



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
BETHESDA, MD 20814

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Date: December 7, 2016

Memorandum

TO : The Commission
Todd Stevenson, Secretary

THROUGH : Mary T. Boyle, General Counsel
Patricia H. Adkins, Executive Director
DeWane Ray, Deputy Executive Director for Safety Operations

FROM : George A. Borlase, Ph.D., P.E., Assistant Executive Director, Office of Hazard
Identification and Reduction
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Economic Analysis
Robert Franklin, Supervisory Economist, Directorate for Economic Analysis
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SUBJECT : Response to Commissioner Mohorovic's Question for the Record Regarding the
Notice of Availability – Regulatory Flexibility Act Section 610 Review of the
Standard for Flammability (Open Flame) of Mattress Sets

This memorandum provides staff's response to the question for the record from Commissioner Mohorovic regarding the Notice of Availability – Regulatory Flexibility Act Section 610 Review of the Standard for Flammability (Open Flame) of Mattress Sets.

Question from Commissioner Mohorovic:

Commissioner Mohorovic would like to request that the economic analysis staff re-estimate the benefit cost analysis of the rule reflected in the original regulatory analysis based on the observed reduction in deaths and injuries as described in the recent review of the 1633 rule under section 610 of the RFA and updated estimates of the value of a statistical life and injury costs.

Staff recalculated the estimates in the benefit-cost analysis from the 2005 final rule regulatory analysis for the mattress flammability rule (16 C.F.R. part 1633, referred to as "the rule"), using a reduced value for effectiveness of the standard, and an updated value of a statistical life (VSL). Additionally, we have updated injury and other cost estimates for inflation. We used a 14-year useful life for mattresses in these calculations for the reasons described in the economics memorandum in the Commission briefing package for the Regulatory Flexibility Act review of the rule (economics rule review memo).

The economics rule review memo noted that the deaths per capita in the most recent 3-year period for which the data were available (2011 to 2013) was about 16 percent lower than the deaths per capita in the 3-year period before compliant mattresses began entering the market (2002 to 2004). The per capita injuries were about 22 percent lower in 2011 to 2014 than in

* This analysis was prepared by CPSC staff, and has not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

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2002 to 2004. These numbers were compared with the estimated effectiveness of the standard in the regulatory analysis of the final rule in which the staff estimated a reduction of about 73.5 percent in addressable deaths and a reduction of about 78.5 percent in addressable injuries when all mattresses were compliant (Tohamy, 2006).¹

Staff estimated that in the period from 2011 to 2013, about 36 percent of the mattresses in use were compliant with the standard. Multiplying the share of compliant mattresses against the estimates of the predicted reductions in deaths and injuries when all mattresses comply, *and assuming away all other factors that could affect the risk of mattress fire death or injury*, could suggest that there would have been a 26 percent reduction in deaths (*i.e.*, 0.735×0.36) and a 28 percent reduction in injuries (*i.e.*, 0.785×0.36) by the 2011 to 2013 period. Dividing the observed 16 percent reduction in addressable deaths per capita and the 22 percent reduction in addressable injuries per capita by the expected reductions of 26 percent and 28 percent, respectively, could suggest that the rule is only about 60 percent as effective in reducing deaths (*i.e.*, $0.16 \div 0.26$) and about 78 percent as effective in reducing injuries (*i.e.*, $0.22 \div 0.28$), as assumed in the final regulatory analysis.

The table below shows the results of the recalculation of the benefits per mattress. The first column shows the midpoint of the benefits estimates from Table 4 of the final regulatory analysis (Tohamy, 2006), assuming an average mattress life of 14 years, and inflated to 2014 dollars using the consumer price index. The second column shows the recalculated benefits. In recalculating the benefits, we have updated the VSL to \$8.7 million to reflect the 2014 value.

	(1) Original Benefits and Costs in Final Regulatory Analysis, assuming 14 year mattress life, updated for inflation (2014 dollars)	(2) Recalculated Benefits and Costs (2014 dollars)
DEATHS		
Annual Benefits, per Mattress	\$5.09	\$4.38 (60% as effective as original estimate and assuming 8.7 million VSL)
Lifetime Benefits, per Mattress	\$57.50	\$49.48

¹ The final regulatory analysis estimated that the rule would reduce addressable deaths by 69 to 78 percent. The midpoint of this estimate is 73.5 percent. Multiplying 73.5 percent by 36 percent is about 26 percent. Similarly, the final regulatory analysis estimated that the rule would reduce addressable injuries by 73 to 84 percent. The midpoint of this estimate is 78.5 percent, and multiplying this by 36 percent is about 28 percent.

	(1) Original Benefits and Costs in Final Regulatory Analysis, assuming 14 year mattress life, updated for inflation (2014 dollars)	(2) Recalculated Benefits and Costs (2014 dollars)
<u>INJURIES</u>		
Annual Benefits, per Mattress	\$0.74	\$0.58 (78% as effective as of original estimate)
Lifetime Benefits, per Mattress	\$8.36	\$6.55
Total Lifetime Benefits, per Mattress	\$65.86	\$56.03
Total Resource Cost Per Mattress (from Table 5 in Final Regulatory Analysis)	\$18.27	\$18.27
Net Benefits per Mattress	\$47.59	\$37.76

Column 2 suggests that, using the revised death and injury reduction estimates, the standard reduces the annual death and injury costs by about \$4.38 and \$0.58, respectively, per mattress, per year. The present value of these reduced annual death and injury costs, over the 14-year product life of a mattress would amount to about \$56.03 (*i.e.*, \$49.48 + \$6.55). Net benefits (benefits – costs) would amount to about \$37.76 per mattress (*i.e.*, \$56.03 - \$18.27) over the mattress's expected product life. As suggested by the table above, although the estimated effectiveness of the rule in preventing deaths and injuries is reduced, this is offset, somewhat, by the higher estimated VSL. The net impact of this recalculation would reduce the estimated net benefit of the rule by 21 percent per mattress (*i.e.*, $(\$47.59 - \$37.76) \div \$47.59$).

Given per-unit benefits and costs and mattress sales, we can calculate aggregate benefits and costs. Based on 2013 sales data cited in the economics rule review memo (approximately 22.3 million mattresses sold), the aggregate annual benefits (based on the revised effectiveness estimates in column 2) would have been about \$1,249 million (*i.e.*, 22.3 million \times \$56.03). The aggregate annual costs would have been about \$407 million (*i.e.*, 22.3 million \times \$18.27). Therefore, the annual aggregate net benefits would have been about \$842 million (*i.e.*, \$1,249 million – \$407 million).

This analysis is based on the assumption that the reduction in per capita deaths and injuries over the time period we are considering was attributable solely to the impact of the rule and can be used to estimate the effectiveness of the rule when all mattresses are compliant. Other factors that might affect the risk of mattress fire death and injuries have not been considered (*e.g.*, changes in the use of smoke alarms or smoking materials). The analysis also did not consider other socio-economic factors such as the possibility that more affluent consumers (who might have a lower risk mattress fire death or injury) might have been more likely to replace or

buy a new mattress since the rule went into effect. Finally, we note that we have used point estimates and have not considered any statistical uncertainty in these estimates. As discussed in Miller, 2016, there is considerable year-to-year variability in the estimated deaths and injuries and the data are not from a probability sample. “Therefore it is not possible to use statistical inference to determine if apparent trends are statistically significant.”

To assess effectiveness of the standard accurately, we would need information on the number of fire deaths and injuries on compliant and noncompliant mattresses, as well as information on the environment in which the fire occurred and characteristics of the users or victims. With this information, we could determine the risk of fire injury or death on compliant mattresses compared to noncompliant mattresses, controlling for other factors that could affect the risk.

References

Miller, David (2016), CPSC Memorandum to Lisa Scott, “Mattress Fire Loss Estimates for Open-Flame Mattress 1633 Rule Review,” U.S. Consumer Product Safety Commission, Bethesda MD.

Squibb, Robert (2016). CPSC Memorandum to Lisa Scott, “Open Flame Flammability Standard for Mattresses and Mattress Sets Rule Review,” U.S. Consumer Product Safety Commission, Bethesda MD.

Tohamy, Suomaya (2006), Final Regulatory Analysis of Staff’s Draft Final Standard to Address Open-Flame Ignition of Mattresses. U.S. Consumer Product Safety Commission, Bethesda MD.