmented that at flow ra of 28.3 L/min sourg glass fiber filters.	China, Hangzhou mi as ate	See 11.1- See 11.1 11.4	114 See 11.1-1	4 See 11.1-11.4	5ee 11.1-11.4	See 11.1-11.4	See 11.1-11.4	See 11.1-11.4	See 11.1-11.4	See 11.1-11.4	See 11.1-11.4	See 11.1-11.4	See 11.1-11.4	See 11.3-11.4	See 11.1-11.4	See 11.1-11.4	Relevant to exposure OPTRs for general population in public spaces and some workplace and home/office environments	b) <u>Insighting</u> for considering findings or other studies where concentrations of analytes may be on particles and the imprance of vapor pressure on results.	Good graphics of findings but mean and distributions described in text fi concentrations. Tedious for use in quantitative assessments.	UPLC-MS/MS analysis + 4LDD-J/2 LDD Good particulate matter concentration method and distribution and correspondence to analyte concentration.	Segregation of analytes on MMAD (mae median aerodynamic diameter) - Clum TDCPP, TorP, TEHP, ~2.5 um Tnpp, TBEP, EHDPP Ops with low Vp aduction on saparticies, threfore may deposit in nanopharyngal aera during inhalation. NHAALTION ENDOSUMES calculated for diff particulate depositions
11.1	Yang et a 2014	l, 2013 Feb-7	, Offices Apr	TCEP	Indoor air	common office fumiture and electronic	See 11.0	See 11.0	China, Hangzhou	10 NR	NR	4.91	3.11	1.03	13.38	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 11.0	See 11.0	See 11.0	See 11.0	
11.2	Yang et a 2014	L, 2013 Feb-7	, Offices Apr	TCPP	Indoor air	products common office furniture and electronic	See 11.0	See 11.0	China, Hangzhou	10 NR	NR	24.2	7.76	0.83	81.04	NR	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 11.0	See 11.0	See 11.0	See 11.0	
11.3	Yang et a 2014	l., 2013 Feb-4	, Offices Apr	TPP	Indoor air	oroducts common office furniture and electronic	See 11.0	See 11.0	China, Hangzhou	10 NR	NR	2.09	1.41	0.25	10.21	NR	NR	ng/m3	NR	NR	NR	NR	NŘ	NR	See 11.0	See 11.0	See 11.0	See 11.0	
11.4	Yang et a 2014	l., 2013 Feb-4	, Offices Apr	TDCPP	Indoor air	products common office furniture and electronic	See 11.0	See 11.0	China, Hangzhou	10 NR	NR	2.25	0.63	0.04	14.3	NŘ	NR	ng/m3	NR	NR	NR	NR	NR	NR	See 11.0	See 11.0	See 11.0	See 11.0	
12	Kanazaw al., 2010	a et 2006 2007 Jan	- Houses ; Oct-	TCEP, TES	, Indoorair p	oroducts building materia (waltı, cellings), curtains	Is The aim of this study we to evaluate the levels of servivalatile compound (SVOCs) in exidential detached houses in Sapporo, Japar, and whether exposure to these SVOCs was associated with the development of building related symptoms aime sick house symptome	n See 22.1-22.22 N	Japan, Sapporo	See 12.1- See 12.1 12.12 12.12	See 12.1-12	12 See 12.1-12.1	2 See 12.1-12.12	See 12.1-12.12	See 12.1-12.12	See 12.1-12.12	See 12.1-12.12	See 12.1-12.12	See 12.1-12.12	See 12.1- 12.12	See 12.1-12.12	See 12.1-12.12	See 12.1-12.12	See 12.1-12.12	Relevant to construct of range of Rs in buildings under different variables for general populations of all ages. Includes phosphate triesters.	on Factors contributing to exposure differences considered for general buildings and conditions. These consisted to health of inhabitants and SVOC concentration	Limited: Detection rates and concentrations given as combined concentrations of gaseous and particular phases. Median and ranges (P Max, Min) reported for n samples. Details of due for multi- surface and floor given as median and gauge of n samples	Descriptions of analytic methodology limited.	al relationship to 553/345 not considered here. Also no comment on health effects methodology or quality.
12.1	Kanazaw al., 2010	et 2006 2007 Jan	- Houses , Oct-	TCEP	Indoor air	building materia (walls, ceilings), curtains	(505). Is See 12.0	Air sampling was performed at a height of 1.0–1.5 from a floor and about 1 m from a wall. 47-mm Empore Disks CI8 extractio disks were used in a	m Japan, Sapporo	41 none	NR	NR	15.5	-MDL	297	NR	NR	ng/m3	NR	60%	NR	NR	12.6	ng/m3	See 12.0	See 12.0	See 12.0	See 12.0	
12.2	Kanazaw al., 2010	et 2006 2007 Jan	- Houses , Oct-	TEP	Indoor air	building materia (walls, ceilings), curtains	ls See 12.0	vectors participation are passing intrough at 200 mil/min for 48 hours. Air sampling was performed at a height of 1.0–1.5 is from a floor and about 1 m from a wall-47-mm Empore Disk C18 extracted olds were used in a vacuum pump with air passing through at 200 mil/min for 48 hours.	m Japan, Sapporo	41 none	NR	NR	62.3	18.1	511	NR	NR	ng/m3	NR	100%	NR	NR	5.1	ng/m3	See 12.0	See 12.0	See 12.0	See 12.0	

12.3	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses 2-	TDCPP	Indoor air	building materials (walls, ceilings), curtains	5ee 12.0	Air simpling was performed at a height of 1.0–1.5 from a floor and about 1 m from a wall.47-mm Empore Disks C18 extractio disks were used in a vacuum pump with air passing through at 200	m Japan, Sapporo	41	none	NR	NR	<mdl< th=""><th><mdl< th=""><th>61.4</th><th>NR</th><th>NR</th><th>ng/m3</th><th>NR</th><th>37.50%</th><th>NR</th><th>NR</th><th>11.5</th><th>ng/m3</th><th>See 12.0</th><th>See 12.0</th><th>See 12.0</th><th>See 12.0</th></mdl<></th></mdl<>	<mdl< th=""><th>61.4</th><th>NR</th><th>NR</th><th>ng/m3</th><th>NR</th><th>37.50%</th><th>NR</th><th>NR</th><th>11.5</th><th>ng/m3</th><th>See 12.0</th><th>See 12.0</th><th>See 12.0</th><th>See 12.0</th></mdl<>	61.4	NR	NR	ng/m3	NR	37.50%	NR	NR	11.5	ng/m3	See 12.0	See 12.0	See 12.0	See 12.0
12.4	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses 3-	TPP	Indoor air	building materials (walls, ceilings), curtains	See 12.0	mi/min for 48 hours Air sampling was performed at a height of 1.0–1.5 in from a floor and about 1 m from a wall. 47-mm Empore Disks C18 extractio disks were used in a	m Japan, Sapporo	41	none	NR	NR	<mdl< td=""><td><mdl< td=""><td>17.5</td><td>NR</td><td>NR</td><td>ng/m3</td><td>NR</td><td>37.50%</td><td>NR</td><td>NR</td><td>4.8</td><td>ng/m3</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td></mdl<></td></mdl<>	<mdl< td=""><td>17.5</td><td>NR</td><td>NR</td><td>ng/m3</td><td>NR</td><td>37.50%</td><td>NR</td><td>NR</td><td>4.8</td><td>ng/m3</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td></mdl<>	17.5	NR	NR	ng/m3	NR	37.50%	NR	NR	4.8	ng/m3	See 12.0	See 12.0	See 12.0	See 12.0
12.5	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses 1-	TCEP	Dust, floor	NR	See 12.0	vacuum pump with air passing through at 200 Dust samples were collected using a vacuum cleans (National HC-V15, Matsushita Electric Works, Ltd.,Osaka, Japan) equipped with a paper dust bag.	er Japan, Sapporo	41	Samples from all over floor	NR	NR	7500	<mdl< td=""><td>308000</td><td>NR</td><td>NR</td><td>ng/g (7.5 mg/kg; 308 mg/kg)</td><td>NR</td><td>97.60%</td><td>NR</td><td>NR</td><td>1300</td><td>ng/g (1.3 mg/kg)</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td></mdl<>	308000	NR	NR	ng/g (7.5 mg/kg; 308 mg/kg)	NR	97.60%	NR	NR	1300	ng/g (1.3 mg/kg)	See 12.0	See 12.0	See 12.0	See 12.0
12.6	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses 1-	TEP	Dust, floor	NR	See 12.0	Dust samples were collected using a vacuum cleans (National HC-V15, Matsushita Electric Works, Ltd.,Osaka, Japan) equipped with a paper dust bag.	er Japan, Sapporo	40	Samples from all over floor	NR	NR	<mdl< td=""><td><mdl< td=""><td>2100</td><td>NR</td><td>NR</td><td>ng/g (2.1 mg/kg)</td><td>NR</td><td>20.00%</td><td>NR</td><td>NR</td><td>520</td><td>ng/g (0.52 mg/kg)</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td></mdl<></td></mdl<>	<mdl< td=""><td>2100</td><td>NR</td><td>NR</td><td>ng/g (2.1 mg/kg)</td><td>NR</td><td>20.00%</td><td>NR</td><td>NR</td><td>520</td><td>ng/g (0.52 mg/kg)</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td></mdl<>	2100	NR	NR	ng/g (2.1 mg/kg)	NR	20.00%	NR	NR	520	ng/g (0.52 mg/kg)	See 12.0	See 12.0	See 12.0	See 12.0
12.7	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses 1-	TDCPP	Dust, floor	NR	See 12.0	Dust samples were collected using a vacuum cleans (National HC-V15, Matsushita Electric Works, Ltd.,Osaka, Japan) equipped with a paper dust bag.	er Japan, Sapporo	41	Samples from all over floor	NR	NR	4000	<mdl< td=""><td>105000</td><td>NR</td><td>NR</td><td>ng/g (4 mg/kg; 105 mg/kg)</td><td>NR</td><td>73.20%</td><td>NR</td><td>NR</td><td>1200</td><td>ng/g (1.2 mg/kg)</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td></mdl<>	105000	NR	NR	ng/g (4 mg/kg; 105 mg/kg)	NR	73.20%	NR	NR	1200	ng/g (1.2 mg/kg)	See 12.0	See 12.0	See 12.0	See 12.0
12.8	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses 1-	TPP	Dust, floor	NR	See 12.0	Dust samples were collected using a vacuum cleans (National HC-V15, Matsushita Electric Works, Ltd.,Osaka, Japan) equipped with a paper dust bag.	er Japan, Sapporo	40	Samples from all over floor	NR	NR	0	٥	0	NR	NR	ng/g	NR	0.00%	NR	NR	490	ng/g (0.49 mg/kg)	See 12.0	See 12.0	See 12.0	See 12.0
12.9	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses a-	TCEP	dust, multi- surface	NR	See 12.0	Dust samples were collected using a vacuum cleane (National HC-V15, Matsushita Electric Works, Ltd.,Osaka, Japan) equipped with a paper dust bag.	er Japan, Sapporo	41	Samples from tops of doors, shelves,	NR	NR	9800	<mdl< td=""><td>70700</td><td>NR</td><td>NR</td><td>ng/g (9.8 mg/kg; 70.7 mg/kg)</td><td>NR</td><td>92.70%</td><td>NR</td><td>NR</td><td>1300</td><td>ng/g (1.3 mg/kg)</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td></mdl<>	70700	NR	NR	ng/g (9.8 mg/kg; 70.7 mg/kg)	NR	92.70%	NR	NR	1300	ng/g (1.3 mg/kg)	See 12.0	See 12.0	See 12.0	See 12.0
12.10	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses a-	TEP	dust, multi- surface	NR	See 12.0	Dust samples were collected using a vacuum cleane (National HC-V15, Matsushita Electric Works, Ltd.,Osaka, Japan) equipped with a paper dust bag.	er Japan, Sapporo	40	Samples from tops of doors, shelves,	NR	NR	<mdl< td=""><td><mdl< td=""><td>2100</td><td>NR</td><td>NR</td><td>ng/g (2.1 mg/kg)</td><td>NR</td><td>30.00%</td><td>NR</td><td>NR</td><td>520</td><td>ng/g (0.52 mg/kg)</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td></mdl<></td></mdl<>	<mdl< td=""><td>2100</td><td>NR</td><td>NR</td><td>ng/g (2.1 mg/kg)</td><td>NR</td><td>30.00%</td><td>NR</td><td>NR</td><td>520</td><td>ng/g (0.52 mg/kg)</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td><td>See 12.0</td></mdl<>	2100	NR	NR	ng/g (2.1 mg/kg)	NR	30.00%	NR	NR	520	ng/g (0.52 mg/kg)	See 12.0	See 12.0	See 12.0	See 12.0
12.11	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses a-	TDCPP	dust, multi- surface	NR	See 12.0	Dust samples were collected using a vacuum cleane (National HC-V15, Matsushita Electric Works, Ltd.,Osaka, Japan) equipped with a paper dust bag.	er Japan, Sapporo	41	Samples from tops of doors, shelves,	NR	NR	22300	5800	127000	NR	NR	ng/g (22.3 mg/kg; 5.8 mg/kg; 127	NR	100.00%	NR	NR	1200	ng/g (1.2 mg/kg)	See 12.0	See 12.0	See 12.0	See 12.0
12.12	Kanazawa e al., 2010	t 2006- 2007, Oc Jan	Houses 1-	TPP	dust, multi- surface	NR	See 12.0	Dust samples were collected using a vacuum cleane (National HC-V15, Matsushita Electric Works, Ltd.,Osaka, Japan) equipped with a paper dust bag.	er Japan, Sapporo	40	cupboards, Samples from tops of doors, shelves, curboards	NR	NR	0	٥	0	NR	NR	ng/sg)	NR	0.00%	NR	NR	490	ng/g (0.49 mg/kg)	See 12.0	See 12.0	See 12.0	See 12.0
13	Dodson et a	L, 2005 &	Houses	тсер, тври	Dust	furniture,	Dust collected in 16	See 13.1-13.16	United	see 13.1-	See 13.1- See	13.1-13.16 See	13.1-13.16 5	NR 13.1-13.16 S	ee 13.1-13.16 S	w 13.1-13.16 Se	e 13.1-13.16 S	iee 13.1-13.16	See 13.1-13.16 Se	13.1-13.16	See 13.1- 1	See 13.1-13.16	See 13.1-13.16	See 13.1-13.16	See 13.1-13.16	General population	Shows changes in	Very Good detail of results incl.	Very Good: Sampling Measurement at two time periods
	2012	2011		TBB, TBBPA TPP, TDCPP	•	electronics, carpet	California homes in 2006 and 2011 were analyzed for BFRs and OPFRs and 13 legacy chemicals for inference on mixtures and potential sources to characterize FR chemical in homes over time.		States, California, San Francisco Bay Area	13.16	19.16										13.16					exposures retrospectively (before regulations) and current for BRFs and OPFRs	analytes over time in house dant suggesting chaning sources and/or use in products and/or emission rates	%xQQ and individual analytes Good presentation of data for quantitative use in building concentration distributions.	methodology standardiad and anges for the investigation of changes standardinad and parket, such talkay serificit QA. Molifaja sample appropriate ange the standard standard standard appropriate anges standard standard standard standardiad standard
13.1	Dodson et a	1., 2006	Houses	TCEP	Dust	famiture,	See 13.0	Samples were collected by trained field staff using	a United States,	16	houses	NR	NR	5100	610	160000	NR	NR	ng/g	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
	2012					electronics, carpet	t	Euroka Mighty-Mite vacuum cleaner fitted with a specially designed PTFE Tellon creates tool attachment modified to collect dust into a cellulosi estraction thimble (19 × 80 mm). Samples were collected by Johny dragging the creates tool for approximately. 30 min over surfaces in the living areas of the borne.	California, San Francisco e Bay Area																				
13.2	Dodson et a 2012	I., 2011	Houses	TCEP	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	2700	330	110000	NR	NR	ng/g	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.3	Dodson et a 2012	I., 2006	Houses	тав	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	48	4	740	NR	NR	ngig	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.4	Dodson et a 2012	I., 2011	Houses	TBB	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	100	45	5900	NR	NR	ng/g	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.5	Dodson et a 2012	I., 2006	Houses	тарн	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco	16	houses	NR	NR	140	36	1900	NR	NR	ngig	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.6	Dodson et a 2012	I., 2011	Houses	тарн	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	260	4	3800	NR	NR	ngig	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.7	Dodson et a 2012	I., 2006	Houses	TPP	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	3000	580	14000	NŘ	NR	ns/s	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.8	Dodson et a 2012	I., 2011	Houses	TPP	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	2800	790	36000	NŘ	NR	ns/s	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.9	Dodson et a 2012	I., 2006	Houses	TEP	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	28	<20	410	NR	NR	ng/g	NR	56%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.10	Dodson et a 2012	I., 2011	Houses	TEP	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	<20	<20	250	NR	NR	ngrig	NR	31%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.11	Dodson et a 2012	I., 2006	Houses	TCPP	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	2100	340	120000	NR	NR	ngig	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.12	Dodson et a 2012	I., 2011	Houses	TCPP	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	2200	490	140000	NR	NR	ngig	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.13	Dodson et a 2012	I., 2006	Houses	TDCPP	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	2800	730	24000	NR	NR	ng/g	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.14	Dodson et a 2012	I., 2011	Houses	TDCPP	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	2100	920	4400	NR	NR	ng/g	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.15	Dodson et a 2012	I., 2006	Houses	TBBPA	Dust	fumiture, electronics, carpet	See 13.0	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	260	<10	3400	NR	NR	ng/g	NR	94%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0
13.16	Dodson et a 2012	I., 2011	Houses	TBEPA	Dust	fumiture, electronics, carpet	See 13.0 t	See 13.1	United States, California, San Francisco Bay Area	16	houses	NR	NR	200	22	2000	NR	NR	ng/g	NR	100%	NR	NR	NR	NR	See 13.0	See 13.0	See 13.0	See 13.0

14	Fang et al., 2013	2009	Mouses and cars	TCEP	Dust	polyurethane feam (FUF) int bahy product cans and furnitum	The goals of this study were: (1) to proprie and anticles (1) develops a commercial anticles (1) develops (1)	549 565 33 3 •	United States, Boston, MA	See 14.0- 14.3	See 14.0-14.3	See 14.0-14.3	See 14.014.3	See 14.0-14.3	See 14.0-14.3	5ee 14.5-14.3	See 14.0-14.3	See 14.0-14.3	See 14.0-34.3 S	ee 140-14.3 S	See 14.014.3	See 14.0-34.3	See 14.0-14.3	See 14.0-14.3		General population exposure to TCEP and the VG FRs.	Quantitative relationship bateven V6 FR and the TCP contamisert highly characteristics for FRs now in use.	Av, for a poslacita - 3D in each vite (house, car, baily products	Contemporary methodology and standards used.	TCP noted as in inputly in Vd and facad in homes, from and cas. The facad in homes, from and cas. The high one of VB in car interface.
14.1	Fang et al., 2013	2009	Houses	TCEP	Dust	fumiture	See 14.0	dust samples were collected using a Eureka Mighty- Mite vacuum cleaner (model 3670) and crevice tool attachment. House dust samples were obtained in the backnown from 20 Buckton (MA)	United States, Boston, MA	20	houses	NR	NR	50.2	<20	1350	NR	NR	ng/g	NR	48%	NR	NR	NR	NR	See 14	See 14	See 14	See 14	
14.2	Fang et al., 2013	NR	Baby products	TCEP	foam	PUF	See 14.0	area houses during 2009. Foam analyzed from 12 products that previously were identified to contain V6.	United States, Boston, MA	12		3600000	NR	NR	1,100,000	5,900,000	NR	NR	ng/g	1600000	NR	NR	NR	NR	NR	See 14	See 14	See 14	See 14	Most detections were in nursing pillows but it was also detected in one sleep positioner, one portable mattress, and one baby carrier.
14.3	Fang et al., 2013	2009	cars	TCEP	dust	PUF	See 14.0	car dust, 20 samples were collected from the surface of the front and back seats of participants' cars. The information on the car manufacturer, production year, and sampling date were recorded.	es United States, Boston, MA	20	inside surfaces of 20 cars	NR	NR	1080	<20	50120	NR	NR	ng/g	NR	95%	NR	NR	NR	NR	See 14	See 14	See 14	See 14	
15	Stapleton e al., 2014	I NR	Mouses	TCIP, TBB TBP4,TBB , TDCPP	i, Dust and PA Handwipes	PUF in furniture and baby products	Objectives of the study were to: (1) examine the correlations between the study of the study of the event measured in house dust; (1) examine longitudinal associations to POE travels measured by the study association to POE travels measured the study of the study of the the same at of children dust, (1) determine appressimately the years appert, and (1) determine appert, appert, ee 211.33.20	United States, Boston, North Carolina	See 15.1- 15.10	See 15.1- 1 15.10	ee 15.1-15.10 :	See 15.3-15.10 :	See 15.1-15.10	See 15.1-15.10	See 15.1-15.10	See 15.1-15.10 S	iee 15.1-15.10	See 15.1-15.10 Se	w 15.3-13.10	See 15.1- 15.10	See 15.1-15.10	See 15.1-15.10	See 15.1-15.10	See 15.1-15.10	Important for parameters defining exposes assessment syoung children, especiality changes in and hand-to-mosth events. Shows longitu-dinal association	Important re: methodology for e stimating oral exposure from hand constact with surface house doct using handwige methodology handwige methodology house the dependent changes in house dust analyte levels	Results presented as geometric mass and range for sumplex with X- denset for each major. Good for quantitudive use.	Good methodology for sample starting, analytical method and tata evaluation. Shown lengthefaul associations . Results compared in NAST Standard SRM 2382	Study augents changes in children's behavior in adjusticant factors in changes and and an introduction constraints of a space of a second state of a space that for consider on the second state of the SMAN TO MONT the down that when is spontant to consider with age change.	
15.1	Stapleton e	2012,	Houses	TCEP	Handwipe	PUF in furniture	tanongen.	Mands wiped with sterile gauze wipe soaked in incommon stocked, complex taken from both branks	United States,	43	children	NR	NR	NR	24	197	NR	NR	ng/g	NR	47%	NR	NR	NR	NR	See 15.0	See 15.0	See 15.0	See 15.0	
15.2	Stapleton e al., 2014	2012, sring	houses	TCEP	Dust	and baby products PLF in famiture and baby products	See 15.0	Those of the second sec	Carolina d United States, North Carolina r	30	houses	NR	NR	NİL	20	6920	Nik	348	ngris	NR	100%	NR	NR	NR	NR	See 15.0	See 15.0	5ee 15.0	See 15.0	A short questionnaire was also administered during the home visit, which collected information on the time the child last washed their hands, how cfrent they washed their hands on average, and where the child spends most of his/her time. Once completed, the child's height and weight were also
15.3	Stapleton e al., 2014	2012, sring	Houses	тав	Handwipe	PUF in furniture and baby	See 15.0	Hands wiped with sterile gauze wipe soaked in isopropyl alcohol, samples taken from both hands.	United States, North	43	children	NR	NR	NR	<0.60	154	NR	4.1	ng/g	NR	93%	NR	NR	NR	NR	See 15.0	See 15.0	See 15.0	See 15.0	and the second s
15.4	Stapleton e al., 2014	2012, sring	houses	TBB	Dust	products PUF in furniture and baby products	See 15.0	Floor dust samples were taken in the room identifie by the parent as where the child spends most of higher time. The dust was collected on both hardwood and capstel discoving a vacuum cleans with a cellulous thimble inserted in the hose attachment until a sufficient amount (at least 100 mel had accoundured.	Carolina d United States, North Carolina ir	30	houses	NR	NR	NR	6	2430	NR	97	ngrig	NR	100%	NR	NR	NR	NR	See 15.0	See 15.0	See 15.0	See 15.0	
15.5	Stapleton e al., 2014	2012, sring	Houses	тарн	Handwipe	PUF in furniture and baby products	See 15.0	Hands wiped with sterile gauze wipe soaked in isopropyl alcohol, samples taken from both hands.	United States, North Carolina	43	children	NR	NR	NR	<0.70	116	NR	2.5	ng/g	NR	53%	NR	NR	NR	NR	See 15.0	See 15.0	See 15.0	See 15.0	
15.6	Stapleton e al., 2014	2012, sring	houses	тарн	Dust	PUF in furniture and baby products	See 15.0	Floor dust samples were taken in the room identifie by the parent as where the child spends most of highrer time. The dust was collected on both hardwood and carpeted floor using a vacuum clean with a cellulous thindhe inserted in the hose attachment until a sufficient amount (at least 100 mm heat acrumcilated	d United States, North Carolina Ir	30	houses	NR	NR	NR	82.9	20960	NR	604	ng/g	NR	100%	NR	NR	NR	NR	See 15.0	See 15.0	See 15.0	See 15.0	
15.7	Stapleton e al., 2014	2012, sring	Houses	TBBPA	Handwipe	PUF in furniture and baby products	See 15.0	Hands wiped with sterile gauze wipe soaked in isopropyl alcohol, samples taken from both hands.	United States, North Carolina	43	children	NR	NR	NR	<0.02	35	NR	0.4	ng/g	NR	70%	NR	NR	NR	NR	See 15.0	See 15.0	See 15.0	See 15.0	
15.8	Stapleton e al., 2014	2012, sring	houses	твера	Dust	PUF in furniture and baby products	See 15.0	Floor dust samples were taken in the room identifie by the parent as where the child spends most of higher time. The dust was collected on both hardwood and carpeted floor using a vacuum clean with a cellulous thimble inserted is the hose attachment until a sufficient around (at least 100	d United States, North Carolina er	30	houses	NR	NR	NR	<0.2	245	NR	7.9	ng/g	NR	76%	NR	NR	NR	NR	See 15.0	See 15.0	See 15.0	See 15.0	
15.9	Stapleton e al., 2014	2012, sring	Houses	TDCPP	Handwipe	PUF in furniture and baby	See 15.0	mai haid accumulated. Hands wiped with sterile gauze wipe soaked in isopropyl alcohol, samples taken from both hands.	United States, North	43	children	NR	NR	NR	a	530	NR	74.2	ng/g	NR	96%	NR	NR	NR	NR	See 15.0	See 15.0	See 15.0	See 15.0	
15.10	Stapleton e al, 2014	2012, sring	houses	TDCPP	Dust	products PUF in formiture and baby products	See 15.0	Floor dust samples were taken in the room identifie by the parent as where the child spends most of his/her time. The dust was collected on both hardwood and carpeted floor using a vacuum clean with a cellulous thimble inserted in the hose attachment until a sufficient amount (at least 100 mal had accumulated.	Carolina d United States, North Carolina ir	30	houses	NR	NR	NR	621	13110	NR	2730	ngrig	NR	100%	NR	NR	NR	NR	See 15.0	See 15.0	See 15.0	See 15.0	
16	Fan et al., 2014	NR	Urban homes	TCEP, TPP TCPP, TDC	, Dust pp	NR	The objectives of this sudy ware to develop an analytical method to simultaneourly measure the concentrations of 13 OPEs in indoor house dust, and then to compare fresh dust and household dust sampling determination of OPEs is settled indoor dust.	See 16.3.16.8	Canada	See 16.1- 16.8	See 16.1-16.8	See 16.1-16.8	See 16.1-16.8	See 16.1-16.8	See 16.1-16.8	See 16.1-16.8	See 16.1-16.8 5	See 16.1-16.8	See 16.1-16.8 5	ee 16.1-16.8 5	See 16.1-16.8	3ee 16.1-16.8	See 16.1-16.8	3ee 16.1-16.8	See 16.1-16.8	Two Important Points + Relevance: 1) Mathodology for collection and analysis 2) levels of 00 esten is urban houses in North America for general population exposure assents.	of Important conclusions re: sampling methodology and anathodology and Contribution to NIST standard SRM 2585 fee Contribution to NIST standard SRM 2585 fee Household dast. Comparisons of two different vacuum sampling methodologie and intra/lister day variations metables for consideration of other studies' metabology and impact on results	Excellent detail on results for quantitative use and relation to standards.	Excellent methodology presentation; Comparisons of two vacuum sampling techniques presented. Analysis: solvent extraction with sonication, solid phase extraction clearup, GC/PCI-MS/MS analysis with later and intra-day variations.	Cancelastinan Hausehald veccom dust bag collection sposiantens other standardised methods for collections cC/pCH-34/MS Parkby lists an Angliced for CP extens. Standards for NST SIM 2385
16.1	fan et al., 2	314 NR	Urban homes	TCEP	Dust	NR	See 16.0	Fresh Dust (1D) samples were collected by trained technicain form living areas (buditoons, living coms, livings, follow) says a Nutrain fold wacoum simpler, available and trains in the (bichard dust and exclude do how of add toor of a living of an extra section of a new where the householder don net vacoum the sampling areas for 1 week prior to 10 wacoum thesampling.	Canada L	134	fD method	NR	NR	800	-MDL	33000	4400	NŘ	ng/g -Median: 0.8 µg/g: Max: 33 µg/g 95th: 4.4 µg/g	NR	96%	NR	NR	70	ng/g (0.07 μg/g)	See 16.0	See 16.0	See 16.0	See 16.0	
16.2	Fan et al., 2	314 NR	House	TCEP	Dust	NR	See 16.0	Household dust (HD) were obtained from the vacuus systems used by the study participants as part of their regular house cleaning routine.	n Canada	134	HD method	NR	NR	600	-MDL	7000	3700	NR	ng/g - Median: 0.6 μg/g: Max: 7 μg/g; 95th: 3.7 μg/g	NR	95N	NR	NR	70	ng/g (0.07 µg/g)	See 16.0	See 16.0	See 16.0	See 16.0	

16.3	Fan et al., :	1014 NR	Houses	ТРР	Dust	nek	See 16.0	Firsh Dust (FD) samples were collected by trained technicians from large area (bedrooms, Naing coms, Nainaya, Chicol avieg a Varians Hist Inter, Naine (Chicol) avieg a Varians Hist Inter, autoroms, lasordar roms). J O consisted of active dust and excluded do blook dust foront in joints and cracks in flooring or in areas where the householder does not vaccuum an englarb basis. Protricipant advant or to vaccum the sampling areas for 1 week prior for D1 avient.	Canada 3	134 FD method	NR	NR	1700	260	63000	8900	NR	ng/g - Median: 1.7 µg/g: Mix 0.26 µg/g: Max: 63 µg/g: 95th: 8.9 µg/g	NR		NR	NR	200	ng/g (0.2 μg/g)	See 16.0	See 16.0	5ee 16.0	See 16.0	
16.4	Fan et al., i	1014 NR	Houses	TPP	Dust	NR	See 16.0	Household dust (HD) were obtained from the vacuum systems used by the study participants as part of their regular house cleaning routine.	Canada 3	134 HD method	NR	NR	1600	<mdl< td=""><td>9500</td><td>12000</td><td>NR</td><td>ng/g - Median: 1.6 µg/g: Max: 95 µg/g: 95th: 12 µg/g</td><td>NR</td><td></td><td>NR</td><td>NR</td><td>200</td><td>ng/g (0.2 μg/g)</td><td>See 16.0</td><td>See 16.0</td><td>See 16.0</td><td>See 16.0</td><td></td></mdl<>	9500	12000	NR	ng/g - Median: 1.6 µg/g: Max: 95 µg/g: 95th: 12 µg/g	NR		NR	NR	200	ng/g (0.2 μg/g)	See 16.0	See 16.0	See 16.0	See 16.0	
165	Fan et al., :	1014 NR	Houses	TCPP	Dust	NR	See 16.0	Fresh Dast (FD) samples were collected by trained technicins from linet areas budgetones, being sources samples, budgetones, being sources samples, budget set areas in the Dichness, bathrooms, launder rooms, J P Consisted of a colle source samples are an englar basis. Forticipant asked not to secour the sampling areas for 1 week prior to 10 supering.	Canada 3	134 FD method	NR	NR	1400	<mdl< td=""><td>56000</td><td>13000</td><td>NŘ</td><td>ng/g - Median: 1.4 µg/g: Max: 56 µg/g: 95th: 13 µg/g</td><td>NR</td><td>97%</td><td>NR</td><td>NŘ</td><td>10</td><td>ng/g (0.11 μg/g)</td><td>See 16.0</td><td>See 16.0</td><td>See 16.0</td><td>See 16.0</td><td></td></mdl<>	56000	13000	NŘ	ng/g - Median: 1.4 µg/g: Max: 56 µg/g: 95th: 13 µg/g	NR	97%	NR	NŘ	10	ng/g (0.11 μg/g)	See 16.0	See 16.0	See 16.0	See 16.0	
16.6	Fan et al., i	014 NR	Houses	TCPP	Dust	NR	See 16.0	Household dust (HD) were obtained from the vacuum systems used by the study participants as part of their regular house cleaning routine.	Canada 3	134 HD method	NR	NR	1100	<mdl< td=""><td>49000</td><td>9600</td><td>NR</td><td>ng/g - Median: 1.1 µg/g; Max: 49 µg/g; 95th: 9.6 µg/g</td><td>NR</td><td>96%</td><td>NR</td><td>NR</td><td>10</td><td>ng/g (0.11 µg/g)</td><td>See 16.0</td><td>See 16.0</td><td>See 16.0</td><td>See 16.0</td><td></td></mdl<>	49000	9600	NR	ng/g - Median: 1.1 µg/g; Max: 49 µg/g; 95th: 9.6 µg/g	NR	96%	NR	NR	10	ng/g (0.11 µg/g)	See 16.0	See 16.0	See 16.0	See 16.0	
16.7	Fan et al., i	1014 NR	Houses	TDCP9	Dust	NR	See 16.0	Fresh Day (H) samples were collected by triands technician (non line) mans (Bedronous L) leng rooms, Jahway, celfong) sates a Julimon het vaccom sampler, soliciting wet areas in the Blachens, bathrooms, laundry rooms). P to consisted of active dust and excluded do shore dust foront in joints and cracks in flooring or in areas where the householder does not vaccoum on a regular basis. Principant asked not to vaccoum the sampling areas for 1 week prior to TD sampler.	Canada 2	134 FD method	NR	NR	2700	120	7700	9000	NŘ	ng/g - Median: (2.7 μg/g) Range: (0.12-77 μg/g) 95th: (9 μg/g)	NR	100%	NR	NR	80	ng/g (0.08 μg/g)	See 16.0	See 16.0	See 16.0	See 16.0	
16.8	fan et al., i	1014 NR	Houses	TDCP9	Dust	NŘ	See 16.0	Mousehold dust (HD) were obtained from the vacuum systems used by the study participants as part of their regular house cleaning routine.	Canada 3	134 HD method	NR	NR	2000	110	101000	12000	NR	ng/g - Median: (2.0 μg/g) Range: (0.11-101 μg/g) 95th: (12 μg/g)	NR	100%	NR	NR	80	ng/g (0.08 µg/g)	See 16.0	See 16.0	See 16.0	See 16.0	
17	Kim et al., 2013	2008, August	Mouses	TCEP, TPP	Dust	Consumer products, waste dumping	The objectives of this study were to (1) provide background information on indoor contamination by PTRs in the Philippines and (2) estimate the noi- dietary exposure to PTRs, via duta ingestion for children and adolts, and (2) compare the nelative significance of nondistary exposures to that of PTR exposure from dietary (e.g., finh) sources.	5ee 17.137.4	Philippines, See Malate 2 (residential area) and Payatas (dumping area)	17.1- Sec 17.1-37.4 7.4	See 17.1-17.4	See 17.1-17.4	See 17.1-17.4	See 17.1-17.4 :	See 17.1-17.4 :	iee 17.1-17.4 S	ee 17.1-17 <i>.</i> 4	See 17.3-17.4 Se	en 17.1-17.4 S	iee 17.1-17.4 :	See 17.1-17.4	See 17.1-17.4	See 17.1-17.4	See 17.1-17.4	May be relevant to house dux load of PW in homes in developin coatties in this east, espourse considering activity profiles, hand- moath events and oth relationships between dux, food stronge, housing chatacteristic tock useful for general US population, May b useful for specific unique US community	limited utility s f to- er	Condend SUB of PFRs for comparison. One simple per die per houre limits quantitative utility.	LC-MS method One sample per site per house.	
17.1	Kim et al., 2013	2008, August	Houses	TCEP	Dust	NR	See 17.0	Floor dust samples were collected by vacuum cleaner bags used in each of the sampled house, which collected dust from the living room, kitchen, and bedrooms. We acked volunteers to use a new vacuum cleaner-bag for the sampling period, and a single vacuum cleaner bag was used for each home.	Philippines, Malate (residential area)	17 common residential area having no specific industrial pollution	NR	NR	34	<0.44	1200	Nit	32	ng/g	NR	NR	NR	NR	NR	NR	See 17.0	See 17.0	See 17.0	See 17.0	
17.2	Kim et al., 2013	2008, August	Houses	TCEP	Dust	NŘ	See 17.0	Floor dust samples were collected by vacuum cleaner bags used in each of the sampled house, which collected dust from the living room, kitchern, and bedrooms. We acked volumeners to use a new vacuum cleaner-bag for the sampling period, and a single vacuum cleaner bag was used for each home.	Philippines,Pa yatas (dumping area)	20 municipal dumping area	NR	NR	16	<0.44	140	NR	6.4	ng/g	NR	NR	NŘ	NR	NR	NR	See 17.0	See 17.0	See 17.0	See 17.0	
17.3	Kim et al., 2013	2008, August	Houses	ТРР	Dust	NR	See 17.0	Floor dust samples were collected by vacuum cleaner bags used in each of the simpled house, which collected dust from the living room, bitcheru, and bedrooms. We asked volunteers to use a new vacuum cleaner-bag for the sampling period, and a single vacuum cleaner bag was used for each home.	Philippines, Malate (residential area)	17 common residential area having no specific industrial pollution	NR	NR	80	8.5	2100	NR	110	ne/e	NR	NR	NŘ	NR	NR	NR	See 17.0	See 17.0	See 17.0	See 17.0	
17.4	Kim et al., 2013	2008, August	Houses	TPP	Dust	NR	See 17.0	Floor dust samples were collected by vacuum cleaner bags used in each of the sampled house, which collected dust from the living room, bitcheru, and bedtoorns. We asked volunteers to use a new vacuum cleaner-bag for the sampling period, and a single vacuum cleaner bag was used for each home.	Philippines,Pa yatas (dumping area)	20 municipal dumping area	NR	NR	71	13	440	NR	73	ng/g	NR	NR	NR	NR	NR	NR	See 17.0	See 17.0	See 17.0	See 17.0	
18	Araki et al. 2014	. 2006, Sept-De	Houses	TCEP, TEP, TDCPP, TP	Floor, P Multi surface	PUF, textiles, furniture, baby	This paper determined the levels of PTRs in	See 18.1-18.8	Japan, See Sapporo, 1	18.1- See 18.1-18.8 8.8	See 18.1-18.8	See 18.1-18.8	See 18.1-18.8	See 18.1-18.8	See 18.1-18.8	iee 18.1-18.8 S	ee 18.1-18.8	See 18.1-18.8 Se	ee 18.1-18.8 S	iee 18.1-18.8	See 18.1-18.8	See 18.1-18.8	See 18.1-18.8	See 18.1-18.8	May be relevant to th era in Japanese house	t Methodology and site characteristics limit	Median, 25th and 75th percentiles reported for n samples of each	GC-FPD analysis differe than comparative	nt Methodology for epidemiology aspects and correlations with health effects not
					dust	products	house dust and investigated the realationships between PIR levels and the prevalence of asthma and alternise	1	Fukushima, Nagoya, Osaka, Okayama, and Fukuoka																May not apply to othe locations. Relevant to comparison of differen surface types.	<ul> <li>utility for representation of it results to this method other sites.</li> </ul>	analyte. s	studies, may account fo higher levels reported	<ul> <li>considered here. Results: higher levels of PFRs than reported in Europe, US, Asia-Pacific studies</li> </ul>
18.1	Araki et al. 2014	2006, Sept-De	Houses	TCEP	floor dust	NR	See 18.0	Dust samples collected using a hand held vacuum cleaner with a paper dust bag from all surfaces of the floor.	Japan, 3 Sapporo, Fukushima, Nagoya, Osaka, Okavama.	448 single family homes <7 yrs old	NR	NR	5830	<mdl< td=""><td>338450</td><td>NI</td><td>NR</td><td>ng/g Median: (5.83 μg/g) Max: (338.45 μg/g)</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td></mdl<>	338450	NI	NR	ng/g Median: (5.83 μg/g) Max: (338.45 μg/g)	NR	NR	NR	NR	NR	NR	See 18.0	See 18.0	See 18.0	See 18.0	See 18.0
18.2	Araki et al. 2014	2006, Sept-De	Houses	TCEP	Multi-surface dust	NR	See 18.0	Dust samples collected using a hand held vacuum cleaner with a paper dust bag from surfaces such as shivites, cupboards, frames, door frames, windowslits, TV sets, audio sets, personal computers, and interior materials such as wall and celling papers.	and Fukuoka Japan, 3 Sapporo, Fukushima, Nagoya, Osaka, Okayama.	120 single family homes <7 yrs old	NR	NR	8260	«MDL	2320000	NR	NR	ng/g Median: (8.26 µg/g) Max: (2320 µg/g)	NR	NR	NR	NR	NR	NR	See 18.0	See 18.0	See 18.0	See 18.0	See 18.0
18.3	Araki et al. 2014	2006, Sept-Di	Houses	TDCPP	floor dust	NR	See 18.0	Dust samples collected using a hand held vacuum cleaner with a paper dust bag from all surfaces of the floor.	and Fukuoka Japan, 3 Sapporo, Fukushima, Nagoya, Osaka, Okayama,	148 single family homes <7 yrs old	NR	NR	2,800	NR	864,040	NR	NR	ng/g Median: (2.8 μg/g) Mac (864.04 μg/g)	NR	NR	NR	NR	NR	NR	See 18.0	See 18.0	See 18.0	See 18.0	See 18.0
18.4	Araki et al. 2014	2006, Sept-Di	Houses	TDCPP	Multi-surface dust	NR	See 18.0	Dust samples collected using a hand held vacuum cleaner with a paper dust bag from surfaces such as shives, cupboards, frames, door frames, windowslik, IV sets, audo sets, percoal computers, and interior materials such as wall and celling papers.	and Fukuoka Japan, 3 Sapporo, Fukushima, Nagoya, Olaka, Okayama,	120 single family homes <7 yrs old	NR	NR	10,810	<mdl< td=""><td>593,140</td><td>NR</td><td>NR</td><td>ng/g Median: (10.81 μg/g) Max: (593.14 μg/g)</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td></mdl<>	593,140	NR	NR	ng/g Median: (10.81 μg/g) Max: (593.14 μg/g)	NR	NR	NR	NR	NR	NR	See 18.0	See 18.0	See 18.0	See 18.0	See 18.0
18.5	Ataki et al. 2014	2006, Sept-Di	Houses IC	TEP	floor dust	NR	See 18.0	Dust samples collected using a hand held vacuum cleaner with a paper dust bag from all surfaces of the floor.	and Fukuska Japan, 1 Sapporo, Fukushima, Nagoya, Osaka, Okayama,	148 single family homes <7 yrs old	NR	NR	<mdl< td=""><td><mdl< td=""><td>2,800</td><td>NR</td><td>NR</td><td>ng/g Max: (2.8 μg/g)</td><td>NR</td><td>NR</td><td>NŘ</td><td>NR</td><td>NR</td><td>NR</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td></mdl<></td></mdl<>	<mdl< td=""><td>2,800</td><td>NR</td><td>NR</td><td>ng/g Max: (2.8 μg/g)</td><td>NR</td><td>NR</td><td>NŘ</td><td>NR</td><td>NR</td><td>NR</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td></mdl<>	2,800	NR	NR	ng/g Max: (2.8 μg/g)	NR	NR	NŘ	NR	NR	NR	See 18.0	See 18.0	See 18.0	See 18.0	See 18.0
18.6	Araki et al. 2014	2006, Sept-De	Houses	TEP	Multi-surface dust	NŘ	See 18.0	Dust samples collected using a hand held vacuum cleaner with a paper dust bag from surfaces such as shalves, cupboards, firming, door firming, windowsilis, TV sets, audio sets, penschal computer, and interior materials such as wall and ceiling papers.	and Fukuoka Japan, 1 Sappero, Fukushima, Nagoya, Osaka, Osaka, Osayama, and Fukuoka	120 single family homes <7 yrs old	NR	NR	<mdl< td=""><td><mdl< td=""><td>3,310</td><td>NR</td><td>NR</td><td>ng/g Mac: (3.31 µg/g)</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td></mdl<></td></mdl<>	<mdl< td=""><td>3,310</td><td>NR</td><td>NR</td><td>ng/g Mac: (3.31 µg/g)</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td></mdl<>	3,310	NR	NR	ng/g Mac: (3.31 µg/g)	NR	NR	NR	NR	NR	NR	See 18.0	See 18.0	See 18.0	See 18.0	See 18.0

18.7	Araki et al., 2014	2006, Sept-Dec	Houses	TPP	floor dust	NR	See 18.0	Dust samples collected using a hand held vacuum cleaner with a paper dust bag from all surfaces of th floor.	Japan, Sapporo, Fukushima, Nagoya, Osaka, Okayama,	148 singl hom ald	le family ses <7 yrs	NR	NR	4,510	-MDL	245,080	NR	NR	ng/g Median: (4.51 μg/g) Max (245.08 μg/g)	NR	NR	NR	NR	NR	NR	See 18.0	See 18.0	See 18.0	See 18.0	See 18.0
18.8	Araki et al., 2014	2006, Sept-Dec	Houses	TPP	Multi-surface dust	NR	See 18.0	Dust samples collected using a hand held vacuum cleaner with a paper dust bag from surfaces such as shivker, cupboards, frames, door frames, windowall TV sets, audo such, personal computers, and interior materials such as wall and celling papers.	and Fukuoka Japan, Sapporo, Fukushima, Nagoya, Osaka, Okayama, and Fukuoka	120 singl hom old	le family nes <7 yrs	NR	NR	11,540	<mdl< td=""><td>889,180</td><td>NR</td><td>NR</td><td>Median: (11.54 µg/g) Max: (889.18 µg/g)</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>NR</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td><td>See 18.0</td></mdl<>	889,180	NR	NR	Median: (11.54 µg/g) Max: (889.18 µg/g)	NR	NR	NR	NR	NR	NR	See 18.0	See 18.0	See 18.0	See 18.0	See 18.0
19.0	Haumann ar Thumulia, 2002	nd 1996- 2006	Homes, schools commercial buildings	TCEP, TCPP	Dust	Foams, paints, mattresses, sealants	OP FR levels in house dust: results from German orgoing exposure study	See 19.1-19.10	Germany	See 19.1- See 19.10 19.1	19.1- See : 0	19.1-19.10 Se	e 19.1-19.10 Se	e 19.1-19.10 S	iee 19.1-19.10 S	ee 19.1-19.10 Se	e 19.1-19.10 See	e 19.1-19.10	See 19.1-19.10 See	19.1-19.10	See 19.1- 5 19.10	See 19.1-19.10	See 19.1-19.10	See 19.1-19.10	See 19.1-19.10	Pre 2004 uses in Germany. Use for retrospective exposur assessment for Germa -may not represent US	Dated study with samples from pre 2004 e comparing to 3999 and ny: 1982 date. Useful for longitudinal study of residues.	Lage sampling base; Results show 50th, 90th, 95th and max percentile across n samples	Dated analytical methodology.Uses German 2003 guidelines for vaccuming-after general cleaning 1 week prior. Only fine dust fractiss analyted ?? LOI for GC/MS analysis with .3-3 mg/kg.	Organotin methods and results not discussed her. s k hD
19.1	Haumann ar Thumalla, 2002	nd 1996- 2006	Homes, schools commercial buildings	TCEP	Dust	NR	see 19.0	Dast samples (1-5 g) were collected by vacuum cleaner collection following VVD publisher 4020 418. The dust collections ware performable there against were before sample collection. During this period, wards for the sample collection. During this period, wards collecting was allowed. The starting ware collected by industrial hyginistic, environmental homosomers, because of haukh complaints. Only the find dust factors ware analyzed.	Germany	1569 samı	ples	NR	NR	600	NR	330000	8400	NR	ng/g Median: (0.6 mg/kg) 95th: (8.4 mg/kg) Mae: (330 mg/kg)	NR	NR	nek	NR	NR	Nik	See 19.0	See 19.0	See 19.0	See 19.0	
19.2	Haumann ar Thumulla, 2002	nd 1996- 2006	Homes, schools commercial buildings	TCPP	Dust	neit	see 19.0	Dat simple (1-6 g) were callered by accum desare calcutes for directly VD painter 4500.8 (ii) The dut calcutes were parformed after a gener desaring of the weteries to be aben carrier do or one web shore sample calcutes. During this pards, actical catening was allowed. The samples were callected by industrial higginities, and homeowers, because of health compliants. Dury the fired dut factions were analyzed.	Germany	1337 sam	ples	NR	NR	1000	NR	470000	14000	NR	Median: (1 mg/kg) 95th: (14 mg/kg) Mac: (470 mg/kg)	NR	NR	nek	neit:	NR	NR	See 19.0	See 19.0	See 19.0	5ee 19.0	
19.3	Haumann ar Thumulia, 2002	vd 1996- 2006	Homes, schools commercial buildines	TCEP	Material samples	soft foams	see 19.0	Materials were analyzed to identify primary sources of previous findings in the dust and related emissions.	Germany	563		NR	NR	NR	NR	6400000	NR	NR	ng/g (6400 mg/kg)	NR	NR	NR	NR	NR	NR	See 19.0	See 19.0	See 19.0	See 19.0	
19.4	Haumann ar Thumulia, 2002	vd 1996- 2006	Homes, schools commercial buildings	TCEP	Material samples	paints/finishes	see 19.0	Materials were analyzed to identify primary sources of previous findings in the dust and related emissions.	Germany	563		NR	NR	NR	NR	840000	NR	NR	ng/g (840 mg/kg)	NR	NR	NR	NR	NR	NR	See 19.0	See 19.0	See 19.0	See 19.0	
19.5	Haumann ar Thumulia, 2002	vd 1996- 2006	Homes, schools commercial buildings	TCEP	Material samples	mattresses	see 19.0	Materials were analyzed to identify primary sources of previous findings in the dust and related emissions.	Germany	563		NR	NR	NR	NR	890000	NR	NR	ng/g (890 mg/kg)	NR	NR	NR	NR	NR	NR	See 19.0	See 19.0	See 19.0	See 19.0	
19.6	Haumann ar Thumulia, 2002	vd 1996- 2006	Homes, schools commercial buildings	TCEP	Material samples	foam sealants	see 19.0	Materials were analyzed to identify primary sources of previous findings in the dust and related emissions.	Germany	563		NR	NR	NR	NR	89000000	NR	NR	ng/g (89000 mg/kg)	NR	NR	NR	NR	NR	NR	See 19.0	See 19.0	See 19.0	See 19.0	
19.7	Haumann ar Thumulia, 2002	nd 1996- 2006	Homes, schools commercial buildings	TCPP	Material samples	soft foams	see 19.0	Materials were analyzed to identify primary sources of previous findings in the dust and related amissions	Germany	563		NR	NR	NR	NR	16000	NR	NR	ng/g (16 mg/kg)	NR	NR	NR	NR	NR	NR	See 19.0	See 19.0	See 19.0	See 19.0	
19.8	Haumann ar Thumulia,	nd 1996- 2006	Homes, schools commercial	TCPP	Material samples	paints/finishes	see 19.0	Materials were analyzed to identify primary sources of previous findings in the dust and related emissions	Germany	563		NR	NR	NR	NR	20000	NR	NR	ng/g (20 mg/kg)	NR	NR	NR	NR	NR	NR	See 19.0	See 19.0	See 19.0	See 19.0	
19.9	Haumann ar Thumulia,	nd 1996- 2006	Homes, schools commercial	TCPP	Material samples	mattresses	see 19.0	Materials were analyzed to identify primary sources of previous findings in the dust and related	Germany	563		NR	NR	NR	NR	16000	NR	NR	ng/g (16 mg/kg)	NR	NR	NR	NR	NR	NR	See 19.0	See 19.0	See 19.0	See 19.0	
19.10	Haumann ar Thumulia,	nd 1996- 2006	Homes, schools commercial	TCPP	Material samples	foam sealants	see 19.0	emeasons. Materials were analyzed to identify primary sources of previous findings in the dust and related	Germany	563		NR	NR	NR	NR	190000000	NR	NR	ng/g (190000 mg/kg)	NR	NR	NR	NR	NR	NR	See 19.0	See 19.0	See 19.0	See 19.0	
20	Ingerowski al., 2001	et NR	Poded homogen- ized sample from 20 buildings, most residences	TCEP, TCPP	Dust	wood preservative coatings, polyurethane mattresses, wal paper (glass fiber), polyurethane carpet backing, polyurethane foam, polyurethane foam fiber, floc	The study was initiated to 1) investigate the distribution of TCFP and TCFP using house dust to the samples as a matrix; 2) inter-laboratory comparisons of methodology and results from pooled sample. At	o See 20.1-20.6	Germany	See 20.1- See 20.6	20.1-20.6 See	20.1-20.6 Se	re 20.1-20.6 Sr	ee 20.1-20.6 5	See 20.1-20.6	See 20.1-20.6 S	ne 20.1-20.6 Se	ee 20.1-20.6	See 20.1-20.6 Se	e 20.1-20.6 5e	ee 20.1-20.6	See 20.1-20.6	See 20.1-20.6	See 20.3-20.6	See 20.1-20.6	general population exposure potential considering 2001 era insterior materials. Generally extrapolatec globally, but consider German home design.	Insightful for considerin source for CEP and TCCP and loading potential in dust gifter 2 week from 2020 era interior materials.	g USFUL presentation of data across distribution of data where Kore ach analyte in each lab.	Good methodology in 3 labs. Good sampling methodology. Use of internal standards compliance with 2001 guidance and standards opportunities.	Conclusions: Good correlations among 3 liebs. Source of TCP+ fourn, putting walpager; source of TCP+insulation, availant fearm: TCP TCP LIPUIS MEASURED IN 8 INTERIOR MATERIALS
20	Ingerouski al., 2001 Ingerouski al., 2001	et NR	Pooled homogen- ized sample from 20 buildings, most residences Pooled homogen- ized sample from buildings, mostly residences	тсер, тсер Фу тсер 20	Dust	wood preservative coatings, polyurethane mattresses, wal paper (gisser, wal paper (gisser, wal paper, and the second paper (gisser), polyurethane foam, foam, filter, filter, foam (filter, filter, sealing material accuutic calling coating. See 20	The study was initiating a provide the state of the state of the state distribution of TCP and the state of the state distributions of the state of the state based of the state of the state state of the state of the state of the state state of the stat	See 22.326 Conventional vacuum with filter from cleans with health publicate, result from 3 Microsoftware	Germany	See 20.1 See 20.6	20.1-20.6 See	920.1-20.6 Se	2230	re 20.1-20.6 5	See 20.1-20.6	54000	8800	670	ng/g Arith Mean: (2.23 ng/ng) Gao Mean: (6.67 ng/ng) Macri (6.4 ng/ng)	e 20.1-20.6 Se	nR	See 20.1-20.6	3ee 20.1-20.6 NR	See 20.3-20.6	See 20120.6	genati population engouure potentin considering 2003 era interior material Generally extrapolatée globally, tot consolution German home design. See 20.0	Insight for consider source for ICCP and TCCP and loading potential in dota after 2 week from 2001 era Interior materials.	IL USEFUE presentation of data across distribution of a values for each analyse in each tab.	Good methodologi n3 Jak. Good sampling methodology. Use of internal standards compliance with 2001 guidance and standards opportunities.	Conclusion: Bool completion, panel, the Source of Diro Source, panel, and the Source of Diro Source, and the Source of Diro Source, and the Source of Diro Source, Medicates in a Instituted Matthaus.
20 20.1 20.2	Ingerowski al., 2001 Ingerowski al., 2001 Ingerowski al., 2001	et NR it NR	Nodel homogen- und asmpti from 23 building, mot residences Prodech homogen- teri angel from 5 buildings, mostly residences Prodech homogen- und sampti from 5 buildings, mostly residences	20 TCEP	Dust Dust	wood preservative coatings, polycethare peoprefifese fiker, polycethare carget backing, polycethare carget backing, polycethare carget backing, form filter, filter, form filter, filter, casting, see 20	The study was killed bet ) invarigates their study of the study of the study to the study of the study of the study to the study of the study of the study term posted sample. See 20 See 20	<ul> <li>See 22.326</li> <li>Connectional account with their from clears with hardb publicity endows result hard big from clears with hardb publicity endows result hard big from clears with hardb publicity endows result hard big publicity endows result hard big publicity.</li> </ul>	Germany Germany	See 20.1 See 20.6	2 <b>0.1.20.6</b> See	20.1-20.6 54 NR	2230 2240	re 201-20.6 5	5ee 20.1-20.6 : NR	54000 1211000	m 20.1-20.6 Se 8800 7500	670 640	see 20.1.32.6         5e           ag/g, Arth	= 20.1-20.6 5e	NR NR	542 20.1 20.6	5ee 20.1-20.6 NR	5ee 20.3-20.6 NR NR	544 20130.6 NR	grend population opportung polaritis opportung polaritis interor makenila, globale, bot censider Generala home deeps. See 20.0	Insight for consider trans for 100 and potential in data field potential in data field week from 2005 era Intenior estimate.	UPT2 presentation of data across disclosures of values for each set any or each bit. See 200	Good methodologi or 1 dah. Good samping Lab. Good samping internal identication compliance with 2001 goldance and standards opportunities.	Canctaines: Bool ormalisme, munol. Sale Sareer 2019: So Human public subart Samer 1201 KO2 LINES MARCARED IN INTERIOR MARTINALS
20 20.1 20.2 20.3	Ingeroachi al, 2001 Ingeroachi al, 2001 Ingeroachi al, 2001	et NR et NR	Nodel homogen- tied sample form and sample form product form buildings, mostly residences Product homogen- tied sample from 3 buildings, mostly residences Product homogen- tied sample from 3 buildings, mostly residences Product homogen- tied sample from 3 buildings, mostly residences Product homogen- ties sample from 3 buildings, mostly residences Product homogen- ties sample from 3 buildings, mostly residences Product homogen- ties sample from 3 buildings, mostly residences Product homogen- ties sample from 3 buildings, mostly residences Product homogen- ties sample from 3 buildings, mostly residences Product homogen- ties sample from 3 buildings, mostly residences Product homogen- buildings, mostly residences Product homogen- product  homogen- homogen	TCEP         20           20         TCEP           20         TCEP           20         TCEP           20         TCEP           20         TCEP	Dust Dust Dust	wood presservoire polywethane matterwase, we polywethane for how campt backing for how campt backing for how campt backing for how for search and search a	The andress we billing of Torman and the second s	<ul> <li>Is at 21.25.6</li> <li>Converticitud vacuum with Thire from Games with hardth problems, results from 1 Meroscotrise and the problems, results from 1 Meroscotrise and the problems, results from 1 Meroscotrise Meroscotrised vacuum with Thire from Games with hardth problems, results from 1 Meroscotrise and the problems, results from 1 Meroscotrise</li> </ul>	Germany Germany Germany	541 lub 2 86 lub 2	20.1.20.6 See	NR NR	2230 2240 3750	Pait Nat	NR NR NR	54000 94000	# 20.1-20.6 5# #800 7500	670 640 850	see 201.326.6         5 e           mg/g Arith         Mase:           (2.13 mg/g)         (3.67 mg/g)           (3.67 mg/g)         Mase:           (3.67 mg/g)         (3.67 mg/g)           (3.67 mg/g)         Mase:           (3.64 mg/g)         (3.64 mg/g)           (3.64 mg/g)         Mase:           (3.65 mg/g)         Mase:           (3.64 mg/g)         Mase:           (3.65 mg/g)         Mase:           (3.65 mg/g)         Mase:           (3.65 mg/g)         Mase:           (3.65 mg/g)         Mase:           (3.65 mg/g)         Mase:           (3.65 mg/g)         Mase:           (3.65 mg/g)	20.1-20.6 5e	NR NR	542 20.1-20.6 NR NR	549 20.3 28.6 NR NR	544 20.3 20.6 NR NR	NR NR NR	green inpution considering 2013 of instance materials. See 20.0 See 20.0 See 20.0	ingleti de consiste COS and loading petersi no doa der to selector makeroli selector br>selector selector	UPT2 presentation of data across disclosus of a value back andyse in with Me. See 200 See 200	Good methodology in 1 methodology in 2 methodology in 2 m	Canctaines: Bool annual for the second secon
201 201 203 203	недитичный и, 2001 н. 2001 н. 2001 н. 2001 н. 2001 н. 2001 н. 2001 н. 2001 н. 2001	e NR e NR e NR	Noted homogen- solutions and an and a single from a contrast of the single from a builting, monty evidences Noted homogen- tices and sengle from a selections Noted homogen- tices and sengle from a selections Noted homogen- tices and sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle from a selection network of the sengle network of the sendle network of the sengle network network network of the sengle	тсар, тори 50 20 ТСАР 20 ТСАР 20 ТСАР 20 ТСАР 20 ТСАР 20 ТСАР 20 ТСАР 20 ТСАР	Dat Dat	wood working polyupedane materiaan, wang polyupedane p	The and year so biling of a line of the source of the sour	<ul> <li>I ar 21.25.6</li> <li>Convertednet vacuum with filter from clares with hashin problems; results from 1 Mercentries</li> <li>Convertednet vacuum with filter from clares with hashin problems; results from 1 Mercentries</li> <li>Convertednet vacuum with filter from clares with hashin problems; results from 1 Mercentries</li> <li>Convertednet vacuum with filter from clares with hashin problems; results from 1 Mercentries</li> </ul>	Gernany Gernany Gernany	23.6 km 2 23.6 km 2 541 km 2 216 km 3	2 2	NR NR	2230 2240 1750	NI NI NI	NR NR NR NR	54000 94000 13000	#20.3.0.5 54 #2000 12000	670 640 500	see 201.326.6         se           reg/g Arth         g/g Arth           (2.3)         se           (2.3)         se           (2.4)         se           (2.5)         se           (2.4)         se           (2.5)         se           (2.4)         se           (2.5)         se           (2.6)         se           (2.6)         se           (2.4)         se           (2.4)         se           (2.5)         se           (2.4)         se           (2.5)         se           (2.4)         se           (2.5)	NR NR	1933.35.6 1 1933 1935	542 20.1.20.6 Net Net	544 20.1.23.6 NR NR	NR NR NR	147 147 147	green legalation considering 2013 ( listeer en action), listeer en action), See 20.0 See 20.0 See 20.0 See 20.0	singht for consultant COC and basing petersin in site of the second seco	UPT2 presentation of data seems discharges of values of the second analysis of the second second second second Sec 200 Sec 200 Sec 200	Good methodology in a function of the second	Cardiante: Bool and Anton June 2 Handra Sancer (1977) Anton June 2 Handra Sancer (1977) Anton June 2 Handra Sancer (1977) Anton June 2 Handra Sancer (1977) Anton June 2 Handra June
20.1 20.2 20.3 20.4	недитичей «, 2001 надитичей ( 2003 и, 2003 надитичей ( 2003 и, 2003 надитичей ( 2003 надитичей ( 2003)	<ul> <li>NR</li> <li>NR</li> <li>NR</li> <li>NR</li> <li>NR</li> <li>NR</li> <li>NR</li> </ul>	Noted homogen- ality of the second se	1029, 1029 20 1029 20 1029 20 1029 20 1029 20 1029 20 1029 20 1029 20 1029	Dat Dat Dat	words windling. and/warks. and/warks. files. files. words words files. file	The address set billing of a list decision of the address of the a	te ze z z z z d      Granentizent uscom with filter frem denn with     insche publicer, results frem 1 Mercentien      Granentizent uscom with filter frem denn with     insche publicer, results frem 1 Mercentien      Granentizent uscom with filter frem denn with     insche publicer, results frem 1 Mercentien      Granentizent uscom with filter frem denn with     insche publicer, results frem 1 Mercentien      Granentizent uscom with filter frem denn with     insche publicer, results frem 1 Mercentien      Granentizent uscom with filter frem denn with     insche publicer, results frem 1 Mercentien	Comany Comany Comany Comany Comany	542 23.4. int int int int int int int int int int	1 1	NR NR NR NR	2230 2240 3750 2000	NR NR NR NR	NA NA NA NA NA	4400 11100 1000	#20.3.5.6 54 #200 7000 22000	670 640 500 330	الله         الله           الله </td <td>22.27.6 54</td> <td>1923.3.5.6. 1 1928 1928 1928</td> <td>447 31 32 43 447 447 447 447 447 447 447 447 447 4</td> <td>544 20.1.23.6 NR NR NR</td> <td>9 20 3 20 3 20 3 NR NR NR</td> <td>147 147 147 147 147 147 147</td> <td>arene input for a first second</td> <td>segata da constante (CO) and loading percenti is non alter 1 second in the constant is the 200 second secon</td> <td>UPT2 protection of data seek discharges of values of the seek and year on which See 200 See 200 See 200 See 200</td> <td>Good methodology in 1 international control of the international control of the international control of the international control of the international control of the exponentials. See 200 See 200 See 200</td> <td>Carcianos: Good amadema para ga Marcianos de Carco de Ca</td>	22.27.6 54	1923.3.5.6. 1 1928 1928 1928	447 31 32 43 447 447 447 447 447 447 447 447 447 4	544 20.1.23.6 NR NR NR	9 20 3 20 3 20 3 NR NR NR	147 147 147 147 147 147 147	arene input for a first second	segata da constante (CO) and loading percenti is non alter 1 second in the constant is the 200 second secon	UPT2 protection of data seek discharges of values of the seek and year on which See 200 See 200 See 200 See 200	Good methodology in 1 international control of the international control of the international control of the international control of the international control of the exponentials. See 200 See 200 See 200	Carcianos: Good amadema para ga Marcianos de Carco de Ca

	2012a	Note	TCEP	Dust	floor and mattre	ess Objectives are to measu concentrations of AFRs i indoor dust, and estimat exposure to todellers and adults via dust ingestion	re See 211-21.6 # # 5	New Zealand	See 21.1- 5 21.6	lee 21.1-21.6 See	121.1-21.6 Se	e 21.1-21.6 S	ee 21.1-21.6	See 21.1-21.6	See 21.1-21.6 5	iee 21.1-21.6 See	21.1-21.6 Se	ee 21.1-21.6 5	ee 21.1-21.6 Se	ee 21.3-21.6	See 21.1-21.6	See 21.1-21.6	See 21.1-21.6	See 21.1-21.6	Profiles of FR residues from mattress material vs general house floor dust. General populati exposure in living scenarios similar to Ne Zealand rural and urba	profiles of OPFR and s BFRs from mattresses w floor dust-infers m different sources Also, correctations between w replacement AFRs and h PBDE for that time	Results of this and other studies s presented as median, mean-SD, range. For samples of each or sum of analytes. USEFUL for quantitative assessments.	Good: GC-MS/ECNI GD/MS in El mode and valudated against NIST SRM 2585 standards	exposure assessment methods and conclusions presented by subthor for New Zealand population not considered as part of this review.
																									climate)				
21.1	Ali et al., 2012a NR	House	TCEP	Dust	floor	See 21	Nifisk Sprint Plus 1600W vacuum cleaner used on bare floors mes and carriet	New Zealand	34 N	NR	NR	NR	110	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 21.0	See 21.0	See 21.0	See 21.0	
21.2	Ali et al., 2012a NR	House	TCEP	Dust	mattress	See 21	Nifisk Sprint Plus 1600W vacuum cleaner used on bare floors. rues. and carpet.	New Zealand	16 N	NR	NR	NR	10	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 21.0	See 21.0	See 21.0	See 21.0	
21.3	Ali et al., 2012a NR	House	тав	Dust	floor	See 21	Nifrisk Sprint Plus 1600W vacuum cleaner used on bare floors, rugs, and carpet.	New Zealand, Wellington, Wairarapa	34 N	NR	NR	NR	4	2	2285	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 21.0	See 21.0	See 21.0	See 21.0	
								Christchurch and North Canterbury																					
21.4	Ali et al., 2012a NR	House	тав	Dust	mattress	See 21	Any mattress covers and under sheets were left on and mattress vacuumed evenly and thoroughly for dust collection	New Zealand, Wellington, Wairarapa	16 N	NR	NR	NR	3	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 21.0	See 21.0	See 21.0	See 21.0	
								Christchurch and North Canterbury																					
21.5	Ali et al., 2012a NR	House	тарн	Dust	floor	See 21	Nilfisk Sprint Plus 1600W vacuum cleaner used on bare floors, rugs, and carpet.	New Zealand, Wellington, Wairarapa	34 N	NR	NR	NR	12	2	640	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 21.0	See 21.0	See 21.0	See 21.0	
								Christchurch and North Canterbury																					
21.6	Ali et al., 2012a NR	House	тарн	Dust	mattress	See 21	Any mattress covers and under sheets were left on and mattress vacuumed evenly and thoroughly	New Zealand, Wellington, Wairarapa	16 N	NR	NR	NR	1	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 21.0	See 21.0	See 21.0	See 21.0	
								Christchurch and North Canterbury																					
22.0	Branduma et NR al., 2013	House, hotel,	motel TCEP	Dust	upholstered fumiture, foam napping equipment	Interlaboratory comparisons of results from standard samples to test quantitative measurements and control of lab contamination	5ee 22.1 o	Netherlands	NR S	iee 22.1 5	See 22.1	See 22.1	See 22.1	See 22.1	See 22.1	See 22.1 S	See 22.1	See 22.1	See 22.1	See 22.1	Sec 22.1	See 22.1	See 22.1	See 22.1	Methodology Study: Not useful for exposur assessment BUT very useful for consideratio of study data quality.	Perspective on potentia for intralaboratory contamination and on quantitative power of two analytical methods	il Mean and SD presented for n samples across different labs for different matrices.	Known aliquots of house dust in multiple matricer presented to multiple labs along with blanks and standards. Labs used contemporary extraction and analytic	<ul> <li>Conclusions: Some interlab variation on s quantitative results, but notable problems controlling intratab contarmination as evidenced by "blanks"</li> </ul>
22.1	Brandsma et NR al., 2013	House, hotel, i	motel TCEP	Dust	uphoistered furniture, foam napping	See 22	Composite reference dust from NIST (SRM2585), collected from vacuum cleaner bags	Netherlands	NR N	NR	NR	792	NR	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 22.0	See 22.0	See 22.0	methods. See 22.0	See 22.0
23.0	Brandsma et NR al., 2014	House	TCEP	Dust	electronics, polis carpet padding,	sh, 1) Comparison of results using GC-EI-MS vs LC-ESI	See 23.1-23.4	Netherlands	See 23.1- 5 23.4	See 23.1-23.4 See	23.1-23.4 Se	e 23.1-23.4 Se	ee 23.1-23.4	See 23.1-23.4	See 23.1-23.4	iee 23.1-23.4 See	23.1-23.4 Se	ee 23.1-23.4 Se	ee 23.1-23.4 Se	ne 23.1-23.4	See 23.1-23.4	See 23.1-23.4	See 23.1-23.4	See 23.1-23.4	General population exposures in house, ca	profile of car residues in dust similar to areas	n excellent detail of reported values and additional materials and details	Excellent methodology for sampling, analytical.	Conclusions: High variation between and within countries on reported OPFRs
					wall covering, upholstery,	MS/MS analytical methods; 2) continuation	n																		microenvironments in developed countries in	near electronics; comparisons of results	available in Supplemental Materials from author if accessed.	validation w SRM 2585 (at two concentrations)	in house dust; Probable sources of Ops iin car dust foam in seats and plastics in
23.1	Brandsma et NR	House	TCEP	Dust	Insulator	of longitudinal See 23	Collected using dustreamtm dust collector	Netherlands	NR a	round	NR	NR	1300	220	6900	NR	NR	NR	NR	NR	NR	NR	NR	NR	moderate to cool See 23.0	from 2 popular See 23.0	See 23.0	stitutical See 23.0	car interiors; car residues similar to
23.2	al., 2014 Brandsma et NR	House	TCEP	Dust	NR	See 23	Collected using dustreamtm dust collector	Netherlands	e NR o	electronics an electronics	NR	NR	800	520	2200	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 23.0	See 23.0	See 23.0	See 23.0	
23.3	al., 2014 Brandsma et NR	Car	TCEP	Dust	foam upholstry,	See 23	Collected using dustreamtm dust collector	Netherlands	NR fi	rom	NR	NR	2800	1100	5700	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 23.0	See 23.0	See 23.0	See 23.0	
23.4	al. 2014 Brandsma et NR al. 2014	Car	TCEP	Dust	interior plastics foam upholstry, interior plastics	See 23	Collected using dustreamtm dust collector	Netherlands	d NR fi	dashboard from seats	NR	NR	600	240	5600	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 23.0	See 23.0	See 23.0	See 23.0	
24	Markland et NR	Houses	TOPP	Dust	Building	This study was part of th	w See 241.245	Swadan	See 24 1. 5	lae 241.245 See	241.245 50	# 24 1.24 5 S	ee 24 1.24 5	See 24 1.24 5	See 24 1.24 5	ina 24 1.24 5 See	241.245 54	aa 24 1.24 5 5	ee 24 1.24 5 Se	ne 24 1.24 5	See 24 1.24 5	See 24 1.24 5	See 24 1.24 5	See 24 1.24 5	Relevant to	Standard monitoring	Individual measurements provided	Contemporary methods	Samalina from 15 indexe anxietements
24	Marklund at NR al., 2003	Houses	TCEP	Dust	Building materials, floor waxes, upholestry, electronic equipment	This study was part of th screaring to investigate the occurrence and sources of OPs in different environmental compartments. The purpose was to conduct serri-quantitative screaring analyses of OP from different indoor environments and investigate their distribution patterns.	n in 21.31.5 N	Sweden	See 24.1- 5 24.5	iee 24.1-24.5 See	:24.1-24.5 Se	*24.1-24.5 S	** 24.1-24.5	See 24.1-24.5 :	See 24.1-24.5 5	iee 24.1-24.5 See	: 24.1-24.5 Se	ee 24.1-24.5 Sr	ee 24.1-24.5 Se	w 24.1-24.5	See 24.1-24.5	See 24.1-24.5	See 24.1-24.5	See 24.1-24.5	Relevant to retropactive exposure assessments, considering Swedish climates, building and product characteristics Useful for retrospect view of differences in different environment	Standard monitoring	indvidual measurements provided for each sampling site (or1)	Contemporary methods for early 2000s	Sampling from 15 indion environments (data) and unique of computer concess and covers.
<b>24</b> 24.1	Markland et NR al., 2003	<b>Noues</b>	TCEP TCEP	Dust	Building materials, floor waxes, upholostry, selectonic equipment Boor mans, upholostry, selectonic	This study was pert of the screening to investigate the occurrence and more than the occurrence and occurrence and the occurrence and the occurrence and the purpose was to construct the occurrence and the occurrence of the occurrence and the screening and the occurrence and the occurrence and the occurrence occurrence and the occurrence occurrence occurrence and the occurrence	Yang See 21.3-35.5 N	Sweden Sweden	See 24.3- S 24.5 NR N	iee 24.134.5 See	124.1-24.5 See	w 24.1-28.5 Se	ee 24.1-24.5 :	5ee 24.1-24.5 :	See 24.1-24.5 1	iee 24.1-24.5 See	924.124.5 Se	ng/g	ee 24.1.34.5 5e NR	ee 24.1.24.5 NR	See 24.3-24.5	See 24.324.5	See 26.3-26.5 NR	5ee 24.1-34.5 Nit	Relevant to retrogenetive expours assessments, considenting sweddla climates, Subding and climates, Subding and Useful for retrospect useful for retrospec	Standard monitoring	Indeklauf measurments provided for each sampling site (e-1) 5ee 24.0	Containgoursy matched for early 2000s	Sampling from 13 Indices and sometime (data) and unique of computer screens and course.
24 24.1 24.2	Markkoud et NR Markkoud et NR al. 2003	Nouses Houses Work Edgeset	TCEP TCEP n TCEP and final	Dust Dust	Building material, floor water, water, equipment Building material floor material	This study was part of the screening to investigate the occurrence and	<ul> <li>See 21.3-26.5</li> <li>Vacuum classer lag collection, 2 houses</li> <li>Vacuum classer lag collection, secupt buttle fully and languid annumesses interplocked</li> </ul>	Sweden Sweden	See 24.1 - 5 24.5 NR h	See 24.134.5 See 41	24.1-24.5 See NR	* 24.1-24.5 5r NR	ne 24.1-24.5	5ee 24.1-24.5 *	5ee 24.1-24.5 : 0.19 48	ier 24.1.24.5 See NR NR	824.1-24.5 Se NR	ng/g ng/g	ee 24.1-24.5 5e NR	we 24.1.24.5 NR	5ee 24.1-24.5 NR	5ee 24.124.5 NR	5ee 24.1.24.5 NR	See 24.124.5	Relevant to netropactive exponen- constants, and the climeters, building and order of the association of the order of the association of the different environment See 24.0	Standard monitoring See 24.0 See 24.0	Indeklad mesuammeti provided for anti-sampling sile (o-1) See 24.0	Contemporary methods for early 2000s	Sampling from 15 Indian and sometime (data) and solgers of computer sources and norms.
24 24.1 24.2 24.3	Markhoot et 107 al. 2003 Markhoot et 107 al. 2003 Markhoot et 107 Markhoot et 107 Markhoot et 107	Houses Houses Work (daycare) hospital, radia hospital, radia hospital, radia	TCEP n, TCEP final filteral filt	Dust Dust Dust	Sudding makenda makenda setceonic equipment Budding material Budding mater	This study was part of the recenting the interplates ourses of OPAs and Constraints of the interplates and plates of the interplates and plates of the interplates of the interplates of the interplates of the interplates of the interplates distribution patterns.	<ul> <li>See 24.3-36.5</li> <li>Vecount cleaner lag collection, 2 houses</li> <li>Vecount cleaner lag collection, except statils slog and hospital samples were hospitable.</li> <li>Vecount cleaner lag collection</li> </ul>	Sweden Sweden Sweden	See 24.1 - 5 24.5 NR N NR N	160 24.134.5 See NT NT	24.1-24.5 See NR NR NR	* 24.1-24.5 5 NR NR NR	ee 241-245 5 5 NR NR NR	5ee 24.1-24.5 : 0.27 0.37 0.85	0.19 48 54	NR NR NR	NR NR	ng/g ng/g	ee 24.1-34.5 See NR NR NR	NR NR NR	5ee 24.1.24.5 NR NR NR	5ee 24.1-24.5 NR NR	5ee 26.3-26.5 NR NR	5ee 24.1.24.5 NR NR NR	Relevant D retrogeneration compared to the architecture climate, building and product to the architecture view of all formacian view of all formacian set and architecture set an	Standard monthering 5 m 24.0 5 m 24.0	Individual measurments provided for each sampling the (n-1) See 24.0 See 24.0	Contemporary methods for early 2000; See 24.0 See 24.0	Sampling from 15 Indust environments (destination) of computer screene and coards.
24 24.1 24.2 24.3 24.4	Marklood et al., 2003         NR           Marklood et al., 2003         NR           Marklood et al., 2003         NR           Marklood et al., 2003         NR	Noses Noses	TCEP 5. TCEP and diffici bross, TCEP bross, TCEP 4. seen TCEP	Dust Dust Dust Dust Wipe from	Building makenik mekenik uphohesiny, equipment floor makenik equipment floor makenik uphohesiny, electoonik equipment NR NR Electoonik	This shady was part of the search of or the search of or the search of or the search of or the search of or the search of or the search of or the search of or the search of or the search of or the search of or the search of or the search of or the search of or the search of the sea	<ul> <li>te 21.5.31.5</li> <li>Viscust denver big collection, 2 houses</li> <li>Viscust denver big collection, 2 houses</li> <li>Viscust denver big collection, except totalle shop and toppid ampion were hotopical.</li> <li>Viscust denver big collection</li> </ul>	Sweden Sweden Sweden Sweden	See 24.1- 5 24.5 5 NE 5 NE 5	100 24.1.34.5 See NR NR	24.1-24.5 See NR NR NR	** <b>24.1-24.5</b> 54 NR NR NR 220	nak Nak Nak Nak	0.27 0.37 0.45 NR	0.19 0.19 48 94 NR	iee 24.1.24.5 See NR NR NR NR	24.1-24.5 54 NR NR NR	ng/g ng/g	ee 24.1.24.5 So NR NR NR NR	NR NR NR NR	5ee 24.1-24.5 NR NR NR	5ee 24.3.24.5 NR NR NR NR	5ee 24.3-24.5 NR NR NR	5ee 24.1.243 NR NR NR NR	Relevant D retrogeneration considered Second climate Schöttig and climate Schöttig and climate Schöttig and climate Schöttig and climate Schöttig and schöttig and Sec 24.0 Sec 24.0 Sec 24.0 Sec 24.0	Standard monthering 5 m 24.0 5 m 24.0 5 m 24.0 5 m 24.0	Individual weaturments provided for acids sampling the (n-1) isee 24.0 isee 24.0 isee 24.0	Contemportery methods for early 2005 See 24.0 See 24.0 See 24.0	Sangling from 15 Indus environments (determined computer process) end closers.
24 24.1 24.2 24.3 24.4 24.5	Markhood et al. 2003 Markhood et al. 2003	Noses Pouses Work Edvants Market Files Pouses Pouses Pouses Pouses Pouses Pouses Pouses Pouses Pouses Pouses Pouses Pouses Pouses Pouses Pouses	TCEP TCEP sand diffe books, TCEP doors, TCEP asses TCEP een TCEP	Dust Dust Dust Dust Dust Weightern cover	Budding meden Roer wycholestry, equipment Budding material floor means, upholestry, eductional Roe wydpmart, NR RE Electionic Electionic Electionic	This study was part of the sensitivity in the sensitivity of the sensi	tes 25.335      tes 25.335      vicuum diserer lag collection, 2 houses      vicuum diserer lag collection, 2 houses      vicuum diserer lag collection, 2 houses      vicuum diserer lag collection      vigues an surplex location of comparer and      vigues an surplex location of comparer and      vigues an surplex location of comparer and      vigues and surplex location o	Sweden Sweden Sweden Sweden Sweden Sweden	548-24.1 5 24.5 5 NR 5 NR 6 NR 6 NR 6	460 24.1.24.5 See 41 41 41 41 41 41 41	24.1-24.5 See NR NR NR NR NR	n 24.1-24.5 54 Nik Nik 220 230	ee 24.1.24.5 : Nit Nit Nit Nit Nit	0.27 0.37 0.85 NR NR	0.19 48 94 NR NR	kee 24.1.24.5 See NR NR NR NR NR	24.3-24.5 54 NR NR NR NR NR	ng/g ng/m2 ng/m2	ee 24.1.24.5 See NR NR NR NR NR	ne 24.1-24.5 Nit Nit Nit Nit Nit	5ee 24.1-24.5 NR NR NR NR NR NR	5ee 24.3.24.5 NR NR NR NR NR NR	5ee 24.3-24.5 NR NR NR NR NR NR	5ee 24.1.24.5 NR NR NR NR NR	Aniversitä maranavaria. Sandhardi paedio product de entregolation product	520404 Manifold 500 2210 500 200 500 br>500 200 500 500 500 500 500 500 500 500 500	Individual mesuamento provided for acids sampling the (n-1) isee 24.0 isee 34.0 isee 34.0 isee 34.0 isee 34.0 isee 34.0	Contemposity methods for early 2005 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0	Sanghing from 15 Indus environments (determined computer process) end closers.
24 24.1 24.3 24.4 24.5 25	Machined et al. 2003 Machined et al. 2003	Nouse Ploses Work Baycor Nouse Ploses Work Baycor Ploses Nouse Nouse Nouse Nouse Nouse	1029 6. 1029 7. 1029 7. 1029 7. 1029 7. 1029 7. 1029 7. 1029 7. 1029	Dut Dut Dut Dut Ways form Ways on Ways on Ways on Ways	Badding material water, water, and and an analysis equipment. Na Rectancia equipment, creat support, constraint Rectancia equipment, creat Support, constraint support,	The analyses part of the second probability	<ul> <li>te 21.3.3.5</li> <li>Viscuum cleaner big collection, 2 houses</li> <li>Viscuum cleaner big collection, 2 houses</li> <li>Viscuum cleaner big collection, 2 houses</li> <li>Viscuum cleaner big collection</li> <li>Viscuum cleaner big collection</li> <li>Viscuum cleaner big collection</li> <li>Viscuum cleaner big collection</li> <li>Viscuum cleaner big collection</li> <li>Viscuum cleaner big collection</li> <li>Viscuum cleaner big collection</li> </ul>	Sweden Sweden Sweden Sweden Sweden Sweden Sweden Sweden Sweden	See 24.1 - 3 24.5 - 3 NR 5 NR 5 NR 6 NR 6 NR 6 NR 7 See 25.1 - 5	400 24.134.3 See 41 41 41 41 41 41 41 41 41 41 41 41 41	NI NI NI NI NI NI NI NI NI NI NI NI NI N	+21.33.3 3 NR NR 220 230 231.33.2 5	NR NR NR NR NR NR NR NR NR	6: 21 343 1 0.27 0.55 NR NR NR NR	600 21.1 24.5 1 6.1 94 94 94 94 94 94 94	ee 24.3.24.5 See NR NR NR NR NR NR NR NR NR	NI 223.5 54 NI 233.5 54 NI 233.5 54 NI 233.5 54	-10 21.3 21.5 2 -10 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 2 -10 -10 -10 2 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10	42.343.343 Se 102 103 103 103 103 103 103 103 103 103 103	NR NR NR NR NR NR NR NR NR NR	500 24.1.24.5 NR NR NR NR See 25.1.25.2	5ee 24.1-24.5 NR NR NR NR See 25.1-25.2	3ee 24.3.34.5 NR NR NR NR NR NR See 25.3.55.2	549 241.343 M M M M M M M M M M M	Anderset 10 managements considered to 4000 considered	Sandard monitoring	Individual mesuarments provided for each sampling the (n-1) See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0	Contemposity methods for early 2005	Sampling from 15 Indust environments (starting of your of computer screens and cores).
24.1 24.2 24.3 24.4 25.3 25.1	Mathematical         Mathematical<	Norm	109 107 107 107 107 107 107 107 107	Dat Dat Dat Dat Dat Weeken Dat	Ruding materials and several sever	his study was part of the part service of a service of a service of a service of a service of a service of a service service of a servi	ter 21.3.3.5     vecours classes by confection, 2 booses     vecours classes by confection, except setuition are     vecours classes by confection, except setuition are     vecours classes by confection of comparer and     vecours described by confection of comparer and	Sandari Sandari Sandari Sandari Sandari Sandari Sandari Sandari	549-24.1 5 24.3 5 NR 6 NR 6 NR 6 NR 7 21.2 5	01 01 01 02 03 04 04 04 04 04 04 04 04 04	221325 S	4201-343 9 10 10 10 10 10 10 10 10 10 10 10 10 10	na na na na na na 220	6.27 6.37 6.6 56 56 56 56 56 56 56 56 56 56 56 56 56	6 - 24 3 - 24 3	101 21 23 23 24 101 102 103 103 103 103 103 103 103 103 103 103	NI 01 01 01 01 01 01 01 01 01 01 01 01 01	ಕರ 23.3 26.3 5 ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ಶಿ ಕರ್ ಕರ್ ಕರ್ ಕರ್ ಕರ್ ಕರ್ ಕರ್ ಕರ್ ಕರ್ ಕರ್	40 21.2.3.2. 54 NG NG NG NG NG NG	NR NR NR NR NR NR NR NR	507 252 352 507 507 507 507 507 507 507 507 507 507	544 24.3.34.5 NR NR SR 544 25.1.25.2 NR	5ee 24.3.44.5 NR NR NR See 25.3.52.2	549 243 343 141 141 141 141 141 141 141 141 141	Antonet by merecentre, tession control of earlier by tession product for earlier by tession p	See 34.0 See 34.0 See 34.0 See 24.0 See	Individual mesaurmentis provided for each sampling die (o-1) see 24.0 see 2	Contemporty methods for early 2003 See 24.0 See	Sangking Ham 21 Madar anityamatik farat devents.
24.1 24.2 24.3 24.4 24.5 25.1 25.2	Mathema et al., 2003         Rail           Mathema et al., 2003         Rail           Mathema et al., 2003         Rail           Mathema et al., 2003         Rail           Mathema et al., 2003         Rail           Mathema et al., 2003         Rail           Mathema et al., 2003         Rail           Mathema et al., 2003         Rail           Mathema et al., 2003         Rail           Ver et al., 2003         Rail           Ver et al., 2003         Rail           Ver et al., 2003         Rail           Ver et al., 2003         Rail           Ver et al., 2003         Rail	Notestes Not	139 139 139 139 139 139 139 139 139 139	bat Dat Dat Dat Dat Waterson Dat Dat	Andream An Andream And	ha hady was part of the back stores and the stores of the stores and of the stores of the stores and of the stores	te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5     te 23.3.5	Sandon Sandon Sandon Sandon Sandon Sandon Ragan Ragan Ragan Ragan Ragan Ragan	549-24.1 5 38.2 5 NUT 0 NUT 0 NUT 0 Sup 25.1 5 59.2 5 NUT 0 NUT 0	90 90 90 90 90 90 90 90 90 90 90 90 90 9	10.1.1.0.5 So 10.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	424.345 5 14 14 14 15 15 15 15 15 15 15 15 15 15	98 211 345 1 98 98 98 98 98 98 98 98 98 98 98 98 98	0.27 0.27 0.65 36 2513 523 60 80 80 80 80	6: 24.3 34.8 1 0.37 44 94 86: 25.3 25.3 1 26:00 54:00	93 93 93 93 93 93 93 93 93 93 93 93 94 94 94 94 94 94 94 94 94 94 94 94 94	241.343 4 141 141 141 141 141 141 141 1		22.333 Se 20. 20. 20. 20. 20. 20. 20. 20. 20. 20.	NR NR NR NR NR NR NR NR NR NR NR	50 2 2 3 2 3 3 3 2 3	544 24.3 24.5 NR NR NR S44 22.3 22.2 NR NR	5ee 24.3.34.5 NK NK NK See 25.3.52.2 NK	549 24.343 M M M M S49 23.242 M	Antoneth mean manual considered bandle product for an antonethy instant for an antonethy and for an antonethy antonethy and for an antonethy and nethy and for an antonethy and for an antonethy	Sandad manthaing	Individual mesaurmentis provided for each sampling die (n-1) see 24.0 see 2	Cartenguery methods for early 2007 5 as 24.0 5 as 24.0 5 as 24.0 5 as 24.0 6 as 24.0 7 as 25.0 7	See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0 See 24.0

26.1	Van den Eede et al., 2012	NR House	TCE	P Dust	NR	See 26	Vacuum dust samples	Belgium	NR NR	NR	NR	NR	75	1310	at NR	ng/g	NR	NR	NR	NR	NR	NR	See 26.0	See 26.0	See 26.0	See 26.0	
26.2	Van den Eede et al., 2012	NR House	TCE	P Dust	NR	See 26	Vacuum dust samples	Romania	NR NR	NR	NR	NR	40	1450	at NR	ng/g	NR	NR	NR	NR	NR	NR	See 26.0	See 26.0	See 26.0	See 26.0	
26.3	Van den Eede et al., 2012	NR House	TCE	P Dust	NR	See 26	Vacuum dust samples	Spain	NR NR	NR	82	NR	NR	NR	ar NR	ng/g	NR	NR	NR	NR	NR	NR	See 26.0	See 26.0	See 26.0	See 26.0	
27	Cristale and Lacorte, 2013	NR House	TCE	P Dust	NR	<ol> <li>Present and validate extraction, clean-up and analysis of existing and new FRs 2) application techniques on dust, skudge, sediment samples</li> </ol>	See 27.1	Spain S	iee 27.1 See 27.1	See 27.1	See 27.1	See 27.1	5ee 27.1	See 27.1 Se	27.1 See 27.1	Sec 27.1	See 27.1	See 27.1	See 27.1	See 27.1	Sec 27.1	See 27.1	Excellent methodology study and useful measurements of OPFR in European house dust. Useful for general population exposure assessment	Illustrates extraction and clean-up methods to for reliable custification of existing and new FRs. Importance of NIST standard illustrated.	Mean/SD presented for n values in different matrices from samples. Also, comparisons with standards presented.	Excellent methodology described and documented.	Applications and measurements in matrices other than dust not considered here.
27.1	Cristale and Lacorte, 2013	NR House	TCE	P Dust	NR	See 27	Vacuum cleaner bag collection	Spain	NR NR	NR	757	NR	NR	NR	ak NR	ng/g (0.757 μg/g)	NR	NR	NR	NR	NR	NR	See 27.0	See 27.0	See 27.0	See 27.0	See 27.0
28	Abdallah and Covaci, 2014	NR Car, ho microe (coffee restaur superm	ouse, office, TCE invironments e shops, rants, narkets)	P Dust	NR	Measure the concentrations of flame retardants in microenvironments in Egypt.	See 28.1-28.4	Egypt, S Assiut	ee 28.1- See 28.1-2 28.4	8.4 Sec 28.1-28.4	See 28.1-28.4 S	ee 28.1-28.4	See 28.1-28.4 5	ee 28.1-28.4 See 2	1.1-28.4 See 28.1-28	4 See 28.1-28.4	See 28.1-28.4	See 28.1-28.4	See 28.1-28.4	See 28.1-28.4	See 28.1-28.4	See 28.1-28.4	Relevant to countries with similar socioeconomic, climate and living conditions to Egypt /northern Africa. Not relevant to US scenarios	Useful statistical result for exposure input for similar North African microenvironments	s Report results as average, SD, Median, Min, max for n samples of each analyte at each site. Adequate for quantitative utility.	Adequate: GC-MS analytical with adequate recovery rates for dust No discussion of ventilation, type/age of cars or office /home contents,	
28.1	Abdallah and Covaci, 2014	NR Car	TCE	P Dust	NR	See 28	Collected with a dust buster vacuum	Egypt, Assiut	NR NR	198	NR	127	NR	572	IR NR	ng/g	NR	NR	NR	NR	NR	NR	See 28.0	See 28.0	See 28.0	See 28.0	
28.2	Abdallah and Covaci, 2014	NR House	TCE	P Dust	NR	See 28	Collected with a dust buster vacuum	Egypt, Assiut	NR NR	43	NR	22	NR	132	ar NR	ng/g	NR	NR	NR	NR	NR	NR	See 28.0	See 28.0	See 28.0	See 28.0	
28.3	Abdallah and Covaci, 2014	NR Office	TCE	P Dust	NR	See 28	Collected with a dust buster vacuum	Egypt, Assiut	NR NR	61	NR	31	NR	125	ek NR	ng/g	NR	NR	NR	NR	NR	NR	See 28.0	See 28.0	See 28.0	See 28.0	
28.4	Abdallah and Covaci, 2014	NR Micro-4 (coffee restaur superm	environment TCE shops, rants, narkets)	P Dust	NR	See 28	Collected with a dust buster vacuum	Egypt, Assiut	NR NR	277	NR	234	NR	538	ik Nit	ng/g	NR	NR	NR	NR	NR	NR	See 28.0	See 28.0	See 28.0	See 28.0	
29	Ionas and Covaci, 2013 as cited in Fan et al., 2014	NR House	TCE	P Dust	NR	Did not review original study-cited here by reference in Fan study	See 28.1	See 29.1 S	iee 29.1 See 29.1	See 29.1	See 29.1	See 29.1	See 29.1	See 29.1 Se	29.1 See 29.1	See 29.1	See 29.1	See 29.1	See 29.1	See 29.1	See 29.1	See 29.1	General population exposure assessment	Did not review original studycited here by reference in Pan study	Did not review original study-cited here by reference in Fan study	Did not review original studycited here by reference in Fan study	
29.1	Ionas and Covaci, 2013 as cited in Fan et al. 2014	NR House	TCE	P Dust	NR	Sec 29	Not provided in Fan et al., 2014	NR	NR NR	NR	820	NR	NR	NR	ik NR	ng/g (0.82 μg/g)	NR	NR	NR	NR	NŘ	NR	See 29.0	See 29.0	See 29.0	See 29.0	
30	Murray et al., 2013 as cited in Fan et al.	NR House	та	P Dust	NR	Did not review original study-cited here by reference in Fan study	See 30.1	See 30.1 S	iee 30.1 See 30.1	See 30.1	See 30.1	See 30.1	See 30.1	See 30.1 Se	30.1 See 30.1	See 30.1	See 30.1	See 30.1	See 30.1	See 30.1	See 30.1	See 30.1	General population exposure assessment	Did not review original study-cited here by reference in Fan study	Did not review original studycited here by reference in Fan study	Did not review original study-cited here by reference in Fan study	
30.1	2014 Murray et al., 2013 as cited in Fan et al., 2014	NR House	TCE	P Dust	NR	See 30	Not provided in Fan et al., 2014	NR	NR NR	NR	820	NR	NR	NR	iR NR	пg/g (0.82 µg/g)	NR	NR	NR	NR	NR	NR	See 30.0	See 30.0	See 10.0	See 30.0	
31	Stapleton et al., 2012	1985 Houses 2010	s TCE	P Polyure feam (P	thare Fumiture, UF) couches	Establish the pattern of PR in furniture PUP before and Netz 2003 regulatory phase-out of PROE and introduction of new BFRs nd Ops as noted in California and not California purchases.	see 31.331.6 4	United States S	er 31.1- Ser 31.1-3 31.6	16 Sec 31.1-31.6	See 31.1-31.6 5	ee 31.1-31.6	See 31.1-31.6 5	er 31.1-31.6 See 3	.1-31.6 See 31.1-31	6 See 31.1-31.6	See 31.1-31.6	See 31.1-31.6	See 31.1-31.6	See 31.1-31.6	See 31.1-31.6	5ee 31.1-31.6	General population exposure assessment	Important Paper re- differences in patterns of Fits before and after key regulation. Pre/post 2005 Fits in furniture PUF (California/not California)	Tedios presentation of qualitative results and statistical representation of comparisons, etc. throughout test without placing into tables. Therefoos precision varies with discussion in paper. Good work but poorly presented. Supporting information available from author which may present data more completely.	Excellent study rs: sampling strategy for noted variables.	
<b>31</b> 31.1	Stapleton et al., 2012	1985- Houses 1985- Houses 2004	а тсе а тсе	P Polyure foam (P P Polyure foam (P	thare Fumiture, CO Coaches	Establish the pattern of This in function. Free Tor regulatory spheres - or of PECE and Interfactions on we BFA on Opass noted in Collionia and not California purchases.	See 31.51.6	United States	ee 31.1- See 31.1-3 31.6 41 products parchased bitween 12 2004	1.6 See 31.1-31.6 ND NS-	See 31.1-31.6 S	ee 31.1-31.6	See 31.1-31.6 5	ee 31.1-31.6 5ee 3	.1.31.6 See 31.1.31	6 See 31.1-31.6 NR	See 31.1-31.6	5ee 31.131.6 0	See 31.1-31.6 NR	5ee 31.1-31.6 NR	5ee 31.1-31.6 NR	See 311-31.6	General population exposure assessment See 31	Important Paper er: differences in patterns of Rts budros and differences way repulsion. Pre/post 2005 TRs in (Laifornia/not California)	Tedhon presentation of qualitation of comparison, etc. threadyout test of comparison, etc. threadyout test without placing into tasks. Therefore preclaims values with provide the state of the state of the state of the state of the state information available from active completely. See 31	Excellent study re- sumpting strange for noted variables.	
31.1 31.2	Staplaton et el., 2012 Staplaton et el., 2012 Staplaton et el., 2012	1985 Houses 2010 Houses 1985 Houses 2005 Houses	а тсе а тсе	P Polyare foam (P P Polyare foam (P P Polyaret foam (P	have fumilurs, cou cosches have fumilurs, cou ur)	Excluding the partners of this is formione WF before and After 2020 regulatory phase-act of new BF and Open and noted in a Giffennia and noted in a Giffennia and noted file a Giffenni	See 21.3.1.4 Boostel fam samples soluted all ow U.S. See caches parchased between 1983 and 2005.	United States	e 11.1 See 11.1 3 11.6 see 11.1 3 11.6	ND 845- 5,470,000 205-	5ee 31.1-31.6 5 NR	nik Nik	5ee 31.1-31.6 S	ne 31.1-31.6 See 3	21-31.6 500 31.1-31 28 NR	5 5 5ee 11.1-31.6 ΝR (3.47 mg/g)	5ee 31.1-31.6 NR	5ee 31.331.6 0	5ee 31.1-31.6 NR NR	5ee 31.131.6 NR	5ee 21.1-31.6 NR NR	See 311-31.6 NR	General population exposure assessment See 31 See 31	Ingotan Paper et: difference in patterns difference in patterns expregulation. Profpart SOBOR in Profpart SOBOR in Profpart SOBOR in Profpart SOBOR in California) See 31	Trading processition of exploring the processition of the submitted of comparison of the theory of the submitted of the submi	Excellence study re- sumpling strategy for noted variables.	
31.1 31.2 31.3	Stapleton et al., 2012 Stapleton et al., 2012 Stapleton et al., 2012 Stapleton et al., 2012	1985 Houses 1985 Nouses 2006 Mouses 2006 Furnitu	s TCE s TCE une Suite TBP TPP	P Polyurer feam (P P Polyurer feam (P P Polyurer feam (P feam (P	have femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure, could find the femilure f	the field of the particular of the field of	see 21.3.1.8.4	United States	<ul> <li>e 11.1 See 11.3</li> <li>31.6</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.3</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li> <li>e 11.4</li></ul>	ND 85- 5,470,000 19,769,000 85-	544 31.1-31.6 5 NR NR	ee 31.1-31.6 NR NR	NR NR 5,180,000	NR NR	a na a na	δ 5 6 11.1.31.6 NR (5.47 mg/g) (5.47 mg/g) 10.7 mg/g (Mear: 10.7 mg/g) 10.8 mg/g) 10.8 mg/g) 10.8 mg/g)	5ee 31.1-31.6 NR NR	5ee 11.13116 0 1	5ee 31.1-31.6 NR NR	5ee 31.33.6 NR NR	NR NR	5ee 31.1.31.6 Nit Nit	General propulsion experience assessment See 31 See 31 See 31	Impact Approx	Trading procession of equilables in the second seco	Exactlent tudy re: sampling strategy for noted variables. See 31 See 31	
n 31.1 31.2 31.3	Stephenon et et, 2022 Stephenon et et, 2012 Stephenon et et, 2012 Stephenon et et, 2012	1985 Houses 1985 Houses 2005 Houses 2005 Houses 1985 Fumitu 1985 Fumitu	s TCE s TCE ure Sum TP TP TP TP TP TP	P         Polymer           P         Polymer           P         Polymer           P         Polymer           P         Polymer           Nof TBB, PUF         PuF           Nof TBB, PUF         PuF	have Penthers, cou have Penthers, cou have Penthers, cou Feathers, cou Feathers, cou	action         See 31           action         See 31           action         See 31           action         See 31	see 21.3.13.4	United States 4 United States United States United States	<ul> <li>e 11.1 See 11.3</li> <li>31.6</li> <li>and the set of th</li></ul>	NG NG 35- 19,760,000 19,760,000 19,760,000 19,760,000	544 31.1-31.6 5 NR NR NR	ne 311-31.6 Net Net	5,180,000 : 5	NR NR 16,850,000	at NA at NA at NA at NA at NA	4 5 6 11.31.4 NR 24/3 (5.47 mg/g) Rage (5.13 3.15 mg/g) Rage (5.13 3.15 mg/g) Rage (5.13 3.15 mg/g) Rage (5.13 3.15 mg/g) Sat mg/g) Sat mg/g) Sat mg/g) Sat mg/g) Sat mg/g) Sat mg/g)	5ee 31.1-32.6 N/R N/R N/R	0 1 1	5ee 31.1.31.6 NR NR NR	544 31.1.31.6 NR NR NR	549 31.1.31.6 NR NR NR	5ee 31.1.31.6 NR NR NR	General peppidien experies executives 5 ere 3 1 5 ere 3 1 5 ere 3 1	Impleted Paper et: difference in parameters tery reprint 2005 etc. (callennin) See 31 See 31 See 31	Trading measurements of equilables to express address which and address the proper section of the section provide the proper section of the section provide the trading section based of the section provide the section of the section	Dealheat and yet: any deal of the second sec	
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31 31.1 31.2 31.3 31.4 31.5	Supton et al, 2022 Supton et al, 2022 Supton et al, 2022 Supton et al, 2022 Supton et al, 2022 Supton et al, 2022	1383         Near           1395         Rome           2020         Rome           1395         Rome	• • • • • • • • • • • • • • • • • • •	Р Рирост Р Рирост Р Рирост Р Рирост Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Валер Р Рирост Р Рирост Валер Р Рирост Р	have rembers caches have functions, cou of functions, cou functions, cou functions, cou functions, cou	ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31           ubes         See 31	ter 31.31.4	United States United States United States United States United States United States	<ul> <li>es 11.1. des 21.1.3</li> <li>es 21.1. es 21.1.3</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 21.1.4</li> <li>es 2</li></ul>	ND ND ND 15. 15.747,000 15.747,000 15.747,000 15.747,000 15.747,000 15.740,0000 15.740,000 15.740,000 15.740,000 15.740,000	50 11 1 3 1 4 50 1 50 1 50 1 50 1 50 1 50 1 50 1 50 1	NI NI NI NI NI	NR NR NR 5.180,000 1 1.000,0000 1	NR NR NR 10,450,000 10,000,000 0	4 1.1.1.4 144 11.1.1 4 NA 4 NA 4 NA 4 NA 4 NA	4 5 544 31.3.3.1.6 NR 740.6 (5.4.7 reg/g) 740.6	50 31-31.6 NR NR NR NR	0 1 1 2 1 2 3 2 3 2	548 31.1-31.6 NR NR NR NR	544 31.1.31.6 NR NR NR NR	540 31.32.4 NR NR NR NR	549 213 33 4 NR NR NR NR	General personness experience personness See 31 See 31 See 31 See 31 See 31	Implement Approved. Markense in Parkense Ner yeak 2005 Per in Ver yeak 2005 Per in Ver yeak 2005 Per in Ver in Parkense Sen 31 Sen 31 Sen 31 Sen 31 Sen 31	Traduction processition of evaluations of the constraints of evaluations of the constraints of the constrain	bauhata ang en med wakas.	

32.1	Stapleton et N al., 2011	t houses, car	TCEP	Material samples	PLF from 1 Car seat, 1 changing table pad, 1 sleep positioner, 1 portable mattness 10 nursing pillows, 1 baby carrier, 2 infant bath mats/slings	See 32 5	PUF samples from 101 baby products. TCEP > 1,000,000 ng/g is 17.	United States	101 N	NK 1	en 5,91	0,000 >	it 1,080,00	5,940,000	NR	NR	ng/g (Mean: 5:91 mg/g) Range: (1.08-5:94 mg/g)	NR	NR	NER	NR	NR	NR	see 32.0	see 32.0	see 32.0	see 32.0	
32.2	Stapleton et N al., 2011	t houses, car	TBS	Material samples - Bab products, donated used and purchase new	PUF from car by seats, changing table pads, d mattresses, id rocking chairs	See 32	TBB/TBHP was found in 17 of 101 baby products sampled. TBB/TBPH comprise 50% of the overall mixture of FM 550	United States	101 h	NR 1	en 18,51	0,000 >	R 5,850,00	42,500,000	NR	NR	ng/g (Mean: 18.51 mg/g) Range: (5.85-42.5 mg/g) (TBB/TBHP measured together)	NR	NR	NER	NR	NR	NR	see 32.0	see 32.0	see 32.0	see 32.0	
32.3	Stapleton et N al., 2011	t houses, car	тарн	Material samples - Bab products, donated used and purchase new	PU foam from car by seats, changing table pads, d mattresses, id rocking chairs	r See 32	T88/T8HP was found in 17 of 301 baby products sampled. T88/T8H comprise 50% of the overall mixture of FM 550	United States	101 N	nek n	eR 18,51	0,000 >	R 5,850,00	42,500,000	NR	NR	ng/g (Mean: 18.51 mg/g) Range: (5.85.42.5 mg/g) (TB8/TBHP measured together)	NR	NR	NR	NR	NR	NR	see 32.0	see 32.0	see 32.0	see 32.0	
33	Schreder, 2012 2	11 Co-sleeper	TCEP	Feam	Changing pads, bassinet pads, nuning pillows, a walker, and a sleep positioner.	Authors relate patterns and lavels of FBs is children's products to regulatory initiatives and market dynamics of authoffutions of chemical to conform to these regulations.	5ee 33.1-33.6	United States, Connecticut, Massachusett s, Michigan, New York, and Washington State	See 33.1- 5 33.6	See 31.1-31.6 See 31	1.1-33.6 See 33	.1-33.6 See 33	1-33.6 See 33.1-3	1.6 See 33.1-33.6	See 33.1-33.6	See 33.1-33.6	See 33.1-33.6	iee 33.1-33.6 See	. 33.1-33.6	See 33.1-33.6	See 33.3-33.6	5ee 33.1-33.6	See 33.1-33.6	Report describes range of FRs detected in consumer products, products and compare selected reports to regulatory eras and actions. Product sourc (retail stores, etc) noted.	Not quantitatively helipful, but perspectives on patterns of PR in these products well presented.	Values not characterized.	No Methods Descriptions	Results listed in Appendix 3, Table 3
33.1	Schreder, 2012 2	11 Co-sleeper	TCEP	foam	Changing pads, bassinet pads, nursing pillows, a walker, and a	See 33	1 inch foam square removed from each product	United States	20 a e si 4	all products f except 1 co- sleeper was 40,000 ng/g	er n	ik P	R +40000	2,990,000	NR	NR	ng/g (<0.04-2.99 mg/g)	NR	NR	NR	NR	NR	NR	See 33	See 33	See 33	See 33	
33.2	Schreder, 2012 2	11 Co-sleeper	TCPP	foim	sleep positioner. Changing pads, bassinet pads, nursing pillows, a walker, and a	See 33	1 inch foam square removed from each product	United States	20		iR N	ik P	R <10000	37650000	NR	NR	ng/g (<0.01-37.65 mg/g)	NR	NR	NR	NR	NR	NR	See 33	See 33	See 33	See 33	
33.3	Schreder, 2012 2	11 Co-sleeper	TDCPP	foam	sleep positioner. Changing pads, bassinet pads, nursing pillows, a walker, and a	See 33	1 inch foam square removed from each product	United States	20		er n	к ,	R <80000	50630000	NR	NR	ng/g (<0.08-50.63 mg/g)	NR	NR	NR	NR	NR	NR	See 33	See 33	See 33	See 33	
33.4	Schreder, 2012 2	11 Co-sleeper	ТРР	Foam	sleep positioner. Changing pads, bassinet pads, nursing pillows, a walker and a	See 33	1 inch foam square removed from each product	United States	20		iR N	ik P	R -20000	15850000	NR	NR	ng/g (<0.02-15.85 mg/g)	NR	NR	NR	NR	NR	NR	See 33	See 33	See 33	See 33	
33.5	Schreder, 2012 2	11 Co-sleeper	тав	Foam	sleep positioner. Changing pads, bassinet pads, nursing pillows, a	See 33	1 inch foam square removed from each product	United States	20		iR N	ik P	R -20000	20200000	NR	NR	ng/g (<0.02-20.2 mg/g)	NR	NR	NR	NR	NR	NR	See 33	See 33	See 33	See 33	
33.6	Schreder, 2012 2	11 Co-sleeper	тарн	Foam	sleep positioner. Changing pads, bassinet pads, nunsing pillows, a walker, and a sleep positioner.	See 33	1 inch foam square removed from each product	United States	20		en n	ır ,	R <10000	9750000	NR	NR	ng/g (+0.01-9.75 mg/g)	NR	NR	NR	NR	NR	NR	See 33	See 33	See 33	See 33	
34	Canada 2 Gazette, 2011 2 SOR/DORS/20 14-79 page 1123	09, Houses, car 10	TCEP	Foam	Sleep positioner, PUF book	Cited in regulation report	See 34.1-34.4	Canada	See 34.1- S 34.4	See 34.1-34.4 See 34	1.1-34.4 See 34	.1-34.4 See 34	1-34.4 See 34.1-3	.4 See 34.1-34.4	See 34.1-34.4	See 34.1-34.4	See 34.1-34.4	iee 34.1-34.4 See	e 34.1-34.4	See 34.1-34.4	See 34.1-34.4	See 34.1-34.4	See 34.1-34.4	limited value	limited value	single values for n=1 each findings in products	no details provided in report.	referenced in regulatory report as a sampling and testing program for TCEP conducted by Health Canada's PSL.
34.1	Canada 2 Gazette, 2011 SOR/DORS/20 14-79 page	09 Houses, car	TCEP	Foim	PUF book	See 34	2009: sofas, mattresses, acoustical panels, seat fro car; but only children's products reported	im Canada	NR N	NR P	eR 13,	000 9	R NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 34	See 34	See 34	See 34	
34.2	1123 Canada 2 Gazette, 2011 SOR/DORS/20 14-79 page	09 Houses, car	TCEP	Foim	sleep positioner	See 34	2009: sofas, mattresses, acoustical panels, seat fro car; but only children's products reported	im Canada	NR N	NR I	iR 21,	000 9	R NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 34	See 34	See 34	See 34	
34.3	1123 Canada 2 Gazette, 2011 SOR/DORS/20 14-79 page	10 Houses, car	TCEP	foam	PUF book	See 34	2009: sofas, mattrinses, acoustical panels, seat fro car; but only children's products reported	ım Canada	NR N	NR P	4R 38	DD 9	R NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 34	See 34	See 34	See 34	
34.4	1123 Canada 2 Gazette, 2011 SOR/DORS/20 14-79 page	10 Houses, car	TCEP	Foim	sleep positioner	See 34	2009: sofas, mattresses, acoustical panels, seat fro car; but only children's products reported	im Canada	NR N	NR P	eR 3	4 9	R NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 34	See 34	See 34	See 34	
35	1223 Ionas et al., N 2014	t 64 toya	TCEP	Foam	MR	Assessment of FRs in 106 toys collected as representative of multiple explosure pathways children and for pro/post HEACH regulation 2007 impact.	500 XL	Belgium	See 35.1 S	5ee 33.1 See	35.1 See	35.1 See	35.1 See 35.3	See 35.1	See 35.1	See 35.1	See 35.1	See 35.1 5	See 35.1	See 35.1	See 33.1	5ee 35.1	See 35.1	Exposure assessment 1 infants/children in EU. Can be used for U.S. at the used for U.S. at the used for U.S. at the used for U.S. at the used for U.S. at the text of text of	or Good illustration of impact of REACL, other important vuriables uince US has no visited to be like regulation of toy products	Good presentation of results sorted by key unitatives: 500, medianynean, mee key sort on samples of diff andret types for each analysis, the sort of the sorted sorted sorted sorted sorted sorted sorted sorted sorted sorted sorted important variables.	Used Toys collected from donation, files markets, etc. Noting rolevant data short water possible. Multiple matrices regarded different extraction methods. Methodologies compatible with contemporiny processes. Using internal standards.	Important variables considered: chifr's age for two way production data; spectra strategies and the spectra strategies and the spectra strate will tray; construction material of tray
35.1	ionas et al., N 2014	t 64 toys	TCEP	Foam	NR	See 35	A number of 106 toys (foam and textile, hard plast soft plastic/vobber and wood) were kindly donated by parents of children of different ages, collected from a recycling park in Artwarp (Belgium) during period of two monitors or boght from a files marka and a major toy store. Samples of each toy were taken at a size of zmm or less.	tic, Belgium d it	64		א טז	IR <1	DQ. NR	NR	NR	NR	ng/g; value is actually the 75th percentile	NR	NR	NR	NR	NR	NR	See 35.0	See 35.0	See 35.0	See 35.0	See 35.0
36	Kajiwara et al., 2 2011	OS houses	TCEP	dust	Laptop compute LCD TVs; curtains electrical outlets, wall paper, insulation boards	c) Profile concentrations of b BFRs and CPFRs in electronics, curtains, wallpaper, building imsterials. Note contributions from new and emerging FR replacements.	See 36.3-36.4	Japan	See 36.1- 5 36.6	See 36.136.6 See 34	i.1-36.6 See 36	.1-36.6 See 36	1-36.6 See 36.1-3	.6 See 36.1-36.6	See 36.1-36.6	See 36.1-36.6	See 36.1-36.6	iee 36.1-36.6 See	26.1-36.6	See 36.1-36.6	See 36.1-36.6	See 36.1-36.6	See 36.1-36.6	Highly Relevant to general/global population expoure from contemporary consumer products	INDIVIDUAL ELECTRONIC COMPONENT STUDY unique XXII approach. Residue concentration FR profile changes resulting from FR replacements and relative contributions from electronics of this decade	Single values for each analyte in different matrices presented. Extraction methods compared.	Novel XRF methodology applied to electronic product parts. Detailed analysis for individual consumer products	Notes impact of REACH directives and Japan labeling inwa on understanding profile of FR types in consumer products.

36.1	Kajiwara et al., 2008 2011	houses	TCEP	dust	Laptop computer	r 5ee 36	The window despenses were conducted to the monopensors using and then publicated to fixe product with a feature mill prior to extraction & diversical analysis.	Japan k sr		Eleptop partis (Chassis 16 %/% Geyboard top of ng/g 20 Coolerd 14 %/% 2000rg fan and speakers 120 ng/g K adapter <4 %/%	NR	NR	Nit	-04	120	NR	NR	ngig	NR	NR	NR	NR	NR	NR	See 16.0	See 36.0	See 36.0	See 36.0	individual product component cardributions inferred from XFB analyses
36.2	Kajiwara et al. 2008 2011	houses	TCEP		LCD TVIC putchased new in Japan in 2008	See 36 n	The unlessed comparators over coulded into homogeneous and piezes, and then publicated to the product and home mell pieze to extraction & chemical analysis.	Japan k sr	2 5	2 TVs, Rear cover 7.0 mg/g TV1 44 mg/g TV2 front cover 40 mg/g TV1 40 mg/g TV1 40 mg/g TV1 40 mg/g TV1 40 mg/g TV1 40 mg/g TV1 50 mg/g TV1 50 mg/g TV1 20 mg/g TV1 20 mg/g TV1 20 mg/g TV1 20 mg/g TV1 20 mg/g TV1 20 mg/g TV1 20 mg/g TV1	NR	NR	NR	એ	7	Nit	Nİ	ng/g	NR	NŘ	NR	NR	NR	NR	5ee 36.0	See 36.0	See 35.0	5ee 36.0	
36.3	Kajiwara et al., 2008 2011	houses	TCEP	Other product purchased new in Japan in	s: Curtains v	See 36	The selected components were crushed into homogeneous small pieces and then pulverized to a fine powder with a freezer mill prior to extraction fi	Japan a Sr	2	rd no.le TV31	NR	NR	NR	4	6	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 36.0	See 36.0	See 36.0	See 36.0	
36.4	Kajiwara et al. 2008 2011	houses	TCEP	2008 Other products: purchased new in Japan in 2008	Electrical outlets	See 36	chemical analysis. The selected components were crushed into homogeneous small pieces and then pulverized to fine powder with a freezer mill prior to extraction fi chemical analysis.	Japan a ar	2		NR	NR	NR	4	-3	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 36.0	See 36.0	See 36.0	See 36.0	
36.5	Kajiwara et al., 2008 2011	houses	TCEP	Other product purchased new in Japan in	s: Insulation boards	s See 36	The selected components were crushed into homogeneous small pieces and then palverized to a fine powder with a freezer mill prior to extraction fi	Japan a	2		NR	NR	NR	<9.0	10	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 36.0	See 36.0	See 36.0	See 36.0	
36.6	Kajiwara et al., 2008 2011	houses	TCEP	2008 Other product purchased nes in Japan in 2008	s: Wallpaper v	See 36	chemical analysis. The selected components were crushed into homogeneous small pieces and then pulverized to a fine powder with a freezer mill prior to extraction fi chemical analysis.	Japan a ar	4		NR	NR	NIK	-2	<20	NR	NR	ngig	NR	NR	NR	NR	NR	NR	See 36.0	See 36.0	See 36.0	See 36.0	
37	Wenning, 1999 NR as cited in Maingren- Hansen et al., 2003	Houses	TCEP	Electrical and electronic products	10 New and old TVs	Survey report of chemicals and their emission characteristics from electrical/electronic products circa late 1990s and early 2000s in Dermark	See 37.1.37.2	Denmark	See 37.1- 1 37.2	iee 37.1-37.2 Si	ne 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	See 37.1-37.2	High relevance for som elements of retrospective exposure assessments considerie electronic products cin 1930s and early 2000s	e Good presentation of emission curves suggested by g measurements for the a types of electronics. Important profile for considering new/old product emission	Results only summarized in review article se	Methodology only breifly presented in review article.	See exposure and risk assessment approach/logic/defining factors for population and exposure characterization
37.1	Wensing, 1939 NR as cited in Malmgren- Hansen et al.,	Houses	TCEP	Electrical and electronic products	New TVs	See 37	75% of equilibrium after 100 hours	Denmark	10 7	NR	NR	10	NR	NR	NR	NR	NR	ng/set-hr (0.01 µg/set-hr)	NR	NR	NR	NR	NR	NR	See 37.0	sotentials See 37.0	See 37.0	See 37.0	
37.2	2003 Wensing, 1999 NR as cited in Maimgren- Hansen et al., 2002	Houses	TCEP	Electrical and electronic products	Old TVs	See 37	75% of equilibrium after 100 hours	Denmark	10 1	NR	NR	NR	NR	10	300	NR	NR	ng/set-hr (+0.01 to 0.30 µg/set-hr)	NR	NR	NR	NR	NR	NR	See 37.0	See 37.0	See 37.0	See 37.0	
38	Borling et al., NR 2006	houses	TCEP	Children's products	1 Sword, 2 floor puzzles, 1swim board, 1 mask, 1 ball, 1 book, 1 activity carpet	Danish survey of chemicals in tops and childcare products made from foam plastic	See 38.1	Denmark	See 38.1 5	iee 38.1	See 38.1	See 38.1	See 38.1	See 38.1	See 38.1	See 38.1	See 38.1	See 38.1	See 38.1	See 38.1	See 38.1	See 38.1	See 18.1	Sec 38.1	Not relevant for quantitative exposes assessment, but useful for consideration of to types and foam conter	Good tabulation of many toy types, child age representativeness construction materials t. (Xifoam) circa 2004	Not useful for quantitative analyses	<ul> <li>Toys obtained from Danish wholesakers for large array of toys for different age groups. Relatively simple extraction methods an analytical methods GC/MS made with only internal standards for C . No methods for</li> </ul>	Mathoda, calculations, results of Phase 3 objectives not considered in this review: toxicology profiles, exposure assessment
38.1	Borling et al., NR 2006	houses	TCEP	Children's products	1 Sword, 2 floor puzzles, 1swim board, 1 mask, 1 ball, 1 book, 1 activity carpet	See 38	Tested foam matrix	Denmark	NR P	NR	NR	>0.1%	NR	NR	NR	NR	NR	by content (specific concentrations not reported)	NR	NR	NR	NR	NR	NR	See 38.0	See 38.0	See 38.0	ouantitative analysis. See 38.0	
39	Tonnig et al., NR 2008	Mouses	TCEP	Baby Products	3 Foam wash cloths, 2 feeding pillows, 2 covere mattresses, 2 nunsing pillows, 3 baby carriers, 2 perambulator aproms	Survey of chemicals in baby products in Dermar d and health assessments (exposure and risk) 2	5ee 39.1 k	See 33.1	See 39.1	See 39.1	See 39.1	See 39.1	See 39.1	Sec 39.1	See 39.1	See 39.1	See 39.1	Sec 39.1	See 39.1	See 29.1	See 39.1	See 39.1	See 39.1	Sec 39.1	Key importance is relevance of sweat and saliva migration studie and survey of products and material parts. Likely useful for US cin post 2007 period.	Sweat and Saliva migration Study important for risk assessment parameter a	All samples (<1 µg/g) so no quantification to report for TCEP. Other analyte s results reported for each item.	Detailed listing of material parts of baby products sampled.	Methods and issues related to health assessments not considered in this review. Pp16-12 contain listing of probable material composition of baby products SALIVA MIGRATION STUDY / SWEAT MIGRATION
39.1	Tonnig et al., NR 2008	houses	TCEP	Baby Products	3 foam wash cloths, 2 feeding pillows, 2 coveree mattresses, 2 nursing pillows, 2 baby carriers, 2 perambulator aprorsi	See 39 d	Chemical analysis of 13 different products		13 7	NR	NR	<1,000	NR	NR	NR	NR	NR	пд/д (<1 µд/д)	NR	NR	Detection limit = 1,000 ng/g (<1 µg/g)	NR	NR	NR	See 39.0	See 39.0	See 39.0	See 39.0	
40	Nagase et al., NR 2003, as cited by ATSDR, 2012 : Sertion	NR	TCEP	Poly-urethane foam	NR	NR in ATSDR, 2012	See 40.1	See 40.1	See 40.1 5	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	See 40.1	Limited value	Limited value	only range of values given for unknown # samples	not knownno details provided in ATSDR report.	
40.1	6.4.4 page 273 Nagase et al., NR 2003, as cited by ATSDR, 2012 : Section 6.4.4 page 273	NR	TCEP	Poly-urethane foam	NR	See 40	NR in ATSDR, 2012	NR	NR P	NR	NR	NR	NR	800	3100	NR	NR	ng/g (0.8-3.1 µg/g)	NR	NR	NR	NR	NR	NİL	See 40.0	See 40.0	See 40.0	See 40.0	
41.0	La Guarda et NR al., 2015	House, Gym	тва	Air, dust, foan	n NR	Measure FR in air, particulates, dust, foam from gym, coad's knomes and gym foam to profile exposure opportunity to residues of existing and new FRs.	5ee 41.1-41.10	United States, Washington, Seattle	See 41.1- 5 41.10 4	5ee 41.1- Se 81.10	e 41.1-41.10	See 41.1-41.10 1	See 41.1-41.10	See 41.1-41.10	See 41.1-41.10	See 41.1-41.10	See 41.1-41.10	See 41.1-41.10	iee 41.1-41.10	See 41.1- 41.10	See 41.1-41.10	Sec 41.1-41.10	See 41.1-41.10	See 41.1-41.10	General population exposure, key to subpopulation frequenting gyms (children, coaches, workers, parents, atheletes, exercisers)	Illustrated preferential affinities of different analytes to different size particulates (as found in other studies) variable factors of foar type, manufacturer, microenvicemment AM illustrates dynamics of emerging FRs on overs patterns of residues	Supplementary Data exist for detail on results and methods-net availat for this service. Nublication reports mean values on sites, matrices, analytes and for particulate sizes.	s Contemporary le methodology.	Conclusions: residue pattern dependent on duit n particulate size vo form type. For some analysies in much granet man grem environment as compared to home. Shows residue pattern changing to new FR moleties.

41.1	La Guardia et NR al., 2015	House	TBS	Air	NR :	See 41	8-hour samples of <4 µm particulates (ArChek 2000 pump).4 samples for each location.	United States, Washington, Seattle	4	4 samples for each location.	NR	NR	NR	6.93	22	NR Þ	IR ng/m3 (rar of means	e NR	NR	NR	NR	NR	NIL	See 41.0	See 41.0	See 41.0	See 41.0	
41.2	La Guardia et NR al., 2015	Gym	тав	Air I	NR S	See 41	8-hour samples of <4 µm particulates (AirChek 2000 pump). 4 samples for each location.	United States, Washington, Seattle	4	4 samples for each location.	NR	NR	Nit	5.41	143	NR Þ	iit ng/m3 (rar of means	e NR	NR	NR	NR	NR	NR	See 41.0	See 41.0	See 41.0	See 41.0	
41.3	La Guardia et NR al., 2015	House	тав	dust 1	NR S	Sec 41	Settled dust samples ["1 g] were collected from SGA gymnasium floors (bare floor and carpet) at each of the four training facilities and residences of the four coaches.	United States, Washington, Seattle	4	4 samples for each location.	NR	2,580	NR	500	7,100	NR Þ	iit ng/g (Mei 2.58 µg/g Range: (0.5 µg/g)	: NR	NR	NR	NR	NR	NR	See 41.0	See 41.0	See 41.0	See 41.0	
41.4	La Guardia et NR al., 2015	Gym	TBB	dust 1	NR S	See 41	Settled dust samples ("1 g) were collected from SGA gymnasium floos, (bare floor and caped) at each of the four training facilities and residences of the four coaches.	United States, Washington, Seattle	4	4 samples for each location.	NR	40,800	NR	12,300	73,500	NK P	iR ng/g (Mea 40.8 μg/j Range: (12 73.5 μg/j	- NR	NR	NR	NER	NR	Nit	Sec 41.0	Sec 41.0	See 41.0	See 41.0	
41.5	La Guardia et NR al., 2015	Gymnastic pit fo bfock	am 185	Foam	NR S	See 41	4 foam blocks from Gym #4 pit, 1 from Gym #2 pit, 1 new block from Gym #4 storage	1 United States, Washington, Seattle	6	4 samples for each location.	NR	NR	NR	1,400,000 1	3,700,000	NR P	iit ng/g (Ran) 1,400-13,7 μg/g)	NR D	NR	NR	NR	NŘ	NR	See 41.0	See 41.0	Sec 41.0	See 41.0	
41.6	La Guardia et NR al., 2015	House	тарн	Air 1	NR :	See 41	8-hour samples of <4 µm particulates (AirChek 2000 pump); 4 samples for each location.	United States, Washington, Seattle	4	4 samples for each location.	NR	NR	NR	8.61	21.4	NR 5	iit ng/m3 (rar of means	e NR	NR	NŘ	NR	NR	NR	See 41.0	See 41.0	See 41.0	See 41.0	
41.7	La Guardia et NR al., 2015	Gym	тарн	Air 1	NR S	See 41	8-hour samples of <4 µm particulates (AirChek 2000 pump); 4 samples for each location.	United States, Washington, Seattle	4	4 samples for each location.	NR	NR	NR	11.4	34.3	NR B	iit ng/m3 (rar of means	e NR	NR	NR	NR	NR	NR	See 41.0	See 41.0	Sec 41.0	See 41.0	
41.8	La Guardia et NR al., 2015	Gym	тарн	Dust	NR :	See 41	Settled dust samples ("1 g) were collected from SGA gymnasium floors, (pare floor and capet) at each of four training facilities and residences of the four coaches.	United States, Washington, Seattle	4	4 samples for each location.	NR	24,300	NR	4,800	44,900	NR Þ	iR ng/g (Mea 24.3 μg/j Range: (4. 44.9 μg/j	NR	NR	NR	NR	NR	NR	See 41.0	See 41.0	See 41.0	See 41.0	
41.9	La Guardia et NR al., 2015	House	тарн	Dust	NR :	Sec 41	Settled dust samples ("1 g) were collected from SGA gymnasium floors gave floor and carpet) at each of four training facilities and residences of the four coaches.	United States, Washington, Seattle	4	4 samples for each location.	NR	1,850	NR	700	3,100	NR Þ	iR ng/g (Mea 1.85 μg/j Range: (0. 3.1μg/g)	NR	NR	NR	NR	NR	NİL	See 41.0	See 41.0	See 41.0	See 41.0	
41.10	La Guardia et NR al., 2015	Gymnastic pit fo block	am TBPH	Foam I	NR S	See 41	4 foam blocks from Gym #4 pit, 1 from Gym #2 pit, 1 new block from Gym #4 storage	1 United States, Washington, Seattle	6	4 samples for each location.	NR	NR	NR	225,000	1,710,000	NR B	iit ng/g (Range: 22 5,710 µg/	NR	NR	NR	NR	NR	NIK	See 41.0	See 41.0	See 41.0	See 41.0	
42	Carignan et al., NR 2013a	Gym	тав, тарн, трр, тосрр тсрр	Indoor air, dust I	107	Characterize pattern of FRs in gym environments and personal exposures t symnasts.	See 42.1-42.30 s to	United States, Eastern	See 42.1- 1 42.30	See 42.1- See 42.30	re 42.1-42.30 Se	e 42.1-42.30 Se	w 42.1-42.30 S	ee 42.1-42.30 See	42.1-42.30 See 4	2.1-42.30 See 42.	1-42.30 See 42.1-42	0 See 42.1-42.30	See 42.1- 42.30	See 42.1-42.30	See 42.1-42.30	See 42.1-42.30 Se	ee 42.1-42.30	Relevant for exposure assessment to athletes, and to children in activity centers in	measurements of analytes on hands before and after practices presents dat	median and ranges provided with D Supplemental information available from author.	<ol> <li>contemporary methodology employed</li> </ol>	Biomonitoring accompanied the dust/air d and handwipe data providing a continuim of personal exposure, environmental media residue
																								schools and private centers.	for considering derma loading. Data relating levels in air near pits suggests rates of air loading. Other correlations useful in	d 1		concentrations and possible sources of exposure opportunities in the gym environmer.". Eliosnihoring data and correlation methodology not considered in this review.
42.1	Carignan et al., NR 2013a	Gym	таз	indoor air 1	tuf :	See 42	Stationary air samgling pumps collected samgles over a continuous 75 hour period beginning prior to	United States, Eastern	5	Gym, within 30 cm of the loose foam in	NR	NR	26.1	NR	NR	NR 5	uk ng/m3	NR	NR	NR	NR	NŘ	NR	schools and private centers. See 42.0	for considering darma loading. Data relating levels in air near pits suggests rates of air loading. Other correlations useful in this useer. See 42.0	d : See 42.0	See 42.0	concentrations and possible sources of exposure opposition in the gym envicenment. Bioentology and consultation methodology not considerend in this review.
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42.1 42.2 42.3 42.4 42.5 42.5 42.5 42.5 42.5 42.5 42.5	Gorgan et al., 183 Corgan et al., 184 2013 - 184 2013 - 184 2013 - 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184 Corgan et al., 184	6m 6m 6m 6m 6m 6m	тая тая тая тая тая тая таяч таяч	Index at 1 Index at 1 dect 1 Andex 1 Index at 1 Index at 1 Andex 1 Andex 1 Index at 1		5an 42 5an 42 5an 42 5an 42 5an 42 5an 42 5an 42 5an 42 5an 42 5an 42	Statisticary at sampling partice celeteral angular and a series continuous. The bary particul highering parts in the series of t	United Store, Enter United Store, Enter Store, Enter Store, Store, Store, United Store, Enter Store, Enter Store, S	5	Gen, which is the second of th	201 201 201 201 201 201 201 201 201 201	101 101 101 101 101 101 101 101 101	25.1 5.01 22,500 0.03 22 2.66 80,000 60 27.9	96 96 10 10 10 10 10 10 10 10 10 10 10 10 10	ық К.,000 611 770 жы 44,000 220 244	NA	۲		50 50 50 50 50 50 50 50 50 50	NK NA NK NK NK NK	на 484 184 184 184 184 184 184 184	NR NR NR NR NR NR NR	503 503 503 503 503 503 503 503 503 503	<ul> <li>actual of photos</li> <li>contors.</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li> <li>see 42.0</li></ul>	for constituting example           for constituting example           weights in of cases           <	100 42.0 100 42.0 100 42.0 100 42.0 100 42.0 100 42.0 100 42.0 100 42.0	5m 420 5m 420 5m 420 5m 420 5m 420 5m 420 5m 420	executions of person spectra registrations in the person spectra registration in the person execution of the person execution of the person execution of the person execution of the person execution of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person person of the person
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411 422 434 435 435 435 435 433 433 4310 4311	Corgan et al., 183 Corgan et al., 184 2213 Corgan et al., 184	6m 6m 6m 6m 6m 6m 6m 6m	128 128 128 128 1294 1294 1294 1294 1294 1294	Index of a final sector of a f		5ee 42 5ee 42 5ee 42 5ee 42 5ee 42 5ee 42 5ee 42 5ee 42 5ee 42 5ee 42 5ee 42 5ee 42	Statisticary of sampling purps, collected analysis of the second	United States Enforce United States S	5 3 3 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Gyn, within the sector of the sector of the sector sector of the sector	60 60 60 60 60 60 60 60 60 60 60 60 60 6	203 203 203 203 203 203 203 203 203 203	26.1 5.01 22,500 60.8 2.6 30,000 60 2.73 60 2.73 60.4 2.73	м м с 149 4.65 4.65 4.65 4.65 4.65 4.63 4.63 4.63 4.63 4.63 4.63 4.63 4.63	ык 100 100 101 101 101 101 101 101 101 10	NA	Emilge         Bit           Emilge         Bit     <		50 50 50 50 50 50 50 50 50 50 50 50 50 5	88 88 88 88 88 88 88 88 88 88 88 88 88	ня ня ня ня ня ня ня ня ня ня ня ня	NR NR NR NR NR NR NR NR NR NR NR	60. 101. 102. 103. 103. 103. 103. 103. 103. 103.		for constituting dumma between to of a constrained of the constrai	100 420 100		enconception of personal to general segment regularization of general service of the second second second second service of the second

| 42.15   | Carignan et al., NR<br>2013a   | Gym   | ТРР   | dust   | PUP                         | See 42   | Gym 1-1 dust sample from each of the women's<br>gymnastics apparatus (vauit, bars, beam, and floor)<br>and 1 from within the losse foam pit. Collected in a<br>celludose extraction thimble inserted into the credice<br>ocid of a £ureka Mighty-Mite carister vacuum  | United<br>States,<br>Eastern   
   | 5 арра  | ritus  | NR   | NR  | <mdl< th=""><th><mdl< th=""><th>-MDL</th><th>NR</th><th>NR n</th><th>ng/g (-MDL)</th><th>NR</th><th>NR</th><th>NR</th><th>NR</th><th>NR</th><th>NR</th><th>See 42.0</th><th>See 42.0</th><th>See 42.0</th><th>See 42.0</th></mdl<></th></mdl<> | <mdl< th=""><th>-MDL</th><th>NR</th><th>NR n</th><th>ng/g (-MDL)</th><th>NR</th><th>NR</th><th>NR</th><th>NR</th><th>NR</th><th>NR</th><th>See 42.0</th><th>See 42.0</th><th>See 42.0</th><th>See 42.0</th></mdl<>   
   
  | -MDL  | NR   | NR n   | ng/g (-MDL)  
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
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| 42.16   | Carignan et al., NR<br>2013a   | Gym   | TPP   | dust   | PUF                         | See 42   | cleaner.<br>Viacumed dust from two locations: (1) within the<br>loose foam pit and (2) from the surface of a landing<br>mat that covered a small portion of the pit.<br>Collected the gym viacuum cleaner bag that had bee<br>used in all areas of the gym including the office and<br>lobby   | United<br>States,<br>Eastern<br>n  
   | 3 withi<br>near   | in and<br>the pit  | NR   | NR  | 22900  | 20100  
   
  | 25000   | NR   | NR nj  | g/g (Median:<br>22.9 µg/g)<br>iange: (20.1-<br>25 µg/g)  
   | NR   | NR  | NR  | NR   | NR   | Nit  | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.17   | Carignan et al., NR<br>2013a   | Gym   | ТРР   | Handwipes  | PUF                         | See 42   | Analyzed hand wipes from gymnasts before and afte<br>2.5 hour practice; 91% detection frequency  | United<br>ir States,<br>Eastern  
   | 11 hand<br>samp<br>befor  | l wipe<br>ples<br>re   | NR   | NR  | NR   | NR   
   
  | NR  | NR   | NR   | ng/wipe  
   | NR   | NR  | NR  | NR   | NR   | NIL  | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.18   | Carignan et al., NR<br>2013a   | Gym   | TPP   | Handwipes  | PUF                         | See 42   | Median increase from before to after: 70.8 ng/wipe;<br>100% detection frequency  | United<br>States,  
   | 11 hand<br>samp   | tice<br>I wipe<br>ples after   | NR   | NR  | NR   | NR   
   
  | NR  | NR   | NR   | ng/wipe  
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.19   | Carignan et al., NR<br>2013a   | Gym   | TDCPP   | indoor air   | PUF                         | See 42   | Stationary air sampling pumps collected samples  | Eastern<br>United<br>States  
   | 5 Oym,  | tice<br>, within<br>m of the   | NR   | NR  | 12.5   | NR   
   
  | NR  | NR   | NR   | ng/m3  
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.20   | Carignan et al., NR<br>2013a   | Gym   | TDCPP   | indoor air   | PUF                         | See 42   | practice and ending after practice.<br>Stationary air sampling pumps collected samples<br>over a continuous 75 hour period beginning prior to  | Eastern<br>United<br>States,   
   | loose<br>the p<br>3 Gym,<br>side o  | e foam in<br>oit<br>, opposite<br>of gym   | NR   | NR  | 8.41   | NR   
   
  | NR  | NR   | NR   | ng/m3  
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.21   | Carignan et al., NR<br>2013a   | Gym   | TDCPP   | dust   | PUF                         | See 42   | practice and ending after practice.<br>Gym 1-1 dust sample from each of the women's<br>gymnastics apparatus (vault, bars, beam, and floor)<br>and 1 from within the losse foam pit. Collected in a   | Eastern<br>United<br>States,<br>Eastern  
   | away<br>oit<br>5 appa   | y from the<br>eratus   | NR   | NR  | 5050   | 2720   
   
  | 22700   | NR   | NR ng  | g/g (Median:<br>5.05 µg/g)<br>lange: (2.72-  
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.22   | Carignan et al., NR<br>2013a   | Gym   | TDCPP   | dust   | PUF                         | See 42   | contrade twistabulity interference may use to the Corolo of a Linvika Mighty-Mitc cantother vacuum<br>cleaner. Vacuumed dast from two locations: (1) within the<br>loose foam pit and (2) from the surface of a landing<br>mat that covered a small portion of the pit.<br>Collected the gram vacuum desarer bag that had been   | United<br>States,<br>Eastern   
   | 3 withi<br>near   | in and<br>the pit  | NR   | NR  | 13000  | 3190   
   
  | 38200   | NR   | NR nj<br>13  | g/g (Median:<br>:µg/g) Range:<br>(3.19-38.2<br>µg/g)   
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.23   | Carignan et al., NR  | Gym   | TDCPP   | Handwipes  | PUF                         | See 42   | used in all areas of the gym including the office and lobby  | United   
   | 11 hand   | i wipe   | NR   | NR  | NR   | <31.8  
   
  | 255   | NR   | NR   | ng/wipe  
   | NR   | 10%   | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
|   | 2013a  |   |   |  |                             |  | Analyzed hand wipes from gymnasts before and afte<br>2.5 hour practice; 91% detection frequency  | r States,<br>Eastern   
   | samp<br>befor<br>pract  | ples<br>ne<br>tice   |  |   |  |  
   
  |   |  |  |  
   |  |   |   |  |  |  |   |  |  
   |  |
| 42.24   | Carignan et al., NR<br>2013a   | Gym   | TDCPP   | Handwipes  | PUF                         | See 42   | Median increase from before to after: 70.8 ng/wipe;<br>100% detection frequency  | United<br>States,<br>Eastern   
   | 11 hand<br>samp<br>pract  | l wipe<br>ples after<br>tice   | NR   | NR  | NR   | <31.8  
   
  | 81.9  | NR   | NR   | ng/wipe  
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.25   | Carignan et al., NR<br>2013a   | Gym   | TCPP  | indoor air   | PUF                         | See 42   | Stationary air sampling pumps collected samples<br>over a continuous 75 hour period beginning prior to<br>practice and ending after practice.  | United<br>States,<br>Eastern   
   | 5 Gym,<br>30 cr<br>loose  | , within<br>m of the<br>e foam in  | NR   | NR  | 2.68   | NR   
   
  | NR  | NR   | NR   | ng/m3  
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.26   | Carignan et al., NR<br>2013a   | Gym   | TCPP  | indoor air   | PUF                         | See 42   | Stationary air sampling pumps collected samples<br>over a continuous 75 hour period beginning prior to<br>practice and ending after practice.  | United<br>States,<br>Eastern   
   | the p<br>3 Gym,<br>side o<br>away   | oit<br>, opposite<br>of gym<br>y from the  | NR   | NR  | 0.74   | NR   
   
  | NR  | NR   | NR   | ng/m3  
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.27   | Carignan et al., NR<br>2013a   | Gym   | TCPP  | dust   | PUF                         | See 42   | Oym 1-1 dust sample from each of the women's<br>gymnastics apparatus (vault, ban, beam, and floor)<br>and 1 from within the loose foam pit. Collected in a<br>cellulose extraction thimble inserted into the crevice<br>cool of a Eureka Ministry-Minis casister vacuum  | United<br>States,<br>Eastern   
   | oit<br>5 appa   | ratus  | NR   | NR  | 2480   | 750  
   
  | 3060  | NR   | NR nj  | g/g (Median:<br>2.48 μg/g)<br>lange: (0.75-<br>3.06 μg/g)  
   | NR   | NR  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.28   | Carignan et al., NR<br>2013a   | Gym   | TCPP  | dust   | PUF                         | See 42   | cleaner.<br>Vacuumed dust from two locations: (1) within the<br>loose foarn pit and (2) from the surface of a landing<br>mat that covered a small portion of the pit.<br>Collected the gram vacuum cleaner bag that had been<br>used in all areas of the gym including the office and<br>lobby   | United<br>States,<br>Eastern<br>n  
   | 3 withi<br>near   | in and<br>the pit  | NR   | NR  | Nit  | NR   
   
  | NR  | Nİ   | NR   | NR   
   | NR   | NR  | NR  | NR   | NR   | Nit  | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
| 42.29   | Carignan et al., NR  | Gym   | TCPP  | Handwipes  | PUF                         | See 42   |  | United   
   | 11 hand   | I wipe   | NR   | NR  | NR   | <40.2  
   
  | 97.4  | NR   | NR   | ng/wipe  
   | NR   | 36%   | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | See 42.0   |
|   | 2013a  |   |   |  |                             |  | Analyzed hand wipes from gymnasts before and afte<br>2.5 hour practice; 91% detection frequency  | er States,<br>Eastern  
   | samp<br>befor   | ples<br>re   |  |   |  |  
   
  |   |  |  |  
   |  |   |   |  |  |  |   |  |  
   |  |
| 42.30   | 2013a<br>Carignan et al., NR<br>2013a  | Gym   | TCPP  | Handwipes  | PUF                         | See 42   | Analyzed hand wipes from gymnasts before and afte<br>2.5 hour practice; 91% detection frequency<br>Median increase from before to after: 70.8 ng/wipe;<br>100% detection frequency   | r States,<br>Eastern<br>: United<br>States,<br>Eastern   
   | samp<br>befor<br>pract<br>11 hand<br>samp<br>oract  | oles<br>re<br>tice<br>I wipe<br>oles after<br>tice   | NR   | NR  | NR   | <40.2  
   
  | NR  | NR   | NR   | ng/wipe  
   | NR   | 0%  | NR  | NR   | NR   | NR   | See 42.0  | See 42.0   | See 42.0   
   | 5ee 42.0   |
| 42.30<br>43                                   | 2013a<br>Carignan et al., NR<br>2013a<br>Carignan et al., NR<br>2013b  | Gym<br>Hozass, offices,<br>vehicles   | TCP9<br>. TDCP9   | Handwipes<br>Dust  | PUF                         | See 42<br>Obaracterise exposure of<br>addreffice workers (29)<br>to TOCPP pressure(is) at<br>BOCPI or unity;<br>measuring TOCPP officers,<br>measuring TOCPP officers,<br>which can addressing<br>possible predictors of<br>exposure   | Adaptar bard says from genarali birden and the<br>20 Sub particle. The Statistical Inspanse<br>Modian income from before to a short '20.8 mg/seje.<br>20 Sci datation frequency<br>5 en 411-45.4   | rr States,<br>Exatern<br>United<br>States,<br>Eastern<br>United S<br>States,<br>Massachusset<br>s, Boston  
   | sarg<br>befor<br>pract<br>12 hand<br>sarg<br>orict<br>42.1- See 4<br>43.4   | oles<br>re<br>tice<br>k sipa<br>bles after<br>tice<br><b>43.1.43.4</b> See   | NR<br>43.1-43.4 See  | NR<br>43.1-43.4 See   | NR<br>20 43.1-43.4 Se  | <40.2  
   
  | NR<br>18 43.1-43.4 See  | NR<br>8 42 1 - 43 . 4 5 4 8 4                                    | NR<br>43.1-43.4 54   | ng/wipe<br>ee 43.1-43.4 See  
   | NR<br># 43.1-43.4 5e   | 0%<br>ne 43.1-43.4 Se   | NR<br>ne 43.1-43.4  | NR   | NR<br>See 43.1-43.4  | Nit<br>See 42.1-43.4                                       | See 42.0<br>Exposure assessment 1<br>populations in<br>offices/residences/pub<br>c areas.   | See 42.0<br>distribution of TDCPP 1<br>dust fournet to be<br>approximately tog-<br>for parametic<br>distributions with<br>the second second second<br>comparison of data<br>comparison of data<br>comparison of data<br>comparison of data<br>comparison of data<br>presumakly (mainking<br>agi/errorazion) show<br>thereasting results.   | See 42.0<br>Unitsel: CAI for a samples provided<br>for each building site.   
   | See 42.0<br>I pool amonging strategy,<br>and analytical methods.   |
| 42.10<br>43<br>43.1                           | 2013a<br>Carignan et al., NR<br>2013a<br>Carignan et al., NR<br>2013b  | Gym<br>Houses, offices,<br>vehicles   | TCP9<br>TDCP9   | Handwipes<br>Deat  | PLF<br>NR<br>NR             | See 42<br>Ournationic exposure of<br>adde office workine (27)<br>to TOOP by newsing its<br>primary metabolite<br>DOOP of unive;<br>meaning TOOPs (adde)<br>meaning TOOPs (adde)<br>meaning possible predictors of<br>exposure<br>See 43  | Adaptar bard says two generals the form and the<br>2 store particle T-Sterior to say the<br>Madas stores from Sterior to a dark 7.23 a gluope<br>5.64 adaptario from Sterior Sterior Sterior<br>5.64 adaptario from Sterior Sterior<br>5.64 adaptario from Sterior Sterior<br>5.64 adaptario from Sterior Sterior Sterior<br>5.64 adaptario from Sterior Sterior Sterior Sterior<br>5.64 adaptario from Sterior Sterior Sterior Sterior Sterior<br>5.64 adaptario from Sterior Sterior Sterior Sterior Sterior<br>5.64 adaptario from Sterior Sterio   | v Safes,<br>Eatern<br>United<br>Safes,<br>Eatern<br>United Eatern<br>«, Boston<br>United Safes,<br>Messchuset<br>s, Boston   
   | sarg<br>befor<br>prat<br>12 hard<br>sarg<br>oract<br>see 43.1- See 4<br>43.4<br>31 Main<br>area   | ples<br>re<br>tice<br>tice<br>surpe<br>ples after<br>tice<br><b>43.1-43.4</b> See<br>studies   | NR<br>43.1-43.4 See  | NR<br>43.1-43.4 Ser<br>NR   | Nit<br>ee 43.1-43.4 Se   | -460.2<br>ee 43.1-43.4 Se<br>560   
   
  | NR<br># 43.3-43.4 See<br>30,600   | NR<br>• <b>431-43.4 See 4</b><br>NR 4                            | NR<br>43.1-43.4 54<br>4,220<br>(<br><br>0  | ng/wipa<br>ee 43.1-43.4 See<br>Ng/g<br>Siao mean:<br>4.21 µg/,0.36   
   | NR<br># <b>43.1-43.4 5#</b><br>2700  | 0%<br>** 43.143.4 Se  | NR<br>ee <b>43.3-43.4</b><br>NR   | NR<br>See 43.1-43.4<br>NR  | NR<br>5ee 43.1-43.4<br>NR  | NR<br>5ee 42.1.43.4<br>NR                                  | See 42.0<br>Exposure assessment 1<br>populations in<br>offices/residences/pub<br>c areas.   | See 42.0<br>a distribution of TDCPP,<br>dust found to be<br>approximately long-<br>normal, May be used<br>distributions without<br>distributions without<br>the set of the set of the<br>comparison of data<br>from max, newly<br>nerrowsted and data<br>buildings (and<br>pressurably fundaheng<br>agg/renovster) theoshing<br>agg/renovster)                             | See 42.0<br>United: 600 for a samples provide<br>for each building site.   | See 42.8<br>moto sumpting
antego-<br>contemporty sampling<br>and analytical methods.   |
| 42.10<br>43<br>43.1<br>43.2                   | 2013a<br>Carguna etal., NR<br>2013a<br>Carguna etal., NR<br>2013b<br>Carguna etal., NR<br>Carguna etal., NR  | Cym<br>Houses<br>Houses   | тся»<br>тася»<br>тася»<br>тася»                             | Handwipes<br>Dust<br>Dust  | PUF<br>NR<br>NR             | See 42<br>Obtactifies exposure of<br>adds office worker (20)<br>DCDP by measure<br>BCOP to worker<br>measuring TOCP in deal<br>of the second second<br>second second second<br>second second second<br>second second second<br>second second second<br>second second second<br>second second second<br>second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second<br>second second second second second<br>second second second second second<br>second second second second second second<br>second second second second second<br>second second second second second second<br>second second second second second second<br>second second second second second second second<br>second second second second second second<br>second second second second second second<br>second second second second second second second<br>second second second second second second second<br>second second second second second second second<br>second second second second second second second<br>second second second second second second second second second<br>second second second second second second second second second<br>second second second second second second second second second<br>second secon | Adapta bad spec han genaral kinet and die<br>2. So kan parket 28: The sector is a direct and the<br>2. So kan parket 28: The sector is a direct 28.8 software<br>3. Software for the sector is a direct 29.8 software<br>3. Software for the sector is a direct and the sector is<br>the sector software in the sector is a direct and the sector is<br>the sector software in the sector is a direct and the sector is<br>the sector software in the sector is a direct and the sector is<br>the sector is a direct and the sector is a direct and the sector is<br>the sector is a direct and the sector is a direct and the sector is<br>the sector is a direct and the sector is a direct and the sector is<br>the sector is a direct and the sector   | <ul> <li>Salara,</li> <li>Linked Salara,</li> <li>Masschusst</li> <li>Koston</li> </ul>  
   | sarg<br>pieto<br>prat<br>11 hard<br>sarg<br>orict<br>ise 43.1- See 4<br>43.4<br>31 Main<br>area<br>29 Bedro   | ples<br>re<br>tice wipp<br>ples after<br>tice<br><b>81.143.4 See</b><br>5 Swing<br>5 Swing   | NR<br>4 <b>3.1-43.4 Ser</b><br>NR<br>NR                          | NR<br>43.1-43.4 Ser<br>NR<br>NR   | Nit<br>ee 42.3-43.4 Se<br>Nit  | -46.2<br>ee 4 <b>21-43.4</b> 5e<br>560<br>270  
   
  | NR<br># <b>43.143.4</b> 5ee<br>30,600<br>18,200   | NR<br>4 <b>3.1.43.4 See 4</b><br>NR 4                            | NR<br>43.1-43.4 54<br>4,230 (<br>1,460 (<br>0  | ng/wipe<br>ex 43.1-41.4 See<br>Ng/g<br>(Sio maan:<br>4.21 µg/g)<br>Mange 0.56-<br>Mange 0.56-<br>Mange 0.27-<br>1.40 µg/0.27-<br>Mange 0.27-   
   | NR<br># <b>43.1-43.4 5</b> #<br>2700<br>2500   | 0%<br>ee 43.3-43.4 Se<br>NR   | NR<br>ee 43.1-43.4<br>NR  | NK<br>5ee 43.1-43.4<br>NR  | NR<br>See 43.1-43.4<br>NR  | NR<br>5ee 43.1.43.4<br>NR<br>NR                            | See 42.0<br>Deposer assessment<br>population in<br>director/waterood/pot<br>c area.<br>See 41.0<br>See 41.0   | See 42.0<br>distribution of TDCPP 1<br>dust found to be<br>approximately approximately approximately<br>for parametely<br>distributions with data<br>comparison of attas<br>comparison of attas | See 420<br>United. Of the a sample provided<br>for each building also<br>See 410<br>See 410  | See 43.0<br>pool sampling strange,<br>contamputery sampling<br>and analytical methods.<br>See 41.0   
   |
| 42.30<br>43<br>43.1<br>43.2<br>43.3           | 2013a<br>Garguan et al., NR<br>Garguan et al., NR<br>Garguan et al., NR<br>2013b<br>Carguan et al., NR<br>Garguan et al., NR<br>Garguan et al., NR   | Oym<br>House, office,<br>Houses<br>Houses   | тся»<br>тося»<br>тося»<br>тося»                             | Handwipes<br>Dust<br>Dust<br>Dust  | PUF<br>NR<br>NR<br>NR       | See 42<br>December 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first<br>to DOP the sector 2009 of the first to DOP the first<br>to DOP the first   | Adapter bad spec for general biological for and the<br>2-2 separates Technological for specific<br>to an another the bad to also ? All advises<br>to determine frequency<br>5-e 43-14-4<br>Viscours collection through callulate extraction<br>through callulate through callulate extraction<br>through.  | <ul> <li>Salara,</li> <li>Lubide Lation</li> <li>Lubide Salara,</li> <li>Lubide Salara,</li> <li>Reaschusteriet</li> <li>Boston</li> </ul>   
   | sarg<br>bid<br>prat<br>11 hang<br>oraci<br>oraci<br>area<br>41.4 See 4<br>41.4<br>29 Bedro<br>30  | ples<br>re<br>tice<br>visp<br>lice<br><b>83.143.4 See</b><br><b>83.143.4 See</b>   | NR<br>43.1.43.4 See<br>NR<br>NR                                  | NR<br>43.1-43.4 Sec<br>NR<br>NR   | NR<br>ee 43.1-43.4 Se<br>NR<br>NR<br>NR  | -40.2<br>ee <b>61.1-43.4</b> 5e<br>560<br>2770<br>60   
   
  | NE<br><b>84 43.3.43.4 See</b><br>10.600<br>18,200<br>72,00  | NR 4   | NR<br>42.3-42.4 54<br>4,230 (<br>)<br>1,460 (<br>)<br>6,060 (<br>)   | ng/wipe<br>ee 431-43.4 See<br>Sigo maan:<br>4.21 ga/gi<br>Marge 0.36-<br>30.5 ga/gi<br>Sigo Marge 0.27<br>1.43 ga/gi<br>Marge 0.27<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43
ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.43 ga/gi<br>1.4  | NR<br><b>43.1-43.4</b> 5<br>2700<br>2500<br>5400   | 0%<br>****13.1-43.4 5#<br>NR<br>NR  | NR<br># 43.1-43.4<br>NR<br>NR   | NR<br>500 433.43.4<br>NR<br>NR   | NR<br>5ee 43.143.4<br>NR<br>NR   | Nit<br>See 43.1.43.4<br>Nit<br>Nit<br>Nit                  | See 42.0<br>Repetitive streamment<br>office/valuescip/od<br>office/valuescip/od<br>See 41.0<br>See 41.0   | See 42.9<br>a dealers of the second sec   | See 420<br>Dombar 20 for on anyology possible<br>for each shalling the.<br>See 430<br>See 430   
  | See 43.0<br>endermanying strategy,<br>and undyrect methods:<br>See 43.0<br>See 43.0  |
| 4230<br>43<br>431<br>432<br>433<br>434        | 2013a<br>Cargona et.al., 195<br>Cargona et.al., 195<br>Cargona et.al., 195<br>Cargona et.al., 195<br>Cargona et.al., 195<br>Cargona et.al., 195<br>Cargona et.al., 195<br>Cargona et.al., 195  | Gym<br>House, office<br>whicks<br>Houses<br>Offices                                     | тся»<br>тося»<br>тося»<br>тося»                             | Handwipes<br>Dest<br>Dust<br>Dust  | PUF<br>NR<br>NR<br>NR<br>NR | Set 1<br>Oursteiner ergense off<br>in ergen versioner<br>in ergen versioner<br>her state ergen versioner<br>in ergen versioner<br>in ergen versioner<br>in ergen versioner<br>serveren<br>Set 1<br>Set 1<br>Set 1  | Adapter bud sees two generations the server<br>of the second   | <ul> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li> <li>Jakes</li>
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  | NR<br># <b>43.1-43.4</b> See<br>10.600<br>18,200<br>72,00   | NR 4<br>43.1.43.4 See 4<br>NR 4<br>NR 1<br>NR 6<br>NR 2          | NR<br>4431-43.4 54<br>4,210 (<br>0<br>6,040 (<br>0<br>6,040 (<br>0<br>6,040 (<br>0<br>6,040 (<br>0<br>6,040 (<br>0<br>8,040 (<br>0<br>8,040 (<br>0<br>8,040 (<br>0<br>8,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,040 (<br>1,0) | ng/wips<br>ex 43.1-43.4 See<br>Pagle<br>Eliss remains<br>Pagle<br>Eliss
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  | NR 81.14.4 14<br>10.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>13.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.0000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.00000<br>14.000000<br>14.000000<br>14.000000<br>14.00000000<br>14.0000000000  | NK 4<br>443-444 104<br>NK 4<br>NK 11<br>NK 11<br>NK 11           | NR<br>421-04.5<br>1.400 (<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0  |
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  | NA<br>4.1.1.4.4 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44.4	Newton et a 2015	I., 2012	various	тарн	indoor air	NR	See 44	Sampler configuration consisting of four sampling trains, each containing a GFF and two FUE's for collecting particle phase and gas phase contaminant	Sweden, Stockholm s	12 NR	NR	NR	-0.035	-0.035	0.15	NR	NR	ng/m3 (Median: <35 pg/m3) Range: (<35 150 pg/m3)	NR	NR	NŘ	NŘ	NR	NR	See 44.0	See 44.0	See 44.0	See 44.0	
44.5	Newton et a 2015	I., 2012	various	тарн	dust	NR	See 44	Dust samples were collected immediately after a 24 hour air sampling period. Settled dust was collected from surfaces at least one meter above the floor	Sweden, Stockholm	12 NR	NR	NR	140	<33	1,500	NR	NR	ng/g	NR	NR	NR	NR	NR	Nik	See 44.0	See 44.0	See 44.0	See 44.0	
45	Maetal., 2	112 2005- 2011; Jan Dec	NR	T88, T891	Amblent Air	NR	Document presence of TBB/TB7H in the environment and investigate atmospheric distributions using 507 samples collected by Integrated Atmospheric Deposition Nettwork at 6 sites aroung shores of Great Lakes as a function of sampling location and	See 45.1-45.12	United Sa States, Illinois, Ohio, New York; Canada	re 45.1- See + 45.12 45.1	45.1- See 45.1-45.1; 2	5ee 45.1-45.12	See 45.1-45.12	See 45.1-45.12	See 45.1-45.12	ee 45.1-45.12 S	iee 45.1-45.12	See 45.1.45.12 S	iee 45.1-45.12	See 45.1- 45.12	See 45.1-45.12	See 45.145.12	See 45.1-45.12	See 45.1-45.12	Relevant to Backgroun exposure from ambian air for these geographical North American regions	d time trend analysis for t these analytes in ambient air and possible measurements in other studies and possible background contamination in air sampling.	Sidetects, range, OM, average for n samples at each location for each e analyte. Temporal trend analysis curves also presented.	Excellent sample analysi and analytical methods with certified internal standards.	is longortant paper for time-relevant atmospheric trends of FRs in ambient air.
45.1	Ma et al., 20	12 2005- 2011; Jan Dec	NR	TBB	Ambient Air	NR	time. See 45	24 hour samples every 12 days from 1 January 2005 to 31 December 2011 using high-volume air samplers. XA2 2 resin to trav vapor phase chemicals, quartz fiber filter to collect particles.	United States, Illinois, D- Chicago	86 NR	NR	0.0048	NR	0.0005	0.019	NR	NR	ng/m3 (Mean: 4.8 pg/m3) Range: (0.5-19 pg/m3)	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
45.2	Ma et al., 20	12 2005- 2011; Jan Dec	NR	тав	Ambient Air	NR	See 45	24 hour samples every 12 days from 1 January 2005 to 31 December 2011 using high-volume air samplers. XAC 2 resin to trap vapor phase chemicals, quartz fiber filter to collect particles.	United States, Ohio, D- Cleveland	76 NR	NR	0.0057	NR	0.0005	0.055	NR	NR	ng/m3 (Mean: 5.7 pg/m3) Range: (0.5-55 pg/m3)	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
45.3	Ma et al., 20	12 2005- 2011; Jan Dec	NR	тав	Ambient Air	NR	See 45	24 hour samples every 12 days from 1 January 2005 to 31 December 2011 using high-volume air samplers. XAD 2 resin to trap vapor phase chemicals, quartz fiber fiber to collect saerticles.	United States , New York, 2- Sturgeon Point	95 NR	NR	0.00072	NR	0.00011	0.041	NR	NR	ng/m3 (Mean: 0.72 pg/m3) Range: (0.11-41 pg/m3)	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
45.4	Ma et al., 20	12 2005- 2011; Jan Dec	NR	тав	Ambient Air	NR	See 45	24 hour samples every 12 days from 1 January 2005 to 31 December 2011 using high-volume air samplers. XAD 2 resin to trap vapor phase chemicalis, quartz fiber fibers to relate naetricios	United States , Michigan, Eagle Harbor	100 NR	NR	0.00057	NR	0.00005	0.0066	NR	NR	ng/m3 (Mean: 0.57 pg/m3) Range: (0.050- 6.6 pg/m3)	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
45.5	Ma et al., 20	12 2005- 2011; Jan Dec	NR	тав	Ambient Air	NR	See 45	24 hour samples every 12 days from 1 January 2005 to 31 December 2011 using high-volume air samplers. XAD 2 resin to trap vapor phase chemicalis, quartz fiber fibers to relate naetricios	United States, Michigan, D- Sleeping bear	100 NR	NR	0.00097	NR	0.000086	0.0075	NR	NR	ng/m3 (Mean: 0.97 pg/m3) Range: (0.086- 7.5 pg/m3)	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
45.6	Ma et al., 20	12 2005- 2011; Jan Dec	NR	Tas	Ambient Air	NR	See 45	24 hour samples every 12 days from 1 January 2005 to 31 December 2011 using high-volume air samplers. XAD 2 resin to trap vapor phase chemicals, quartz fiber fiber to collect particles.	Canada, Ontario, Point 3- Petre	NR	NR	0.00031	NR	0.000074	0.00082	NR	NR	ng/m3 (Mean: 0.31 pg/m3) Range: (0.074- 0.82 pg/m3)	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
45.7	Ma et al., 20	12 2005- 2011; Jan Dec	NR	тарн	Ambient Air	NR	See 45	24 hour samples every 12 days from January 1, 2005 to December 31, 2011 using high-volume air samplers: XAD-2 resin to trap vapor phase chemicals quartz fiber filter to collect particles	i United States, Illinois, , Chicago	86 NR	NR	0.0062	NR	0.00036	0.076	NR	NR	ng/m3 (Mean: 6.2 pg/m3) Range: (0.36-76 ps/m3)	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
45.8	Ma et al., 20	12 2005- 2011; Jan Dec	NR	тврн	Ambient Air	NR	See 45	24 hour samples every 12 days from January 1, 2005 to December 31, 2011 using high-volume air samplers: XAD-2 resin to tria-vapor phase chemicals quartz fiber filter to collect particles	United States, Ohio, Cleveland	76 NR	NR	0.014	NR	0.00047	0.29	NR	NR	ng/m3 (Mean: 14 pg/m3 Range: (0.47- 290 pg/m3)	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
45.9	Ma et al., 20	12 2005- 2011; Jan Dec	Nit .	тарн	Ambient Air	NR	See 45	24 hour samples every 12 days from January 3, 2005 to December 31, 2011 using high-volume air samplers: XAD-2 resin to triay-vapor phase chemicals quartz fiber filter to collect particles	United States , New York, , Sturgeon Point	95 NR	NR	0.0009	NR	0.00014	0.017	NR	NR	ng/m3 (Mean: 0.9 pg/m3) Range: (0.14-17 pg/m3)	NR	NR	NR	NR	NR	Nİ	See 45.0	See 45.0	See 45.0	See 45.0	
45.10	Ma et al., 20	12 2005- 2011; Jan Dec	NR	тарн	Ambient Air	NR	See 45	24 hour samples every 12 days from January 1, 2005 to December 31, 2011 using high-volume air samplers: XAO-2 resis to tray supor phase chemicals, quartz fiber filter to collect particles 24 hour samples every 12 days from January 1, 2009	United States , Michigan, , Eagle Harbor	100 NR	NR	0.0011	NR	0.00013	0.032	NR	NR	ng/m3 (Mean: 1.1 pg/m3) Range: (0.13-32 pg/m3) ne/m3 (Mean	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
45.12	Ma et al., 20	2011; Jan Dec 12 2005-	NR	тарн	Ambient Air	NR	See 45	to December 31, 2011 using high-volume air samplers: XAD-2 resin to trap vapor phase chemicals, quartz fiber filter to collect particles 24 hour samples every 12 days from January 1, 2005	Michigan, Sleeping bear	45 NR	NR	0.00079	NR	0.00018	0.0037	NR	NR	1.1 pg/m3 ) Range: (0.11-16 pg/m3) ng/m3 (Mean:	NR	NR	NR	NR	NR	NR	See 45.0	See 45.0	See 45.0	See 45.0	
46	Schreder an	2011; Jan Dec	bruse	TAR TROP	dent	NR	Measure EBs in brune	to December 31, 2011 using high-volume air samplers: XAD-2 resin to trap vapor phase chemicals quartz fiber filter to collect particles See 46 1.46 2	Ontario, Point , Petre	ne 46 1. See .	66 1.66 2 See 66 1.66 2	See 45 1.45 2	See 46 1.46 2	See 46 1.46 2	See 46 1.46 2	See 46 1.46 2	See 46 1.46 2	0.79 pg/m3) Range: (0.18- 3.7 pg/m3)	See 46 1.46 2	See 26 1.46 2	See 46 1.46 7	See 46 1.46 7	See 46 1.46 2	See 46 1.46 2		Dathway from dust or		RIBs analized by	
	La Guardia, 2014						dust and laundry wastwater to test the hypothesis that dust collecting on clothing and transferring to laundry water is a source of FRs to wastewater treatment plants and waterways.		States, Massachusett s, Boston	46.2															US general population exposure re: surface at floor contact and uptail from formishings directly.	fumilure to human clothes useful as indicator of TRANSFER SINETICS for human d exposure parameters. Pathway from house to aquatic Bit e via house effluent important for ecological determinants. Suggestive of residues	Tediolus discussion of results in text for motion values, sometimes with ranges.	UPLC/APPI tandem MS/MS. Validation with NIST SIM 2585.	
46.1	Schreder an La Guardia, 2014	i 2011, 2012	house	788	dust	NR	See 46	Researchers visited homes to collect dust and laundre wastewater in 2011 and 2012. Dust was collected using a turnek adhydry-Mete (model 35000) vaccum fitted with a callulose filter (Mutartan 2800-199) did in the croscio toul with a stainise steel rise, Researchers collected dus from primary living areas inclusing kitchen, horg noon, befooro, effoo, and dining room by moving the croscie tool slowly across bare floor and carpet.	y United States, Massachusett s, Boston	20 NR	NR	NR	190	NR	1430	NŘ	NŘ	ng/g	NR	NR	NR	NR	NR	NR	See 46.0	in seafood. See 46.0	See 46.0	See 46.0	
46.2	Schreder an La Guandia, 2014	i 2011, 2012	house	тарн	dust	NŘ	See 46	Researchers withed homes to collect dust and laundre westewater in 2013 and 2012. Dust was collected uring a Lannik Algher/Atte Introdo StroOQ waccum balance and the concern tool with a Lannikes street ing heads in the concern tool with a Lannikes street ing heads in the concern tool with a Lannikes street ing inclusing toom by moning the creates tool slowly across bare floor and carpet.	y United States, Massachusett s, Boston	20 NR	NR	NR	115	NR	435	NR	NR	ng/g	NR	NŘ	NR	NR	NR	Nit	See 46.0	See 46.0	See 45.0	See 46.0	
47	Allen et al., 2013	NR	Airplane	T88, T8P	Dust	NR	measurement of FRs in airplane microenviconment, transfer to human hands and comparison with other study results in homes and offices	See 47.1-47.4	United States Se	47.1- See 47.4	47.147.4 See 47.1-47.4	See 47.1-47.4	See 47.1-47.4	See 47.1-47.4	See 47.1-47.4	See 47.1-47.4	See 47.1-47.4	See 47.1-47.4	See 47.1-47.4	See 47.1-47.4	See 47.1-47.4	See 47.3-47.4	See 47.1-47.4	See 47.1-47.4	exposure opportunity o travellers, crew, cleaners, airport workers	f transfer dynamics inferred with measurements on travellers' hands. XRF shows upbiguitous distribution in plane	Good presentation of results and comparisons with similar metrics (other subdies) for residence / offices. Userul for exposure assessment/residue distributions.	Contemporary methodology and validatin with NIST SRM 2585 standard	Levels of BDEs > than in residences/offices by orders of magnitude. Residues on hands of travellers. High use of RFs in all plane components and in electronics.
47.1	Allen et al., 2013	NR	Airplane	тав	Dust	NR	See 47	300 mg dust samples were collected and quantified using GC/EIMS by ion fragments	United States	19 floor	r NR	NR	350	200	3000	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 47.0	See 47.0	See 47.0	See 47.0	
47.2	Allen et al., 2013	NR	Airplane	TBB	Dust	NR	See 47	300 mg dust samples were collected and quantified using GC/EIMS by ion fragments 300 ms dust samples were	United States	19 vent	t NR	NR	740	300	5000	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 47.0	See 47.0	See 47.0	See 47.0	
47.5	Allen et al., Allen et al	NR	Airplane	тарн	Dust	NR	See 47	using GC/EIMS by ion fragments 300 mg dust samples were collected and quantified	United States	19 Verit	- NR	NR	1200	350	3600	NR	NR	ng/e	NR	NR	NR	NR	NR	NR	See 47.0	See 47.0	See 47.0	See 47.0	
	2013							using GC/EIMS by ion fragments										. •											

48	Hoffman et al., NR 2014	House	T88,T8P	Dust	NR	Characterize human exposure to popular FR "Firemaster 550" measuring FR moletties in dust, handwipes and unine of 64 volunteers	See 48.3-48.4	United States, North Carolina	See 48.1- See 48.4	48.148.4 See 48	148.4 Se	e 48.1-48.4 See	48.1-48.4 5	ee 48.1-48.4 S	ee 48.1-48.4	See 48.1-48.4	See 48.1-48.4 S	ee 48.1-48.4 Se	e 48.1-48.4 Se	ee 48.1-48.4	See 48.1-48.4	See 48.1-48.4	See 48.1-48.4	See 48.1-48.4	Highly relevant to general population exposure, especially considering PRs and emerging PRs. Relevant to residues in residences' dust.	Relationship of TBB, TBPH residues related to new additive FR products and probable urine metabolites as markers	Supplemental Materials made available by author-not available for this review. Data possentied: mean, percentile distributions and max for of different analytes in dust, handwipes, urine	Illustrated new analytical method for TBBA in urine and variability of measurements. Contemporary dust analytical methods validated against NIST SIM 2585	Like PBDE, FM550 is additive with leachable components primarily TBB and TBFH
48.1	Hoffman et al., NR 2014	House	TBB	Dust	NR	See 48	Nylon thimble in hose attachment of home vacuum 2 minutes.	<ul> <li>United States,</li> <li>North</li> </ul>	53 NR	N	R	NR	NR	NR	NR	NR	315.1	ng/g	NR	NR	NR	NR	NR	NR	See 48.0	See 48.0	See 48.0	See 48.0	
48.2	Hoffman et al., NR 2014	House	тав	Handwipes	NR	See 48	Hands wiped with sterile gauze wipe soaked in isopropyl alcohol; no range given	Carolina United States, North	53 han	ds N	R	NR	NR	NR	NR	NR	31.4	ng/g	NR	NR	NR	NR	NR	NR	See 48.0	See 48.0	See 48.0	See 48.0	
48.3	Hoffman et al., NR	House	тран	Dust	NR	See 48	Nylon thimble in hose attachment of home vacuum	Carolina - United States,	53 mai	n living N	R	NR	NR	NR	NR	NR	364.7	ng/g	NR	NR	NR	NR	NR	NR	See 48.0	See 48.0	See 48.0	See 48.0	
48.4	2014 Hoffman et al., NR	House	тран	Handwipes	NR	See 48	2 minutes. Hands wiped with sterile gauge soaked in isopropyl	North Carolina United States,	53 NR	is N	R	NR	NR	9.9	655.1	NR	23.4	ng/wipe	NR	NR	NR	NR	NR	NR	See 48.0	See 48.0	See 48.0	See 48.0	
	2014						alcohol	Carolina																					
49	Stapleton et NR al., 2008	House	T88, T8P	M Dust	NR	To detect new IPs replacing PBDE FIRs in indeor environments-19 Boston homes-comparing bedroom vs living area – comparing area specific vn whole floor area residue profile	See 49.1-49.7	United States, Massachusett s, Boston	See 49.1- See 49.7	49.1-49.7 See 49	1-49.7 Se	e 49.1-49.7 See	49.1-49.7 S	ee 49.1-49.7 S	ee 49.1-49.7	See 49.1-49.7	See 40.1-40.7 S	ae 49.1-49.7 Se	e 49.1-49.7 Se	e 49.1-49.7	See 49.1-49.7	See 49.1-49.7	See 40.1-69.7	See 49.1-49.7	general population exposure opportunities. Infers source contributions.	Spatial differences in BFR profiles within a residence. Values from home vacuum cleaner not representative of ranges in single area sampling.	Presentation of GM/SD, range S/detects for n samples of each site for each analyte. USEPUL for quantification of residue distribution	Contemporary methodology and validation w NIST SRM 2585 standard	compares sampling methodologies and area-specific sampling workhole bouse residue profiles. Concentration highest in living room areas.
49.1	Stapleton et NR al., 2008	House	тав	Dust	NR	See 49	Dust collected using Eureka Mighty-Mite Vacuum	United States, Massachusett	16 mai area	n living N	R	NR	NR	<6.6	15030	NR	322	ng/g	NR	NR	NR	NR	NR	NR	See 49.0	See 49.0	See 49.0	See 49.0	
49.2	Stapleton et NR al., 2008	House	TBB	Dust	NR	See 49	Dust collected using Eureka Mighty-Mite Vacuum	s. Boston United States, Massachusett	14 bed	room N	R	NR	NR	<10.6	378	NR	90.4	ng/g	NR	NR	NR	NR	NR	NR	See 49.0	See 49.0	See 49.0	See 49.0	
49.3	Stapleton et NR al., 2008	House	TBB	Dust	NR	See 49	Dust collected using home vacuum cleaner	s, Boston United States, Massachusett	7 NR	N	R	NR	NR	35.7	669	NR	91.1	ng/g	NR	NR	NR	NR	NR	NR	See 49.0	See 49.0	See 49.0	See 49.0	
49.4	Stapleton et NR al., 2008	House	TBB	Dust	NR	See 49	Dust collected on hardwood and carpeted floors using a vacuum cleaner with a cellulous thimble	s. Boston United States, Massachusett s. Boston	30 NR	N	R	NR	NR	6	2430	NR	97	ng/g	NR	NR	NR	NR	NR	NR	See 49.0	See 49.0	See 49.0	See 49.0	
49.5	Stapleton et NR	House	тарн	Dust	NR	See 49	Dust collected using Eureka Mighty-Mite Vacuum	United States,	16 mai	n living N	R	NR	NR	3	10630	NR	234	ng/g	NR	NR	NR	NR	NR	NR	See 49.0	See 49.0	See 49.0	See 49.0	
49.6	Stapleton et NR al., 2008	House	тврн	Dust	NR	See 49	Dust collected using Eureka Mighty-Mite Vacuum	s. Boston United States, Massachusett	14 bed	room N	R	NR	NR	15	763	NR	105	ng/g	NR	NR	NR	NR	NR	NR	See 49.0	See 49.0	See 49.0	See 49.0	
49.7	Stapleton et NR al., 2008	House	тврн	Dust	NR	See 49	Dust collected using home vacuum cleaner	s, Boston United States, Massachusett	7 NR	N	R	NR	NR	24.3	111	NR	65.8	ng/g	NR	NR	NR	NR	NR	NR	See 49.0	See 49.0	See 49.0	See 49.0	
50	Brown et al., NR 2014	Homes, fire stal quarters	tion TBB,TBP	H Dust	NR	measurement of 11 nove beeninated FRs in house dat and dust in firstations for exposure related to children and firefighter occupational exposure.	See 50.1-60.4	s. Boston United States, California, Northern	See 50.1- See 50.4	50.1-50.4 See 50	1-50.4 Se	e 50.1-50.4 See	50.1-50.4 5	ee 50.1-50.4 S	ee 50.1-50.4 :	See 50.1-50.4	See 50.1-50.4 S	ee 50.1-50.4 Se	e 50.1-50.4 Se	w 50.1-50.4	See 50.1-50.4	See 50.1-50.4	See 50.3-50.4	See 50.1-50.4	General population (including children) exposure and exposure contributions to finefighter/workers in fire stations	Standard FR residue study	Details presented in Sopplemental Info not available for this review.	different sampling and sample handling methodologies between house/firestation. Validation with NIST SRM 2285 OR "contemporary house dust simple used as a lab control" Latter option not as desireable for validation process. Different methodologies	
50.1	Brown et al., NR 2014	Homes	TBS	Dust	NR	See 50	2010 Childhood leukemia study; dust samples collected from vacuum cleaners	United States, California, Northern	59				NR	<0.64	19198	NR	310	ng/g	NR	NR	NR	NR	NR	NR	See 50.0	See 50.0	See 50.0	comparisons See 50.0	
50.2	Brown et al., NR 2014	Fire station qua	rters TBB	Dust	NR	See 50	2010-2011 Firefighter occupational exposure study; dust samples collected from vacuum cleaners	United States, California,	27				NR	<0.64	29007	NR	1400	ng/g	NR	NR	NR	NR	NR	NR	See 50.0	See 50.0	See 50.0	See 50.0	
50.3	Brown et al., NR 2014	Homes	тарн	Dust	NR	See 50	2010 Childhood leukemia study; dust samples collected from vacuum cleaners	United States, California,	59				NR	<0.64	3483	NR	144	ng/g	NR	NR	NR	NR	NR	NR	See 50.0	See 50.0	See 50.0	See 50.0	
50.4	Brown et al., NR 2014	Fire station qua	rters TBPH	Dust	NR	See 50	2010-2011 Firefighter occupational exposure study; samples were collected from vacuum cleaners	Northern United States, California,	27				NR	<0.64	11422	NR	1096	ng/g	NR	NR	NR	NR	NR	NR	See 50.0	See 50.0	See 50.0	See 50.0	
51	Johnson et al., NR 2013	Mouses	T88, T89	H Dust	MR	Study assolication etween PBDEs in house dust and hommone levels in mer being treated for infertility	500 511.01.2	Northern United States, Boston, Massachusett s	See 51.1- See 51.2	51.1-31.2 See 51	1512 Se	e 51.1-51.2 See	51.1-51.2 5	ee51.1-51.2 S	ee 51.1-51.2	See 51.1-51.2	See 51.1-51.2 5	ne 51.1-51.2 Se	e 51.1-51.2 Se	w 51.1-51.2	See 51.1-51.2	3ee 51.1-51.2	See 51.1-51.2	See 51.1-51.2	Limited utility in genera	Limited utility for exposure related issues	mean, percentien, max and Science noted for each analyse in n dust samples.	Problematic: Sample collection by mail-in of bone services hap- to services hap- services and services and services and TBPH results. Does not invalidate results.Low TBB and TBPH detection frequencies antylical. Calls into question results for TBB and TBPH, especially considering sample collection methods.	Economismity methodology and corrections to FR levels in dust not comilarien to hits varies. Construitions singflicture positive associations between house dust concertains of PBDEs and houmane level disruption in men.
51.1	Johnson et al., NR 2013	Houses	тав	Dust	NR	See 51	Detected in 47% of home vacuum samples	United States, Boston, Maccadecate	38 NR	N	R	NR	NR	NR	72460	NR	409	ng/g	NR	47%	NR	NR	NR	NR	See 51.0	See 51.0	See 51.0	See 51.0	
51.2	Johnson et al., NR 2013	Houses	тарн	Dust	NR	See 51	TBPH detected in 63% of home vacuum samples	s United States, Boston, Massachusett S	38 NR	N	R	NR	NR	NR	47110	NR	377	ng/g	NR	63%	NR	NR	NR	NR	See 51.0	See 51.0	See 51.0	See 51.0	
52	Stapleton et NR al., 2009	Houses	T88, T89	H Dust	MR	To investigate chemicals being used as replacements for PBDE in polyouthane foun, measured 260ypes furniture and house dust (due to hNdetsction clorinated phosphates in furniture foam)	5ee 52.1-32.3	United States, Boston, Massachusett s	See 52.1- See 52.5	52.1-52.5 See 52	1-52.5 Se	852.152.5 See	52.1-52.5 5	ee 52.1-52.5 S	ee 52.1-52.5	See 52.1-52.5	iee 52.1-52.5 S	ee 52.1-52.5 Se	e 52.1-52.5 Se	e 52.1-52.5	See 52.1-52.5	3ee 52.1-52.5	See 52.1-52.5	See 52.1-52.5	Limited use for exposure assessment in US homes for issues related to methodology and uses of FRs in consumer products in great flax during era of this study.	Poor connections between source and dust levels.	Mean/anges Sidetection given in text. Problems with methodology in this study and some unreparted quantitative results call these data into question.	Problematic Issues: Dust samples NOT collected from same sibes as form same sibes as form samples. Problematic for showing in use of PDDC or attenative PRs. Validation did not use NST standards. Blank corrections were high for CPP, TOOP, TPP. Co- elution problems in ortentarion problems in	note: Sampling focused on mendectarer claiming to not use bornisate filame notestante. Doet study intendente. Doet alternatives were accumulating in house dost.
52.1	Stapleton et NR al., 2009	Houses	тав	dust	NR	See 52	Household vacuum cleaner bag collection	United States, Boston,	50 NR	N	R	NR	NR	<450	75000	NR	840	NR	NR	NR	NR	NR	NR	NR	See 52.0	See 52.0	See 52.0	See 52.0	
52.2	Stapleton et NR al., 2009	Houses	тав	Dust	NR	See 52	Household vacuum cleaner bag collection	Massachusett s United States, Boston,	50 NR	N	R	NR	NR	<450	75000	NR	840	NR	NR	NR	NR	NR	NR	NR	See 52.0	See 52.0	See 52.0	See 52.0	
52.3	Stapleton et NR al. 2009	Couch	тав	PU foirm	NR	See 52	One couch tested, purchased in 2007	Massachusett s United States, Boston	50 4.2	6 by N ets (188	R	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 52.0	See 52.0	See 52.0	See 52.0	
52.4	Stapleton et NR	Houses	тврн	House	NR	See 52	Household vacuum cleaner bag collection; collected	Massachusett s United States, Rector	and toe 50 NR	TBPH ither] N	R	NR	NR	<300	47110	NR	650	NR	NR	NR	NR	NR	NR	NR	See 52.0	See 52.0	See 52.0	See 52.0	
	al, 2009	Church	TREA	(0-50)	MB	(m.17	verween 2002-2007; 50% detection	Massachusett S					1.0	MB				MB		NB		MR			Sec. 52.0	Sec. 63.0	Sec. 83.0	(m) 520	
52.5	al, 2009	couch	IdPH	PU ISAM	NR.	-ME22	une wath tested, purchased in 2007	onnee States, Boston, Massachusett s	1 One test 200	ed, chased in 7	n	AR.	AR.	nn.	NEK	ner.	55	NR	NK.	NR	nen.	net	NIS	nit	240 Sec.	246 22.0	une Juli	24 SLU	

53	Shoelb et al., 2012, as cited by Brown et al., 2014	NR	Mouses	T88, T8PH	Dust	NR	Nit in Brown et al., 2014	See 53.1-53.2	Canada, British Columbia, Vancouver,	See 53.1- See 53.2	53.1-53.2 See 53	1-53.2 See 53	.1-53.2 See	e 53.1-53.2 Se	ne 53.1-53.2	See 53.1-53.2	See 53.1-53.2	See 53.1-53.2	See 53.1-53.2	See 53.1-53.2	See 53.1-53.2	See 53.1-53.2	See 53.1-53.2	See 53.1-53.2	See 53.1-53.2	General population exposure	Relevance Unclear given this is just a Citation of Shoeib in Brown 2014 publication	nly min, max, median for n+116 in Vancouver homes. Details not known	Methodology not presented.	
53.1	Shoelb et al., 2012, as cited by Brown et al.,	NR	Houses	тав	dust	NR	See 53	NR in Brown et al., 2014	Canada, British Columbia,	116 NR		N	ik	120	<0.3	18000	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 53.0	See 53.0	See 53.0	See 53.0	
53.2	Shoelb et al., 2012, as cited by Brown et al., 2014	NR	Houses	тарн	dust	NR	See 53	NR in Brown et al., 2014	Canada, British Columbia, Vancouver.	116 NR		N	IR	99	10	6400	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 53.0	See 53.0	See 53.0	See 53.0	
54	Peng et al., 2015	NR	Houses	тврн	Dust	NR	Develop and validate methodology to detect, id and quantify hydroxylated forms of PBPH in house dust, possibly from Firemaster SSO and Firemaster B254.	5ee 54.1	Canada, Saskatoon, Saskatchewa n	See 54.1 See	54.1 See	54.1 See	54.1 5	See 54.1	See 54.1	See 54.1	See 54.1	See 54.1	See 54.1	See 54.1	See 54.1	See 54.1	See 54.1	See 54.1	See 54.1	General population exposure opportunities from house dust for TBPH and by extrapolation to hydroxylated forms.	Hydroxylated forms may be more bloavailable and may be more tosic. Relative contributions calculated in this methodology provides default to estimate hydroxylated forms from untested TBPH values.	GM4-GSD, min, max %detect %contribuion reported for TBPH and 2 hydroxylated forms for n=23	New Ultra high- performance HRLC methods used to separabe TBPH from oxylated forms. Some sample contamination- results corrected from blanks. Detailed method and QA presented	
54.1	Peng et al., 2015	NR	Houses	тарн	Dust	NR	See 54	Dust samples were collected from 8 houses (2-3 dust samples per house) using a Eureka Mighty-Mite vacuum cleaner with cellulose extraction thimble; 100% detection frequency	Canada	23 NR	N	R N	IR	NR	15	22251	NR	734	ng/g	NR	NR	NR	NR	NR	NR	See 54.0	See 54.0	See 54.0	See 54.0	
55	Aliet al., 2011	2007-2008	Houses	T88, T8₽+	, Dust	NR	Main objectives were: (i) to evolve the presence of relative information of the object information of the object of the object or extende exposure to NMTRs of cilders up to equivaction with existing data on PROE concentrations in the arms amples, to arms explain in door REAL and the explanation of the NMTRs of the explanation of the object of the object of the main series of the object of the NMTR of the object of the NMTR of the object of the sector of the object of the values the sector of the NMTR of the object of the NMTR of the object of the sector of the object of the NMTR of the object of the object of the NMTR of the object of the object of the NMTR of the object of the object of the NMTR of the object of the object of the object of the NMTR of the object of the object of the object of the NMTR of the object of the object of the object of the object of the object of the object of the object of the object of the object of the object	5er (51-05.6	Belgium, United Kingdom	See 55.1- See 55.6	53.1-53.6 See 55	1455 Ser53	.135.6 See	e551-638 Sa	ee 551-85.6 :	See 15.1-35.6 :	See 55.1-55.6	See 53.1-53.6	See 33.1-33.6	See 55.1-53.6	See 53.1-35.6	See 53.1-53.6	5ee 55.1-53.6	5ee 55.1-53.6	See 55.1-55.6	Relevant for quantitative exposure assument to school children and general population.	Comports to finding in other todots. Lower values in classrooms without the second second frequent classring or chosen classrooms have less foum based furniture.	Ter eta-bila with a sample, Scherchin, QA mars 5:0 mellion min/max, Sh and 55th Neis presentet. Good presentation for construction of parametric distributions.	Contemporary methods for recount collection and analysis by GC/MS with CON	Explore an exercise if we needed here any other here any ending product on the market. Exhipping and any product on the market. Exhipping and product on the other here any ending of the fiber vertex.
55.1	Ali et al., 2011	2008 (Jan- June)	Houses	TBS	dust	NR	See 55	To collect dust one square metter of carpet was vacuumed for 2 min or where carpet vasi absent, 4 m2 of bare floor was vacuumed for 4 min. A combined dust imple per house wisis collected from common/requested to coms, including bing areas, lichthrus, studies and befores. Samples were collected using nylon sampling socks fitted	Belgium	39		2	0	1	4	436	75	2	ng/g	55	NR	NR	NR	NR	NR	See 55.0	See 55.0	See 55.0	See 55.0	
55.2	Ali et al., 2011	2008 (Jan- June)	Offices	TBS	dust	NR	See 55	within the nazzle of the vacuum cleaner. To collect dust one square mether of carget was vacuumed for 2 min or where carpet was absent, 4 m2 of bare floor was vacuumed for 4 mins. A combined dust simple per house was collected from common/frequented rooms, including living areas, licithers, studies and bedrooms. Samples were collected using m/on sampling socks fitted	Belgium	6	N	R 2	2	7	4	31	30	6	ng/g	13						See 55.0	See 55.0	See 55.0	See 55.0	
55.3	Ali et al., 2011	2007 (winter)- 2008 (spring)	Child care facilitie and primary elementaries	s TBB	dust	NR	See 55	within the nazzle of the vacuum cleaner. To collect data cen square metter of circpet was vacuumed for 2 min or where carpet was absent, 4 m2 of bare floor was vacuumed for 4 min. A combined data sample per house was collected from common/requested rooms, including long areas, licitations, studies and before. Samples were collected using myton sampling tocks fitted within the neurone of the neurone of houses.	United Kingdom	36 Cla	srooms N	R 4	5	25	a	289	126	22	ng/g	1151	NR	NŘ	NŘ	NR	Nit	See 55.0	See 55.0	See 55.0	See 55.0	
55.4	Ali et al., 2011	2008 (Jan- June)	Houses	тарн	dust	NR	See 55	Norman and statute of explainer matter of clarpet was to collect dual care square matter of clarpet was waccumed for 2 min or where carpet was absent, 4 mi2 of bare floor was succurred for 4 min. A combined dust simple per house was collected form common/requested rooms, including living areas, licitations, studies and bedrooms. Surprises ware collected using refors simpling tocks fitted within the normal of the aurcure of thearer.	Belgium	39	N	R 2	12	13	4	5004	450	19	ng/g	73	NŘ	NR	NR	NR	NR	See 55.0	See 53.0	See 55.0	See 55.0	
55.5	Ali et al., 2011	2008 (Jan- June)	Offices	тарн	dust	NR	See 55	To collect duit one square meter of carpet wis vacuumed for 2 min or where carpet was absent, 4 m2 of bare floor was vacuumed for 4 min. A combined dust sample per house was collected from common/requented rooms, including living areas, kitchinns, studies and behrooms. Samples were collected using reylon sampling tocks fitted within the nozie of the vacuum cleaner.	Belgium	6	N	R S	5	64	16	265	228	67	ng/g	89	NR	NR	nek	NR	NR	See 55.0	See 55.0	See 55.0	See 55.0	
55.6	Ali et al., 2011	2007 (winter)- 2008 (spring)	Child care facilitie and primary elementaries	s тарн	dust	NR	See 55	To collect dust one square meter of carpet was vacuumed for 2 min or where carpet was absent, 4 m2 of hare floor was vacuumed for 4 min. A combined dust sample per house was collected from common/frequented rooms, including living areas, lichtens, studies and beforems. Samples was collected using nylon sampling tocks fitted within the nozico of the waccuum cleaner.	United Kingdom	36 Cla	srooms N	R 3	81	96	4	6175	1424	83	ng/g	867	NR	NR	NR	NR	NR	See 55.0	See 55.0	See 55.0	See 55.0	
56	Hassan and Shoeib 2015	NR	Houses, work places, cars	T88, T8PF	Dust	NR	Measure PBDEs and novel FRs in Cairo Egypt homes, workplaces and cars and	See 56.1-56.6	Egypt, Cairo	See 56.1- See 56.6	56.1-56.6 See 56	.1-56.6 See 56	.1-56.6 See	e 56.1-56.6 Se	re 56.1-56.6	See 56.1-56.6	See 56.1-56.6	See 56.1-56.6	See 55.1-56.6	See 56.1-56.6	See 56.1-56.6	See 56.1-56.6	See 56.1-56.6	See 56.1-56.6	See 56.1-56.6	General population exposure for North Africa and Middle East	Patterns (circa 2011- 2014) for old and new FRs in these countries.	Only median concentrations listed	Contemporary methods, with internal standards for QA	Methods, calculations and results of exposure and risk assessments not considered in this review.
56.1	Hassan and Shoelb 2015	NR	Houses	тав	dust	NR	assess exposure and risk	Dust sampled from vacuum cleaner contents; ranges estimated from graph	Egypt, Cairo	17 NR	N	R N	IR	0.8	0.2	500	NŘ	NR	ng/g	NR	NR	NR	NR	NR	NR	areas. Not useful for U See 56.0	5 See 56.0	See 36.0	See 56.0	
56.2	Hassan and Shoelb 2015	NR	Work places	тав	dust	NR	See 56	Dust sampled from vacuum cleaner contents; ranges estimated from graph	Egypt, Cairo	14 NR	N	R N	ik	71	0.7	200	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 56.0	See 56.0	See 56.0	See 56.0	
56.3	Hassan and Shoeib 2015	NR	Cars	тав	dust	NR	See 56	Dust sampled from vacuum cleaner contents; ranges estimated from graph	Egypt, Cairo	5 NR	N	R b	ik	5.81	0.4	90	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 56.0	See 56.0	See 56.0	See 56.0	
56.4	Hassan and Shoelb 2015	NR	Houses	тарн	dust	NR	See 56	Dust sampled from vacuum cleaner contents. Values estimated from graph.	Egypt, Cairo	17 NR	N	R N	IR	0.1	0.06	13	NR	NR	ng/g	NR	NR	NR	NR	NR	Nik	See 56.0	See 56.0	See 56.0	See 56.0	
56.5	Hassan and Shoelb 2015	NR	Work places	тарн	dust	NR	See 56	Dust sampled from vacuum cleaner contents. Values estimated from graph.	Egypt, Cairo	S NR	N	R N	IR	0.09	0.05	0.4	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 56.0	See 56.0	See 56.0	See 56.0	
56.6	Hassan and Shoeib 2015	NR	Cars	тарн	dust	NR	See 56	Dust sampled from vacuum cleaner contents. Values estimated from graph.	Egypt, Cairo	9 NR	N	R N	IR	0.6	0.5	9	NR	NR	ng/g	NR	NR	NR	NR	NR	Nit	See 56.0	See 56.0	See 36.0	See 56.0	
57	Ali et al., 2012b	NR	Houses, Mosques	T88, T8P+	Dust	NR	Measure OC contaminants in dust of homes and mosques in Pakistan, compare to values in other countries, assess exposure via ingestion of dust.	See 37.1-37.4	Pakistan	See 57.1- See 57.4	57.1-57.4 See 57	1-57.4 See 57	.1-57.4 Sec	e 57.1-57.4 Se	ne 57.1-57.4 :	See 57.1-57.4	See 57.1-57.4	See 57.1-57.4	See 57.1-57.4	See 57.1-57.4	See 57.1-57.4	See 57.1-57.4	See 57.1-57.4	See 57.1-57.4	See 57.1-57.4	General population exposure for Pakistan and Middle East areas. Not useful for US assessments due.	Patterns (circa 2011- 2014) for old and new FRs in these countries.	Mean, median, range for n samples presented in each grouping.	Contemporary methods, with internal standards for QA	Methods, calculations and results of exposure and risk assessments not considered in this review.
57.1	Ali et al., 2012b	NR	Houses	тав	Dust	NR	See 57	Dust samples collected with brush over 4 m2 floor surface; sieved through a 500 µm mesh sieve; LOD not reported.	Pakistan, Gujrat	31 Ho	sies N	R 0.	37	0.03	<0.2	45	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 57.0	See 57.0	See 57.0	See 57.0	
57.2	Att et al., 2012b	niR	mosques	TBB	Dust	NR	see 57	uses samples collected with brush over 4 m2 floor surface; sieved through a 500 µm mesh sieve; LOD not reported.	Hakistan, Gujnat	12 Mo	iques N	n N	IR.	0.03	0.2	3	NR	NIL	ng/g (estimated from graph)	NR	NŘ	NR	NR	NR	NR	5mi 57.0	sei 57.0	see 57.0	sent 57.0	

57.3	Ali et al. 2012b	NR	Houses	тарн	Dust	NR	See 57	Dust samples collected with brush over 4 m2 floor surface; sieved through a 500 µm mesh sieve; level o	Pakistan, f Gujrat	31	Houses	NR	7.3	3.5	<0.2	141	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 57.0	See 57.0	See 57.0	See 57.0	
57.4	Ali et al. 2012b	NR	Mosques	тарн	Dust	NR	See 57	detection not reported. Dust samples collected with brush over 4 m2 floor surface: sieved through a 500 um mesh sieve: level o	Pakistan, f Guirat	12	Mosques	NR	NR	8	1	10	NR	NR	ng/g (estimated from graph)	NR	NR	NR	NR	NR	NR	See 57.0	See 57.0	See 57.0	See 57.0	
								detection not reported.																						
58	Alietal	2014 NR	University,	T88, T8PF	1 Dust	NR	1) measure contaminants	s See 58.1-58.6	Pakistan,	See 58.1-	See 58.1-58.6 Se	e 58.1-58.6 5	iee 58.1-58.6 5	ee 58.1-58.6	See 58.1-58.6	See 58.1-58.6	See 58.1-58.6 5	See 58.1-58.6	See 58.1-58.6	See 58.1-58.6	See 58.1-58.6	See 58.1-58.6	See 58.1-58.6	See 58.1-58.6	See 58.1-58.6	Not useful for US	Not useful	Good presentation of results and	Broad objectives	major aspects of this study involving
			electronic store clothing				in indoor dust in 3 occupational settings,		Fasalabad	58.6																assessments. Origins	4	statistical description, but not necessarily relevant for US exposure	covering multiple variables of sampling	determinant of inhalation as pathway, sampling, analysis and conclusions of
58.1	ALECA	2014 NK	University	105	Dist	NR	266.28	surface. Samples were sieved through a 500 µm mesh sieve	Faisalabad	10	University	NR.	1	13	40.2	10	NK	NR.	ng/g	NR.	NR	NK	NK	NK	No.	266.2970	244 28.0	246.2970	244 28.0	
58.2	Ali et al.	2014 NR	Clothing store	тав	Dust	NR	See 58	Dust samples collected by brushing 4 m2 of floor confines. Examples union simulat through a £00 um.	Pakistan, Existenced	15	clothing store	NR	0.6	0.7	<0.2	1.2	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 58.0	See 58.0	See 58.0	See 58.0	
								mesh sieve																						
58.3	Ali et al.	2014 NR	Electronic store	TBB	Dust	NR	See 58	Dust samples collected by brushing 4 m2 of floor surface. Samples were sieved through a 500 um	Pakistan, Faisalabad	30	Electronic stores	NR	3	1	0.2	15	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 58.0	See 58.0	See 58.0	See 58.0	
58.4	Ali et al.	2014 NR	University	тарн	Dust	NR	See 58	mesh sieve Dust samples collected by brushing 4 m2 of the floor	Pakistan,	16	University	NR	35	19	3	225	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 58.0	See 58.0	See 58.0	See 58.0	
								surface. Samples were sieved through a 500 µm mesh sieve.	Faisalabad																					
58.5	Ali et al.	2014 NR	Clothing store	тарн	Dust	NR	See 58	Dust samples collected by brushing 4 m2 of the floor surface. Samples were sieved through a 500 µm	Pakistan, Faisalabad	15	Clothing Store	NR	11	9	<0.2	35	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 58.0	See 58.0	See 58.0	See 58.0	
								mesh sieve.																						
58.6	Ali et al.	2014 NR	Electronic store	тарн	Dust	NR	See 58	Dust samples collected by brushing 4 m2 of the floor surface. Samples were sized through a 500 um	Pakistan, Faisalabari	30	Electronic	NR	100	20	0.6	950	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 58.0	See 58.0	See 58.0	See 58.0	
								mesh sieve.	T an and call		200																			
59	Alietal	NR	E-waste Storage	T88, TP8H	4 Dust	Electronic device	Objectives: Analytical and	d See 59.1-59.8	Thailand,	See 59.1-	See 59.1-59.8 Se	e 59.1-59.8 5	iee 59.1-59.8 5	ee 59.1-59.8	See 59.1-59.8	See 59.1-59.8	See 59.1-59.8 5	See 59.1-59.8	See 59.1-59.8	See 59.1-59.8	See 59.1-59.8	See 59.1-59.8	See 59.1-59.8	See 59.1-59.8	See 59.1-59.8	Direct use of	Important contribution	Excellent presentation of results:	Excellent methodology	
	20116		Facility				Sample Prep Methods Development; application of new method to	n	Ayutthaya and Nonthahuri	59.8																concentration values relevant to unique	to understanding FR from electronic sources Basidue, contributions	Sdetect, LOQ, min, max, mean, i: median 95th Sile, GM and SD given for n samples of each ecouning	for sample prep and analysis.	
							measurement of NBFRs in dust from e-waste storage	n #	Provinces																	scenarios. However, patterns insightful for	to dust under different conditions of electronic	Individual types of electronics facilit space presented.	,	
							facilities.																			consideration of exposures in spaces	types useful to extrapolate to relative			
																										containing electronics	contributions from different types of			
59.1	Ali et al.	NR	E-waste Storage	TBB	Dust	Electronic device	See 59	Dust samples were collected using 25-	Thailand,	21	NR	NR	18	NR	4	59	NR	NR	ng/g	14	NR	NR	NR	NR	NR	See 59.0	See 59.0	See 59.0	See 59.0	
	2011b		Facility					µm pore size nylon sampling socks inserted in the nozzle of a vacuum cleaner	Ayutthaya and																					
									Nonthaburi Provinces																					
59.2	Ali et al. 2011b	NR	E-waste Storage Facility	тав	Dust	Electronic device	See 59	Dust samples were collected using 25µm pore size nylon sampling socks inserted in the nozzle of a	Thailand, Ayutthaya	12	PC, printer	NR	NR	NR	4	59	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 59.0	See 59.0	See 59.0	See 59.0	
								vacuum cleaner in a room containing the products listed under type.	and Nonthaburi																					
59.3	Ali et al. 2011b	NR	E-waste Storage Facility	тав	Dust	Electronic device	See 59	Dust samples were collected using 25µm pore size rolon sampling sories inserted in the north of a	Thailand, Anothera	2	τv	NR	NR	NR	-2	9	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 59.0	See 59.0	See 59.0	See 59.0	
								vacuum cleaner in a room containing the products listed under type.	and Nonthaburi																					
59.4	Ali et al.	NR	E-waste Storage	тав	Dust	Electronic device	See 59	Dust samples were collected using 25µm pore size	Provinces Thailand,	7	PC, TV, fridge,	NR	NR	NR	5	36	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 59.0	See 59.0	See 59.0	See 59.0	
	2011b		Facility					nylon sampling socks inserted in the nozzle of a vacuum cleaner in a room containing the products	Ayutthaya and		washing machine,																			
								inted under type.	Provinces		viceo recorder, fan, microwave																			
											rice cooker, photocopier,																			
59.5	Ali et al.	NR	E-waste Storage	тарн	Dust	Electronic device	See 59	Dust samples were collected using 25-µm pore size	Thailand,	21	typewriter	NR	270	NR	79	1300	NR	NR	ng/g	265	NR	NR	NR	NR	NR	See 59.0	See 59.0	See 59.0	See 59.0	
	20115		Facility					nyton sampling socks inserted in the nozzle of a vacuum cleaner	Ayutthaya and Noothahuri																					
59.6	Ali et al.	NR	E-waste Storage	тарн	Dust	Electronic device	See 59	Dust samples were collected using 25µm pore size	Provinces Thailand,	12	PC, printer	NR	NR	NR	110	1300	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 59.0	See 59.0	See 59.0	See 59.0	
	2011b		Facility					nylon sampling socks inserted in the nozzle of a vacuum cleaner in a room containing the products	Ayutthaya and																					
59.7	Ali et al	NR	F-waste Storage	TRPH	Dest	Flactmair desire	See 50	listed under type.	Nonthaburi Provinces Thailand	,	TV	NR	NR	NR	144	181	NR	NR	nala	NR	NR	NR	NR	NR	NR	See 59.0	See 59.0	See 59.0	See 50.0	
	2011b		Facility					nylon sampling socks inserted in the nozzle of a vacuum cleaner in a room containing the products	Ayutthaya and										-976											
						discussion of a database	664	listed under type.	Nonthaburi Provinces																					
59.8	Ali et al. 2011b	NR	E-waste Storage Facility	тарн	Dust	Electronic device	See 59	Dust samples were collected using 25µm pore size nylon sampling socks inserted in the nozzle of a vacuum cleaner in a room containing the reoducts	Thailand, Ayutthaya and	7	PC, TV, fridge, washing marhine	NR	NR	NR	79	419	NK	NR	ng/g	NR	NR	NR	NR	NR	NR	See 59.0	See 59.0	See 59.0	See 59.0	
								listed under type.	Nonthaburi Provinces		video recorder, fan,																			
											microwave, rice cooker,																			
											p=otocopier, tvpewriter																			
60	Springe 2012	et al., 2009, winter	Office, houses,	ars TBPH	Dust	NR	Objectives: 1)measure TBPH in dust collected	See 60.1-60.3	United States,	See 60.1- 60.3	See 60.1-60.3 Se	e 60.1-60.3 5	iee 60.1-60.3 S	ee 60.1-60.3	See 60.1-60.3	See 60.1-60.3	See 60.1-60.3 5	See 60.1-60.3	See 60.1-60.3	See 60.1-60.3	See 60.1-60.3	See 60.1-60.3	See 60.1-60.3	See 60.1-60.3	See 60.1-60.3	General population exposure assessment:	General principles for exposure-related issue	Median, range, %detects were presented for n samples in each	Very good methods employed for dust	Methods, results and conclusions related to in vitro and in vivo studies not
							from homes, offices, cars; isolate TBPH, metabolize		Boston, Massachusett																	consider climate conditions as sampling		category. Useful for distributions fo exposure assessments.	collection, analysis including QA with NIST	considered in this review.
							use TBMEHP in taxicology testing	v																		Boston 2009.			SHM 2585 Samples.	
60.1	Springer	et al., NR	Office	тарн	dust	NR	See 60	Dust samples were collected by investigators using a	United States,	31	NR	NR	NR	410	95	15500	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 60.0	See 60.0	See 60.0	See 60.0	
	2012							cellulose extraction thimble (Whatman International Piscataway, NJ) inserted between the crevice tool	, Boston, Massachusett																					
								and vacuum tube extender of a Eureka Mighty-Mite vacuum cleaner. Each main living area of the home and each office was vacuumed for anorwimately 10	\$																					
								min, capturing dust from the surface area of the room.																						
60.2	Springer 2012	et al., NR	Houses	тарн	dust	NR	See 60	Dust samples were collected by investigators using a cellulose extraction thimble (Whatman International,	United States, Boston,	31	NR	NR	NR	150	-4	12400	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 60.0	See 60.0	See 60.0	See 60.0	
								Piscataway, NJ) inserted between the crevice tool and vacuum tube extender of a Eureka Mighty-Mite	Massachusett s																					
								vacuum cleaner. Each main living area of the home and each office was vacuumed for approximately 10 min conturing dust from the second																						
60.7	Savine	et al. NR	Cars	TBPH	dust	NB	See 60	min, capturing dust from the surface area of the room. Dust samples were collected by invastigation of the	United States	20	NR	NR	NR	400	<36	4830	NR	NF	nr/*	N <sup>a</sup>	NB	NR	NR	N*	NR	See 60.0	See 60.0	See 60.0	See 60.0	
00.3	2012							cellulose extraction thimble (Whatman International, Piscataway, NJ) inserted between the crevice tool	, Boston, Massachusett										- <del>6</del> 6											
								and vacuum tube extender of a Eureka Mighty-Mite vacuum cleaner. Cars were vacuumed for	s																					
								surface of the front and back seats. The dashboard, floor, and other surfaces of the vahicles ware and	-																					
								vacuumed.																						

61	Makisen et al., NR 2009	Circuit board factory, furriture workshop, electronics dismantling facilities, computer classroom	IBBPA	Indoor air, NR personal patch samples and handwash	Objectives: To measure occupational exposure Ops and TBBPA by 1) a samplings 2) personal patch analysis and hardwashings (for den exposure potential.	<ul> <li>See 61.1-61.12</li> <li>br</li> </ul>	Finland	See 61.1- See 61.1- 61.12 61.12	See 61.1-61.12	See 61.1-61.12 5	See 61.1-61.12	See 61.1-61.12	See 61.1-61.12	See 61.1-61.12	See 61.1-61.12	See 61.1-61.12	See 61.1-61.12	See 61.1- 61.12	See 61.1-61.12	See 61.1-61.12	See 61.1-61.12	See 61.1-61.12	Occupational exposure especially electronics related industries.	<ul> <li>Illustrates important general patterns of residue in occupationa areas and consequence to workers in terms of personal exposure. Quantification issues limit this but obvious importance of</li> </ul>	Small sampling size for personal monitoring (personal patches and handwashes), and marytotal sisses compromise quantification and reliability of comparisons. Limited use for expoure assessment. BUT important highlight of high levels in electronics industries.	Standard methodology for analysis, but issues with recovery rates suggest problem or contamination or internal standards issues . No NIST standards available. Particle, air and small particle	
																								exposure.		Some compromise to reliability of quantification. Three methods used, but variation and small sample numbers for personal monitoring (n+2)	
61.1	Makinen et al., NR 2009	Orcuit board factory	IBBPA	Indoor air NR	See 61	Two samplers: a glass fiber filter placed in an IOM sampler collected the inhabitab fraction of particle an OVS sampler containing a filter collected particles. XAD resin and PU foam were used for the sampling of compounds prevent in the gas phase. I the analysis, the gas and particle phases were not see at the	Finland k: n	NR	NR	NR	NR	NR	NR	NR	4	ng/m3	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.2	Makinen et al., NR 2009	Fumiture workshop	reepa	Indoor air NR	See 61	Two samplers: a glass fiber filter placed in an IOM sampler collected the inhalable fraction of particle an OVS sampler containing a fiber collected particles. XAD resin and PU foam were used for the sampting of compounds preserve in the gas phase. I the analysis, the gas and particle phases were not the analysis, the gas and particle phases were not	Finland k: n	NR	NR	NR	NR	NR	NR	NR	6	ng/m3	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.3	Makinen et al., NR 2009	Electronics dismantling facility I	IBBPA	Indoor air NR	See 61	sectarization. Two samplers: a glass fiber filter placed in an XDM sampler collected the inhalable fraction of particle an QVS sampler containing, a fiber collected particles. XAD resin and PU Sam were used for the sampling of compounds present in the gas phase. I the analysis, the gas and particle phases were not	Finland k: n	NR	NR	NR	NR	60	180	NR	100	ng/m3	NR	NR	NR	NR	NR	NİL	See 61.0	See 61.0	See 61.0	See 61.0	
61.4	Makinen et al., NR 2009	Electronics dismantling facility II	гавра	Indoor air NR	See 61	searabed. Two samplers: a glass fiber filter placed in an IOM sampler collected the inhalable fraction of particle an OVS sampler containing a fiber collected particles. XAD resin and PU foam were used for the sampling of compromis present in the gas plass. I the analysis, the gas and particle phases were not	Finland k: n	NR	NR	NR	NR	20	170	NR	60	ng/m3	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.5	Makinen et al., NR 2009	Computer classroom	reepa	Indoor air NR	See 61	searabed. Two samplers: a glass fiber filter placed in an IOM sampler collected the inhalable fraction of particle an OVS sampler containing a fiber collected particles. XAD resin and PU Gam were used for the sampling of compounds present in the gas phase. I the analysis, the pis and particle phases were not	Finland k; n	NR	NR	NR	NR	NR	NR	NR	-65	ng/m3	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.6	Makinen et al., NR 2009	Offices and social premises of factory and workshops	IBBPA	Indoor air NR	See 61	separated. Two samplers: a glass fiber filter placed in an IOM sampler collected the inhalable fraction of particle an OVS sampler containing a fiber collected particles. XXD resin and PU Gam were used for the sampling of compounds present in the gas phase. I the analysis, the pis and particle phases were not	Finland k: n	NR	NR	NR	NR	NR	NR	NR	~6	ng/m3	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.7	Makinen et al., NR 2009	Circuit board factory	гавра	adiobent NR personal patch material	See 61	secarated. Patch test: Absorbent patches affixed to worker clothing for 6 hours.	Finland	3 Patch test (n=3; chest, arm thiab)	NR	NR	NR	NR	NR	NR	<0.09	ng/cm2	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.8	Makinen et al., NR	Circuit board	rbepa	ethanol hand NR	See 61	Hand wash: workers rubbed hands while ethanol	Finland	2 Hand wish	NR	NR	NR	NR	NR	NR	<0.09	ng/two hands	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.9	Makinen et al., NR 2009	Furniture workshop	ГВБРА	ethanol hand NR wash	See 61	Patch test: Absorbent patches affixed to worker clothing for 6 hours.	Finland	1 Patch test (n=1; chest)	NR	NR	NR	NR	NR	NR	<0.09	ng/cm2	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.10	Makinen et al., NR 2009	Fumiture workshop	rbepa	ethanol hand NR wash	See 61	Hand wash: workers rubbed hands while ethanol poured over for 30 seconds.	Finland	2 Hand wash (n+2)	NR	NR	NR	NR	NR	NR	<0.09	ng/two hands	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.11	Makinen et al., NR 2009	dismantling facility I	гаера	adsoberit NR personal patch material	See 61	Patch test: Absorbent patches atfosed to worker clothing for 6 hours.	Finland	3 Patch test (n=3; chest, arm, thigh)	NR	NR	NR	0.4	17	NR	2	ng/cm2	NR	NR	NR	NR	NR	NR	See 61.0	See 61.0	See 61.0	See 61.0	
61.12	Makinen et al., NR 2009	Electronics dismantling facility II	гвера	adsobent NR personal patch material	See 61	Patch test: Absorbent patches affixed to worker clothing for 6 hours.	Finland	3 Patch test (n=3; chest, arm, thigh	NR	NR	NR	<0.09	63	NR	6.7	ng/cm2	NR	NR	NR	NR	NR	NİL	See 61.0	See 61.0	See 61.0	See 61.0	
62	Abb et al., NR 2011	Mouses	respa	Dust NR	measure brominated II in house dust in Germa and US and compare w other studies using different methods.	R See 62.1 my kith	U.S. and Germany	See 62.1 See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	See 62.1	Not useful for US general population exposure assessment	Comparisons of results against studies with different methods : extractions via differe solvenets-no significa difference.	<ul> <li>Poor presentation of results and reference to "average SD" across a range of analytes. Quality of data nt presentation poor and use of two U; nt samples (Denver, CD) as a representative sample of US dust</li> </ul>	Methods used little internal or external standards and may have had contaminantion issues.	
62.1	Abb et al., NR 2011	Houses	ГВВРА	Dust NR	See 62	Household vacuum cleaner bag collection; detecte in 20 of 26 samples	d U.S. and Germany	26 House (U.S. n=2; Germany n=24)	85	NR	48	NR	470	NR	NR	ng/g	NR	NR	NR	NR	NR	NİL	See 62.0	See 62.0	content is unacceptable. See 62.0	See 62.0	
63	Wanner et al., NR 2008, as cited in Abb et al., 2011	Houses	respa	dust NR	Cited results for purpor of comparison of dust concentrations in the U	ur See 63.1 JK	Germany	See 63.1 See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	See 63.1	Limited relevance to consider values in different countries by studies using slightly diff. analytical method	Comparisons not directly quantifiably comparative	Median, av values given for n samples in different studies. Not useful to prepare values for quantitative exposure assessment	Methods mostly unknown except that HRGC-MS used for analytical methods.	
63.1	Wanner et al., NR 2008, as cited in Abb et al.,	Houses	reepa	Dust NR	See 63	Detection level not reported	Germany	34 NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 63.0	See 63.0	See 63.0	See 63.0	
64	Abdallah et al., NR 2008a, as cited in Abb et al., 2011	Houses, Offices, cars	IBBPA	Dust NR	Cited results for purpor of comparison of dust concentrations in Germany	ue See 64.1-64.3	United Kingdom, England, Birmingham	See 64.1- See 64.164.3 64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	See 64.1-64.3	Limited relevance to consider values in different countries by studies using slightly diff. analytical method	Comparisons not directly quantifiably comparative	Median, av values given for n samples in different studies. Not useful to prepare values for quantitative exposure assessment	Methods mostly unknown except that LC MS/MS used for analytical methods.	
64.1	Abdallah et al., NR 2008a, as cited in Abb et al., 2011	Houses	ГВВРА	Dust NR	See 64	Samples collected using nylon sample socks (25 µm pore size) that were mounted in the furniture attachment tube of vacuum cleaner.	n United Kingdom, England, Birmingham	45 NR	87	NR	62	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NİL	See 64.0	See 64.0	See 64.0	See 64.0	
64.2	Abdallah et al., NR 2008a, as cited in Abb et al., 2011	Offices	ГВВРА	Dust NR	See 64	Samples collected using nylon sample socks (25 µm pore size) that were mounted in the furniture attachment tube of vacuum cleaner.	n United Kingdom, England, Birmingham	28 NR	NR	NR	36	NR	NŘ	NR	NR	ng/g	NŘ	NR	NR	NR	NR	NİL	See 64.0	See 64.0	See 64.0	See 64.0	
64.3	Abdallah et al., NR 2008a, as cited in Abb et al., 2011	Cars	f88PA	Dust NR	See 64	Samples collected using nylon sample socks (25 µn pore size) that were mounted in the furniture attachment tube of vacuum cleaner.	n United Kingdom, England, Birmingham	20 NR	NR	NR	2	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NİL	See 64.0	See 64.0	See 64.0	See 64.0	
65	Harrad et al., NR 2010	Daycare centers and primary schools classrooms	IBBPA	Dust NR	characterize levels of BFRs and PCBs in prima school and daycare classrooms and use dat for exposure assessme to young children	See 05.1 Wy Ia nt	United Kingdom West Midlands	See 65.1 See 65.1	See 65.1	Sec 65.1	See 65.1	Sec 65.1	See 65.1	See 65.1	See 65.1	See 65.1	See 65.1	Sec 65.1	See 65.1	See 65.1	See 65.1	See 65.1	Useful for exposure assessments for toddle and young children in general population. More retrospective value since collections done 2007-2008 era.	no unique utility rs	Presents min, max, 5th, 50th, 93th Xile and mean for n values. Useful for quantitative assessment.	standard sampling and LC-M5/M5 - Full floor surface vacuumed in classrooms. Q5 ?? May be in Suppl. Info.	Methods, calculations and results of exposure assessments not included in this review. Study results compared with results from US studies is homes, cars, offices
65.1	Harrad et al., NR 2010	Daycare centers and primary schools classrooms	IBBPA	dust NR	See 65	Portable vacuum cleaners with 25ug mesh sock, entire floor surface	United Kingdom	43 NR	NR	200	110	17	1400	Nit	NR	ng/g	NR	NR	NR	NR	NR	NR	See 65.0	See 65.0	See 65.0	See 65.0	
66	Toms et al., NR 2009 as cited in Abb et al., 2011	Houses	reepa	Dust NR	Cited results for purpos of comparison of dust concentrations in Australia	ue See 66.1	Australia	See 55.1 See 55.1	See 65.1	See 66.1	See 66.1	See 65.1	See 65.1	See 66.1	See 66.1	See 65.1	See 66.1	See 66.1	See 66.1	See 66.1	See 66.1	See 66.1	Limited relevance to consider values in different countries by studies using slightly diff. analytical method	Comparisons not directly quantifiably comparative	Median, av values given for n samples in different studies. Not useful to prepare values for quantitative exposure assessment	Methods mostly unknown except that HRGC-HRMS used for analytical methods.	
66.1	Toms et al., NR 2009 as cited in Abb et al., 2011	Houses	гавра	dast NR	See 66	Detection level and method not reported	Australia	10 NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 66.0	See 66.0	See 66.0	See 66.0	

67	D'Hollander e al., 2010	t NR	Houses, offices	TESPA	Dust	NR		5ee 67.1-67.2	Belgium, Flanders	See 67.1- 5 67.2	ee 67.1-67.2 See 67.1	67.2 See 67.1-	57.2 See 67.1-67.	5ee 67.1-67.2	See 67.1-67.2	See 67.1-67.2	See 67.1-67.2	See 67.1-67.2 5	ee 67.1-67.2 S	iee 67.1-67.2	See 67.1-67.2	See 67.1-67.2	See 67.1-67.2	See 67.1-67.2	General population exposure assessment fo TBBPA from home dust. Note era and temperate climate makes this best for retrospective assessments.	Limited extrapolations r because of era, limited ventiliation, building materials and products in Flanders Belgium	Only mean and 93th Kile given for results – difficult for use in creating distributions or understanding pattern.	Standard methods for vacuum, whole area collections; for sample prep. Analalytical by MS ENI/MS MRM for TBBPA. 13C internal standards used for QA	Methods, calculations, conclusions of exposure assessments not considered in this review. Conclusions re relative 5 contributions to overall exposure not reviewed.
67.1	D'Hollander e al., 2010 D'Hollander e	t NR	Houses	TBBPA	dust Dest	NR	See 67	Samples collected with a vacuum using a nylon sock mounted in the furniture attachment Samples collected with a vacuum using a nylon sock	k Belgium, Flanders k Belgium	45 M	IR NR	NR	11.7	NR	NR 419	141	NR NR	ng/g	NR	NR	NR NR	NR	NR	NR	See 67.0	See 67.0	See 67.0	See 67.0	
65	al, 2010 Geens et al., 2009	NR	Houses, offices	TEBPA	Dust	NR	Measurement of BPA, TBBPA, Tricksan in dust in Belgian homes and offices.	mounted in the furriture attachment	Flanders Belgium, Flanders	See 68.1- 5 68.2	ee 68.1-68.2 See 68.1	68.2 See 68.1-	38.2 See 68.1-68.	5ee 68.1-68.2	See 68.1-68.2	See 68.1-68.2	See 68.1-68.2	See 68.1-68.2 5	ee 68.1-68.2 S	lee 68.1-68.2	See 68.1-68.2	See 68.1-68.2	See 68.1-68.2	See 68.1-68.2	General population exposure assessment fo TBBPA from home dust. Note era and temperate climate makes this best for retrospective	Limited extrapolations r because of era, limited ventillation, building materials and products in Flanders Belgium	For offices, two measurements gives For homes (n=18) min, max, mean, SD, 93th Nile. Adequate for distribution.	Standard methods for vacuum, whole area collections; for sample prep. Analalytical by MS ENL/MS MRM for TBBPA. 13C internal	Methoda, calculations, conclusions of exposure assessments not considered in this review. Conclusions re relative 5 contribution to overall exposure not reviewed. Study found levels in offices = 106 keels in houses.
68.1	Geens et al	NR	Houses	TREPA	dust	NB	See 68	Collected using a varuum cleaner	Balaison	18 . 6		NR	10	1	1480	NR	NR	nala	NR	NR	NR	NB	NB	NR	assessments.	See 68.0	See 68.0	standards used for QA	
68.2	2009 Geens et al.,	NR	Offices	твера	Dust	NR	See 68	Collected using a vacuum cleaner	Flanders Belgium,	2 1	IR NR	NR	75	45	100	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 68.0	See 68.0	See 68.0	See 68.0	
69	2009 Cunha et al., 2010 as cited in Abb et al., 2011	NR	Mouses	TEBPA	Dust	NR	Cited results for purpose of comparison of dust concentrations in Portuga	See 69.1 d	Flanders Portugal	See 69.1 S	ee 69.1 See 65	1 See 69	1 See 69.1	See 69.1	See 69.1	See 69.1	See 69.1	See 69.1	See 69.1	See 69.1	See 69.1	See 69.1	See 69.1	See 69.1	Limited relevance to consider values in different countries by studies using slightly diff. analytical methods.	Comparisons not directly quantifiably comparative	Median, av values given for n samples in different studies. Not useful to prepare values for quantitative exposure assessment	Methods mostly unknown except that GC MS used for analytical methods.	
69.1	Cunha et al., 2010 as cited in Abb et al., 2011	NR	Houses	тавра	Dust	NR	See 69	NR in Abb et al., 2011	Portugal	10 N	IR NR	ND	NR	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 69.0	See 69.0	See 69.0	See 69.0	
70	Takigami et al 2009	L, NR	Houses	TBBPA	Dust	NR	NR	See 70.1	Japan	See 70.1 S	ee 70.1 See 70	1 See 70	1 See 70.1	See 70.1	See 70.1	See 70.1	See 70.1	See 70.1	See 70.1	See 70.1	See 70.1	See 70.1	See 70.1	See 70.1	Limited relevance: two houses/two samples/Japanese housing scenario from 2004-2006 construction.	limited value given limited sampling	only two samples for dust those values presented	Contemporary methods	methods and results for air sampling not considered in this review.
70.1	Takigami et al 2009	L, NR	Houses	TBBPA	Dust	NR	NR	Collected dust from owners' vacuum cleaners	Japan	2 N	IR 490	NR	520	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 70.0	See 70.0	See 70.0	See 70.0	
n	Deng et al., 2014	NR	Dismantling and sorting workshop, Printed circuit board recycling workshop, Wire recycling workshop	TBBPA	Dust	TV housing, printed circuit board, wires	1)Study levels and distribution characteristic of PBOE, TBBPA, 5 heary metals; 2)assess occupational risk is recycling industry	548 71.1-71.6 3	China	See 71.1- S 71.6	ee 71.1-71.6 See 71.1	71.6 See 71.1-	716 See 711-71	5 See 71.1-71.6	See 71.1-71.6	See 71.1-71.6	See 71.1-71.6	See 71.1-71.6 5	ee 71.1-71.6 S	iee 71.1-71.6	See 71.1-71.6	See 71.1-71.6	See 71.1-71.6	See 71.1-71.6	Not directly relevant to general population exposure as these were measurements in a Chinese industry deconstructing 2000 TV daily, General principles may be relevant for electronic shops, facilities reatoring computers, home based work scenarios.	General information about B/Rs and heavy metals in electronics which can migrate, volatilize or otherwise is become released into a the environment	not relevant for general exposure assessment	not relevant for general exposure assessment	encellent review and explanation of electronics recycling process in bulk
71.1	Deng et al., 2014	NR	Dismantling and sorting workshop	TBBPA	Dust	Electrical equipment	See 71	Waste electrical and electronic equipment recycling plant; handheld vacuum cleaner collection	China	12 N	IR NR	NR	NR	205	950	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 71.0	See 71.0	See 71.0	See 71.0	
71.2	Deng et al., 2014	NR	Printed circuit board recycling	TBBPA	Dust	circuit board	See 71	Waste electrical and electronic equipment recycling plant; handheld vacuum cleaner collection	China	15 M	IR NR	NR	NR	189	961	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 71.0	See 71.0	See 71.0	See 71.0	
71.3	Deng et al., 2014	NR	workshoo Wire recycling workshop	TBBPA	Dust	wire	See 71	Waste electrical and electronic equipment recycling plant; handheld vacuum cleaner collection	China	3 N	ik NR	80.4	NR	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 71.0	See 71.0	See 71.0	See 71.0	
71.4	Deng et al., 2014	NR	NR	TBEPA	Dust	NR	See 71	Waste electrical and electronic equipment recycling center	China	12 N	IR NR	18,500,0	00 NR	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 71.0	See 71.0	See 71.0	See 71.0	
71.5	Deng et al., 2014	NR	NR	твера	Dust	NR	See 71	Waste electrical and electronic equipment recycling center	China	10 N	IR NR	20,50	NR	NR	NR	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 71.0	See 71.0	See 71.0	See 71.0	
71.6	Ni and Zeng, 2013	2009, March	Offices	TBBPA	Dust	NR	See 71 Research the occurrence of polybrominated	Waste electrical and electronic equipment recycling center See 72.1-72.3	China, China, Shenzhen	5 N See 72.1- S 72.3	ee 72.1-72.3 See 72.1	7,450 72.3 See 72.1-	NII. 72.3 See 72.1-72.	NR 5ee 72.1-72.3	NR See 72.1-72.3	NR See 72.1-72.3	NR See 72.1-72.3	ng/g See 72.1-72.3 S	NR ee 72.1-72.3 5	NR lee 72.1-72.3	NR See 72.1-72.3	NR See 72.1-72.3	NR See 72.1-72.3	NR See 72.1-72.3	See 71.0 Highly relevant: General population	See 71.0 Comparison of whole dust, P2.5 and P10	See 71.0 Excellent presentation of whole dust P2.5 and P10 content. GM,5D,min,	See 71.0 Interesting methodology, esp for	Valuable study.
							diphenyl ethers (PSDEs) in central air conditioner filter dust (PPIA in the present study) from an office building in Shenzhen, China.																		exposure in public spaces / office scenarios.Study done in China, but Shenzhen located on coast, opposite Hong Kong, Heavy industrial air pollution less prevalent than interior China areas. Study involves 50 office sites – broad stampling	fractions. Important for possible default extrapolation to other studies.	max, median, mean presented. Useful for distributions for exposure assessment.	large areas (offices/public spaces) Authors note likihood of underestimation of contribution of small particles because of sampling methodology issues. Excellent analytical methodology. 56 office spaces tested.	e .
72.1	Ni and Zeng, 2013	2009, March	Offices	TBBPA	Dust	NR	See 72	Central air conditioner filter dusts were collected as Particulate Phase of Indoor Air samples	China	56	NR	3,382	975	30	59,140	NR	949	ng/g	5	NR	NR	NR	NR	NR	See 72.0	See 72.0	See 72.0	See 72.0	
72.2	Ni and Zeng, 2013	2009, March	Offices	тавра	Indoor air, PM2.5	NR	See 72	Central air conditioner litter duits were collected as Particulate Phase of Indoor Air samples	China	56	NR	0.465	0.507	0.0127	1.057	NR	NR	ng/m3 (Mean: 465; Median: 507; Range: 12.7-1057	NR	NR	NR	NR	NR	NR	See 72.0	See 72.0	See 72.0	See 72.0	
72.3	Ni and Zeng. 2013	2009, March	Offices	теера	Indoor air, PM10	NR	See 72	Central air conditioner filter dusts were collected as Particulate Phase of Indoor Air samples	China	56	NR	0.235	0.240	0.00626	0.511	NR	NR	oz/m31 ng/m3 (Mean: 235; Median: 240; Range: 6.26-511 oz/m31	NR	NR	NR	NR	NR	NR	See 72.0	See 72.0	See 72.0	See 72.0	
73	Napoli-Davis and Owens, 2013	NR	Bectronic surfaces	TEBPA	Dust	Copier, computer towers, microwave, refrigerator, computer monitors, printer	<ul> <li>The objective of this work was to develop a quantitative,</li> <li>highthroughput method for the analysis of TBBPA is in dust from various consumer electronics (Kajiware et al., 2011) found in offices and homes using DLLME.</li> </ul>	k 5ee 71.1-71.6	United States	See 73.1- 5 73.6	ee 73.1-73.6 See 73.1	73.6 See 73.1-	73.6 See 73.1-73.	5 See 73.1-73.6	See 73.1-73.6	See 73.1-73.6	See 73.1-73.6	See 73.1-73.6 5	ee 73.1-73.6 5	lee 73.1-73.6	See 73.1-73.6	See 73.1-73.6	See 73.1-73.6	Sec 73.1.73.6	Useful for general population exposure assessment based on contact with dust from electronics	Dust contact from individual electronic types provides metrics to consider home/offici scenarios with multiple components, mixes of components, and components per unit area in rooms containing the components	Mean of n=5 samples	Methods/method validations well documented.	
73.1	Napoli-Davis and Owens, 2013	NR	Electronic surfaces	твера	dust	Copier	See 73	LOQ not reported. Wipe samples using Kimwipe misted with methanol/acetone misture. Five 100 cm2 areas were surveyed on each plastic-surface	United States	NR N	IR NR	<1.00	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 73.0	See 73.0	See 73.0	See 73.0	
73.2	Napoli-Davis and Owens, 2013	NR	Electronic surfaces	твера	dust	Computer towers	i See 73	component of the electronics. LOQ not reported. Wipe samples using Kimwipe misted with methanol/acetone mixture. Five 100 cm2 areas were surveyed on each plastic-surface	United States	NR N	IR NR	<1.0Q	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 73.0	See 73.0	See 73.0	See 73.0	
73.3	Napoli-Davis and Owens, 2013	NR	Electronic surfaces	твера	duit	Microwave	See 73	component of the electronics. Wipe samples using Kimwipe misted with methanol/acetone misture. Five 100 cm2 areas wern surveyed on each plastic-surface component of the electronics	United States re	NR N	IR NR	1.65	NR	NR	NR	NR	NR	ng/100 cm2	NR	NR	NR	NR	NR	NR	See 73.0	See 73.0	See 73.0	See 73.0	
73.4	Napoli-Davis and Owens, 2013	NR	Electronic surfaces	твера	dust	Refrigerator	See 73	Wipe samples using Kimwipe misted with methanol/acetone mixture. Five 100 cm2 areas wern surveyed on each plastic-surface component of the destension	United States v	NR N	IR NR	1.55	NR	NR	NR	NR	NR	ng/100 cm2	NR	NR	NR	NR	NR	NR	See 73.0	See 73.0	See 73.0	See 73.0	
73.5	Napoli-Davis and Owens,	NR	Electronic surfaces	TBBPA	dust	Computer monitors	See 73	Wipe samples using Kinwipe misted with methanol/acetone mixture. Five 100 cm2 areas were	United States	NR N	IR NR	4.18	NR	NR	NR	NR	NR	ng/100 cm2	NR	NR	NR	NR	NR	NR	See 73.0	See 73.0	See 73.0	See 73.0	
	2013							surveyed on each plastic-surface component of the electroneics																					

74	Gallen et al 2014	é, NR	Plastic surfaces	TBBPA	Actual produc as listed.	ts Electronic TV, Electronic small household appliances, Electronic large household appliances, electronic other plastic other, TV computer, baby accessories	Development of rapid methods to id BPRs in plastics using Comparitor methodologies isvolving XPR, zurlace wipes and destructive chemical analysis.	See 94.374.35	Australia	Sen 74.1- Sen 74.1- 74.15 74.15	See 74.1-74.15	See 74.1-74.15 5	ee 74.1-74.15 :	iee 74.1-74.15	See 74.1-74.15	iee 74.1-74.15 :	See 74.1-74.15	See 74.1-74.15	See 74.1-74.15	See 74.1- 74.15	See 74.1-74.15	See 74.1-74.15	See 74.1-74.15	See 74.1-74.15	Highly relevant to exposure assessments for many population subgroups.	Highly representative for comparison of or linking of results of other studies where different testing methods used. Also illustrates high probability of 87% in these peodects and the mobility of 168% in surface where it is transferable. [75%	Excellent presentation of results across all methods and comparisons for Type II error	Comparitive methodologies involving XPR, surface wipes and destructive chemical analysis. Set up as tiered experiments to all 3 methods used on each sample. 1714 plashic products tested	Reudit: XXII + 252: confirmation, uniferal viga = >>25: confirmation compared to actual chem analysis for BPRs.
74.1	Gallen et al 2014	L, NR	Plastic surfaces	TBBPA	Wiped produc	t Electronic TV	See 74	55% detects, wipe samples: 90 mm glass filter pape wetted with isopropanol firmly wiped over a 100	r Australia	20 NR	NR	NR	NR	75	160000	NR	NR	ng/wipe	NR	55%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.2	Gallen et al 2014	L, NR	Plastic surfaces	TBBPA	Wiped produc	t Electronic small household appliances	See 74	cm2 area 47% dotects, wipe samples: 90 mm glass filter pape wetted with isopropanol firmly wiped over a 100 cm2 area	r Australia	75 NR	NR	NR	NR	2.7	20000	NR	NR	ng/wipe	NR	47%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.3	Gallen et al 2014	L, NR	Plastic surfaces	TBBPA	Wiped produc	t Electronic large household	See 74	22% detects, wipe samples: 90 mm glass filter pape wetted with isopropanol firmly wiped over a 100	r Australia	9 NR	NR	NR	NR	4.7	220	NR	NR	ng/wipe	NR	22%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.4	Gallen et al 2014	L, NR	Plastic surfaces	твера	Wiped produc	appliances at Electronic other	See 74	cm2 area 58% detects, wipe samples: 90 mm glass filter pape wetted with isopropanol firmly wiped over a 100	r Australia	19 NR	NR	NR	NR	6.1	22000	NR	NR	ng/wipe	NR	58%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.5	Gallen et al 2014	L, NR	Plastic surfaces	TBBPA	Wiped produc	t Toys plastic	See 74	cm2 area 33% detects, wipe samples: 90 mm glass filter pape wetted with isopropanol firmly wiped over a 100	r Australia	3 NR	NR	NR	20000	NR	NR	NR	NR	ng/wipe	NR	33%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.6	Gallen et al 2014	L, NR	Plastic surfaces	TBBPA	Wiped produc	t Plastic other	See 74	cm2 area 67% detects, wipe samples: 90 mm glass filter paper wetted with isopropunol family wiped over a 100 cm.	Australia	5 NR	NR	NR	NR	3.9	2600	NR	NR	ng/wipe	NR	67%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.7	Gallen et al 2014	L, NR	Plastic surfaces	TBBPA	Wiped produc	t Baby accessorie	s See 74	arca 0% detects, wipe samples: 90 mm glass filter paper wetted with isopropanol firmly wiped over a 100	Australia	3 NR	NR	NR	ND	NR	NR	NR	NR		NR		NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.8	Gallen et al 2014	L, NR	Plastic surfaces	тввра	Wiped produc	t Electronic computer	See 74	cm2 area 33% detects, wipe samples: 90 mm glass filter pape wetted with isopropanol firmly wiped over a 100	r Australia	3 NR	NR	NR	75	NR	NR	NR	NR	ng/wipe	NR	33%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.9	Gallen et al 2014	L, NR	Plastic	твера	Destructive analysis of product	Electronic TV	See 74	cmz area 83% detects, destructive chemical analysis with GC- MS	Australia	12 NR	NR	NR	NR	110,000	150,000,000	NR	NR	ng/g (110-150,000 µg/g)	NR	83%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.10	Gallen et al 2014	L, NR	Plastic	TBBPA	Destructive analysis of product	Electronic small household appliances	See 74	59% detects, destructive chemical analysis with GC- MS	Australia	17 NR	NR	NR	NR	26,000	160,000,000	NR	NR	ng/g (26-160,000 μg/g)	NR	59%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.11	Gallen et al 2014	L, NR	Plastic	твера	Destructive analysis of	Electronic large household	See 74	50% detects, destructive chemical analysis with GC- MS	Australia	4 NR	NR	NR	NR	12,000	110,000	NR	NR	ng/g (12-110 μg/g)	NR	50%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.12	Galien et al 2014	L, NR	Plastic	TBBPA	product Destructive analysis of product	apoliances Electronic other	See 74	70% detects, destructive chemical analysis with GC- MS	Australia	10 NR	NR	NR	NR	59,000,000	164,000,000	NR	NR	ng/g (59,000- 164,000 μg/g)	NR	70%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.13	Gallen et al 2014	L, NR	Plastic	TBBPA	Destructive analysis of product	Toys plastic	See 74	100% detects2, destructive chemical analysis with 0 MS	C-Australia	2 NR	NR	NR	NR	150,000	143,000,000	NR	NR	ng/g (150-143,000 µg/g)	NR	100%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.14	Gallen et al 2014	L, NR	Plastic	TBBPA	Destructive analysis of	Plastic other	See 74	100% detects, destructive chemical analysis	Australia	1 NR	NR	NR	2,700,000	NR	NR	NR	NR	ng/g (2,700 μg/g)	NR	100%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
74.15	Gallen et al 2014	L, NR	Plastic	TBBPA	product Destructive analysis of product	Electronic computer	See 74	50% detects, destructive chemical analysis with GC-MS	Australia	2 NR	NR	NR	150,000	NR	NR	NR	NR	ng/g (150 µg/g)	NR	50%	NR	NR	NR	NR	See 74.0	See 74.0	See 74.0	See 74.0	
75	Choi et al., 2009	. NR	TV housing	TEBPA	Material sample	Premolded plas	tic Characterize rate of leaching of BFR from polymers in presence of Dissolved humic matter a indicator of degree of ecological contamination by consumer products in landfills and open dumps	See 75.1	Australia	See 75.1 See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	See 75.1	Significant findings to extimate potential ecological contamination by BVRs leaching from plastics such as casings of TVs is landifilis and open dumps	Relative leaching rates under these conditions inferred for all plastics of similar makeup where BFRs thought to be used. Concentratic in plastic measured.	Single value for concentration in plastic.	Contemporary methodology with isotopic recovery measurements, quantification by MRGC, HRMS.	Conclusions: Leaching of BFRs including TBBPA accellerated under Numis conditions. Concentration in plattic component measured. Methodology and results for lachate not evaluated in this review.
75.1	Choi et al., 2009	NR	TV housing	TBEPA	Material sample	Premolded plast	tic See 75	Raw material for TV housing from a TV manufacture in 2002	d Australia	NR NR	NR	NR	8,100	NR	NR	NR	NR	n8/8	NR	NR	NR	NR	NR	NR	See 75.0	Single value for concentration of TBBPJ in plastic casing may or may not be representative of concentrations in other plastics or other TV casings from other manufactures	See 75.0	See 75.0	concentration in plastic_not in leachates.
76	Takigami et 2008	tal, NR	τv	TBBPA	Material sample and DUST	Circuit board, front and rear cabinet		See 76.1-76.4	Japan	See 76.1- See 76.1-76.4 76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	See 76.1-76.4	Retrospective exposure assessments (pre 2008 considering consumer products (cathode ray TV and similar electronics)	<ul> <li>Transfer kinetics inferred from components/materials in electronic consumer products. Can be extraoolated to other</li> </ul>	Mean and ranges presented for component parts, dust for each analyte	Contemporary methodology	Dust collecting in/around electronic products provide opportunity for kinetics demonstrated hare to exist for other scenarios. Specific example of cathode-ray TV not relevant in today's market.
76.1	Takigami et 2008	tal, NR	ти	TBBPA	Pulverized circuit board	Circuit board	See 76	Component parts pulverized	Japan	S NR	NR	280,000	NR	7,900	1,300,000	NR	NR	ng/g (Mean: 280 µg/g) (Range:	NR	NR	NR	NR	NR	NR	See 76.0	products See 76.0	See 76.0	See 76.0	
76.2	Takigarni et 2008	tal, NR	ти	твера	Pulverized cabinet material	Front cabinet	See 76	Component parts pulverized	Japan	S NR	NR	20,000	NR	240	67,000	NR	NR	ng/g (Mean: 20 µg/g) (Range:0.24-67	NR	NR	NR	NR	NR	NR	See 76.0	See 76.0	See 76.0	See 76.0	
76.3	Takigami et 2008	tal, NR	TV	TBBPA	Pulverized cabinet material	Rear cabinet	See 76	Component parts pulverized	Japan	5 NR	NR	19,000,000	NR	120	97,000,000	NR	NR	ng/g (Mean:19,000 µg/g) (Nange: 0.12-97,000 µg/g)	NR	NR	NR	NR	NR	NR	See 76.0	See 76.0	See 76.0	See 76.0	
76.4	Takigami et 2008	tal, NR	TV	TBEPA	DUST	TV Component parts	See 76	Collected by vacuuming the inside of each TV set urnil sufficient mass (>200 mg) was collected on a glass fiber filter.	Japan	5 NR	NR	240,000	NR	5,500	680,000	NR	NR	ng/g (Mearc240 μg/g) (Range: 5.5-680 μg/g)	NR	NR	NR	NR	NR	NR	See 76.0	See 76.0	See 76.0	See 76.0	
77	Rani et al., 2014	. NR	Packaging mater food containen, insulation, buoys	ia, TBBPA	material samples	Polystyrene products (PS)	measure flame retandart added to polystyrene products, some of which present human exposure opportunities and ecological concern	is See 77.1	Korea	See 77.1 See 77.1	See 77.1	See 77.1	See 77.1	See 77.1	See 77.1	See 77.1	See 77.1	See 77.1	See 77.1	See 77.1	Sec 77.1	See 77.1	See 77.1	See 77.1	PS products used in homes, with foods, storage containers, forks, etc contain BFRs. Relevant for oral exposure assessment contribution.	Unique study: BFR in I presents new route an source for exposure assessment consideration	5 mean +-SD for each product type, fo I each analyte given. Non-detects Important for TBBPA	<ul> <li>BIR quantification done with isotopic dilution technique based on additioni of 13C labeled IS solutions. Tandem MS/MS-APCI negative ion mode. No BIR found in blanks.</li> </ul>	
77.1	Rani et al., 2014	NR	Packaging materi food containers, insulation, buoys	al, TBBPA	material samples	Polystyrene products (PS)	See 77	3 types of PS: expanded PS, extruded PS and extruded PS foam; detected in 7 of 34 samples; detection level not reported	Korea	34 NR	NR	NR	NR	ND	545	NR	NR	ng/g	NR	NR	NR	NR	NR	NR	See 77.0	See 77.0	See 77.0	See 77.0	

78	Majestis 2012	cetal., NR	Elementary sc	hool ATO	Indoor air (PM3), dust	Carpet	Determine Indeo(fontdoor sources o metals and trace-metals by comparing size- resolved mass resolved	569 MLIN2	United States, Arizona, Flagstaff	See 78.1- See 78 78.2	1782 See 781-78.	2 See 78.1-78.2	See 78.1-78.2	See 78.1-78.2	See 78.1-78.2	See 78.1-78.2	See 78.1-78.2	See 78.1-78.2	See 78.1-78.2	See 78.1-78.2	See 78.1-78.2	See 78.1-78.2	See 781-78.2	See 78.1-78.2	Useful for exposure assessment: general population including children.	Important guidance for considering data in Bernature: Sb in particulates does not characteristics (Indoor characteristics (Indoor dators, and and and and characteristics, Illustrates importances of PA 1 2.10 fractions in terms of Sb content. Enrichmener Flactes mean carabiti particulation in lawy of contails organism. Enrichmener Flactes mean and FD-10 kiely and FD-10 kiely anthropogenic scores.	Av +-50 for 50 concentrations.	Excellent methodology and study strategy. Study based on 11 size fractions from <2.035 um to >18 um.	Only a few 36 meanwares MU good methodolog gains underlying calculations explored which are suffic acculations of the measurements reported in Threfure.
78.1	Majestie 2012	et al., NR	Elementary sci	hool ATO	Indoor air (PM1)	Carpet		2 MOUDI samplers used to sample PM1 from arounvimately 8 am to 6 nm. Antimoty measured	United States, Arizona	NR NR	17	NR	NR	NR	NR	NR	NR	ng/m3	7	NR	NR	NR	NR	NR	See 78.0	Important "rule of thumb" See 78.0	See 78.0	See 78.0	Outdoor Sb concentratin in PM1 was
78.2	Majestis 2012	etal, NR	Elementary sci	hool ATO	Dust	carpet		using HR-ICP-MS. The authors correlate school air Antimony concentrations with emission and/or resuspension free correct (78 urs).	Flaestaff United States, Arizona, Elected	NR NR	NR	6,000	NR	NR	NR	NR	NR	ng/g (6.0 µg/g)	NR	NR	NR	NR	NR	NR	See 78.0	See 78.0	See 78.0	See 78.0	
79	Kawam al., 200	ara et NR S	Nİ	ATO	Tested PVC toys	Orange animal toy	Method comparison of results between 150 812- 3 and Japanese official methods for migration test protocols. Measurement of elements in baby toys an 10 paints.	5ee 79.1	Japan	See 79.1 See 79	1 See 79.1	See 79.1	Sec 79.1	See 79.1	See 79.1	Sec 79.1	See 79.1	Sec 79.1	Sec 79.1	Sec 79.1	See 79.1	See 79.1	Sec 79.1	See 79.1	Unsuredetails of stud in Japanese.	y Unsure_details of study in Japanese.	Individual results given for 5b center and migrations from toys and paints	t Presumably methods of 150 B124-3 and Japanese official methods ?? Used for these measurements Results published in English but all narrative is in Japanese.	
79.1	Kawami al., 200	ara et NR S	NR	ATO	Tested PVC toys	Orange animal to	ry See 79	Japanese article with only abstract and tables available in English; not clear if FR use	Japan	2 2 trials	NR	5,300	NR	NR	NR	NR	NR	ng/g (5.3 mg/kg)	NR	NR	NR	NR	NR	NR	See 79.0	See 79.0	See 79.0	See 79.0	
80	Rivas et 2014	al., NR	School	ATD	Indoor air (PM2.5)	NR	Measure air pollutants in schools in/near Barcelons	See 80.1	Spain, Barcelona	See 80.1 See 80	1 See 80.1	See 80.1	See 80.1	See 80.1	See 80.1	See 80.1	See 80.1	See 80.1	Sec 80.1	See 80.1	See 80.1	See 80.1	See 80.1	See 80.1	Useful for exposure assessment: general population including children. May be especially relevant to areas of high traffic,	Outdoor Sb levels found to be better indicator of traffic emissions than PM 2-5 levels.	Mean, min/max, median, SD provided	Only PM 2.5 collected in this study. Collection done at breathing zone height for children age 2 9.	Urban background and outdoor (near schook) also monitored in this study. Good discussion of contaminant distributions in PM 2.5 fractions.
80.1	Rivas et 2014	al., NR	School	ATD	Indoor air (PM2.5)	NR	See 80	PM2.5 samples obtained with high volume sampler MCV CAV-A/mb using an inlet with a nozzle plate for PM2.5 (MCV), and then collected on Palflex quartz fiber filters; Antimony measured using ICP-AES	Spain, Barcelona	77 NR	NR	0.83	NR	0.13	1.6	NR	NR	ng/m3	0.35	NR	NR	NR	NR	NR	ngn desel moton, See 80.0	See 80.0	See 80.0	See 80.0	
81	Huang e 2014	tal., NR	Houses	ATO	Indoor air (PM2.5)	NR	<ol> <li>measure contamination and distribution of metaloids and metalais is nead dust, household AC filter dust and PM 2.5; 2) evaluate bioaccessibility of metaloids via ingestion and inhalation; 3) estimate chronic daily istakes and characterize risk.</li> </ol>	See 81.1-61.2	China, Guangzhou	See 81.1- See 81 81.2	1412 See 81.141.	2 See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	See 81.1-81.2	Limited utility for US general population BU May be especially relevant to areas of hig traffic, high density populations and high pollution.	Distribution of f contaminants near road dust sites (different h types of road use) interesting for consideration of contaminants in high traffic areas. Note EF values companying groad dust and house dust.	Mean, median values presented. EF values included.	Enrichment Factors calculated for contaminants in PM 2.5 fractions.	Study location: Guangzhou (aka Canton) is 3rd largest Chinese chy (lopoulation) - 14 million), transportation hub and trading yon 7.5 millis hit of hong Kong methods and the state of the state of the method of the state of the state of the method of the state of the state of the fee biascensibility and expanse/hik not considered in this review.
81.1	Huang e 2014	tal., NR	Houses	ATD	Indoor air (PM2.5)	NR	See 81	Sampled in urban areas. Active SLC PM2.5/PM10 sampler and PM2.5 air monitoring membrane; Antimony quantified using ICP-MS	China, Guangzhou	7 NR	NR	29.78	25.4	NR	NR	NR	NR	ng/m3 (Mean: 2.79 mg/kg) (Median: 2.35 mg/kg)	NR	NR	NR	NR	NR	Nit	See 81.0	See 81.0	See 81.0	See 81.0	
81.2	Huàng e 2014	tal., NR	Houses	ATD	Household AC filter dust	NR	See 81		China, Guangzhou	10 NR	NR	7280	4650	NR	NR	NR	NR	ng/g (Mean: 7.28 mg/kg) (Median: 4.65 me/ke)	NR	NR	NR	NR	NR	NR	See 81.0	See 81.0	See 81.0	See 81.0	
82	Gonzale 2004	setal, NR	Houses	ATO	Surface wipes	Dust	Quantify metals in dust samples from jewelers' homes, compare with background levels from homes not of jewelers. Note: in-home industry	See 82.1	United States, New Mexico, Zuni reservation	See 82.1 See 82	1 See 82.1	See #2.1	See 82.1	See 82.1	See 82.1	See 82.1	See 82.1	See 82.1	See 82.1	See 82.1	See 82.1	Sec 82.1	See 82.1	See 82.1	Highly relevant to any home-workshop environment and exposure assessments where 5b may be in work materials.	??? Could not see data	??? Could not see data	Surface wipe sampling for dust loading in/near work areas (scometimes were also eating areas). Natural log-transformed parametric analysis used since data distributions were right-skewed.	Study also considered efficacy of personal protective measures, ventiliation and inventoried home-bases workshop setups in Native American (Zuri) community. Inventoried chemicals, metals, stones, materials used to make jeweity.
82.1	Gonzale 2004	setal, NR	Houses	ATD	Surface wipes	Dust	See 82	Study looked at concentrations of surface-dust metals in Native American jeweiry making homes. Data reported here are from non-jeweiry making contexh homes; surface dust samples were collected by steping Whatman 41.70-mm filter paper on 715 cm2 surface areas; Antimory measured using KP-M and AAS.	United States, New Mexico, Zuni reservation S	8 Indoor dust, o homes	surface NR introl	NR	NIL	5	9	NR	7	ng/ sample (Geo mean: 0.007 µg/sample) (Itange: 0.005- 0.009 µg/sample)	NR	NR	NR	NR	NR	NR	See 82.0	See 82.0	See 82.0	See 82.0	
83	Ferguis al., 198	on et NR S	Houses	ATO	Dust	NR	investigate multi-elemen composition of house dust over city-wid area [Christchurch, New Zealand]	t See 83.1	New Zealand, Christchurch	See 83.1 See 83	1 See 83.1	See 83.1	See 83.1	See 83.1	See 83.1	See 83.1	See 83.1	See 83.1	See 83.1	See 83.1	See 83.1	See 83.1	See 83.1	Sec 83.1	Limited utility as methodology dated an building materials and goods from 1986 unlikely to exist in US for prospective exposure assessment. May be useful for retrospective excosure	no unique features.	mean, SD, range presented.	Old methodology for sampling (1977-84) and analytical determinations (1968). Method details not available for review.	
83.1	Ferguss al., 1981	on et NR	Houses	ATD	dust	NR	See 83	Samples were taken from the carpet in the main living area using a small disphrager vacuum pump from a 0.25 m2 area of carpet onto a 37 mm filter; authors suggested concentrations similar to that in local soils	New Zealand, Christchurch	11 NR	NR	10	NI	1.83	30.6	NR	NŘ	ng/g (Mean: 10 µg/kg) (5tD: 9.64 µg/kg) (Nange: 1.83- 30.6 µg/kg)	9.64	NR	NR	NR	NR	NR	acaconante See 83.0	See 83.0	See 83.0	See 83.0	
84	Davis ar Gulson,	id NR 2005	Houses	ATO	Dust	NR	Investigation of ceiling and attic dust as indirect measure of air pollution integrated over varying time periods. Assessed mattals in ceiling dust from 38 houses in city of Sydney, Australia citca 2004	5ee 84.154.3	Australia, Sydney	See 84.1- See 84 84.3	1443 See 841-84.	3 See 84.1-84.3	See 84.1-84.3	See 84.1-84.3	See 84.1-84.3	See 84.1-84.3	See 84.1-84.3	See \$4.1-34.3	See 84.1-84.3	See 24.1-84.3	Sec 84.1-84.3	See 84.1-84.3	See 84.1-84.3	See 84.144.3	General population exposure assessment i home environments.	Houses in industrial settings have X5b than in non-industrial settings. Roof types not a factor, As with other studies, Sb has high EF (x26 in bits study) showing primary source is anthropomorphic.	mean, SD, median, GM, min, max given for a sample's in each grouping Good presentation of particular distribution. If and IT background shown foral groupings.	Multiple factors considered: house age, nod types, industrial, semi-industrial and non- industrial areas. Enrichment Factors calculated via comparison with local rocks and solis. ICP-AES, XRF, NAA analytical methods unce. Particle size distribution.	Study shows particulate distributions and volume of dust below 250 micross.
84.1	Davis ar Gulson,	d NR 2005	Houses	ATD	Dust	NR	See 84	Sampling was performed by brushing a measured area of dwa (100 cm 2) if possible jinto polyetylytem containers. The authors suggest polymetral containations from vehicular traffic, combaution, material, and possibly the dispersion of particulates carried by winds.	Australia, Sydney	10 Ceiling dust/at dust in not nei industr	NR tic hames r	7,000	6,800	2,000	14,700	NR	5,500	ng/g (Mean: 7.0 mg/kg) (StD: 4.6 mg/kg) (Median: 6.8 mg/kg) (Geo mean: 5.5 mg/kg) (Barge: 2.0- 14.7 mg/kg)	4,600	NR	NR	NR	NR	NI	See 84.0	See 84.0	See 84.0	See 84.0	

84.2	Davis and Gulson, 2005	NR	Houses	ATD	Dust	NR	See 84	Sampling was performed by brushing a measured area of sixu (120 cm 2i (possible) into polyetylene containers. The autohom suggest polyetherial contributions from vehicular traffic, combustion, hernical diodistion, building and combustion material, and probably the dispersion of particulates carried by winds.	Australia, Sydney	9 Ceiling dust/attic dust in homes near industry	NR	30100	28300	7200	66400	NR	25500	ng/g (Mean: 30.1 mg/kg) (5tD: 17.21 mg/kg) (Median: 28.3 mg/kg) (Geo mean: 25.5 mg/kg) (Bangr, 7.2.66.4 mg/kg)	17200	NR	NR	NR	NR	NR	See 84.0	See 84.0	See 34.0	See 84.0	
84.3	Davis and Gulson, 2005	NR	Houses	ATO	Dust	NR	See 84	Sampling was performed by brushing a measured area of dwa (120 cm 2i gossible) into poterbyine containers. The autohom suggest potential contributions from vehicular torffic, combattion, hernical availation, building and contraction material, and probably the dispersion of particulates carried by winds	Australia, Sydney	15 Ceiling dust/attic dust in homes sierei-near industry	NR	17900	12600	5400	58400	NR	14200	ng/g (Mean: 17.9 mg/kg) (St0: 15.1 mg/kg) (Median: 12.6 mg/kg) (Geo mean: 14.2 mg/kg) (Rangi: 5.4- 58.4 mg/kg)	15100	NR	NR	NR	NR	NR	See 84.0	See 84.0	See 84.0	See 84.0	
85	Rasmussen e al., 2001	nt NR	Mouses	ATO	Dust	NR	Profile multi-elements of indoor house dust actoss areas of Ottawa, Canada.	See 85.1	Canada, Se Ottawa, Ontario	e85.1 See85.1	See 85.1	See 85.1	See 85.1	Sec 85.1	See 85.1	See 85.1	See 85.1	See 85.1	See 85.1	See 85.1	See 85.1	See 85.1	See 85.1	See 85.1	General population exposure assessment home environments.	Sb measurements for in houses in non-industri areas, showing soil ans road dust comparisons for WINTER study conditions.	Good presentation of results and al local background EF. % detects, d Arithmetic mean, GM, median, min man, 90th and 95th Siles provided. Good for creating parametric distributions.	Vacuum collection. EF measured using local solis as background for Sb, Stadard XCP-MS analytical method. Dato compared to 2 NIST dus	Ottawa is relatively small city with very little industry in or nearby. Survey conducted for factors including house age, heat source, distance from a roadway, etc.
85.1	Rasmussen et al., 2001	t NR	Houses	ATD	Dust	NR	See 85	Residents collected indoor dust by vacuuming; antimory measured with ICP-MS. Authors none that mean concentration in dust way greater than concentration in soil from same houses, suggesting there could be additional sources of antimory in the homes.	Canada, Ottawa, Ontario	48 NR	NR	7,280	NR	1,160	57,410	15,380	NŘ	ng/g (Mean: 7.28 mg/kg) (ltarge: 1.16- 57.41 mg/kg) (95th percentile: 15.38 mg/kg)	NR	NR	NR	NR	NR	NR	See 85.0	See 85.0	See 85.0	See 85.0	See 23.0
86	McDenald et al., 2010	: NR	Houses	ATO	Surface wipe	s Dust	Methodology: 1) develop and expand EPA wipe method for dust load for metals including 3b; 21 set typical background background background and background Canadian homes.	o See 86.246.2	Canada, Ser Ontario, S Barrie, Greater Sudbury, Thunder Bay	e 86.1- See 86.146.2 86.2	See 86.1-86.2	See 26.1-36.2	See 86.1-86.2	See 86.1-86.2	See \$6.1-86.2	See 86.1-86.2	See 86.1-86.2	See 85.1-86.2	See 86.1-86.2	See 85.1-86.2	See 86.1-86.2	See 86.1-86.2	5ee 86.1-86.2	See 86.1-86.2	General population exposure assessment home environments.	This study sets up in Canadian Standards fo the wipe method for dust-metals loading fo Canadian homes.	Excellent presentation of all factors for setting up methods and standards.	Methods good for establishing methodology comparison and setting standards. Large sampling: 932 samples, 220 field blanks, 230 duplicate from 232 homes in 3 CA cities. ASTM 1232 standard used and ASTM 1644 modified standard for P comparison used.	Mothedology and background study.
86.1	McDonald et al., 2010	NR	Houses	АТО	Surface wipes	Dust	See 85	Wipe samples collected from January to March 2000 Samples taken with Ghox WipesTM bread within a 30 cm <sup>2</sup> plastic traplet area (ASTM c 127 grotoco measured antimony using (C <sup>2</sup> -M5. No minimum or mean reported. Furth areas 57% < LOQ; interior area 74% < LOQ; LOQ – 0.60 µ/m2	Canada, Ontario, ; Barrie, Greater s Sudbury, Thunder Bay	208 Household wipe samples; entry area of homes (n=208)	NR	500	NR	NR	23,000	4,800	NR	rg/m2 (50th percentile: 0.5 μg/m2) (95th percentile: 4.8 μg/m2) (Max: 23 μg/m2.)	NR	NR	NR	NR	NR	NR	See 86.0	See 86.0	See 85.0	See 86.0	
86.2	McDonald et al., 2010	NR	Houses	ATO	Surface wipes	Dust	See 85	Wipe samples collected from January to March 2000 Samples taken with Ghox WipesTM brand within a 30 cm 2 plaint template area (ASTM 2: 27.28 protocol measured antimony using IC2*AdS. No minimum or mean reported. Furth areas 57% < LO2; interior area 74% < LO2; LO2 – 0.60 $\mu/m^2$	Canada, Ontario, E Barrie, Greater 5 Sudbury, Thunder Bay	498 Household wipe samples; interior areas of homes (498 samples from 228 homes)	NR	200	Nİ	NR	18,000	2,700	NŘ	ng/m2 (S0th percentile: 0.2 µg/m2 ) (95th percentile: 2.7 µg/m2 ) (Max: 18 µg/m2 )	NR	NR	NR	NR	NR	NR	See B6.0	See 85.0	See 26.0	See 86.0	
87	Barbieri et al 2014	L, NR	Houses	ATO	Dust	NR	Assess correlations of matalic content between dust and childen's hair for two bouing conditions: near mining/ non-mining suburbla. Also, influences of children's activities on content.	5m 873-872	Bolivis, Oruro See	e 87.1- See 87.147.2 87.2	See 87.1-87.2	See 87.1-87.2	See 87.1-87.2	See 87.1-87.2	See \$7.1-\$7.2	See 87.1-87.2	See 87.1-87.2	See 87.1-87.2	See 87.1-87.2	See 87.1-87.2	See 87.1-87.2	See 87.147.2	See 87.1-87.2	See 87.1-67.2	Limited value to 5b levels in dust near mining industries are general population exposures in mining industry communities. This study suggests the 5b levels as measured dust of homes in substrain areas may be relevant to all housing scenarios.	Elevated Sb levels in house dust in mining industry areas. Note importance of environmental factors. for considerationss with high totific areas in other possible environmental sceario ot	Median, Shi and Schi Niles presented but without measurements of adolgrand or particulate differentials. or	Unspecified collection methods. Contemporan analysis of 35 bot without direct B <sup>4</sup> measurements or consideration of particulate sites and content, especially for proderity to mixes. Corrolations on data for conclusions can be challenged as to relationships to childnen's activity particulate sites.	Sh concentrations in children' hair also y reported and correlated to shows dart looking in subscheding for mining areas housing in subscheding foro-mining areas housing in subscheding and correlations for behaviour and able So contain not considered in this review.
87.1	Barbieri et al. 2014	., NR	Mouses	ATD	Dust	NR	See 87	Roughly 1 g dust collected from the top surfaces of furniture or windowills using a 1.5 inch brush.	Bolivia, Oruro	41 Suburban non- mining district	NR	NR	33,960	NR	NR	84,310	NŘ	ng/g (Median: 33.96 ppm) (range of 95th percentiles: 23.47-84.31 ppm)	NR	NR	NR	NR	NR	NR	See 87.0	See 87.0	See 87.0	See 87.0	
87.2	Barbieri et al. 2014	., NR	Houses	ATO	Dust	NR	See 87	see 87.1	Bolivia, Oruro	56 mining district	NR	NR	108,700	NR	NR	2,770,280	NR	ng/g (Median: 108.70 ppm) (range of 95th percentiles: 27.08-2770.28 ppm)	NR	NR	NR	NR	NR	NR	See 37.0	See 87.0	See 87.0	See 87.0	
88	Fontúrbel et el., 2011	NR	Houses	ATO	Dust	NR	Measure metallic content between dust from homes near mines and not near mines. Correlate with results from surveys about behaviors.	1 See 81.148.2	Balivia, Oruro Ser	e BE.1- See BE.1-88.2 88.2	See 88.1-88.2	See 88.1-88.2	5ee 88.1-88.2	See 88.1-88.2	See 88.1-88.2	See 88.1-88.2	See 88.1-88.2	See 88.1-88.2	See 88.1-88.2	See 88.1-88.2	See 88.1-88.2	See 88.1-88.2	See 88.1-68.2	See 88.148.2	Limited value to 5b levels in dust near mising industries for general population exposures in mining industry communities. This study suggests th 5b levels as measured dust of homes in suburban areas may n be relevent to all	Elevated Sb levels in house dust in areas ne mine are suggestive of the mine as a source of the Sb, but route of th source not it tested_assumptions in about track back va air born vs other explanations not addressed in this study	Mean, GM, min-max values given for at With concentrations in dust for n samplish in bwe groups. However, or limitations of methodology should a be noted.	<ul> <li>Collection methodology uses brushing instead of vaccuming which may not include smaller particle sizes, skewing overall 5b content.</li> <li>Apparently no official standards used and background, blanks, are soil samples not included. Therefore, no.</li> </ul>	Sorvey, activity profiles and correlations to bahavisur and containant levels not considered in this review, but correlations seem urproven, though reasonable assumptions.
88.1	Fontúrbel et al., 2011	NR	Houses	ато	Dust	NR	See 88	Roughly 1 g dust collected from the top surfaces of formture or windposells using a 1.5 inch brush. The authors suggest that exposure is related to proximity to the mise.	Bolivia, Oruro	41 peripheral district, 3.5 km from mine	NR	46,430	NIL	18,110	203,650	NR	39,230	ng/g (Arithmetic main: 46.43 pm) (StD: 5.93 ppm) (Seo mean: 39.23 ppm) (Range: 18.11-	5,930	NR	NR	NR	NR	NR	housing consults See 88.0	See 88.0	See 33.0	FE valvulated making See 88.0	
88.2	Fontúrbel et al., 2011	NR	Houses	ATO	Dust	NR	See 88	Roughly 1 g dust collected from the top surfaces of furniture or windowills using a 1.5 inch brush. The authors suggest that exposure is related to proximity to the mine.	Bolivia, Oruro	57 mining district	NR	494,440.00	NIL	21,500.00	6,199,350.00	NR	152,910.00	203.05 ppm) rg/g (Arithmetic mean: 494.44 ppm) (St0: 138.5 ppm) (Geo mean: 39.23 ppm) (Narge: 21.5- 6199.35 ppm)	138,500.00	NR	NR	NR	NR	NİL	See 88.0	See 88.0	See 23.0	See 88.0	

89	Giorennec e al., 2012	t NR	Houses	ATO	Surface wipes	i Dust	Assess metal contamination of sol's and dust throughout France.	540 93.143.3 4	France, Various areas	See 89.1- 89.3	See 83.143.3 S	ee 89.1-89.3	iee 89.1-89.3	See 89.1-89.3	See 89.1-89.3	See 89.1-89.3 S	ee 89.1-89.3	See 89.1-89.3	See 89.1-89.3	See 89.1-89.3 5	iee 09.1-89.3	See 83.1-89.3	See 83.183.3	See 89.1-89.3	See 89.1-89.3	Sb contamination level in households and playgrounds. Suitable for exposure assessments to general populations and childre activity scenarios.	Limited extrapolation opportunities for these results because of som methodology issues, bu important areas of considered.	Detailed presentation of data for n samples of holoor dust, plagground and databased and a second dust of the second and databased and a second data second data 95th Xiles.	Broad national study with room specific sampling as per US HID protocol using dust loading wipe method (as per US EPA compared to ASTM blank wipe standard. Plaground sells and house dust collected. Analyspes used NS with quadrupole ICP-MS and compared to US NIST SIM 2383 and CIM 552.	Note: Pleggound solls are relevant exposes opportunity sources for messarily compared of two solls making the data/ail relevant of two making the data/ail relevant of two hose set at if ranks. No "struct aires solls" included in sampling for this. Nor waves perfociate data/biblin small in these compared matrices. Elements of the research to stabublish and children's copsour/fish wave not considered in this review.
89.1	Glorennec el al., 2012	t NŘ	Houses	ATD	Surface wipes	Dust	See 89	A floor area of 0.1 $m^2$ was sampled with a moist lead free wips. LOQ+800 ng/m2 (0.8 $\mu g/m^2)$	I- France	473	surface wipes	NR	NR	<10Q	<1.0Q	8,600	2400	NR	ng/m2 (median: <1.0Q (Range: <1.0Q- 8.6 µg/m <sup>2</sup> ) (95th: 2.4 µg/m <sup>2</sup> )	NR	NR	NR	0.8	NR	NR	See 89.0	See 89.0	See 39.0	See 89.0	
89.2	Glorennec et al., 2012	t NR	Houses	ATO	Surface wipes	Dust	See 89	Playground dust: the soil was sampled using a ring (2 cm deep) or a wipe (0.1 m <sup>2</sup> ) for hard surfaces, with the same collection and packaging procedure as for indoor dust. For hard surfaces, a composite soil sample was constituted from 10 subsamples in the 0-2 cm layer and was prepared according to the NF	2 France	53	playground dust	NR	NR	<10Q	4100	31,000	13000	NR	ng/m2 (median: <loq- (Range: <loq- 31 µg/m<sup>2</sup>) (95th: 13 µg/m<sup>2</sup>)</loq- </loq- 	NR	NR	NR	0.8	NR	Nit	Sec 89.0	See 89.0	See 89.0	See 89.0	
89.3	Giorennec el al., 2012	t NR	Houses	ATD	Surface wipes	Dust	See 89	ISO 11464 standard Playground self: the soil was sampled using a ring (2 cm dreep) or a wipe (0,1 m <sup>3</sup> ) for hard surfaces, with the same collection and packaging percedure as for indoor dust. For hard surfaces, a correposite soil sample was constituted from 10 subsamples in the 0-2 cm layer and was prepared according to the NF	France	315	playground soll	NR	NR	<loq< td=""><td>&lt;100</td><td>41,000</td><td>4000</td><td>NŘ</td><td>ng/m2 (median: <loq- (Range: <loq- 41 µg/m<sup>2</sup>) (95th: 4 µg/m<sup>2</sup>)</loq- </loq- </td><td>NR</td><td>NR</td><td>NR</td><td>0.7</td><td>NR</td><td>NR</td><td>See 89.0</td><td>See 89.0</td><td>See 89.0</td><td>See 89.0</td><td></td></loq<>	<100	41,000	4000	NŘ	ng/m2 (median: <loq- (Range: <loq- 41 µg/m<sup>2</sup>) (95th: 4 µg/m<sup>2</sup>)</loq- </loq- 	NR	NR	NR	0.7	NR	NR	See 89.0	See 89.0	See 89.0	See 89.0	
90	Turner and Hefzi, 2010	NR	House	ATO	Dust	NR	Measure the levels and bloaccessibilities of race metals in dusts from arid determine the dilution of anthropogenic particulates by fine, baseline sand.	See 90.1	Saudi Arabia, Dhahran	See 90.1	See 90.1	See 90.1	See 90.1	See 90.1	See 90.1	See 90.1	See 90.1	See 90.1	See 90.1	See 10.1	See 90.1	See 90.1	Sec 90.1	See 90.1	See 90.1	General household Sb residues in households in dry, sandy environments.	Method for normalizing Enrichment Pactors for grain size given fise and can skew results. Important concept for other studies as well. As with most other studies, 3b source primarily anthropemorphic, highest values indoors.	AM, GM, SD given for n samples with beatine and sand baseline.	Good, contemporary methodology for sampling and analysis. Complex environment studied by collection of house dust (vaccum), roadside dust, area solls and desert fine sand. Ef calculated for all samples, noting dilution factors for fine sands.	
90.1	Turner and Hefzi, 2010	NR	House	ATD	Dust	NR	See 90	Dust collected by vacuuming entire accessible floor space uning an spright, bagies vacuum cleaner and passed through 5 jan Nylon meh; Antimony measured using KD-MS	Saudi Arabia, Dhahran	9	NeR	NR	5,860	NR	NR	neik	NR	5,450	ng/g (Geo mean: 5.45 µd/g) (StD: 2.65 µd/g) (Arithmetic mean: 5.86 µd/g)	2,650	Mean: 10,100 mg/g (10.1 mg/kg) StD: 2,060 mg/kg) Mange: 1,930- 439,000 ng/g (1.93-439 mg/kg)	Nİ	NR	NR	Nit	See 90	See 90	See 90	See 90	
91	Yoshinaga e al., 2014	t NR	Houses	ATO	Dust	NR	Measure 25 elements in house dust (and soils) collected from 100 Japanese residences and consider the potential exposure and risk to children via dust ingestion	See 91.1	Japan, Several regions	Sec 91.1	See 91.1	See 91.1	See 91.1	See 91.1	See 91.1	See 91.1	See 91.1	See 91.1	See 91.1	See 91.1	Sec 91.1	Sec 91.1	See 91.1	See 91.1	See 91.1	General household Sb residues in households in large, non-industrial city (Tokyo) scenarios.	Comparisons to similar work in Canada suggest similar results (same order of magnitude).	Detailed presentation of data for n samples of indoor dust, playground dust, and playground soli: Min, max, Mean, SD and distributions at 5, 25, 50, 75, 95th Kiles.	Vacuum sampling and good contemporary analysis methods, using US NIST SRM 2583 standards. EF calculated.	Calculated exposure and risk to children not considered in this review.
91.1	Yoshinaga et al., 2014	t NR	Houses	ATD	Dust	NR	See 91	Study investigating source of lead from house dust measured other elements, including Antimorry. Volunteered samples from 100 residences collected 2006-2012; vecum clearer dust passed through 251 µm -mesh; Antimory measured using KP-MS.	Japan 0	100	NR	NR	10,100	NR	1,930	439,000	NR	NR	ng/g (Mean: 10.1 mg/kg) (StD: 2.06 mg/kg) (Nange; 1.93- 439 mg/kg)	2,060	NR	NR	NR	NR	NR	See 91.0	See 91.0	See 91.0	See 91.0	
92	Bietal., 200	LI NR	Mouse	ATO	Dust	NR	Measure and compare 3b and A adutifications is indeor dust from 13 e- waste recycling villages vs. villages not involved in this industry.	500 92.192.3	China, Guiyu town in Shantou, Guangdong province	See 92.1- 92.2	See 92.1-92.2 S	ee 92.1-92.2	See 92.1-92.2	See 92.1-92.2	See 92.1-92.2	See 92.1-92.2 5	ee 92.1-92.2	See 92.1-92.2	See 92.1-92.2	See 92.1-92.2 S	iee 92.1-92.2	See 92.1-92.2	See 92.1-92.2	See 92.1-92.2	See 92.1-82.2	Limited but important utility: E waste contaminant potential for unique cenarios where e waste process not controlled by waste reduction methods.	Environmental contamination from e wate via recycling is global issue for which exposure assessments have not traditionally considered. These villages had extreme conditions: 60 employment of wate facilities in family business structures with business structures with little or no environmental controls	Individual Sb concentrations given fo house dust. Data not presented in detail for soil amples or D' calculations.	Collection methodology uses brushing instead of vacuuming which may particle sizes, skewing particle sizes, skewing overall Sb content. Comparitive soil samples included and EF considered.	Authon suggest these contaminant sources could be associated with suppring 30 invols increasing in the Arctic-
92.1	Bi et al., 201	1 NR	House	ATD	Dust	NR	See 92	S control sites and S non-e-waste; dust samples wen collected inside from the floor using a brush and plastic spatula	e China, Guiyu town in Shantou, Guangdong province	5	House Dust, control	NR	NR	NR	660	2,450	NR	NR	ng/g (0.66-2.45 mg/kg)	NR	NR	NR	NR	NR	NR	See 92.0	or more. See 92.0	See 92.0	See 92.0	
92.2	Bi et al., 201	1 NR	House	ATO	Dust	NR	See 92	S control sites and S non-e-waste; dust samples were collected inside from the floor using a brush and plastic spatula	e China, Guiyu town in Shantou, Guangdong province	5	House Dust, non-e-waste	NR	NR	NR	6,100	9,200	NR	NR	ng/g (6.1-9.2 mg/kg)	NR	NR	NR	NR	NR	NR	See 92.0	See 92.0	See 92.0	See 92.0	
93	Lincoln et al 2007	L, NR	Cell phones	ATO	Shredded and digested samples	Cell phones	Methodology comparison of three methods to measure leachate from cell phones.	See 93.1	United States	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	See 93.1	N/A	N/A	N/A	N/A	
93.1	Lincoln et al 2007	~ NR	Cell phones	ATD	Shredded and digested samples	Cell phones	See 93	Brominated FR were absent as reported by authors. This may be suggestive that ATO was not used as a FR synergist.	United States	NR	NR	NR	1,023,000	NR	860,000	1,290,000	NR	NR	ng/g (Mean: 1,023 mg/kg) (Nange: 860- 1,290 mg/kg)	NR	NR	NR	NR	NR	NR	See 93.0	See 93.0	See 93.0	See 93.0	
94	CPSC, 2006a	NR	NIK	ATO	Mattress barriers/fabric	Cotton batting, Nonswoven modacrylic/Nisil, Modacrylic/Nisil, Coated foam/melamine, Coated poly- cotton/melamine Coated poly- cotton/melamine	Testing mattress barriers to assess compliance with OPSC draft final standard for FIRC context. Several migration scenarios testsee for ou us in consumer exposure assessment.	540 94.1-94.7	United States	See 94.1- 94.7	See 94.1-94.7 S	ee 94.1-94.7	See 94.1-94.7	See 94.1-94.7	See 94.1-94.7	See 94.1-94.7 S	ee 94.1-94.7	See 94.1-94.7	See 94.1-94.7	See 94.1-94.7 S	iee 94.1-94.7	See 94.1-94.7	See 94.1-94.7	See 94.1-94.7	See 94.1-94.7	General population exposure assessment and factors for use in selected subpopulation exposure assessment.	Illustrates influence of human factors on migration and different response (changes in load) for different Rs.	Individual or AV + 50 presented for samples in each scenario tested.	<ul> <li>Total ATO load basing uses contemporary ICP methods.</li> </ul>	Features exposure factors used by CPSC for exposure adulpsis. Exposure assessment enablodogy and results not considered as part of this review.
94.1	CPSC, 2006a	NR	NR	ATD	Mattress barriers/fabric	Cotton batting	See 94	FR use, as reported by authors	United States	NR	NR	NR	2.4	NR	NR	NR	NR	NR	×	NR	NR	NR	NR	NR	NR	See 94.0	See 94.0	See 94.0	See 94.0	
94.2 94.3	CPSC, 2006a	NR N <sup>R</sup>	NR NR	ATO	Mattress barriers/fabric Mattress	Nonwoven modacrylic/Visil Modacrylic kwin	See 94 See 94	FR use, as reported by authors	United States	NR	NR	NR	3.8 4.5	NR NR	NR	NR NR	NR NR	NR NP	x x	NR NR	NR	NR	NR NR	NR NR	NR N <sup>a</sup>	See 94.0 See 94.0	See 94.0 See 94.0	See 94.0	See 94.0	
94.4	CPSC, 2006a	NR NR	NR	ATO	Mattress barriers/Tabric	Coated foam/	See 94	FR use, as reported by authors	United States	NR	NR	NR	41	NR	NR	NR	NR	NR	 % (Mean: 4.1 x 107 ps/al	NR	NR	NR	NR	NR	NR	See 94.0	See 94.0	See 94.0	See 94.0	
94.5	CPSC, 2006a	NR NR	NİL	ATD	Mattress barriers/Tabric	Coated poly- cotton ticking/ melamine	See 94	FR use, as reported by authors	United States	NR	NR	NR	2.7	NR	NR	NR	NR	NR	(41,000 mg/kg ar 4.3%) %	NR	NR	NR	NR	NR	NR	See 94.0	See 94.0	See 94.0	See 94.0	

94.6	CPSC, 2006a N	R NR	ATO	Mattress barriers/fabri	Coated poly- c cotton/ melamine	See 94	FR use, as reported by authors	United States	NR	NR	NR	3.1	NR	NR	NR	NR	NR	x	NR	NR	NR	NR	NR	NR	See 94.0	See 94.0	See 94.0	See 94.0	
94.7	CPSC, 2006a N	R NR	ATO	Mattress barriers/fabri	Coated knit/ c melamine	See 94	FR use, as reported by authors	United States	NR	NR	NR	4.4	NR	NR	NR	NR	NR	×	NR	NR	NR	NR	NR	NR	See 94.0	See 94.0	See 94.0	See 94.0	
95	EURAR, 2008 N as cited by Health Canada, 2010	R NR	ATO	Fabrics, plant	ics Fabrics, polymen PET	rs, Health Canada's document summarizes evidence on ATO for compliance with CEPA 1999 standards for products on the Canadian	See 95.1-35.3	Canada	See 95.1 95.3	- See 95.1-95.3	See 95.1-05.3	See 95.1-95.3	See 95.1-95.3	See 95.1-95.3	See 95.1-95.3	See 95.1-95.3	See 95.1-95.3	See 95.1-95.3	See 95.1-95.3	See 95.1-95.3	See 95.1-85.3	Sec 95.1-95.3	See 95.1-95.3	See 95.1-05.3	General exposure assessment and assessments for children.	Study details not available.	Only ranges of concentration given for categories of products.	Methodology details no available in HC publication.	t Table 7 (p.30) presents listing of anthropogenic sources as noted globally for industry, media. Exposure assessment detailed for general population and children with discussion of uncertainty, but not reviewed here.
95.1	EURAR, 2008 N as cited by Health Canada,	R NR	ATO	Fabrics	Fabrics	market. See 95	FR use, as reported by Health Canada	Canada	NR	NR	NR	NR	NR	2,000,000	60,000,000	NR	NR	ng/g (2,000-60,000 mg/kg)	NR	NR	NR	NR	NR	NR	See 95.0	See 95.0	See 95.0	See 95.0	
95.2	2010 EURAR, 2008 N as cited in Health Canada,	R NR	ATO	Plastics	Polymers	See 95	FR use, as reported by Health Canada	Canada	NR	NR	NR	NR	NR	-80,000,000	250,000,000	NR	NR	ng/g (<80,000- 250,000 g/kg)	NR	NR	NR	NR	NR	NR	See 95.0	See 95.0	See 95.0	See 95.0	
95.3	2010 EURAR, 2008 N as cited in Health Canada, 2010	R NR	ATO	Plastics	PET	See 95	FR use, as reported by Health Canada	Canada	NR	NR	NR	NR	NR	180,000	200,000	NR	NR	ng/g (180-200 mg/kg)	NR	NR	NR	NR	NR	Nit	See 95.0	See 95.0	See 95.0	See 95.0	
95	Jenkins et al., N 1998	R Nik	ATO	PVC cot (crib) mattress covers	Bedding	Measure the generation of gaseous antimony from cots/bending as function of microbial action on Sb based FR.	See 96.1 n	United Kingdom	See 96.1	See 95.1	See 95.1	See 16.1	See 96.1	See 96.1	See 96.1	See 96.1	See 96.1	See 96.1	See 96.1	See 96.1	See 96.1	See 96.1	See 96.1	See 96.1	No real value to exposure assessments for ATO in gen population of infants.	Illustrated that gaseou 5 bnot likely to be released due to microbial action on original 5b based FR materials.	s Average 5b content with no other detail	Methods focused on 58 capture from bloactivity on materials. Not traditional methodology for 5b ATO residue measurement.	Part of search for cause of SIDS
96.1	Jenkins et al., N 1998	R NR	ATO	PVC cot (crib) mattress cov	Bedding	See 96	FR use, as reported by authors	United Kingdom	NR	NR	NR	NR	NR	230,000	310,500,000	NR	NR	ng/g (0.23-31.05 mg/g)	NR	NR	NR	NR	NR	NR	See 96.0	See 96.0	See 96.0	See 95.0	
97	Jenkins et al., N 2000	R NR	ATO	Cot (crib) mattress covers	Bedding	Measure the generation of gaseous antimony from mattress foams as function of microbial	See 97.1-97.2 n	United Kingdom	See 97.1 97.2	- See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	See 97.1-97.2	No real value to exposure assessments for ATO in gen population of infants.	N/A	Total Sb content range reported for each SIDS and control group. Matrices of concern in this paper wi # mattresses in control vs SIDS case	Contemporary ICP-MS used to assess total Sb s content.	Part of search for cause of SIDS
97.1	Jenkins et al., N 2000	R NR	ATO	Cot (crib) mattress cov	Bedding rs	action on Sb based FR. See 97	FR use, as reported by authors	United Kingdom	NR	NR	NR	NR	NR	<200	220,600	NR	NR	ng/g (<0.2 - 220.6 µg/g)	NR	NR	NR	NR	NR	NR	See 97.0	See 97.0	See 97.0	See 97.0	
97.2	Jenkins et al., N 2000	R NR	ATO	PU foam samples	Bedding	See 97	FR use, as reported by authors	United Kingdom	NR	NR	NR	NR	NR	<200	×3,300	NR	NR	ng/g <0.2->3.3 μg/g)	NR	NR	NR	NR	NR	NR	See 97.0	See 97.0	See 97.0	See 97.0	
98	Morf et al., N 2005	R e-waste rec plant, Small electrical an electronic equipment r	rcling TBBPA d waste	Component parts	NR	Substance flow analysis: characterize flow of TBBPA (and other) from the bulk WEEE input into the output products.	See 98.1-96.3	Switzerland	See 98.1 98.3	- See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 98.1-98.3	See 18.1-98.3	See 98.1-98.3	No real value for general population exposure assessment.	Presents mechanics of recycling process that incorporates FRs into new products. Important concept.	Mean and 95% confidence interval Mean presented	of Standard methodology for analysis using GC?M with EL	s
98.1	Morf et al., N 2005	materials R e-waste recy plant	cling TBBPA	Printed circui boards	t NR	See 98	Materials from an e-waste recycling plant; some Fit use expected, as reported by authors	Switzerland	NR	NR	NR	2,100,000	NR	NR	NR	NR	NR	ng/g (Mean: 2,100 ± 100 mg/kg)	100,000	NR	NR	NR	NR	NR	See 98.0	See 98.0	See 98.0	See 98.0	
98.2	Morf et al., N 2005	R e-waste recy plant	cling TBBPA	TV housings (wood)	NR	See 98	Materials from an e-waste recycling plant; some Fit use expected, as reported by authors	Switzerland	NR	NR	NR	57,000	NR	NR	NR	NR	NR	ng/g (Mean: 57 ± 1 mg/kg)	1,000	NR	NR	NR	NR	NR	See 98.0	See 98.0	See 98.0	See 98.0	
98.3	Morf et al., N 2005	R e-waste recy plant	cling TBBPA	TV/PC housin (plastic)	gs NR	See 98	Materials from an e-waste recycling plant; some FR use expected, as reported by authors	Switzerland	NR	NR	NR	16,000,000	NR	NR	NR	NR	NR	ng/g (Mean: 16,000 ± 5000 mg/kg)	5,000,000	NR	NR	NR	NR	NR	See 98.0	See 98.0	See 98.0	See 98.0	
93	Schlummer et N al., 2007	R e-waste rec plant	rcling TBBPA	Housing shredder residues	From TV sets an monitors	d Monitor hazardous compounds in polymer types in WEEE polymer fractions. Summary data for polymer type, elemental composition, BFR over four year period.	See 93.1-99.3	Germany	See 93.1 99.3	- See 99.1-99.3	See 99.1-99.3	See 99.1-99.3	See 99.1-99.3	See 93.1-39.3	See 99.1-99.3	See 99.1-99.3	See 99.1-99.3	See 99.1-99.3	See 99.1-99.3	See 99.1-99.3	See 99.1-99.3	Sec 99.1-99.3	See 19.1-19.3	See 99.1-89.3	Not useful for general population exposure assessment but may b very relevant for consideration of wast management and ecological assessment	Good summation of polymer types and e elements/FRs associated with each.	N/A	Contemporary methods including analysis with HPLC-UV/MS for TBBPA	
99.1	Schlummer et N al., 2007	R e-waste recy plant	cling TBBPA	Housing shredder residues	From TV sets and monitors	d See 99	Analyzed shredder samples from an e-waste recyclin plant.	g Germany	8	Housing shredder residues	NR	NR	NR	0.25	11.04	NR	NR	% (estimated from graph)	NR	NR	NR	NR	NR	NR	See 99	See 99	See 99	See 99	
99.2	Schlummer et N al.,2007	R e-waste recy plant	cling TBBPA	Mixed WEEE shredder residues	Residues from WEEE recycling plants processing unsorted WEEE	See 99	Analyzed shredder samples from an e-waste recyclin plant.	g Germany	7	Mixed WEEE shredder residues	NR	NR	NR	0.3	0.95	NR	NR	% (estimated from graph)	NR	NR	NR	NR	NR	Nit	See 99	See 99	See 99	See 99	
99.3	Schlummer et N al., 2007	R e-waste recy plant	cling TBBPA	Single housin Samples	g Single TV set and monitor housing	d See 99 și	Analyzed shredder samples from an e-waste recyclin plant.	g Germany	45	Single housing Samples	NR	ND	NR	NR	NR	NR	NR	% (estimated from graph)	NR	NR	NR	NR	NR	NR	See 99	See 99	See 99	See 99	
100	Butterman and N Carlin, 2004	R Nit	ATO	Not specified	Flexible PVC, polyolefins, polystyrene, PET acrylonitrile- butadiene- styrene (ABS),	Comprehensive review of Sb from mining, uses 7, globally and products in which it is used directly o subsequent to a process or as an FR	f See 100.1-100.5	United States	s See 100.1 100.5	- See 100.1- 100.5	See 100.1- 100.5	See 100.1- 100.5	See 100.1- 100.5	See 100.1- 100.5	See 100.1- 100.5	See 100.1- 100.5	See 100.1- 100.5	See 100.1- 100.5	See 100.1- 100.5	See 100.1- 100.5	See 100.1-100.5	See 100.1-100.5	See 100.1-100.5	See 100.1-100.5	No value for quantitative exposure assessment	N/A	Percent content of antimony oxide i groups of materials, as presented in this table. No other data or statistic given.	n no methodology presented	Extensive history and facts on Sb global use
100.1	Butterman and N Carlin, 2004	R Nik	ATD	Not specified	and polyurethanes Flipsible PVC, polyolefins, polystyrene, PET acrylonitrite-	See 100	This is a review paper - this information is cited secondarily - page 21 of PDF. Citation given at the end of this section is: U.S. Antimory Corp., undated.	United States	NR	NR	NR	NR	NR	1.5	12	NR	NR	~	NR	NR	NR	NR	NR	Nİ	See 100.0	See 100.0	See 100.0	See 100.0	See 100.0
					butadiene-styrer (ABS), and polyurethanes	ne																							
100.2	Butterman and N Carlin. 2004	R NR	ATO	Not specified	Rubber and othe elastomers	er See 100	See 100.2	United States	NR	NR	NR	NR	NR	5	30	NR	NR	~	NR	NR	NR	NR	NR	NR	See 100.0	See 100.0	See 100.0	See 100.0	See 100.0
100.3	Butterman and N Carlin, 2004 Butterman and N Carlin, 2004	r Nit	ATO	Not specified	electrical wires and cables Canvas, carpets, carpet paddine.	. See 100	See 100.2	United States	NR NR	NR	NR	7	NR	NR	NR	NR	NR	~	NR	NR	NR	NR	NR	NR	See 100.0	See 100.0	See 100.0	See 100.0	See 100.0
100.5	Butterman and N	r NR	ATO	Not specified	drapes, tenting, and other (usual heavier) textiles Paper	lly See 100	See 200.2	United States	NR	NR	NR	NR	NR	5	25	NR	NR	*	NR	NR	NR	NR	NR	NR	See 100.0	See 100.0	See 100.0	See 100.0	See 100.0
101	Carlin. 2004 Healthy/Roff or N		ATO	NR	Consumer	N	See 101 1	United States	See101.1	See101.1	See 101 1	See 101 1	See 101 1	See 101 1	See 101 1	See 101 1	See 101 1	See 101 1	See 101 1	See 101 1	See 101 1	Sec101.1	See 101 1	See 101 1	Not relevant for	Interesting listing of	Sinale value mesanted for "Sh" for	No methodology or	
191	g, 2014	n 196	Alo		products, fabrics foams, holiday decorations																				quantitative populatic exposure assessment.	<ul> <li>retail location that may contain Sb, possibly some as a result of AT FR.</li> </ul>	each item prestate. Unknown n, unknown methods for these values. D	discussion of monitoring discussion of monitoring strategy presented. Results show measurements (analytical methods unknown) for 5b, but ny known if 5b was from ATO or part of material content as a metal.	x
101.1	HealthyStuff.or N g, 2014	R NR	ATO	NR	Consumer products, fabrics foams, holiday decorations	NR s.	FR use not specified; consumer products from U.S. stores	United States	NR	NR	NR	NR	NR	15,000	12,714,000	NR	NR	ng/g (15-12,714 ppm)	NR	NR	NR	NR	NR	NR	See 101.0	See 101.0	See 101.0	See 101.0	
102	Vasile, 2000 as N cited in Health Canada, 2010	R NIR	ATO	Plastics	РР, НСРЕ	Health Canada's document summarizes evidence on ATO for compliance with CEPA 1993 standards for	See 102.1-102.2	Canada	See 102.1 102.2	- See 102.1- 102.2	See 102.1- 102.2	See 102.1- 102.2	See 102.1- 102.2	See 102.1- 102.2	See 102.1- 102.2	See 102.1- 102.2	See 102.1- 102.2	See 102.1- 102.2	See 102.1- 102.2	See 102.1- 102.2	See 102.1-102.2	See 102.1-102.2	See 102.1-102.2	See 102.1-102.2	General exposure assessment and assessments for children.	Study details not available.	Only ranges of concentration given for categories of products. (See p 21)	Methodology details no available in HC publication.	t
102.1	Vasile, 2000 as N cited in Health Canada, 2010	R Nit	ATO	Plastics	₽₽	products on the Canadian market. See 102	This is an authoritative review - and secondarily cite "Vasile C. 2000. Handbook of polyolefins. 2nd ed. Revised and expinded. New York (VY): Marcel Dekker" for this information. No additional information on methods is servided.	Canada	NR	NR	NR	20,000,000	NR	NR	NR	NR	NR	ng/g (20,000 mg/kg)	NR	NR	NR	NR	NR	Nİ	See 102.0	See 102.0	See 102.0	See 102.0	

102.2	Vasile, 2000 as cited in Health Canada, 2011	NR	NR	ATD	Plastics	HDPE	See 102	This is an authoritative review - and secondarily cite "Vasile C. 2000. Handbook of polyolefins. 2nd ed. Revised and expanded. New York (NY): Marcel Dekker" for this information. No additional information on methods is oroxided.	Canada	NR	NR	NR	NR	NR	35,000,000	100,000,000	NR	NR	ng/g (35,000 - 100,000 mg/kg)	NR	NR	NR	NR	NR	Nİ	See 102.0	See 102.0	See 102.0	See 102.0	
103	CPSC, 2006a	NR	NR	ATO	Fabrics	Poly-cotton blens fabrics , coated	1	See 103.1-103.2	Canada	See 103. 103.2	1- See 103.1- 103.2	See 103.1- 103.2	See 103.1- 103.2	See 103.1- 103.2	See 103.1- 103.2	See 103.1- 103.2	See 103.1- 103.2	See 103.1- 103.2	See 103.1- 103.2	See 103.1- 103.2	See 103.1- 103.2	See 103.1-103.2	See 103.1-103.2	See 103.1-103.2	See 103.1-103.2					
103.1	CPSC, 2006a	NR	NR	ATO	Fabrics	foam Poly-cotton blens fabrics	i See 104	FR use not specified	Canada	NR	NR	NR	NR	NR	27,000,000	38,000,000	NR	NR	ng/g (27,000-38,000 mg/kg)	NR	NR	NR	NR	NR	NR					
103.2	CPSC, 2006a	NR	NR	ATO	Not specified	Coated foam	See 104	FR use not specified	Canada	NR	NR	NR	41,000,000	NR	NR	NR	NR	NR	ng/g (41,000 mg/kg)	NR	NR	NR	NR	NR	NR	See 103.0	See 103.0	See 103.0	See 103.0	
104	Mansson et al., 2009	NR	NR	ATO	Not specified	Packaging, textiles	Assess societal sources of Sb in urban area (Stockholm) and SFA for Sb	See 104.3-104.2	Sweden	See 104. 104.2	1- See 104.1- 104.2	See 104.1- 104.2	See 104.1- 104.2	See 104.1- 104.2	See 104.1- 104.2	See 104.1- 104.2	See 104.1- 104.2	See 104.1- 104.2	See 104.1- 104.2	See 104.1- 104.2	See 104.1- 104.2	See 104.1-104.2	See 104.1-104.2	See 104.1-104.2	See 104.1-104.3	Not useful for quantitative exposure assessment for genera population	N/A	Little detail on Sb - only averages with no further detail.	Analysis with graphite furnace atomic absorption spectrophotometer (GFAAS) but no details	3FA methods used combining estimates from accounting for sources and analysis of product stock. SFA methodology and results not considered in this review.
104.1	Mansson et al., 2009	NR	NR	ATD	Not specified	Packaging	See 105	PR use not specified	Sweden	NR	NR	287,000	NR	NR	NR	NR	NR	NR	ng/g (Avg: 287 mg/kg ± 27 mg/kg)	27,000	NR	NR	NR	NR	NR	see 104.0	see 104.0	see 104.0	see 104.0	
104.2	Mansson et al., 2009	NR	NR	ATO	Not specified	Testiles	See 105	FR use not specified	Sweden	NR	NR	134,000 ng/g	NR	NR	NR	NR	NR	NR	ng/g (Avg: 134 mg/kg ± 29 mg/kg)	29,000	NR	NR	NR	NR	NR	see 104.0	see 104.0	see 104.0	see 104.0	
105	Huisman et al., 2007 as cited in Chancerel et al., 2013	NR	NR	ATO	PCBS of information and communicatio s technology	Electrical and electronic equipment m	Huisman cited in Chancere's review of metals in tech, telecommunication equipment	See 105.1	Germany	See 105.	1 See 105.1	See 105.1	See 105.1	See 105.1	See 103.1	See 105.1	See 105.1	See 105.1	See 105.1	See 105.1	See 105.1	See 105.1	See 105.1	See 105.1	See 105.1	Not useful for quantitative exposure assessment for gen. population.	N/A	Range of 5b concentrations noted in text. No other details presented	no methodology distussed	
105.1	Huisman et al., 2007 as cited in Chancerel et al., 2013	NR	NR	ATO	PCBS of information and communicatio s technology equipment	Electrical and electronic equipment an	See 106	Tested ATO in PCBs	Germany	NR	NR	NR	NR	NR	0.04	0.35	NR	NŘ	x	NR	NR	NR	NR	NR	NR	See 105.0	See 105.0	See 105.0	See 105.0	
106	Sorensen et al., 2005	NR	NİL	ATO	Not specified	Тоуз	Danish Ministry Study: 1) survey of market, screening of material composition of products, 2) chemical analyses of analytes in poducts and 3) comparison to existing legislation.	See 106.1	Netherlands	See 106.	1 See 106.1	See 106.1	See 106.1	See 106.1	See 106.1	See 106.1	See 106.1	See 105.1	See 106.1	See 106.1	See 105.1	See 106.1	Sec 106.1	See 106.1	See 106.1	Not useful for any exposure assessment because of methodological limitations and poor data reporting.	Products sold on internet likely to be same as sold in retail shops (circa 2004-2005 in Denmark).	Presentation only of resits for 7 of 3: samples where results "show conter of heavy metal exceeding requirements for migration by Darisi regulation". No statistical characterization of results.	Poor Methodology for t many aspects of the study. Methodology included only XRF analysis for "heavy metals".	Toys for animals stadied because many look like children's toys and are likely to be played with by children. Animal toys not regulated as children's toys so are likely to contain different chemicals
106.1	Sorensen et al., 2005	NR	NR	ATD	Not specified	Τογιί	See 107	Not clear as to FR use	Netherlands	NR	NR	NR	NR	NR	400	47,000	NR	NR	ng/g (0.4-47 ppm)	NR	NR	NR	NR	NR	NR	See 106.0	See 106.0	See 106.0	See 106.0	
107	isama et al., 2011	NR	NR	ATO	Household products mad of synthetic resin that infants may swallow	Decorations part acrylic; PVC strap – orange and yellow	<ul> <li>Measure elements, including Sb, in household items that children could swallow by mistake.</li> </ul>	See 107.1-107.3 d	Japan	See 107. 107.3	1- See 107.1- 107.3	See 107.1- 107.3	See 107.1- 107.3	See 107.1- 107.3	See 107.1- 107.3	See 107.1- 107.3	See 107.1- 107.3	See 107.1- 107.3	See 107.1- 107.3	See 107.1- 107.3	See 107.1- 107.3	See 107.1-107.3	See 107.1-107.3	See 107.1-107.3	See 107.1-107.1	Unsuredetails of stu: in Japanese.	y Unsuredetails of stud in Japanese.	<ul> <li>Individual results given for 5b conter and migrations from these items.</li> </ul>	t Iso 8124-3 and ICP-MS analytical methods employed. Text was Japanese so details wer not available for review	Rems included key covers, decontive parts, hairpins, erasers, shoe charm, and other such accessories. These are not e classified as children's toys and thus not . reglated for children's risk.
107.1	isama et al., 2011	NR	NR	ATD	Household products mad of synthetic resin that infants may seallow	Decorations part e acrylic	- See 108	Japanese article with only abstract and tables available in English; not clear if FR use. Only single values reported; ND level not specified	Japan	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	See 107.0	See 107.0	See 107.0	See 107.0	
107.2	isama et al., 2011	NR	NR	ATD	Household products mad of synthetic resin that infants may swallow	PVC strap – e orange	See 108	Japanese article with only abstract and tables available in English; not clear if FR use. Only single values reported; ND level not specified	Japan	NR	NR	NR	NR	389	NR	NR	NR	NR	ng/g (0.389 mg/kg)	NR	NR	NR	NR	NR	NR	See 107.0	See 107.0	See 107.0	See 107.0	
107.3	isama et al., 2011	NR	Nit	ATO	Household products mad of synthetic resin that infants may swallow	PVC strap – yellor e	w See 108	Japanese article with only abstract and tables available in English; not clear if fit use. Only single values reported; ND level not specified	Japan	NR	NR	NR	NR	722	NR	NR	NR	NR	ng/g (0.722 mg/kg)	NR	NR	NR	NR	NR	Nİ	See 107.0	See 107.0	See 107.0	See 107.0	

For ease of comparison, all units are converted to ng equivalent. Original study units, if different, are shown in parentheses.

Country	Location	Media	TDCPP Concentrations	Reference	Notes
			Concentrations		
	25 States and Puerto Rico	Ground and surface water; 74 raw, untreated	All measured below 500 ng/L	Focazio et al., 2008; Barnes et al., 2008	USGS – sites known or suspected to have some human and/or animal wastewater sources
		drinking water sources	Reporting limit: 500 ng/L		upstream or up gradient
	Kanaga Jahngan		(0.5 µg/L)		
	County	Streams	500 ng/L	00 ng/L	
United States	2002-2003		(0.5 μg/L) Maani 400 ng/I	Lee and Rasmussen,	
Onned States		Downstream	(0.4  µg/L)	2006	< 500 m downstream
		from WWTF	$\frac{(0.4 \mu g/L)}{Max^2  600  ng/L}$	1	from the facility
			$(0.6  \mu g/L)$	1	
	Geo Survey		Median: 100 ng/L		
	30 states		(0.1  µg/L)	+	
		Streams	Max: 160 ng/L	Kolpin et al., 2002	
			(0.16 µg/L)	1	
	Iowa	Streams	Range: ND-400 ng/L (ND-0.4 µg/L)	Kolpin et al., 2004	
	Urbanized area	Stream	Range: 60-250 ng/L (0.06-0.25 µg/L)	Stackelberg et al., 2004	
Canada	12 municipalities	Finished drinking water	Range: 0.1-15.7 ng/L	Williams et al., 1982	Water from the Great Lakes
	6 Ontario	Finished	D 0010 7	Lebel et al., 1981 as	Ontario water
	municipalities	drinking water	Range: 0.2-1.8 ng/L	cited in HSDB, 2013	treatment plants
Canada	20	Finished			Water treatment plants,
	municipalities	drinking water	Range: 0.3-23 ng/L	Williams et al., 1981	sources include rivers, lakes and ground water
	Hessen - Schwarzbach, Modau,	Fresh water	Mean: 117 ng/L	Quednow and Puttman, 2008	
	Winkelbach,		Median: 80 ng/L		
	Weschnitz		Max: 1284 ng/L		
	Elbe estuary plume	River estuary plume	~3 ng/L	Andresen et al., 2007	
		Rain	Median: 24 ng/L	-	
	Kleiner Feldberg		Max: 31 ng/L	4	
		Snow	Median: 40 ng/L		
			Max: 113 ng/L	Regnery and	
Germany		Rain	Meuran: 2 ng/L	Futunanii, 2009	
Germany	Wasserkuppe		Madian: 5 ng/L	+	
		Snow	Max: 23 ng/L	+	
			Median: 9 ng/L		
		Rain	Max: 53 ng/L	1	
	Bekond	G	Median: 17 ng/L	4	
		Snow	Max: 83 ng/L	1	
		Pain	Median: 17 ng/L	Regnery and	
	Schmuecke	ixaiii	Max: 25 ng/L	Puttmann, 2009	
	Semmuelke	Snow	Median: 12 ng/L	1	
		SHOW	Max: 52 ng/L		
	Frankfurt	Rain	Median: 7 ng/L	4	
			Max: 32 ng/L		
			Polluted area	4	
	1		Range: 100-900 ng/L	1	

Ianan	Vodo Piver	Divor	(0.1-0.9 µg/L)	Fukushima et al.,	Trend of concentration
Japan		Kivei	Less polluted area	1992	from 1976-1990
			Range: 0-700 ng/L		
			(0-0.7 µg/L)		
	Phine Delta	Divor	Range: 0-55 ng/L	Hendricks et al.,	
	Killie Delta	Kivei	(0-0.055 µg/L)	1994	
	Ruhr, Mohne,				
	Lenne Rivers,	River	~50 ng/L		
Netherlands	and tributaries			Andresen et al., 2004	
	Rhine	River	Range: 13-36 ng/L		
	Lippe	River	17 ng/L		
	Meuse River	Divor	Range: 150-450 ng/L	Jeuken and	
	and tributaries	Kivei	(0.15-0.45 µg/L)	Barreveld, 2004	
	Finland	Snow	12 ng/L		Collected 2 m from
	Numerpar	Sllow	Road 1		major intersection
		Snow	230 ng/L		Collected 100 m from
		Show	Road 2		major intersection
		Snow	8 ng/L		Collected 250 m from
Sweden		SIIOw	Road 3	Marklund et al.,	major intersection
Sweden		Snow	5 ng/L	2005b	Collected at the side of
		SIIOw	Airport 1		runway
		Snow	4 ng/L		Collected at the side of
		SIIOw	Airport 2		runway
		Snow	15 ng/L		Collected in parking lot
		Show	Airport 3		Concercer in parking lot
			Monthly means		
	Albano -	Surface water	Range: 5-60 ng/L		
	Volcanic Lake	Surface water	Range: 20-1335 ng/L		
Italy			Large range in March	Bacaloni et al. 2008	
Italy	Vico - Volcanic	Surface water	Monthly means	Dacaioni et al., 2008	
	Lake	Surface water	Range: 2-35 ng/L		
	Martignano -	Surface water	Monthly means		
	Volcanic Lake	Surface water	Range: 2-23 ng/		

#### **TEP Concentrations in Water**

Country	Location	Media	<b>TEP Concentrations</b>	Reference	Notes
	12 municipalities	Finished drinking water	Range: 10.3-13.0 ng/L	Williams et al., 1982	Source water from the Great Lakes
Canada	6 Ontario municipalities	Finished drinking water	Range: 17.2-27.1 ng/L	Lebel et al., 1981 as cited in HSDB, 2013	Detected in 2 of the 6 Ontario water treatment plants
	29 municipalities	Finished drinking water	Range: 1.1-23 ng/L	Williams et al., 1981	Water treatment plants, sources include rivers, lakes and ground water
Netherlands	Rhine River	Bank-filtered water	Max: 1,000 ng/L	Piet and Morra, 1983 as cited in HSDB, 2013	Surface water
Spain	Northwest area	Surface water	Median: 3 ng/L	Rodil et al., 2012	
Italy	River Tiber	River	Mean: 45 ng/L (June) Mean: 27 ng/L (Nov)	Bacaloni et al., 2007	
Japan	Osaka	Surface water	Mean: 1,500 ng/L (1.5 μg/L)	Fukushima et al., 1992	Trend of concentration from 1976-1990
Europe	River Rhine and tributaries	Surface water	Range: <100-6500 ng/L ( <0.1-6.5 µg/L)	OECD, 2005	Highest concentrations recorded between 1987 and 1992. DL = 100 ng/L (0.1 µg/L)

#### **TPP** Concentrations in Water

Country Location Media	TPP Concentrations	Notes
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	Arkansas		Median: 34 ng/L		Levels estimated at or	
		Surface Water	(0.034 µg/L) (estimated)	Haggard et al. 2006	below the reporting	
		Surface Water	Range: 9-63 ng/L	Thuggard of all, 2000	limit	
			(0.009-0.063 µg/L)	t		
United States	Mississippi Rive	Surface Water	ND-11 ng/L	DeLeon et al., 1986	Detection limit not specified	
	USGS,	Groundwater	<rl< td=""><td>Barnes et al., 2008</td><td>RL = 0.5 <math>\mu</math>g/L; found in 4.3% of 47 samples</td></rl<>	Barnes et al., 2008	RL = 0.5 $\mu$ g/L; found in 4.3% of 47 samples	
	18 States					
	Johnson County, Kansas	Surface water	ND	Lee and Rasmussen, 2006	$LOD = 0.5 \ \mu g/L$	
	30 states	Surface water	Median: 40 ng/L	Kolpin et al., 2002	139 streams sampled in 30 states 1999-2000	
			$(0.04 \ \mu g/L)$			
		Finished	$\frac{30 \text{ ng/L}}{(0.02 \text{ mg/L})}$	Kaith at al. 1076 as	Study datails not	
	New Orleans	drinking water	(0.03 µg/L)	cited in HSDB 2013	available	
United States			$(0.12 \mu\text{g/L})$			
	Rivers in MO,	Surface water	Range: 100-7,900	Mayer et al., 1981 as	Study details not	
	MS, WV, CA		(0.1-7.9 µg/L)	cited in HSDB, 2013	avallaut	
	Delaware River	Surface water	Range: 0.1-0.4 ppb	Sheldon et al., 1978 as cited in HSDB, 2013	Study details not available	
	6 Ontario municipalities	Finished drinking water	Range: 0.2-2.6 ng/L	Lebel et al., 1981 as cited in HSDB, 2013	Detected in 2 of the 6 Ontario water treatment plants	
Canada	29 municipalities	Finished drinking water	Range: 0.2-2.6 ng/L	Williams et al., 1981	Water treatment plants, sources include rivers, lakes and ground water	
	River Ruhr	Surface Water	Range: < LOQ - 80 ng/L	Andresen et al., 2004	LOQ = 10 ng/L; July and Sept 2002 sampling	
Germany	River Ruhr	Surface Water, reservoir	Source Mean: 7.2 ng/L Finished water mean:	Andresen and Bester, 2006		
	Volcanic Lakes	Surface water	<0.3 ng/L Means: 2-21 ng/I		Detection limit not	
Italv	Near Vico Lake	Well Water	Range: ND-164 ng/L	Bacaloni et al., 2008	reported	
	River Tiber	Surface water	Mean: 11,165 ng/L	Bacaloni et al., 2007	1	
Japan	Well Water	Surface water	Mean: 500 ng/L	Fukushima et al., 1992	Trend of concentration from 1976-1990	
			(< 0.5 µg/L)			
	Various cities, inland and coastal,	Tap water	Mean: 40 ng/L		Boiling water increased the TPP concentration	
China	developed and less developed		Range: 19.8-84.1 ng/L	Li et al., 2014	by 5.72 ng/L	
	Various brands (n=8)	Bottled water	Range: 2.57-14.8 ng/L			
	Klodnica River	Surface water	$\frac{300 \text{ ng/L}}{(0.30 \text{ ug/L})}$	ł	New method to	
Poland, Gliwice, Ruda	Kokotka Lake	Surface water	120 ng/L (0.12 μg/L)	Kowalski et al., 2014	identify flame retardants using ultra-	
Slaska, Zabrze	Pileckiego Lake	Surface water	30  ng/L		HPLC equipment and UV detection	
	I	l	(0.00 MB/L)	1	1	

# TBPH Concentrations in Water

Country	Location	Media	TBPH Concentrations	Reference	Notes
		Sea	Mean: 2.1 ng/L	Valls Contonys at al	"Soverel" complex
Spain	Western Coast	River	Mean: 2.2 ng/L	valis-Cantellys et al.,	taken

Ria (an inlet) Mean: 1.3 ng/L	
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TBBPA	<b>Concentrations in</b>	1 Water

IDDYA Concentrations in water										
Country	Location	Madia	TBBPA	Poforonco	Notes					
Country	Location	Meula	Concentrations	Kelefence						
United	England	Freshwater lake	Range: 0.14-3.2 ng/L	Harrad at al. 2000	3 samples taken from					
Kingdom	Eligialiu		(140-3200 pg/L)	Hallau et al., 2009	each of 7 lakes					
China	Lake Chaohu	Freshwater lake	Max: 4.87 µg/L	Yang et al., 2012	July, September,					

#### **TCPP** Concentrations in Water

Country	Location	Media	<b>TCPP</b> Concentration	15	Reference	Notes	
	California, Santa Ana River	Surface water	Range: 0-34 ng/L		Gross et al., 2004	4-8 L samples collected every 4 months from April- December 2002	
United States	California: Los Angeles and San Gabriel Rivers	Surface water	Max: 2,150 ng/L (July)	Max: 2,900 ng/L (October)	Sengupta 2014	Samples collected below discharge points in July and October 2011.	
	Rhine River	Surface water	Range: 80-100 ng/L		Andresen et al., 2004		
	River Elbe	Surface Water	Range: 40-250 ng/L				
	German Bight	Surface water	Range: 3-28 ng/L		Bollman et al., 2012		
	Rhine River	Surface water	Range: 75-160 ng/L				
Germany		~	Range: 30-150 ng/L				
	Rhine River	Surface water	(0.03-0.15 µg/L)		Knepper et al., 1999		
	Hesse Streams	Surface water	502 ng/L Median: 417 ng/L		Quednow and Puttman, 2008		
	Ruhr River	Surface water, reservoir	Mean: 54 <u>+</u> 7.6 ng/L	Max: 65 ng/L	Andresen and Bester 2006		
	Hessian Ried	Groundwater (preciptiation infiltration)	Median: <loq< td=""><td>Max: 6 ng/L</td><td>Pognery et al. 2011</td><td><math>I_{00} = 4 ng/l</math></td></loq<>	Max: 6 ng/L	Pognery et al. 2011	$I_{00} = 4 ng/l$	
Germany	Hessian Ried	Groundwater (riverbank filtration)	Meidan: 38 ng/L	Max: 1,795 ng/L	Regnery et al., 2011		
		Surface Water	Range: 217-2353 ng/L	1			
	Oder River	Groundwater wells	Range: 14-406 ng/L		Stepien et al., 2013		
	Danube River		Range: 33-43 ng/L		Martinen Carballa et		
Austria	Divor	Surface water	170 ng/L		al 2007		
	Liesig River		110 ng/L		al., 2007		
Japan	Yamato River	Surface water	Mean: 13,100 ng/L		Fukushima et al., 1992	Trend of concentration from	
		Groundwater	(15.1 µg/L) Median: 47 ng/I		Podil at al 2012	1970-1990	
		Liobrogat River	1 100 ng/I		Roull et al., 2012		
		(Surface water)	(estimated from graph	)			
Spain		Ebro River	Max: 6 500 ng/I	/	-		
Spain	Iberia	(Surface water)	(estimated from graph	)	-	77 samples collected during two	
	100114	Jucar River	300 ng/L	/	Gorga, 2015	monitoring campaigns	
		(Surface water)	(estimated from graph	)		conducted 2010-2011	
	_	Guadalquivir	600 ng/L	/			
Spain		River (Surface	(estimated from graph	)			
Not Specified	River (4)	Surface water	3 rivers known discharge:24-64 ng/L	1 river downstream of sewage plant: 430 ng/L	Garcia Lopez, 2010	Single samples from 4 rivers	
		Han River	Manue 107 ma/l	Danary 100 210 mg/L			
South Vorea	Secul	(Surface water)	Mean: 197 ng/L	Kange: 100-310 ng/L	Voon at al. 2010		
South Korea	Seoul	Creek (Surface water)	Mean: 403 ng/L	Range: 210-590 ng/L	1 oon et al., 2010		
	Voloonia Laka	Albano Lake (Surface water)	Means: 6-62 ng/L (mo	onthly)			
T. 1	voicanic Lake	Vico Lake (Surface water)	Means: 2-27 ng/L (mo	onthly)	Bacaloni et al., 2008	Detection limit not reported	

nary	Well. Near Vico Lake	Ground water	Range: ND-12 ng/L		
	River Tiber	Surface water	54 ng/L and117 ng/L	Bacaloni et al., 2007	2 samples, June 2006, November 2006

#### **TCEP Concentrations in Water**

Country	Location	Media	TCEP Concentrations	Reference	Notes
	19 Drinking water treatment plants	Source, finished, and distribution water	Median values Source: 120 ng/L Finished: 120 ng/L Distribution:150 ng/L Max values Source: 530 ng/L Finished: 470 ng/L	Benotti et al., 2009	
	Cape Cod public	Water	Distribution:200 ng/L Max: 20 ng/L	Schaider et al., 2010	
	Cape cod	Monitoring wells; drinking water	Monitoring wells: 81- 240 <sup>a</sup> ng/L Private well: 110"	Zimmerman, 2004	
United States	Drinking water supplies	Surface water: raw and finished	Max Source: 260 ng/L (estimated) Max Finished 220 ng/L (estimated)	Kingsbury et al., 2008	
	Kansas	Streams	Avg: 500 ng/L	Lee and Rasmussen, 2006	
	Multiple locations	Streams	Max: 540 ng/L	Kolpin et al., 2002	
	Multiple locations	Groundwater	Max: 737 ng/L	Barnes et al., 2008	Untreated drinking water sources
	Drinking water supplies	Groundwater and surface water	<500 <sup>b</sup> ng/L	Focazio et al., 2008	Untreated drinking water sources
	Drinking water treatment plants	Drinking water	Max values Source:120 ng/L Finished: 50 ng/L	Stackelberg et al., 2007	
United States	Drinking water treatment plant	Surface water and finished drinking water	Median values Source: 5.6 ng/L Finished: 3.7 ng/L Range values Source: 0-51.7 ng/L Finished: 0-20.4 ng/L	Padhye et al., 2014	Large urban treatment plant in southeast United States.
Germany	Oder River	Municipal waste water influent and effluent, river water, groundwater	Mean Effluent:352 ng/L Influent: 986 ng/L Range River: ND-1,036 ng/L Ground: ND-312 ng/L	Fries and Puttmann, 2003 as cited by ATSDR, 2012	ND = 1 ng/L
	N/A	River water untreated and finished	Untreated:10-130 ng/L Finished:0.3-30 ng/L	Andresen and Bester, 2006	
Spain	Northwest area	Surface water	Median: 5 ng/L	Rodil et al., 2012	
Italy	N/A	Volcanic lakes	Mean monthly range: ND-64 ng/L	Bacaloni et al., 2008	Detection limit not reported
		Surface water	Mean: 42 ng/L Range: 14-81 ng/L		
South Korea	Rivers and lakes	Waste water treatment	Mean Influent: 284 ng/L Effluent Means: MBR method: 283- 303 ng/L	Kim et al., 2007	MBR system was not effective for TCEP. Adding UV radiation to the RO and NF mathed did not

	RO met	hod: 14 ng/L	increase effectiveness.	
	NF meth	hod: 13 ng/L		

For ease of comparison, all units are converted to ng equivalent. Original study units, if different, are shown in parentheses.

**TCPP Concentrations in Food** 

Country	Study Type	Food	TCPP Concentrations	Reference	Notes
		Pear	9.3 ng/g		
		real	(0.0093 µg/g)		
		Applo	0.82 ng/g		234 food items were
		Appie	(0.00082 μg/g)		
		Tomato juico	0.30 ng/g	U.S. FDA Total Diet Study , as cited by ATSDR	
United	Market-basket	Tomato Juice	(0.00030 µg/g)		
States	survey	Paby food	0.18 ng/g		
		вару тоой	(0.00018 μg/g)	2009	
		Drupos	0.15 ng/g	-	
		Prunes	(0.00015 μg/g)		
		Apple iuice	0.05 ng/g		
		Apple Juice	(0.00005 µg/g)		

## **TEP Concentrations in Food**

Country	Study Type	Food	TEP Concentration	ons	Reference	Notes
			Food:	Package:	Tomizawa ot al	
UK		Oatmeal	270 ng/g	470 ng/g	101112awa et al.,	
			(0.27 μg/g)	(0.47 μg/g)	2004	
			Food:	Package:	Tomizawa ot al	Japanese study
Italy	Docticido	Pasta	90 ng/g	150 ng/g	101112awa et al.,	measured TEP
	resticide		(0.09 µg/g)	(15 μg/g)	2004	values in products
	analysis	Pasta	Food:	Package:	Tomizawa ot al	and their packaging from
France	analysis		80 ng/g	4,700 ng/g		
			(0.08 µg/g)	(4.7 μg/g)	2004	various countries
France		Pasta	Food:	Package:	Tomizawa ot al	
			90 ng/g	130 ng/g		
			(0.09 µg/g)	(13 µg/g)	2004	

### **TPP in Food and Food Packaging**

Country	Food	TPP Concentrations	Reference	Notes	
	Caramel	40 ng/g		U.S. FDA's Total Diet Study,	
United		(0.04 ppm)		market basket	
Chileu	Margarine	40 ng/g	U.S. FDA, 2000 as	items evaluated	
States	Ivialgaline	(0.04 ppm)	CILED BY ATSUK 2009		
	Baby food	20 ng/g		neriod from 1982	
		(0.02 ppm)		1991	
United	Taco trav	98.4 ng/g	Bradley 2013	Study of migration of inks in packaging to foods. 350 foods packaged in	

Kingdom	(98.4 μg/kg) in packaging	- Drudicy, 2013	paper/board from UK retail outlets. TPP in one packaging material
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## **TBB Concentrations in Food**

Country	Location	Media/Area	TBB Concentrations	Reference	Notes
		Foods from control town	Range: <0.20-11.7 ng/g lipid weight		Foods included: vegetable oil; fish; chicken, shrimp,
China	Eastern China	Foods acquired near e-waste facilities	Range: <3.09-62.2 ng/g lipid weight	Labunska et al., 2015	duck, and pork muscles; chicken and duck livers; and, chicken and duck eggs.

### **TBPH Concentrations in Food**

Country	Location	Media/Area	TRDH Concontrations	Poforonco	Notes
Country	Location	Area		Reference	Notes
		Foods from control town	Range: <0.25-9.32 ng/g lw		Foods included: vegetable oil; fish; chicken, shrimp,
China	Eastern China	Foods acquired near e-waste facilities	Range: 0.81-16.3 ng/g lw	Labunska et al., 2015	duck, and pork muscles; chicken and duck livers; and, chicken and duck eggs.

## **TBBPA Concentrations in Food**

Country	Location	Food	TBBPA Concentrations	Reference	Notes
	9 English lakes	Freshwater fish	Range: <loq-1.7 g<br="" ng="">lw</loq-1.7>	Harrad et al., 2009	LOQ=0.29 ng/g lw
United	Not specified	Oils and fats, nuts, eggs, other vegetables, milk	<lod< td=""><td></td><td>LOD=0.11-0.19 ng/g (0.1119 µg/kg)</td></lod<>		LOD=0.11-0.19 ng/g (0.1119 µg/kg)
Kingdom	Not specified	Canned vegetables, potatoes, fresh fruit, sugars and preserves	<lod< td=""><td>Driffield et al., 2008</td><td>LOD=0.017-0.036 ng/g (0.017-0.036 µg/kg)</td></lod<>	Driffield et al., 2008	LOD=0.017-0.036 ng/g (0.017-0.036 µg/kg)

r					
	Not specified	Fruit, meat and dairy products, green vegetables, carcass meat, offal, fish, poultry, bread, miscellaneous cereals	<lod< td=""><td></td><td>LOD=0.043-0.084 ng/g (0.043-0.084 μg/kg)</td></lod<>		LOD=0.043-0.084 ng/g (0.043-0.084 μg/kg)
		Oysters			LOD=<0.020- <0.050 ng/g
United Kingdom	Scotland	(n=5 locations, 1 value per location)	<lod< td=""><td>Driffield et al., 2008</td><td>(&lt;0.020-&lt;0.050 μg/kg). Samples from 5 different locations were below the LOD for each location. Multiple samples from each location were homogenized together for one value per location.</td></lod<>	Driffield et al., 2008	(<0.020-<0.050 μg/kg). Samples from 5 different locations were below the LOD for each location. Multiple samples from each location were homogenized together for one value per location.
		Mussels (n=10 locations, 1 value per location)	<lod< td=""><td></td><td>LOD=&lt;0.010-&lt;0.12 ng/g (&lt;0.010-&lt;0.12 µg/kg). Multiple samples from each location were homogenized together for one value per location.</td></lod<>		LOD=<0.010-<0.12 ng/g (<0.010-<0.12 µg/kg). Multiple samples from each location were homogenized together for one value per location.
United Kingdom	Scotland	Scallops (n=20 locations, 1 value per location)	<lod< td=""><td>Driffield et al., 2008</td><td>LOD=&lt;0.010-&lt;0.35 ng/g (&lt;0.010-&lt;0.35 µg/kg). Multiple samples from each location were homogenized together for one value per location.</td></lod<>	Driffield et al., 2008	LOD=<0.010-<0.35 ng/g (<0.010-<0.35 µg/kg). Multiple samples from each location were homogenized together for one value per location.
	7 locations around	Mussels, oysters and scallops (n=35	ND	Fernandes et al.,	LOD=0.01 ng/g
	Scotland	pooled)	-	2008	(0.01 µg/kg)
European Countries (Ireland, Norway, Spain and the	Not specified	Fish and other seafood (including amphibians, reptiles, snails and insects) (n=465)	<loq< td=""><td></td><td>LOQ=1.00 ng/g</td></loq<>		LOQ=1.00 ng/g
United Kingdom)					

				-	
	Not specified	Meat and meat products (including edible offal) (n=49)	<loq< td=""><td>EFSA, 2011</td><td>LOQ=0.14 ng/g</td></loq<>	EFSA, 2011	LOQ=0.14 ng/g
	Not specified	Milk and dairy products (n=40)	<loq< td=""><td></td><td>LOQ=0.65 ng/g</td></loq<>		LOQ=0.65 ng/g
	Not specified	Animal and vegetable fats and oils (n=41)	<loq< td=""><td></td><td>LOQ=4.99 ng/g</td></loq<>		LOQ=4.99 ng/g
	Not specified	Products for special nutritional use (n=10)	<loq< td=""><td></td><td>LOQ=0.34 ng/g</td></loq<>		LOQ=0.34 ng/g
	Not specified	Snacks, desserts, and other foods, eggs and egg products (n=30)	<loq< td=""><td></td><td>LOQ=0.08-0.10 ng/g</td></loq<>		LOQ=0.08-0.10 ng/g
European Countries (Ireland, Norway, Spain and the United Kingdom)	Not specified	products, grains and grain-based products, vegetables and vegetable products (including fungi), starchy roots and	<loq< td=""><td>EFSA, 2011</td><td>LOQ=0.01-0.02 ng/g</td></loq<>	EFSA, 2011	LOQ=0.01-0.02 ng/g
Europe	Not specified	Milk	Mean: <0.005 ng/g ww Range: <0.005-0.006 ng/g ww	Papke et al., 2010 as cited in	
	Not specified	Fish, shellfish and crustacean	Range: <0.005-<0.26 ng/g ww	EF3A 2011	
Netherlan	Not specified	Fish, shellfish and crustacean	Range: <0.1-245 ng/g lw	Morris et al., 2004	
ds	Not specified	Fish, shellfish and crustacean	Range: <0.1-5.3 ng/g ww	Van Leeuwen, 2009 as cited in EFSA 2011	
	Not specified	Fish, shellfish and crustacean	Range: 1.0-13.7 ng/g lw	Schlabach et al., 2004 as cited in EFSA 2011	
Norway	Not specified	Milk	0.013 ng/g lw (13 pg/g lw)	Thomsen et al., 2002b	Lipid content was 3.9%, equivalent to a whole milk concentration of 5.1x10 <sup>-4</sup> ng/g (5.1x10 <sup>-4</sup> µg/kg)
China	Guangdong Province in southern China	Meat	Mean: 0.263 ng/g lw (263 pg/g lw) Range: <lod-1.386 ng/g lw (<lod-1,386 g="" lw)<="" pg="" td=""><td>Shi et al., 2009</td><td>LOD<sup>2</sup> = 0.07 ng/g ww (70 pg/g ww)</td></lod-1,386></lod-1.386 	Shi et al., 2009	LOD <sup>2</sup> = 0.07 ng/g ww (70 pg/g ww)

r			I		
China	Guangdong Province in southern China	Aquatic food group	Mean: 0.738 ng/g lw	Shi et al., 2009	LOD = 0.1 ng/g ww
			(738 pg/g lw)		(100 pg/g ww)
			Range: <lod-2.044< td=""><td></td></lod-2.044<>		
			ng/g lw		
			( <lod-2,044 g="" lw)<="" pg="" td=""><td></td></lod-2,044>		
	Not specified	Eggs	Mean: 0.194 ng/g lw		LOD=0.06 ng/g
			(197 pg/g lw)		(60 pg/g ww)
			Range: <lod-0.692< td=""><td></td></lod-0.692<>		
			ng/g lw		
			( <lod-692 g="" lw)<="" pg="" td=""><td></td></lod-692>		
		Milk	Mean: 0.211 ng/g lw		LOD=0.05 ng/g
			(211 pg/g lw)		(50 pg/g ww)
			Range: <lod-0.848< td=""><td></td></lod-0.848<>		
			ng/g lw ( <lod-848< td=""><td></td></lod-848<>		
			pg/g lw)		
	Anhui Province in Eastern China	Four fish species		Yang et al., 2012	
		(Culter alburnus,	Means: 28.5-39.4		
		Cyprinus carpio,			
		Carassius	ng/g		
		auratus, and			
		Silurus asotus )			
Japan	Nagoya (N)	Fish	N region Mean: 0.01	Ashizuka et al., 2008	
			ng/g		Detected in 29 fish samples from Japanese food
			S region Mean: 0.01		
			ng/g		
	Seto Inland		K region Mean: 0.02		markets in 3
	Sea(S)		ng/g		different regions
			Range: 0.01-0.11 ng/g		2004-2005
			ww		
	Kyushu (K)				

# **TCEP Concentrations in Food**

Country	Study Type	Food	TCEP Concentrations	Reference	Notes
		Peas, green, frozen, boiled	1.82 ng/g <sup>a</sup>		
		Oatmeal, plain, cooked	0.02 ng/g <sup>b</sup>		
		Cream of wheat (farina), enriched, cooked	2.59 ng/g <sup>a</sup>		
		Rolls, white, soft, enriched	0.08 ng/g <sup>b</sup>		
		Broccoli, fresh/frozen, boiled	0.14 ng/g <sup>a</sup>	U.S. FDA, 2006 as cited by ATSDR	234 food items were evaluated over a 10-vear
		Green beans, fresh/frozen, boiled	1.59 ng/g <sup>a</sup>		
	Total Diet	BF turkey and rice	0.48 ng/g <sup>a</sup>		
United	ed Baskets 1991-	BF peas	0.02 ng/g <sup>b</sup>		
States	1993, 2003-	Bread, cracked wheat	0.02 ng/g <sup>b</sup>	2009	period between
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	2004	Eggplant, fresh, peeled, boiled	1.75 ng/g <sup>ª</sup>	]	1992 and 1991.
		Candy, hard, any flavor	0.02 ng/g <sup>b</sup>		
		Sweet cucumber pickles	0.05 ng/g <sup>b</sup>		
		BF teething biscuits	0.06 ng/g <sup>b</sup>		
		Soup, Oriental noodles (ramen noodles), prepared with water	7.25 ng/g <sup>a</sup>		
		BF pears, and pineapple	0.02 ng/g <sup>b</sup>		
		BF custard/pudding	28 ng/g <sup>ª</sup>		
United	Total Diet	BF, juice, apple- banana	1.05 ng/g <sup>a</sup>	U.S. FDA, 2006 as	
United S States B 2	Baskets 2004-	BF, juice, apple- cherry	4.63 ng/g <sup>ª</sup>	cited by ATSDR, 2009	
	2005	BF, oatmeal w/fruit	2.37 ng/g <sup>°</sup>		
		BF, veg w/turkey	0.88 ng/g <sup>a</sup>		

<sup>a</sup>Only one sample >=LQ; <sup>b</sup>Trace amounts only; BF – baby food

Reference	Reference Title	Chemical	Tissue/fluid	Associated Residue Monitoring Study (media)	Country (city/region)	n =	n details	Mean	Median	Min	Məx	95th	Concentration units (original study value if not ng)	Detection Frequency	Comments
Dodson et al., 2014	Urinary biomonitoring of phosphate flame retardants: levels in California adults and recommendations for future studies	BCEP (metabolite)	Urine	No	United States, California	16	non-smoking adults living in northern California	0.76	0.63	NR	2.1	NR	ng/l	NR	Creatinine corrected levels were not reported.
Fromme et al., 2014	Polybrominated diphenyl ethers (PBDEs), hexabromocyclododecan e (HBCD) and "novel" brominated flame retardants in house dust in Germany	DCEP (metabolite)	Urine	Yes (air and dust)	Germany	312	spot samples of daycare children	400	200	100	13,100	1,600	ng/l; Mean: (0.4 µg/l) Median: (0.2 µg/l) Range: (<0.1-13.1 µg/l 95th: (1.6 µg/l)	NR	Spot urine samples from 312 children attending daycare centers that were also measured for air and dust concentrations. Creatinine corrected levels were not reported.
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	TCEP	Breast milk	No	Philippines, Payatas	22	dumping site	NR	41	ND	512	NR	ng/g	NR	Detection limits were between 0.01 (2.7%) and 0.08 (7.9%) ng/g lipid weight.
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	TCEP	Breast milk	No	Philippines,Ma late	19	Urban area	NR	42	ND	153	NR	ng/g	NR	Detection limits were between 0.01 (2.7%) and 0.08 (7.9%) ng/g lipid weight.
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	TCEP	Breast milk	No	Japan, Kanagawa	20	Urban area	NR	0.14	ND	20	NR	ng/g	NR	Detection limits were between 0.01 (2.7%) and 0.08 (7.9%) ng/g lipid weight.
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	TCEP	Breast milk	No	Vietnam, Hanoi, Bui Dau, Trang Minh	26	suburban and e-waste recycling site	NR	ND	NR	NR	NR	ng/g	NR	Detection limits were between 0.01 (2.7%) and 0.08 (7.9%) ng/g lipid weight
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	TCEP	Breast milk	No	Vietnam, Bui Dau, Trang Minh	19	e-waste recycling site	NR	NR	ND	18	NR	ng/g	NR	Detection limits were between 0.01 (2.7%) and 0.08 (7.9%) ng/g lipid weight

Reference	Reference Title	Chemical	Tissue/fluid	Associated Residue Monitoring Study (media)	Country (city/region)	n =	n details	Geo Mean	Mean	Median	Min	Max	Concentration units (original study value if not ng)	Detection Frequency	Comments
Hudec et al., 1981	Tris(dichloropropyl)phosp hate, a mutagenic flame retardant: frequent occurrence in human seminal plasma	TDCPP	Human seminal fluid	No	United States	NR	NR	NR	NR	NR	5,000	50,000	ng/mL (5-50 µg/mL)	NR	
Sundkvist et al., 2010	Organophosphorus flame retardants andplasticizers in marine and fresh water biota and in human milk	TDCPP	Human milk lipids	No	United States	NR	NR	NR	NR	4.3	NR	5.3	ng/g	NR	
Hoffman et al., 2014	Urinary metabolites of organophosphate flame retardants and their variability in pregnant women	BDCPP	Urine (metabolite)	No	United States, North Carolina	NR	pregnant women	1.9	NR	NR	NR	37.3	ng/mL	NR	Creatinine corrected levels were not reported.
Hoffman et al., 2014	Urinary metabolites of organophosphate flame retardants and their variability in pregnant women	DPP	Urine (metabolite)	No	United States, North Carolina	NR	pregnant women	1.3	NR	NR	NR	19.9	ng/mL	NR	Creatinine corrected levels were not reported.
Meeker et al., 2013	Urinary Metabolites of Organophosphate Flame Retardants: Temporal Variability and Correlations with House Dust Concentrations	BDCPP	Urine (metabolite)	Yes (dust)	United States	NR	Male volunteers from a reproductive study	0.13	NR	NR	NR	25	ng/mL	NR	house dust levels also measured. Creatinine corrected levels were not reported.
Meeker et al., 2013	Urinary Metabolites of Organophosphate Flame Retardants: Temporal Variability and Correlations with House Dust Concentrations	DPP	Urine (metabolite)	Yes (dust)	United States	NR	Male volunteers from a reproductive study	0.31	NR	NR	NR	9.84	ng/mL	NR	house dust levels also measured. Creatinine corrected levels were not reported.
Carignan et al., 2013b	Predictors of tris(1,3- dichloro-2-propyl) phosphate metabolite in the urine of office workers	BDCPP	Urine (metabolite)	Yes (dust)	United States	NR	Male and female volunteers	0.408	NR	NR	0.0621	1.76	ng/mL Geo mean: (408 pg/mL) Range: (62.1-1,760 pg/mL)	NR	house, car and office dust levels also measured. Metabolite values in urine were adjusted for specific gravity. Creatinine corrected levels were not reported.
Dodson et al., 2014	Urinary biomonitoring of phosphate flame retardants: levels in California adults and recommendations for future studies	BDCPP	Urine (metabolite)	No	United States, Northern California	16	non-smoking adults	NR	0.46	0.09	NR	3.9	ng/mL	NR	Creatinine corrected levels were not reported.
LeBel et al., 1989	Triaryl/alkyl phosphate residues in human adipose autopsy samples from six Ontario municipalities	TDCPP	Human adipose	No	Canada, Ontario	NR	Greater omentum tissue harvested from cadavers	NR	NR	NR	ND	32	ng/g	NR	detection limit = 1 ng/g; samples from six municipalities
LeBel and Williams, 1983 as cited in HSDB,	Determination of organic phosphate triesters in human adipose tissue	TDCPP	Human adipose	No	Canada, Ontario	NR	NR	NR	NR	NR	0.5	110	ng/g	NR	

Reference	Reference Title	Chemical	Tissue/fluid	Associated Residue Monitoring Study (media)	Country (city/region)	n =	n details	Median	Min	Max	Concentration units (original study value if not ng)	Detection Frequency	Comments
Fromme et al., 2014	Polybrominated diphenyl ethers (PBDEs), hexabromocyclododecane (HBCD) and "novel" brominated flame retardants in house dust in Germany	ТСРР	Urine	No	Germany	312	NR	<20	<20	8400	ng/l; Median: (<0.02 μg/L) Range: (<0.2-8.4 μg/L)	NR	Metabolites of TCPP were found in 21% of urine samples collected from 312 children exposed to multiple flame retardants. Creatinine corrected levels were not reported.
Sundkvist et al., 2010	Organophosphorus flame retardants andplasticizers in marine and fresh water biota and in human milk	ТСРР	Human milk lipids	No	Sweden	285	5 Pooled samples with 285 individual	45	22	82	ng/g	NR	285 individuals from 1997-2003, 1 individual sample 2006, 4 towns

Reference	Reference Title	Chemical	Tissue/fluid	Associated Residue Monitoring Study (media)	Country (city/region)	n =	n details	Median	Min	Max	Concentration units (original study value if not ng)	Detection Frequency	Comments
Kim et al., 2014		TEP	Breast milk	No	Philippines, Payatas	22	Dumping site	ND	ND	1.2	ng/g	NR	MDL = 0.01-0.08 ng/g lipid weight (2.7-7.9% lipid weight)
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	TEP	Breast milk	No	Philippines,Ma late	19	Urban area	ND	ND	1.5	ng/g	NR	MDL = 0.01-0.08 ng/g lipid weight (2.7-7.9% lipid weight)
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	TEP	Breast milk	No	Japan, Kanagawa	20	Urban area	ND	ND	15	ng/g	NR	MDL = 0.01-0.08 ng/g lipid weight (2.7-7.9% lipid weight)
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	TEP	Breast milk	No	Vietnam, Bui Dau	10	e-waste recycling site	ND	ND	0.8	ng/g	NR	MDL = 0.01-0.08 ng/g lipid weight (2.7-7.9% lipid weight)
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	TEP	Breast milk	No	Vietnam, Hanoi, Trang Minh	16	Suburban area and e-waste recycling site	ND	ND	ND	ng/g	NR	MDL = 0.01-0.08 ng/g lipid weight (2.7-7.9% lipid weight)

Reference	Reference Title	Chemical	Tissue/fluid	Associated Residue Monitoring Study (media)	Country (city/region)	n =	n details	Geo Mean	Median	Min	Max	Concentration units (original study value if not ng)	Detection Frequency	Comments
Meeker et al., 2013	Urinary Metabolites of Organophosphate Flame Retardants: Temporal Variability and Correlations with House Dust Concentrations	DPP	Urine (metabolite)	Yes (dust)	United States	9	9 repeated urine samples from 7 men over 3 months	0.31	NR	0.07	9.84	ng/ml	96%	House dust levels also measured. Creatinine corrected levels were not reported.
LeBel and Williams, 1983 as cited in HSDB, 2013	Determination of organic phosphate triesters in human adipose tissue	ТРР	Human adipose	No	Canada, Ontario	2	two samples reported	NR	NR	11.2	13.6	ng/g	NR	Two samples reported in HSDB, 2013
Sundkvist et al., 2010	Organophosphorus flame retardants andplasticizers in marine and fresh water	ТРР	Breast milk	No	United States	NR	NR	NR	8.5	3.2	11	ng/g	NR	Based on average lipid content

biota and in human milk

Reference	Reference Title	Chemical	Tissue/fluid	Associated Residue Monitoring Study (media)	Country (city/region)	n =	n details	Average	Mean	Median	Min	Max	95th	Concentration units (original study value if not ng)	Detection Frequency	Comments
Carignan et al., 2012	Predictors of Tetrabromobisphenol-A (TBBP-A) and hexabromocyclododecanes (HBCD) in milk from Boston mothers	TBBPA	Breast milk	No	United States, Massachussetts , Boston	34	34 first time mothers	NR	NR	NR	0.03	0.55	NR	ng/g lw; Range: (<30-550 pg/g lw)	35%	
Johnson- Restrepo et al., 2008 as cited in Abdallah and Harrad, 2011	Tetrabromobisphenol A (TBBPA) and hexabromocyclododecanes (HBCDs) in tissues of humans, dolphins, and sharks from the United States	ТВВРА	Human adipose tissue	No	United States	NR	Number of samples not reported	0.048	NR	NR	NR	NR	NR	ng/g lw	NR	
Abdallah and Harrad, 2011	Tetrabromobisphenol-A, hexabromocyclododecane and its degradation products in UK human milk: relationship to external exposure	ТВВРА	Breast milk	No	United Kingdom, Birmingham	34	NR	0.06	NR	<0.04	<0.04	0.65	NR	ng/g lw	36%	
Cariou et al., 2008	Exposure assessment of French women and their newborns to Tetrabromobisphenol-A: occurrence measurements in maternal adipose tissue, serum, breast milk and cord serum	ТВВРА	Breast milk	No	France, Toulouse	77	NR	NR	4.11	0.48	0.06	37.34	NR	ng/g lw	56%	
Cariou et al., 2008	Exposure assessment of French women and their newborns to Tetrabromobisphenol-A: occurrence measurements in maternal adipose tissue, serum, breast milk and cord serum	TBBPA	Human adipose tissue	No	France, Toulouse	44	NR	NR	ND	NR	NR	NR	NR	ND	NR	
Cariou et al., 2008	Exposure assessment of French women and their newborns to Tetrabromobisphenol-A: occurrence measurements in maternal adipose tissue, serum, breast milk and cord serum	ТВВРА	Maternal serum	No	France, Toulouse	91	NR	NR	19.87	16.14	0.23	93.22	NR	ng/g lw	32%	
Cariou et al., 2008	Exposure assessment of French women and their newborns to Tetrabrombisphenol-A: occurrence measurements in maternal adipose tissue, serum, breast milk and cord serum	ТВВРА	Umbilical cord serum	No	France, Toulouse	90	NR	NR	103.52	54.76	2.09	649.45	NR	ng/g lw	30%	
Antignac et al., 2008	Exposure assessment of fetus and newborn to brominated flame retardants in France: preliminary data	ТВВРА	Breast milk	No	France, Toulouse	23	26 mother/newb orn pairs	NR	NR	0.172	0.034	9.4	NR	ng/g lw; Median: (172 pg/g lw) Range: (34-9,400 pg/g lw)	NR	Samples obtained from volunteer women during caesarean deliveries
Antignac et al., 2008	Exposure assessment of fetus and newborn to brominated flame retardants in France: preliminary data	TBBPA	Maternal serum	No	France, Toulouse	26	26 mother/newb orn pairs	0.054	NR	0.007	0.002	0.783	NR	ng/g fw; Median: (7 pg/g fw) Avg: (54 pg/g fw) Range: (2-783 pg/g fw)	NR	Samples obtained from volunteer women during caesarean deliveries
Antignac et al., 2008	Exposure assessment of fetus and newborn to brominated flame retardants in France: preliminary data	TBBPA	Umbilical serum	No	France, Toulouse	26	26 mother/newb orn pairs	0.152	NR	0.01	0.002	1.012	NR	ng/g fw; Median: (10 pg/g fw) Avg: (152 pg/g fw) Range: (2-1,012 pg/g fw)	NR	Samples obtained from volunteer women during caesarean deliveries
Hagmar et al., 2000a as cited in EURAR, 2006	Computer technicians are occupationally exposed to polybrominated diphenyl ethers and Tetrabromobisphenol A	ТВВРА	Blood serum	No	Sweden	19	computer technicians	NR	NR	NR	<0.5	1.8	NR	ng/g lw; Range: (<0.5-1.8 µg/kg lw)	4	
Hagmar et al., 2000b as cited in EURAR, 2006	Biological half-lives of polybrominated diphenyl ethers and Tetrabromobisphenol A in exposed workers	ТВВРА	Blood serum	No	Sweden	4	electronic equipment dismantling workers	NR	NR	NR	1.1	3.8	NR	ng/g lw; Range: (1.1-3.8 μg/kg lw)	NR	Concentrations measured in electronic equipment dismantling workers decreased during vacation. Half-life of 2.2 days in blood serum.
Hagmar and Bergman, 2001 as cited in EURAR, 2006	Human exposure to BFRs in Europe. Second International Workshop on Brominated Flame Retardants	ТВВРА	Blood plasma	No	Sweden	9	a single detection	NR	0.76	NR	NR	NR	NR	ng/g lw; (0.76 µg/kg lw)	1	
Jakobsson et al., 2002 as cited in EURAR, 2006	Exposure to polybrominated diphenyl ethers and Tetrabromobisphenol A among computer technicians	ТВВРА	Blood plasma	No	Sweden	10	NR	NR	NR	<0.54	<0.54	1.8	NR	ng/g lw; Median: (<0.54 µg/kg lw) Range : (<0.54- 1.8 µg/kg lw)	4	
Thomsen et al., 2001a,c as cited in EURAR, 2006	Brominated flame retardants in plasma sample as from three different occupational groups in Norway & Plasma concentrations of brominated flame retardants in three Norwegian occupational groups	TBBPA	Blood plasma	No	Norway	NR	Electronic equipment dismantlers	NR	1.3	NR	0.64	1.8	NR	ng/g lw; Mean: (1.3 µg/kg lw) Range: (0.64-1.8 µg/kg lw)	NR	LOQ = 400 ng/g

Thomsen et al., 2001a,c as cited in EURAR, 2006	Brominated flame retardants in plasma sample as from three different occupational groups in Norway & Plasma concentrations of brominated flame retardants in three Norwegian occupational groups	TBBPA	Blood plasma	No	Norway	NR	Circuit board producers,	NR	0.54	NR	ND	0.8	NR	ng/g lw; Mean: (0.54 µg/kg lw) Range: (ND-0.80 µg/kg lw)	NR	LOQ = 400 ng/g
Thomsen et al., 2001a,c as cited in EURAR, 2006	Brominated flame retardants in plasma sample as from three different occupational groups in Norway & Plasma concentrations of brominated flame retardants in three Norwegian occupational groups	TBBPA	Blood plasma	No	Norway	NR	Laboratory personnel	NR	0.34	NR	ND	0.52	NR	ng/g lw; Mean: (0.34 µg/kg lw) Range: (ND-0.52 µg/kg lw)	NR	LOQ = 400 ng/g
Thomsen et al., 2001b as cited in EURAR, 2006	A simplified method for determination of Tetrabromobisphenol A and polybrominated diphenyl ethers in human plasma and serum	ТВВРА	Blood plasma	No	Norway	NR	NR	NR	400	NR	NR	NR	NR	ng/g plasma; (0.4 ng/kg plasma)	NR	
Thomsen et al., 2002a as cited in EURAR, 2006	Brominated flame retardants in archived serum samples from Norway: A study on temporal trends and the role of age	ТВВРА	Blood serum	No	Norway	34	5 pools of 10- 14 individuals per pool, Archived samples for 1977	NR	ND	NR	NR	NR	NR	ND	NR	LOQ = 400-1600
Thomsen et al., 2002a as cited in EURAR, 2006	Brominated flame retardants in archived serum samples from Norway: A study on temporal trends and the role of age	ТВВРА	Blood serum	No	Norway	17	5 pools of 10- 14 individuals per pool, Archived samples for 1981	NR	ND	NR	NR	NR	NR	ND	NR	LOQ = 400-1600
Thomsen et al., 2002a as cited in EURAR, 2006	Brominated flame retardants in archived serum samples from Norway: A study on temporal trends and the role of age	TBBPA	Blood serum	No	Norway	24	5 pools of 10- 14 individuals per pool, Archived samples for 1986	NR	0.44	NR	NR	NR	NR	ng/g lw; (0.44 μg/kg lw)	NR	LOQ = 400-1600
Thomsen et al., 2002a as cited in EURAR, 2006	Brominated flame retardants in archived serum samples from Norway: A study on temporal trends and the role of age	ТВВРА	Blood serum	No	Norway	20	5 pools of 10- 14 individuals per pool, Archived samples for 1990	NR	ND	NR	NR	NR	NR	ND	NR	LOQ = 400-1600
Thomsen et al., 2002a as cited in EURAR, 2006	Brominated flame retardants in archived serum samples from Norway: A study on temporal trends and the role of age	ТВВРА	Blood serum	No	Norway	19	5 pools of 10- 14 individuals per pool, Archived samples for 1995	NR	ND	NR	NR	NR	NR	ND	NR	LOQ = 400-1600
Thomsen et al., 2002a as cited in EURAR, 2006	Brominated flame retardants in archived serum samples from Norway: A study on temporal trends and the role of age	ТВВРА	Blood serum	No	Norway	29	5 pools of 10- 14 individuals per pool, Archived samples for 1999	NR	0.65	NR	NR	NR	NR	ng/g lw; (0.65 µg/kg lw)	NR	LOQ = 400-1600
Thomsen et al., 2002a as cited in EURAR, 2006	Brominated flame retardants in archived serum samples from Norway: A study on temporal trends and the role of age	TBBPA	Blood serum	No	Norway	93	8 pools of 10- 14 individuals per pool, Archived samples Archived samples of all age groups for 1998	NR	NR	NR	0.31	0.71	NR	ng/g lw; Range: (0.34-0.71 μg/kg lw)	NR	LOQ = 400-1600
Thomsen et al., 2002b	A new method for determination of halogenated flame retardants in human milk using solid-phase extraction	TBBPA	Breast milk	No	Norway	NR	NR	NR	0.067	NR	NR	NR	NR	ng/g lw; (67 pg/g lw)	NR	Lipid content was 2.6%, equivalent to a whole milk concentration of 0.0017 ng/g (0.0017 µg/kg)
Thomsen et al., 2003	Brominated flame retardants in breast milk from Norway	Dimethyl- TBBPA	Breast milk	No	Norway	3	One sample from each of 3 different geographic areas (pools of 10-12 individuals)	NR	NR	NR	~0.010	0.1	NR	ng/g lw; Range: (~10-100 pg/g/lw)	NR	
Dirtu et al., 2008	Simultaneous determination of bisphenol A, tridosan, and Tetrabromobisphenol A in human serum using solid- phase extraction and gas chromatography-electron capture negative-ionization mass spectrometry	TBBPA	Blood	No	Belgium	7	una collector individual data	NR	NR	0.08	NR	NR	NR	ng/mL	NR	
Dirtu et al., 2008	Simultaneous determination of bisphenol A, tridosan, and Tetrabromobisphenol A in human serum using solid- phase extraction and gas chromatography-electron capture negative-ionization mass spectrometry	ТВВРА	Blood	No	Belgium	24	pooled data	NR	NR	0.096	NR	NR	NR	ng/mL	NR	

Dirtu et al., 2010	Distribution of PCBs, their hydroxylated metabolites and other phenolic contaminants in human serum from two European countries	ТВВРА	Blood	No	Belgium	20	NR	NR	NR	<loq< th=""><th><loq< th=""><th>0.0025</th><th>NR</th><th>ng/mL Range: (<loq-2.5 pg/mL)</loq-2.5 </th><th>NR 5</th><th>LOQ = 0.002 ng/mL (2 pg/mL)</th></loq<></th></loq<>	<loq< th=""><th>0.0025</th><th>NR</th><th>ng/mL Range: (<loq-2.5 pg/mL)</loq-2.5 </th><th>NR 5</th><th>LOQ = 0.002 ng/mL (2 pg/mL)</th></loq<>	0.0025	NR	ng/mL Range: ( <loq-2.5 pg/mL)</loq-2.5 	NR 5	LOQ = 0.002 ng/mL (2 pg/mL)
Kicinski et al., 2012	Neurobehavioral function and low-level exposure to brominated flame retardants in adolescents: a cross-sectional study	TBBPA	Serum	No	Belgium	515	NR	NR	NR	<loq< td=""><td>NR</td><td>186</td><td>22</td><td>ng/L</td><td>NR</td><td>LOQ = 15 ng/L. Cross-sectional data on 515 adolescents (13.6-17 yrs, mean of 14.9 yrs) were used for analysis. Neurobehavioral test found no significant association between TBBPA level and the finger tapping test.</td></loq<>	NR	186	22	ng/L	NR	LOQ = 15 ng/L. Cross-sectional data on 515 adolescents (13.6-17 yrs, mean of 14.9 yrs) were used for analysis. Neurobehavioral test found no significant association between TBBPA level and the finger tapping test.
Pratt et al., 2013	Brominated and fluorinated organic pollutants in the breast milk of first-time Irish mothers: is there a relationship to levels in food?	TBBPA	Breast milk	No	Ireland	109	11 pools of 10-11 individuals were collected from 109 first- time mothers at four centers across Ireland	NR	0.33	NR	<0.29	0.17	NR	ng/g (ali values are upperbound range)	NR	Lower bound mean: 0.05 ng/g
Dirtu et al., 2010	Distribution of PCBs, their hydroxylated metabolites and other phenolic contaminants in human serum from two European countries	ТВВРА	Blood	No	Romania	53	NR	NR	NR	<loq< td=""><td><loq< td=""><td>0.013</td><td>NR</td><td>ng/mL; Range: (<loq-13 pg/mL)</loq-13 </td><td>NR</td><td>LOQ = 0.002 ng/mL (2 pg/mL).</td></loq<></td></loq<>	<loq< td=""><td>0.013</td><td>NR</td><td>ng/mL; Range: (<loq-13 pg/mL)</loq-13 </td><td>NR</td><td>LOQ = 0.002 ng/mL (2 pg/mL).</td></loq<>	0.013	NR	ng/mL; Range: ( <loq-13 pg/mL)</loq-13 	NR	LOQ = 0.002 ng/mL (2 pg/mL).
Shi et al., 2009	Dietary exposure assessment of Chinese adults and nursing infants to Tetrabromobisphenol-A and hexabromocycloddocanes: occurrence measurements in foods and human milk	TBBPA	Breast milk	No	China	1237	1,237 individual samples were collected from 12 different locations in 2007. Individual samples from each area were pooled into one sample for analysis.	NR	0.961	NR	ND	5.124	NR	ng/g lw; Range: (ND-5124 pg/g lw)	NR	Mean was reported as a range: 0.933- 0.961 ng/g lw (933-961 pg/g lw)
Yang et al., 2014b	Urinary levels of bisphenol analogues in residents living near a manufacturing plant in south China	ТВВРА	Urine	No	China	94	spot urine samples collected from 94 individuals living near a Bisphenol AF manufacturin g plant; 50 females (aged 26-79 years) and 44 males (aged 26-84 years	NR	ND	NR	NR	NR	NR	ND	NR	LOQ was 0.04 ng/mL
Nagayama et al., 2001 as cited in EURAR, 2006	Contamination levels of brominated flame retardants, dioxins and organochlorine compounds in the blood of Japanese adults	ТВВРА	Blood	No		54	54 volunteers (27 males and 27 females) in the age range 37 to 49 years old in 1998	NR	NR	2.4	NR	12	NR	ng/g lw; Median: (2.4 µg/kg lw) Max: (12.0 µg/kg lw)	NR	
Nagayama et al., 2000, as cited in EURAR, 2006	Comparison between brominated flame retardants and dioxins or organochlorine compounds in blood levels of Japanese adults	ТВВРА	Blood	No		14	NR	NR	1.35	NR	NR	NR	NR	ng/g (1.35 μg/kg )	NR	
Watanabe and Tatsukawa, 1989 as cited in EURAR, 2006	Anthropogenic brominated aromatics in the Japanese environment. Proceedings of the Workshop on Brominated Aromatic Flame Retardants	Dimethylated TBBPA	Human adipose tissue	No		5	NR	NR	ND	NR	NR	NR	NR	ND	NR	LOD=20 ng/g fat (20 µg/kg fat)
Fujii et al., 2014a	Temporal trend and age- dependent serum concentration of phenolic organohalogen contaminants in Japanese men during 1989-2010	TBBPA	Blood	No	Japan, Kyoto	20	1989	NR	NR	NR	<loq< td=""><td>0.94</td><td>NR</td><td>ng/g ww; Range: (<loq-940 pg/g/ww)</loq-940 </td><td>NR</td><td>LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency</td></loq<>	0.94	NR	ng/g ww; Range: ( <loq-940 pg/g/ww)</loq-940 	NR	LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency
Fujii et al., 2014a	Temporal trend and age- dependent serum concentration of phenolic organohalogen contaminants in Japanese men during 1989-2010	TBBPA	Blood	No	Japan, Kyoto	20	1999	NR	NR	NR	<loq< td=""><td>0.95</td><td>NR</td><td>ng/g ww; Range: (<loq-950 g<br="" pg="">ww)</loq-950></td><td>NR</td><td>LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency</td></loq<>	0.95	NR	ng/g ww; Range: ( <loq-950 g<br="" pg="">ww)</loq-950>	NR	LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency
Fujii et al., 2014a	Temporal trend and age- dependent serum concentration of phenolic organohalogen contaminants in Japanese men during 1989-2010	ТВВРА	Blood	No	Japan, Kyoto	20	2010	NR	NR	NR	<loq< td=""><td>0.42</td><td>NR</td><td>ng/g ww; Range: (<loq-420 g<br="" pg="">ww)</loq-420></td><td>NR</td><td>LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency</td></loq<>	0.42	NR	ng/g ww; Range: ( <loq-420 g<br="" pg="">ww)</loq-420>	NR	LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency
Fujii et al., 2014a	Temporal trend and age- dependent serum concentration of phenolic organohalogen contaminants in Japanese men during 1989-2010	ТВВРА	Blood	No	Japan, Kyoto	30	no year specified, 20 yr olds	NR	NR	NR	<loq< td=""><td>0.95</td><td>NR</td><td>ng/g ww; Range: (<loq-950 g<br="" pg="">ww)</loq-950></td><td>NR</td><td>LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency</td></loq<>	0.95	NR	ng/g ww; Range: ( <loq-950 g<br="" pg="">ww)</loq-950>	NR	LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency

Fujii et al., 2014a	Temporal trend and age- dependent serum concentration of phenolic organohalogen contaminants in Japanese men during 1989-2010	ТВВРА	Blood	No	Japan, Kyoto	30	no year specified, >50 yr olds	NR	NR	NR	<loq< th=""><th>0.42</th><th>NR</th><th>ng/g ww; Range: (<loq-420 g<br="" pg="">ww)</loq-420></th><th>NR</th><th>LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency</th></loq<>	0.42	NR	ng/g ww; Range: ( <loq-420 g<br="" pg="">ww)</loq-420>	NR	LOQ = 0.05 pg/g ww; Means were not reported due to low detection frequency
Fujii et al., 2014b	Dietary exposure to phenolic and methoxylated organohalogen contaminants in relation to their concentrations in breast milk and serum in Japan	ТВВРА	Breast Milk	No	Japan, Okinawa	9	no year specified	NR	1.04	0.72	0.39	2.22	NR	ng/g lw	NR	LOQ not reported
Fujii et al., 2014b	Dietary exposure to phenolic and methoxylated organohalogen contaminants in relation to their concentrations in breast milk and serum in Japan	ТВВРА	Blood	No	Japan, Okinawa	3	no year specified	NR	40.5	1	<loq< td=""><td>238</td><td>NR</td><td>ng/g ww</td><td>NR</td><td></td></loq<>	238	NR	ng/g ww	NR	
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	ТВВРА	Mother blood serum	No	Korea	12	NR	NR	10.93	NR	<mdl< td=""><td>73.96</td><td>NR</td><td>ng/g lipid</td><td>NR</td><td>MDL = 0.072 ng/g Study also sampled blood serum from 26 mother/infant pairs of infants with congenital hypothyroidism</td></mdl<>	73.96	NR	ng/g lipid	NR	MDL = 0.072 ng/g Study also sampled blood serum from 26 mother/infant pairs of infants with congenital hypothyroidism
Kim et al., 2014	Organophosphorus flame retardants (PFRs) in human breast milk from several Asian countries	ТВВРА	Infant blood serum	No	Korea	12	NR	NR	77.65	NR	<mdl< td=""><td>457.4</td><td>NR</td><td>ng/g lipid</td><td>NR</td><td>MDL = 0.072 ng/g Study also sampled blood serum from 26 mother/infant pairs of infants with congenital hypothyroidism</td></mdl<>	457.4	NR	ng/g lipid	NR	MDL = 0.072 ng/g Study also sampled blood serum from 26 mother/infant pairs of infants with congenital hypothyroidism
Kemmlein, 2000, as cited in EURAR, 2006	Polybrominated flame retardants : Development of an analytical procedure and investigation and assessment of the exposure of selected environmental compartments	ТВВРА	Breast Milk	No	Germany, West Berlin	4	25-37 year old); 1998/1999	NR	NR	NR	0.29	0.94	NR	ng/g lw; Range: (0.29-0.94 µg/kg lw)	2	
Kemmlein, 2000, as cited in EURAR, 2006	Polybrominated flame retardants : Development of an analytical procedure and investigation and assessment of the exposure of selected environmental compartments	ТВВРА	Breast Milk	No	Faroe Islands	NR	NR	NR	11	NR	NR	NR	NR	ng/g lw; (11.0 μg/kg lw)	NR	
Lankova et al., 2013	The determination of perfluoroalkyl substances, brominated flame retardants and their metabolites in human breast milk and infant formula	ТВВРА	Breast Milk	No	Czech Republic	50	20-43 years	NR	NR	NR	<2	688	NR	ng/g lw	NR	LOQ = 2 ng/g lw. TBBPA detected above LOQ in less than 30% of samples. Mean and median levels were not calculated because less than 30% of samples were above the LOQ.

Reference	Reference Title	Chemical	Tissue/fluid	Associated Residue Monitoring Study (media)	Country (city/region)	n =	n details	Geo Mean	Mean	Median	Min	Max	Concentration units (original study value if not ng)	Detection Frequency	Comments
Hoffman et al., 2014	Urinary metabolites of organophosphate flame retardants and their variability in pregnant women	ТВВА	Urine (metabolite)	Yes (hand wipes, dust)	United States, North Carolina	53	adults	5.6	NR	NR	NR	340	ng/g	77%	Household dust, hand wipes and urine samples from adults in North Carolina. 76.9% hand T8BA levels detected. Levels of T8B in hand wipes positively correlated with urinary T8BA. 1 urine sample had insufficient volume. Levels of T8B (and T8PH) in dust were positively correlated with corresponding levels of each in the hand wipes. Creatinine corrected levels were not reported.
Butt, 2014	Metabolites of organophosphate flame retardants and 2- ethylhexyl Tetrabromobenzoate in urine from paired mothers and toddlers	TBBA	Urine (metabolite)	No	United States	22	mothers	NR	NR	NR	<3.0	62.2	ng/mL	27%	MDL = 3.0 ng/mL; 21 mother/toddlee between August 2013 and January 2014. TBRA detected in 27% of adults and 70% of children. Geo mean was not available because the detection frequency was < 50%. Creatinine corrected levels were not reported.
Butt, 2014	Metabolites of organophosphate flame retardants and 2- ethylhexyl Tetrabromobenzoate in urine from paired mothers and toddlers	TBBA	Urine (metabolite)	No	United States	23	children	7.4	NR	NR	<3.0	84.9	ng/mL	70%	MDL = 3.0 ng/mL; 21 mother/todiler pairs (some mothers had 2 children) recruited between August 2013 and January 2014. TBBA detected in 27% of adults and 70% of children. Creatinine corrected levels were not reported.
Johnson et al., 2013	Associations between brominated flame retardants in house dust and hormone levels in men	ТВВ	Serum hormone T3	Yes (dust)	United States	38	62 men, aged 18-54 years recruited from couples seeking infertility treatment	NR	NR	NR	NR	NR	NR	NR	TBPH (but not TBB) exposure (estimated from donated home vacuum bag dust) positively associated with T3 for subset of 38 men. TBB was detected in 47% (409 ng/g) of dust samples.
Zhou et al., 2014	Measurements of selected brominated flame retardants in nursing women: implications for human exposure	твв	Maternal serum	No	Canada, Sherbrooke, Quebec	100	100 paired samples from nursing women	NR	5.4	1.6	5.4	68	ng/g lw	56.90%	
Zhou et al., 2014	Measurements of selected brominated flame retardants in nursing women: implications for human exposure	ТВВ	Breast milk	No	Canada, Sherbrooke, Quebec	100	100 paired samples from nursing women	NR	1.3	0.41	<0.03	24	ng/g lw	78.10%	

Reference	Reference Title	Chemical	Tissue/fluid	Associated Residue Monitoring Study (media)	Country (city/region)	n =	n details	Mean	Median	Min	Max	Concentration units (original study value if not ng)	Detection Frequency	Comments
Johnson et al., 2013	Associations between brominated flame retardants in house dust and hormone levels in men	ТВРН	Serum hormone T3	Yes (dust)	United States	38	62 men, aged 18-54 years recruited from couples seeking infertility treatment	NR	NR	NR	NR	NR	NR	TBPH (but not TBB) exposure (estimated from home vacuum bag dust) positively associated with T3 for subset of 38 men. TBPH was detected in 63% (geometric mean 377 ng/g) of dust samples.
Zhou et al., 2014	Measurements of selected brominated flame retardants in nursing women: implications for human exposure	ТВРН	Maternal serum	No	Canada, Sherbrooke, Quebec	102	100 paired samples from nursing women	NR	NR	ND	164	ng/g lw	16.70%	LOD = 7.3 ng/g
Zhou et al., 2014	Measurements of selected brominated flame retardants in nursing women: implications for human exposure	ТВРН	Breast milk	No	Canada, Sherbrooke, Quebec	105	100 paired samples from nursing women	NR	NR	ND	6.6	ng/g lw	32.40%	LOD = 0.15 ng/g
He et al., 2013	Concentrations and trends of halogenated flame retardants in the pooled serum of residents of Laizhou Bay, China	ТВРН	Serum	No	China	NR	30-39 year old female group	260	NR	NR	NR	ng/g lw	NR	TBPH detected in 30-39 year old female group only (pooled sample)
Ali et al., 2014	Levels and profile of several classes of organic contaminants in matched indoor dust and serum samples from occupational settings of Pakistan	ТВРН	Serum	Yes (dust)	Pakistan	NR	Clothing store and university employees	<1	<1	NR	NR	ng/g lw	NR	
Ali et al., 2014	Levels and profile of several classes of organic contaminants in matched indoor dust and serum samples from occupational settings of Pakistan	ТВРН	Serum	Yes (dust)	Pakistan	NR	Electronic store employees	1.5	NR	1	18	ng/g lw	NR	

Reference	Reference Title	Chemical	Tissue/fluid	Associated Residue Monitoring Study (media)	Country (city/region)	n =	n details	Geo Mean	Mean	Median	Min	Max	Other	Concentration units (original study value if not ng)	Detection Frequency	Comments
CDC, 2015	Antimony Trioxide	antimony	Urine	NR	United States	2847	NR	56	NR	NR	53	59	NR	ng/L; Geo mean:	NR	NHANES Survey: 2009-2010. Values are not
CDC, 2015	Antimony Trioxide	antimony	Urine	NR	United States	2847	NR	60	NR	NR	56	64	NR	(0.056 µg/L) Range: (0.053- 0.059 µg/L) ng/L; Geo mean: (0.060 µg/L)	NR	rreatinine corrected. NHANES Survey: 2009-2010. Values are creatinine corrected.
Cooper and Harrison, 2009	The exposure to and health effects of antimony	antimony	Urine	NR	United States	148	NR	NR	NR	NR	<20	500	NR	Range: (0.056- 0.064 µg/L) ng/L; Range: (<0.02 0.5 µg/L) in 97.5% of samples; Range: >1000 ng/L (1 µg/L) in 3.5%	NR	Children from pre-term infants until 2 years of age, part of cot (crib) study; 122 term and 26 pre-term infants; LOD-20 ngL/. Creatinine corrected levels were not reported.
NIOSH, 2010 as cited in Shyam and Jaya, 2010	Antimony toxicity	antimony	Urine	NR	United States	NR	NR	NR	NR	NR	120	364	NR	ng/g creatinine Range: (0.120- 0.364 µg/g) creatinine	NR	Ranges for urinary antimony levels in the general population. Only creatinine corrected levels were reported.
ICRP, 1981, as cited in ATSDR,	Metabolic data for antimony	antimony	Total body burden	NR	United States	NR	NR	NR	NR	NR	NR	NR	7900000	ng (7.9 mg)	NR	
1992 Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanes tissues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenated air and dust from two houses in Japan. Anti-bilharaial antimony drugs. Trace substances in human saliva.	antimony	Skin	NR	Various Countries	NR	NR	NR	96	NR	NR	NR	NR	ng/g (0.096 μg/g)	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Canada), Europe (Poland), and Asia Ugapan and India). Detection limit not reported. Not clar whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated Bame retardants and other polyhalogenated compounds in indoor air and dust from two houses in Japan. Anti-bilharail antimony drugs. Trace substances in human saliva.	antimony	Hair	NR	Various Countries	NR	NR	NR	NR	NR	96	120		ng/g; Range: (0.096 0.12 μg/g)	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Canada), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not clar whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenated and dust from two houses in Japan. Anti-bilharzial antimony drugs. Trace substances in human saliva.	antimony	Adrenal gland	NR	Various Countries	NR	NR	NR	73	NR	NR	NR	NR	ng/g (0.073 μg/g)	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Canada), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not clar whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenated and dust from two houses in Japan. Anti-bilharzial antimony drugs. Trace substances in human saliva.	antimony	Lung	NR	Various Countries	NR	NR	NR	62	NR	NR	NR	NR	ng/g (0.062 μg/g)	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Canada), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not clar whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tssues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenated compounds in indoor air and dust from two houses in Japan. Anti-bilharaila antimony drugs. Trace substances in human saliva.	antimony	Large intestine	NR	Various Countries	NR	NR	NR	47	NR	NR	NR	NR	ng/g (0.047 με/g)	NR	Autopsy data from unexposed Japanese and Swedish aduts; hair samples from North America (USA, Clanad), Europe (Pidand), and Asia Ugapan and India). Detection limit not reported. Not clar whether the reported single values are one measurement or an average.

Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metaks in normal Japansei tisusus. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated frame retardants and other polyhalogenatic and other compounds in indoor air and dust from two houses in Japan. Anti-bilharzial antimony drugs. Trace substances in human sulva.	antimony	Trachea	NR	Various Countries	NR	NR	NR	45	NR	NR	NR	NR	ng/g (0.045 μg/g)	NR	Autopy data from unexposed Japanes and Swedina Jalus, Jah samples from North America (USA, Canada), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not Car whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autops subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenatic flame and dust from two houses in Japan. Anti-bilharzial antimony drugs. Trace substances in human saliva.	antimony	Cerebellum	NR	Various Countries	NR	NR	NR	30	NR	NR	NR	NR	ng/g (0.030 μg/g)	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Chanda), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not clear whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autops subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenatod and dust from two houses in Japan. Anti-bilharaial antimony drugs. Trace substances in human salwa.	antimony	Kidney	NR	Various Countries	NR	NR	NR	NR	NR	ND	43	NR	ng/g; Range: (ND- 0.043 μg/g)	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Canada), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not Clear whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autops subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenatic and other ophylaiogenatic and dust from two houses in Japan. Anti-bilharzial antimony drugs. Trace substances in human saliva.	antimony	Small intestine	NR	Various Countries	NR	NR	NR	39	NR	NR	NR	NR	ng/g (0.039 μg/g)	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Canada), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not clear whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese rissues. Concentrations of some trace elements in hair, liver and kidney from autops subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenatic and other ophylalogenatic and other on disust from two houses in Japan. Anti-bilharzial antimony drugs. Trace substances in human sulva.	antimony	Heart	NR	Various Countries	NR	NR	NR	32	NR	NR	NR	NR	ng/g (0.032 μg/g)	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Canada), Europe (Pidand), and Asia (Japan and India). Detection limit not reported. Not clar whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autops subjects - Relationship between hair and internal organs. Brominated flave retardants and other polyhalogenates in Japan. Anti-bitharzial antimony drugs. Trace substances in human saliva.	antimony	Pancreas	NR	Various Countries	NR	NR	NR	30	NR	NR	NR	NR	ng/g (0.030 μg/g)	NR	Autopry data from unexposed Japanese and Swedish dadits; hair samples from North America (USA: Landa), Europe (Moand), and Asia (Japan and India). Detection limit not reported. Not Clar whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenated compounds in indoor air and dust from two houses in Japan. Anti-bilharzial antimory drugs. Trace substances in human saliva.	antimony	Spleen	NR	Various Countries	NR	NR	NR	29	NR	NR	NR	NR	ng/g (0.029 μg/g)	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Canada), Europe (Poloand), and Asia (Japan and India). Detection limit not reported. Not clear whether the reported single values are one measurement or an average.

Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metaki in normal Japanese tisus. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Broviniated flame retardants and other polyhalogenatic flame and dust from two houses in Japan. Anti-bilharzial antimony drugs. Trace substances in human sulva.	antimony	Liver	NR	Various Countries	NR	NR	NR	NR	NR	ND	23	NR	ng/g (ΝD-0.023 μg/g)	NR	Autopy data from unexposed Japanes and Swedin Jaduk; Ala sangles from North. America (USA, Canada), Europe (Poland), and Asia Upana and India). Detection limit not reported. Not clear whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese Issues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated flave retardants and other polyhalogenatic and in dust from two houses in Japan . Anti-bilharzala antimony drugs. Trace substances in human salva.	antimony	Ovary	NR	Various Countries	NR	NR	NR	21	NR	NR	NR	NR	ng/g (0.021 μg/g)	NR	Autopry data from unexposed Japanese and Swedish adults; hair samples from North America (USA: Chand), Europe (Pioland), and Asia (Japan and India). Detection limit not reported. Not Clar whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated flave retardinats and other polyhalogenatic door air and dust from two house in Japan Anti-bilharzial antimony drugs. Trace substances in human sulva.	antimony	Testicle	NR	Various Countries	NR	NR	NR	17	NR	NR	NR	NR	ng/g (0.017 μg/g)	NR	Autopy data from unegoord Japanes and Swedish adults; hair samples from North America (USA, Canada), Europe (Poland), and Asia Upana and India). Detection limit not reported. Not Car whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1992	Heavy metaki in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenatic and other on diust from two houses in Japan . Anti-bilharzial antimony drugs. Trace substances in human saliva.	antimony	Cerebrum	NR	Various Countries	NR	NR	NR	16	NR	NR	NR	NR	ng/g (0.016 μg/g)	NR	Autopy data from unexposed Japanes and Swedin Jaduk; Jah samples from North America (USA, Canada), Europe (Poland), and Asia Ugana and India). Detection limit not reported. Not Car whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1993	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated Hame retardnats and other polyhalogenated compounds in indoor air and dust from two houses in Japan. Anti-bilharzial antimony drugs. Trace substances in human saliva.	antimony	Blood	NR	Various Countries	NR	NR	NR	NR	NR	0.016	0.34	NR	no units reported	NR	Autopsy data from unexposed Japanese and Swedish adults; hair samples from North America (USA, Chandà), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not Clear whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1994	Heavy metals in normal Japanese tissues. Concentrations of some trace elements in hair, liver and kidney from autopsy subjects - Relationship between hair and internal organs. Brominated flame retardnats and other polyhalogenated compounds in indoor air and dust from two houses in Japan. Anti-bilharaila antimony drugs. Trace substances in human saliva.	antimony	Saliva	NR	Various Countries	NR	NR	NR	0.003	NR	NR	NR	NR	no units reported	NR	Autopay data from unexposed Japanes and Swedish adults; hair samples from North America (USA, Canada), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not clar whether the reported single values are one measurement or an average.
Sumino et al., 1975; Muramatsu and Parr, 1988; Takagi et al., 1986; Mansour et al., 1967; Olmez et al., 1978; as cited in ATSDR, 1995	Heavy metals in normal Japances tissues. Concentrations of some Trace elements in hair, liver and kidney from autopsy subjects Relationship between hair and internal organs. Brominated flame retardants and other polyhalogenated compounds in indoor ain and dust from two houses in Japan. Anti-bilharaial antimony drugs. Trace substances in human saliva.	antimony	Mean body burden	NR	Various Countries	NR	NR	NR	700	NR	NR	NR	NR	ng/g (0.7 mg/kg)	NR	Autops data from unexpossed Japanese and Swedish adults; Jahr samples from North America (USA, Canada), Europe (Poland), and Asia (Japan and India). Detection limit not reported. Not clear whether the reported single values are one measurement or an average.
Nordic Council of Ministers, 1998	The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals, 123 Antimony	antimony	Blood	NR	Nordic Countries	NR	NR	NR	700-85,000	NR	ND	33000000	NR	ng/L; Mean: (0.7- 85 µg/L) Range: (ND-33,000 µg/L)	NR	Background levels in human biological material (wet weight) from non- occupationally exposed. Detection level not specified.

Nordic Council of Ministers, 1998	The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals, 123 Antimony	antimony	Urine	NR	Nordic Countries	NR	NR	NR	<1000-6,200	NR	ND	11000	NR	ng/L; Mean: (<1.0-6.2 μg/L) Range: (ND-11 μg/L)	NR	Background levels in human biological material (wet weight) from non- occupationally exposed. Detection level not specified. Creatinine corrected levels were not reported.
Nordic Council of Ministers, 1998	The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals, 123 Antimony	antimony	Serum	NR	Nordic Countries	NR	NR	NR	<600-5,200	NR	ND	15000	NR	ng/L; Mean: (<0.6- 5.2 μg/L) Range: (ND-15 μg/L)	NR	Background levels in human biological material (wet weight) from non- occupationally exposed. Detection level not specified.
Nordic Council of Ministers, 1998	The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals, 123 Antimony	antimony	Liver	NR	Nordic Countries	NR	NR	NR	6-23	NR	<10	70	NR	ng/g; Mean: (0.006 0.023 mg/kg) Range: (<0.01-0.07 mg/kg)	NR	Background levels in human biological material (wet weight) from non- occupationally exposed. Detection level not specified.
Nordic Council of Ministers, 1998	The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals, 123 Antimony	antimony	Lung	NR	Nordic Countries	NR	NR	NR	17-95	NR	<10	200	NR	ng/g; Mean: (0.017 0.095 mg/kg) Range: (<0.01-0.20 mg/kg)	NR	Background levels in human biological material (wet weight) from non- occupationally exposed. Detection level not specified.
Nordic Council of Ministers, 1998	The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals, 123 Antimony	antimony	Hair	NR	Nordic Countries	NR	NR	NR	41	NR	ND	2640	NR	ng/g; Mean: (0.041 mg/kg) Range: (ND-2.64 mg/kg)	NR	Background levels in human biological material (wet weight) from non- occupationally exposed. Detection level not specified.
Nordic Council of Ministers, 1998	The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals, 123 Antimony	antimony	Teeth	NR	Nordic Countries	NR	NR	NR	NR	NR	5	670	NR	ng/g; Range: (0.005 0.67 mg/kg)	NR	Background levels in human biological material (wet weight) from non- occupationally exposed. Detection level not specified.
Nordic Council of Ministers, 1998	The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals, 123 Antimony	antimony	Bone	NR	Nordic Countries	NR	NR	NR	NR	7	7	100	NR	ng/g; Median: (0.007 ppm ) Range: (0.007-0.1) ppm)	NR	Background levels in human biological material (wet weight) from non- occupationally exposed. Detection level not specified.
Clemente et al., 1982 as cited in Snedeker et al., 2014	The concentration of some trace elements in human milk from Italy	antimony	Breast milk	NR	Italy	NR	NR	NR	NR	NR	<1.0	50	NR	ng/g	NR	
Schulz et al.,	Revised and new	antimony	Urine	NR	Germany	NR	Children aged	NR	300	NR	NR	NR	NR	ng/L	NR	Creatinine corrected levels were not
2009, as cited in Snedeker et al., 2014	reference values for environmental pollutants in urine or blood of children in Germany derived from the German environmental survey on children 2003–2006 (GerES IV)						3 to 14 years old							(0.3 μg/L)		reported.
2009, as cited in Snedeker et al., 2014 Gebel et al., 1998 (Also stratified by exposed and reference groups)	reference values for environmental pollutants in urine or blood of children in Germany derived from the German ervironmental survey on children 2003-2006 (GerES IV) Human biomonitoring of antimony	antimony	Urine, males	NR	Germany	NR	3 to 14 years old NR	NR	1530	NR	<500	4740	NR	(0.3 µg/L) ng/24 hrs; Mean: (1.53 µg/24 hrs) Range: (-0.5-4.74 µg/24 hrs)	NR	reported. Creatinine corrected levels were not reported.
2009, as cited in Snedeker et al., 2014 Gebel et al., 1998 (Also stratified by exposed and reference groups) Gebel et al., 1998 (Also stratified by exposed and reference groups)	reference values for environmental pollutants in urine or blood of children in Germany derived from the German environmental survey on children 2003-2006 (GerEV) Human biomonitoring of antimony	antimony antimony	Urine, males Urine, females	NR	Germany Germany	NR	3 to 14 years old NR	NR	1530 980	NR	<500 500	4740	NR	(0.3 µg/l) ng/24 hrs; Mean: (1.53 µg/24 hrs) Range: (-0.5-5.74 µg/24 hrs) Range: (-0.5-5.35 µg/24 hrs)	NR	reported. Creatinine corrected levels were not reported. Creatinine corrected levels were not reported.
2009, ac ited in Snedser et al., 2014	reference values for environmental pollutants in urine or blood of children in Germany derived from the German environmental survey on children 2003–2006 (GerEV) Human biomonitoring of antimony Human biomonitoring of antimony	antimony antimony antimony	Urine, males Urine, females Blood, males	NR NR	Germany Germany Germany	NR NR	3 to 14 years old NR NR	NR NR	1530 980 970	NR NR	<500 500 NR	4740 5350 7540	NR NR	(0.3 μg/L) ng/24 hrs; Mean: (1.53 μg/24 hrs) Range: (-0.5-4.74 μg/24 hrs) Range: (-0.5-8.75 kange: (-0.5-5.35 μg/24 hrs) Range: (-0.5-5.35 μg/24 hrs) ng/L; Mean: (0.97 μg/L) Max: (7.54 μg/L)	NR NR	reported. Creatinine corrected levels were not reported. Creatinine corrected levels were not reported.
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2009, ac ited in Snedser et al., 2014 2014 2014 2014 2014 2014 2014 2014	reference values for environmental pollutants in urine or blood of children in Germany derived from the German environmental survey on children 2003-2006 (GerES IV) Human biomonitoring of antimony Human biomonitoring of antimony Human biomonitoring of antimony	antimony antimony antimony antimony	Urine, males Urine, females Blood, males Blood, females Scalp hair, males	NR NR NR	Germany Germany Germany Germany	NR NR NR	3 to 14 years old NR NR NR	NR NR NR	1530 980 970 700	NR NR NR	<500 500 NR	4740 5350 7540 3580	NR NR NR	(0.3 μg/L) ng/24 hrs; Mean: (1.53 μg/24 hrs) Range: (-0.5-4.74 μg/24 hrs) ng/24 hrs; ng/24 hrs; ng/24 hrs; ng/L; Mean: (0.97 μg/L) Max: (7.54 μg/L) ng/L; Mean: (0.97 μg/L) Max: (3.58 μg/L) ng/L; Mean: (0.07 μg/L) Max: (3.58 μg/L) ng/L; Mean: (0.07 μg/L) Max: (3.58 μg/L)	NR NR NR	reported. Creatinine corrected levels were not reported. Creatinine corrected levels were not reported.

## Abreviations and notations

μg/L	microgram(s) per liter
µg/g	microgram(s) per gram
ATO	Antimony trioxide
ATSDR	Agency for Toxic Substances and Disease Registry
CalEPA	California Environmental Protection Agency
CEH	Center for Environmental Health
CEPA	Canadian Environmental Protection Act
CPSC	U.S. Consumer Product Safety Commission
ECHA	European Chemicals Agency
EFSA	European Food Safety Authority
EURAR	European Union Risk Assessment Report
FDA	Food and Drug Administration
FSA	Food Standards Agency
FM550	Firemaster 550
FR	Flame retardant
g/mL	gram(s) per milliliter(s)
g/mol	gram(s) per mole
HSDB	Hazardous Substance Database
IARC	International Agency for Research on Cancer
ICRP	International Commission on Radiological Protection
IPCS	International Programme on Chemical Safety
LOD	Level of Detection
LOQ	Level of Quantification
m	meter
max	Maximum
MDL	Maximum detection limit
mg/kg	milligram(s) per kilogram(s)
mg/kg/day	milligram(s) per kilogram(s) per day
mg/L	milligram (s) per liter
Min	minimum
ng	nanogram(s)
ng/mL	nanogram(s) per milliliter(s)
NRC	National Research Council
NSC	National Safety Council
NTP	National Toxicology Program
PC	Personal computer
PBDE	Polybrominated diphenyl ether
ppm	parts per million
PU	Polyurethane
PUF	Polyurethane foam
PVC	Polyvinylchloride
SC	Stratum corneum
SPE	Solid phase extraction
SPME	Solid-phase microextraction

ТВВ	2-Ethylhexyl 2,3,4,5-tetrabromobenzoate
ТВВА	2,3,4,5-Tetrabromobenzoic acid
ТВВРА	Tetrabromobisphenol A
TBMEHP	Mono(2- ethylhexyl) tetrabromophthalate
ТВРН	Di(2-ethylhexyl) tetrabromophthlate
ТСЕР	Tris(2-Chloroethyl) Phosphate
ТСРР	Tris(chloropropyl) phosphate
TDCPP	Tris(1,3-dichloro-2-propyl) Phosphate
TEP	Triethyl Phosphate
TERA	Toxicology Excellence for Risk Assessment
TV	Television
U.S. EPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WWTF	Waste water treatment facility
XFR	X-ray fluorescence