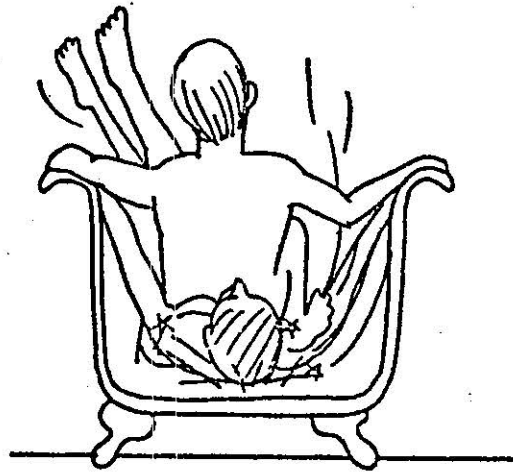


SCENARIO 10

FREQUENCY 6



TUB RISING ACTIVITY OF ADULTS WITH SLIPS AND FALLS

While adults are in a low state of potential energy and danger while sitting, the process of rising requires steps that are unique--with a sequence of user failures and product failures together generating injury.

SCENARIO 10

FREQUENCY 6

TUB RISING ACTIVITY OF ADULTS WITH SLIPS AND FALLS

USER DESCRIPTION

ACCIDENT SETTING FACTORS	PRECITICAL INCIDENT FACTORS	CRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT CONSEQUENCES	INCIDENT RECOVERY CONSEQUENCES
<u>AGE</u> 65 + (3) 55 - 64 (1) 45 - 54 (1) 25 - 44 (1) <u>SEX</u> male (1) female (5) <u>WEIGHT</u> ng (5) 141 - 165 (1) <u>RACE</u> white (4) black (2) <u>EDUCATION</u> ng (5) high school grad. or senior (1) <u>MARITAL</u> married (3) ng (3) <u>OCCUPATION</u> housewife (2) blue collar (2) white collar (1) retired (1) <u>GENHEALTH</u> good - normal (6)	<u>GOAL</u> leave tub (5) bath + wash hair (1) <u>ATTENDANCE</u> ng (5) alone (1) <u>PRECIT B</u> rising in tub (4) placed hand on tub edge (1) use hand rail for support (1)	<u>CRITUSER</u> slip + lose balance (4) hand slipped (2)	<u>POSTA</u> fell down (4) lost balance (1) trying to catch self (1)	<u>FIRST DIAG/ FIRST BODY</u> fracture of lower back + ribs (2) contusions and abrasions of rib upper trunk + side (4) <u>SEVERITY</u> 3 (4) 5 (2)	<u>DISPOSITION</u> treated + released (6)

<u>DAYWEEK</u> Saturday (3) Sunday (2) Monday (1)	<u>AREA</u> In tub (6)	<u>CRITPROD</u> slippery tub bottom (3) slippery tub edge (1) slippery hand rail (1) slippery rubber mat (1)	<u>POSTPROD</u> ng (5) handrail (1)		
<u>PHYSICAL</u> tub or tub/shower (5) old fashioned tub (1)	<u>LIQUID</u> ng (4) tub full (1) tub draining (1)	<u>ADDITIONAL</u> ng (3) bath oil in tub (1) one of two bathmats removed for cleaning (1) porcelain slippery (1)	<u>ENERGY</u> tub side/edge/rim (5) tub bottom (1)		
<u>AGETUB</u> ng (3) over 10 yrs (2) 4 - 6 yrs (1)					
<u>DETAILED</u> ng (5) bathmat (1)					

ENVIRONMENT DESCRIPTION

USER DESCRIPTION

The product involved is always a tub or tub shower combination with one being of the old fashioned variety. 2 tubs are over 10 years old.

The persons involved range in age from 25 to 65 and over, 50% being in the 65 and over category. 5 of the six are females and all six are of normal health.

All 6 cases involved the inside of the tub and it is assumed that both the victim and the tub surface were wet.

In most cases (5 of 6) the victim was leaving the tub. 4 involved the activity of rising up in the tub.

All incidents involved slipperiness, with tub bottoms accounting for three accidents, one on a rubber mat, one on a tub edge and one on hand-rail.

4 of the victims slipped and lost their balance while the remaining 2 had their hands slip on support elements.

The tub edge, side or rim accounted for 5 of the injuries and the tub bottom for the other.

4 victims fell down, 1 lost his balance and 1 tried to catch himself.

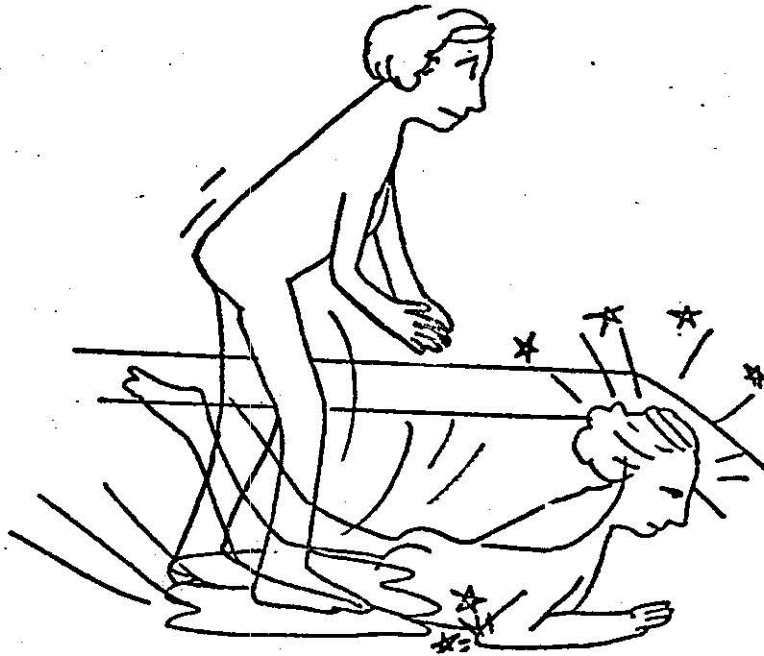
5 victims suffered contusions and abrasions of the ribs, upper trunk and side while 2 suffered fractures of the lower back + ribs.

The severity of the injuries based upon the NEISS index were 4 severity 3 and 2 severity 5.

All 6 victims were treated at the hospital and released.

SCENARIO II

FREQUENCY 16



TUB STANDING ACTIVITY OF ADULTS WITH SLIPS AND FALLS

Tub activity of adults and resultant injuries suggested special intervention strategies relating to adults. Weight, height and body dimension conditions as well as needs and goals might be intervened upon for this group. A separate scenario was indicated.

When the goals, activities and injuries were correlated together--results were diverse and would have diverged into a whole field of minor scenario subtypes.

- The central issue remained--the adult was standing in the tub when he slipped and fell injuring himself against the tub.

Intervention strategies dealing with this central theme were called for.

SCENARIO 11

FREQUENCY 16

TUB STANDING ACTIVITY OF ADULTS WITH SLIPS AND FALLS

USER DESCRIPTION

ACCIDENT SETTING FACTORS	PRECITICAL INCIDENT FACTORS	CRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT CONSEQUENCES	INCIDENT RECOVERY CONSEQUENCES
AGE 20 - 24 yrs (1) 25 - 44 yrs (6) 45 - 54 yrs (7) 55 - 64 yrs (2) SEX female (9) male (7) RACE white (8) black (6) ng (2) EDUCATION ng (8) high school (2) high school grad. or senior (3) college (1) college grad. or senior (1) no school (1) OCCUPATION blue collar (5) white collar (3) professional (3) housewife (2) ng (3)	UPSETTIED ng (14) tired (2) HURRIED ng (12) hurried (4) PRECAUTION/HISTORY history (1) ng (15) DISTRACTION ng (15) soap fell (1) GOAL showering (5) bathing (3) leave tub after bath (3) drying off (1) returning to tub (1) ng (3) PRESENCE ng (15) alone (1) PRESLOC ng (15) out of tub (1) PRECRI B standing (6) standing on rt. foot while washing left (2) leave tub (1) turning while standing (1) reach down to pick up soap (1) reaching for toy on toilet seat (1) placed leg on side of tub to dry (1) stepped forward to turn off water (1)	CRITUSER slip + lose balance (13) lose balance (3)	POSTA falling down (11) falling backwards (2) falling to side (2) falling across tub (1)	FIRST DIAG/ FIRST BODY lacerations ribs (1) lacerations wrist (1) contusions/abrasions: head (2) shoulder (1) side (1) trunk (1) ribs (1) hips (1) fracture ribs (3) upper arm (1) strain or sprain right side (1) concussion (2) SEVERITY 3 (9) 4 (2) 5 (4) 6 (1)	DISPOSITION treated + released (15) hospitalized 10+ days (1)

ENVIRONMENT DESCRIPTION

DAYWEEK

Sunday (1)
Monday (2)
Tuesday (5)
Wednesday (1)
Thursday (1)
Friday (1)
Saturday (4)
ng (1)

PHYSICAL

tub or tub/shower
combination (13)
old fashion tub on
4 legs (1)
standard mfg. (2)

AGE

ng (6)
0 - 3 yr (3)
4 - 6 yrs (1)
7 - 10 yrs (2)
11 - 15 yrs (1)
10 + yrs (1)
20 + yrs (2)

AREA

in tub (16)

PREPROD

ng (11)
soap (4)
towel (1)

CRITPROD

slippery tub bottom (14)
soap in tub (1)
slipped bath mat (1)

ADDITIONAL

ng (7)
soap water in tub (4)
bubble bath present (2)
bath mat old +
worn (1)
soap on tub bottom
melting (1)
detergent on tub
bottom (1)

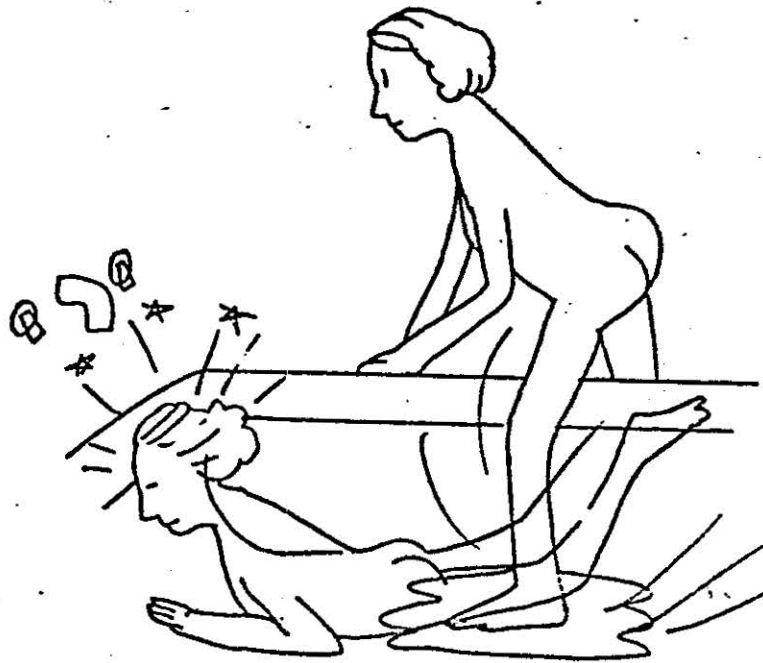
ENERGY

tub side/edge/rim (14)
ng (2)

USER DESCRIPTION	The persons are between the ages of 20 to 64, but are predominantly between 25 and 54 (13 of 16). They are generally in normal health.	All the persons are inside the tub or more inside than outside. They are standing (6) or in the act of doing something while in motion or changing position while standing (10).	All of the persons slip or lose balance (16)	Following the slips or loss of balance while standing, the victim falls downward (11), backward (2), to one side (2), or across tub(1).	The midsection and sides received the most injuries (9), the head was injured in (4) cases and shoulder, arm and wrist the remainder (5). Although there were (9) injuries rated on the NEISS Severity Index as 3, there were (4) rated as severity 5, and 3 which indicates that the injuries are relatively serious.	Almost all of the victims were treated and released in the same day (15 of 16). One case (1) was hospitalized for more than 10 days.
ENVIRONMENT DESCRIPTION	The bathtub-shower is involved in all of the cases. It is interesting to note that of those whose ages are given, six of the tubs are over 7 years old (6 of 10).	The inside of the tub is the scene of all the pre-critical incident activity.	Almost all of the slipping is attributed to a slippery tub bottom (14 of 16). There is soap-soapy liquid, bath oil present in some cases (8) and in one case an old bath mat slips on the bottom.	He almost always falls against the side-edge rim of the tub (14 of 16).		

SCENARIO 12

FREQUENCY 25



TUB ENTERING OR LEAVING ACTIVITY
WITH SLIPS AND FALLS

While value of life and reduction of injury is claimed an equal issue between adults and children, in practice, more interest and responsibility is felt toward children.

Also, of course different capabilities and physical characteristics of these groups differentiate them even under otherwise similar accident sequences. Thus, user-product interactions and intervention strategies may differ.

The negotiation of the tub wall in leaving and entering is a case in point. This activity has characteristics that suggest its separate scenario treatment.

SCENARIO 12

FREQUENCY 25

TUB ENTERING OR LEAVING ACTIVITY WITH SLIPS AND FALLS

USER DESCRIPTION

ACCIDENT SETTING FACTORS	PRECITICAL INCIDENT FACTORS	CRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT CONSEQUENCES	INCIDENT RECOVERY CONSEQUENCES
<u>AGE</u> 10 - 19 yrs (1) 20 - 24 yrs (4) 25 - 34 yrs (7) 45 - 54 yrs (3) 55 - 64 yrs (5) 65 + yrs (5) <u>SEX</u> female (16) male (9) <u>RACE</u> black (9) white (8) other (2) ng (6) <u>EDUCATION</u> post college grad (6) college (1) grades 2 - 6 (1) ng (17) <u>MARITAL</u> ng (15) married (8) single (2) <u>OCCUPATION</u> ng (9) blue collar (5) student (3) housewife (3) professional (2) retired (1) white collar (1) out of school but unemployed (1) <u>GEN HEALTH</u> ng (16) normal - good (9)	<u>UPSETTIED</u> not upset but tired (18) ng/not applicable (7) <u>HURRIED</u> ng/not applicable (20) hurried (5) <u>PRECAUTION/HISTORY</u> nt/not applicable (20) no precautions + a history (4) precautions + a history (1) <u>GOAL</u> leaving tub (14) entering tub (8) bathing (1) drying off (1) waiting for return of responsible person (1) <u>PRECIT B</u> stepped over side of tub (7) leaving tub (5) setting 2nd foot down (3) stepping into tub (3) climbed over side of tub (1) stepped on soap (1) standing (1) legs gave way (1) grabbed for soap dish/bar (1) reached for towel (1) lower self into water (1)	<u>CRITUSER</u> slip + lose balance (24) lose balance (1)	<u>POSTA</u> falling down (19) falling backward (2) falling to side (1) falling forward (1) foot outside tub (1) dragged across tub (1) reached back to grab towel rack (1)	<u>FIRST DIAG/ FIRST BODY</u> contusion/abrasion: head (4) ribs (3) side (1) lower arm/wrist (2) lower leg (1) fracture: ribs (7) shoulder (1) knee (1) laceration toe (1) laceration finger (1) hematoma head (1) dislocation back (1) internal organ injury lower trunk (1) <u>SEVERITY</u> 1 (2) 2 (3) 3 (3) 4 (2) 5 (8) 6 (2)	<u>DISPOSITION</u> treated + released (23) hospitalized 1 day (1) hospitalized 5 - 10 - days (1)

ENVIRONMENT DESCRIPTION

DAYWEEK

ng (4)
 Sunday (5)
 Monday (3)
 Tuesday (1)
 Wednesday (6)
 Friday (3)
 Saturday (3)

PHYSICAL

tub or tub/shower
 combination (19)
 standard size tub w/
 enamel surface (2)
 standard size tub +
 probably porcelain (1)
 porcelain tub +
 probably standard (1)
 old fashion high-
 sided tub (1)
 Gerber bathtub (1)

AGETUB

ng (12)
 0 - 3 yrs (1)
 4 - 6 yrs (3)
 16 - 20 yrs (1)
 5 + yrs (2)
 10 + yrs (6)

AREA

in tub (13)
 in + out of tub (12)

PREPROD

ng/not applicable (23)
 soap (1)
 bath oil (1)

LIQUID

tub wet + empty
 (no water running) (3)
 shower water run-
 ning in tub (3)
 tub full (2)
 tub water draining (1)
 tub water running (1)
 ng (15)

SAFETY

none (14)
 non-slip surface (4)
 bath mat/ not in
 use (2)
 hand rail (1)
 ng (4)

CRITPROD

slippery tub bottom (22)
 soap in tub (1)
 ng (2)

ADDITIONAL

ng (20)
 soap water in tub (2)
 bath oil on tub
 bottom (2)
 bubble bath (1)

POSTPROD

ng/not applicable (24)
 towel rack came
 off wall (1)

ENERGY

tub side/edge/rim/
 back (17)
 tub (4)
 tub bottom (1)
 toilet bowl base (1)
 ng (2)

ENVIRONMENT DESCRIPTION	USER DESCRIPTION					
	The people are between the ages of 20 and 65+ (24) with one exception under 20 (1). Their health is normal. There are slightly more females involved than males (16 to 9).	Most of the people are in the act of entering or leaving the tub (22 of 25). Except for one case, they are all in motion: Stepping over edge or leaving tub (20), climbing over edge (1), reaching or grabbing accessory (2), or lowering into tub over edge (1).	In all cases, the person while entering or leaving the tub slips and/or loses balance. They are in transition, usually with one foot inside the tub and the other outside.	All the victims fall as a result of slipping or losing balance: downward (19), backward (2), forward (1), to side (1), or their foot dragged across tub (1) or reached for towel rack (1).	The part of the body most injured is the mid-section (13) the ribs being injured more (10 of 13). The head received injuries (5) and limbs (7). The severity of the injuries was considerable, (8) ranked as severity 5 on the NEISS index, and (2) as severity 6.	In most cases, the victim was treated and released in the same day (23). Two (2) were hospitalized, one for an extended period.
	The bathtub shower is involved in all of these cases. When given, the majority of the tubs are over 4 years old (12 of 13).	The area of the scene is the edge-rim-side of the bathtub. In all cases where given, the tub has water in it.	In all cases, the tub bottom is slippery, either because it is wet or there is a slipping agent, soap or oil, on the bottom surface.	In falling, all the victims hit against the tub side, edge, rim, back (20) or bottom (2). In falling outward, (1) hits the toilet bowl.		

SCENARIO 13

FREQUENCY 12



SHOWER STALL AREA ACTIVITY RESULTS IN LACERATION

Showering most frequently takes place in tub/shower combination.

However, the shower stall is a second area of shower activity.

The data revealed that this area is not only infrequently involved in injuries (perhaps as a indicator of the relative numbers of shower stalls), but when injured in the shower stalls, the injuries are more homogeneous in character.

Correlations of the physical factors of the shower stall with the activities and injuries revealed patterns resulting in glass and door lacerations.

SCENARIO 13

FREQUENCY 12

SHOWER STALL AREA ACTIVITY RESULTS IN LACERATION

USER DESCRIPTION

ACCIDENT SETTING FACTORS	PRECITICAL INCIDENT FACTORS	CRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT CONSEQUENCES	INCIDENT RECOVERY CONSEQUENCES
<u>AGE</u> 3 - 9 yrs (2) 10 - 19 yrs (5) 20 - 44 yrs (3) 45 - 54 yrs (1) 65 + yrs (1) <u>SEX</u> male (8) female (4) <u>RACE</u> white (11) black (1) <u>EDUCATION</u> ng (1) elementary (1) jr. high (1) senior high (6) high school grad (1) or senior (5) college (1) college grad or senior (1) <u>MARITAL</u> single (7) married (5) <u>OCCUPATION</u> ng (1) preschool (2) student (3) housewife (1) blue collar (2) professional (1) managerial (1) out of school but unemployed (1)	<u>UPSETTIED</u> ng (7) upset (3) tired (2) <u>HURRIED</u> ng (7) hurried (5) <u>PRECAUTION/HISTORY</u> ng (11) history (1) <u>GOAL</u> showering (3) bathrooming (2) playing in bathroom (2) drying off (2) showering + fighting (1) fix shower door (1) leave tub after shower (1) <u>PRESENCE</u> ng (10) children (2) <u>PRESLOC</u> ng (10) shower stall (2) <u>PRECIT B</u> standing (2) showering (1) leaving shower stall (1) shower door slammed (1) jumped back (1) jumping into shower (1) pushing against each other w/ shower door between (1) reached to turn off faucet (1) placed foot on bathroom rug (1) slipper caught on bathroom rug (1) reached through broken door (1)	<u>CRIT/USER</u> slip + lose balance (4) other (trip + fall included) (3) lose balance (2) cut (2) burned (1)	<u>POSTA</u> ng (4) falling down (2) foot outside stall dragged across stall (2) jumped back (1) put hand on shower door to balance (1) trying to catch self (reached out) (1) fell through glass door (1)	<u>FIRST DIAG/ FIRST BODY</u> laceration: leg/knee (4) lower arm/ wrist (3) head (2) lower back/ buttocks (2) lower trunk (1) <u>SEVERITY</u> 2 (10) 5 (2)	<u>DISPOSITION</u> treated + released (12)

ENVIRONMENT DESCRIPTION

DAYWIFE

Sunday (2)
Monday (1)
Tuesday (1)
Wednesday (2)
Thursday (1)
Friday (2)
Saturday (3)

PHYSICAL

Shower Stall (8)
Shower w/shattered
glass door (1)
Homemade shower
stall (1)
Shower stall man-
ufactured by
W F Mfg. Co.,
Glendale, CA (1)
Shower stall by
American Shower
Door Co., Holly-
wood, CA (1)

AGETUB (AGESHOWER)

0 - 3 yrs (1)
4 - 6 yrs (2)
7 - 10 yrs (1)
11 - 15 yrs (2)
10 + yrs (5)
ng (1)

AREA

ng (4)
on bathroom rug (2)
on bathroom floor (1)
in shower stall (2)
inside + outside
shower stall (2)
just inside shower
stall (1)

LIQUID

stall empty + dry
no water running (5)
shower water ru-
nning (3)
shower water off/
stall wet (2)
ng (2)

CRIT PROD

ng (1)
soap/shampoo on
stall floor (2)
glass enclosure
exploded (2)
shower door broke (2)
stall floor slippery (1)
hand rail (1)
very hot water (1)
throw rug not
completely flat (1)
rug slips (1)

ADDITIONAL

ng (10)
door was shattered
and jammed (1)
waxed floor (1)

ENERGY

broken glass (10)
faucet + shower
stall floor (1)
flange at bottom
of aluminum
shower door (1)

ENVIRONMENT DESCRIPTION	USER DESCRIPTION				
	People of all ages, from 5 to 65+ are involved in this scenario. More males were involved than females (8 to 4).	Of all the persons involved (12), five were upset or tired. Five also stated that they were in a hurry. Over half (7) were in the act of taking a shower or were finished, drying themselves off. The remaining cases involved an activity unrelated to showering, e.g. playing (2), fixing shower door (1), entering the bath room (2). All, however, involved an animated activity directly adjacent to the shower stall.	The majority (9) of the persons slipped, lost balance, or tripped while in or adjacent to the shower stall. This includes those who were playing or fighting in the stall environment. One person was burned by a stream of hot water and reacted, and another was fixing a broken glass door.	Half (6) of the victims interacted with the glass shower door in the act of falling or jumping toward it, two of these attempting to break their fall by applying lateral force to the glass. Of all cases, almost all (10) involved glass breaking or shattering. Of the other two, (1) involves a slip and fall against faucets and the other (1) a sharp metal edge causing a laceration.	All of the injuries were lacerations, (10) from broken glass, (1) from a fall against faucets, and (1) from a sharp metal edge. The head was injured in (2) cases, the mid-section of the body in (3), and the limbs in (7) cases. The injuries were not severe, (10) of severity Index 2 and (2) of severity Index 3.
In all cases, the shower stall and glass door (enclosure) are in the setting, it is interesting to note that 10 of the 19 stalls are older than 4 years and 7 of the 12 are older than 10 years.	The victim was in or directly outside the shower stall (5) or standing on the bathroom floor at any (4). In 9 of the 19 cases, the floor of the stall was wet, but in another 8, there was no water involved in setting	A slippery floor of the stall initiated (3) of the accidents. Hot water caused one (1) to jump back; (4) accidents were initiated by fighting or playing action, and (3) involved a loose rug or slippery surface.			

SCENARIO 14

FREQUENCY 11



TUB ENCLOSE GLASS BREAKS
RESULTING IN LACERATION

A breakdown of physical characteristics of tub/shower combinations indicated that where glass enclosures in tub were present and breaks in the glass occurred, lacerations were a constant result.

This scenario emerged when the adult user, while leaning against, striking, bumping or closing the enclosure shattered the glass resulting in a variety of cuts over the lower portion of arms and body.

SCENARIO 14

FREQUENCY 11

TUB ENCLOSURE GLASS BREAKS RESULTING IN LACERATIONS

USER DESCRIPTION

ACCIDENT SETTING FACTORS	PRECITICAL INCIDENT FACTORS	CRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT CONSEQUENCES	INCIDENT RECOVERY CONSEQUENCES
<u>AGE</u> 5 - 9 yrs (2) 10 - 19 yrs (2) 20 - 24 yrs (3) 25 - 44 (2) 45 - 54 (2) <u>SEX</u> male (7) female (4) <u>RACE</u> white (9) ng (1) <u>WEIGHT</u> ng (3) 36 - 55 lb (1) 56 - 110 lb (3) 111 - 140 lb (2) 146 - 185 lb (1) 186 - 220 lb (1) <u>EDUCATION</u> ng (3) grades: 3 - 6 (3) 7 - 9 (1) 9 - 11 (2) high school senior or graduate (2) <u>MARITAL</u> married (5) single (5) ng (1) <u>OCCUPATION</u> student (5) housewife (2) blue collar (1) white collar (1) retired (1) ng (1)	<u>UPSETTIRE</u> tired (4) upset + tired (1) ng (6) <u>PRECAUTION/HISTORY</u> ng (10) history (1) <u>GOAL</u> shower or shower + wash hair (6) enter/leave tub (3) bathrooming/ toileting (2) <u>ATTENDANCE</u> ng (10) parent (1) <u>CONTINUITY</u> ng (10) continuous (1) <u>PRESENCE</u> ng (8) parent/guardian (2) alone (1) <u>PRESLOC</u> ng (9) outside of tub (2) <u>PRECRI 8</u> ng (1) standing (1) standing (raising up) (1) showering (1) sliding the shower door (2) knocked glass off shelf above tub (1) left arm swing over head (1) bending over wash- ing leg w/ left hand (1) setting 2nd foot down (1) right elbow hit	<u>CRITUSER</u> slip + lose balance (5) cut (3) hand slipped (1) ng (1) lose balance (1)	<u>POSTA</u> foot outside tub dragged across tub (2) bumped sliding glass door (1) fell through glass door (1) falling backwards (1) falling to side (1) ng (5)	<u>FIRST DIAG/ FIRST BODY</u> lacerations: arm/lower arm/ hand (9) right lower leg/ right foot (2) <u>SEVERITY</u> 2 (9) 3 (1) 4 (1)	<u>DISPOSITION</u> treated + released (11) hospitalized 1 - 5 days (1)

ENVIRONMENT DESCRIPTION	DAYWEEK	AREA	CRITPROD	POSTPROD	ENERGY
Monday (1)	In tub (6)	tub door broke (3)	glass door broke (6)		
Tuesday (2)	Just outside tub (2)	slippery tub bottom (2)	tub door fell out + broke (1)		
Wednesday (1)	In + out of tub (1)	slippery floor (2)	ng (4)		
Thursday (1)	bathroom floor (1)	glass plate fell out (1)			
Friday (1)	on toilet (1)	ng (3)			
Saturday (3)					
PHYSICAL	PREPROD	ADDITIONAL			
encl Iron tub (7)	ng (9)	ng (9)			
tub or tub/shower combination (3)	box (1)	door was jammed (1)			
porcelain tub w/ PIV lifetime plate glass door (1)	LIQUID	grains of kitty litter on bottom of tub (1)			
AGE/TUB	shower water running in tub (5)				
ng (4)	tub wet + empty (3)				
10 - yrs (3)	tub or stall empty + dry (2)				
4 - 6 yrs (2)	tub full (1)				
0 - 3 yrs (1)	SAFETY				
11 - 15 yrs (1)	ng (8)				
DETAILED	none (3)				
glass enclosure (door track or glass door) (1)					
ng (10)					

ENVIRONMENT DESCRIPTION

USER DESCRIPTION

3 and 54 years old, of normal health.

A bathtub-shower with a glass enclosure is involved in all of the case studies represented by this scenario. No other unusual factors are significant about the environment.

were upset or tired, and one was both upset and tired. The majority were in the process of showering (6) and entering/leaving the bathtub (3). Two (2) others were involved in activities in the bathroom unrelated to showering. All of the persons were engaged in active movement in or around the tub.

The precritical activity was taking place in tub (6) entering or leaving tub. (1), just outside tub (2) or in another area of the bathroom (2). The tub was wet in most cases (9 of 11). In (4) cases, the person was sliding the glass door open.

Almost half the victims slipped or lost their balance (3) on the inside of the tub + (2) on the bathroom floor next to the tub. In other cases, the victims or others present were sliding the glass door open (4). In other incidents, elbows were swung against the glass while the persons were standing, sitting adjacent to the door (2).

A slippery tub floor or bathroom floor accounts for (4) critical incidents. In three (3) cases the shower door broke, and in (1) case there was glass already cracked.

Those persons who lost their balance or slipped (6) fell against + thru the door structure, usually their arm went thru the glass. When the glass door fell being moved (4), the victim tried to avoid it. In the cases of the elbow striking the glass in animated motion, the person was immediately lacerated.

All activities resulted in breaking door glass (11). In seven (7), it was broken by a part of the body either falling or arm motion. The door moving cases (2) involved the door jumping out of its track and falling in one the door jammed and broke when forced open, and in one previously cracked glass fell out.

All of the injuries were lacerations to the limbs: (9) to the arm and hand region, and (2) to the legs in cases where the door fell out of the track. There were other minor lacerations to the shoulder and thighs. The severity according to NEISS Index was relatively low (9) in severity 2 and (2) in severities 3 and 4.

Most of the victims were treated and released the same day (10). One was hospitalized for 1 - 5 days.

SCENARIO 15

FREQUENCY 10



TUB AND SHOWER STALL ENCLOSURE
GLASS FRAME AND TRACK CONTACTS

Originally, the tub/shower combination door was viewed as belonging to a single accident scenario of interactions with these devices.

Closer analysis revealed that the product played two separable and consistent roles; one involving the glass with its particular sequence and injuries (see Scenario 14) and the other involving the frame and track with its scenario sequence.

SCENARIO 15

FREQUENCY 10

TUB AND SHOWER STALL ENCLOSURE GLASS FRAME AND TRACK CONTACTS

USER DESCRIPTION:

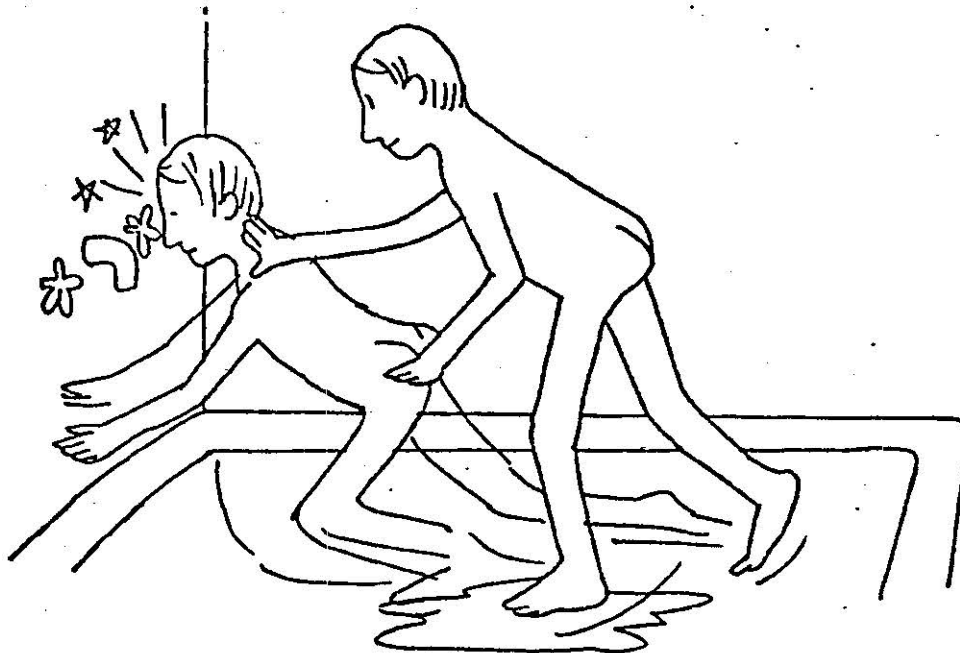
ACCIDENT SETTING FACTORS	PRECITICAL INCIDENT FACTORS	CRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT CONSEQUENCES	INCIDENT RECOVERY CONSEQUENCES
AGE 1 - 2 yrs (1) 2 - 4 yrs (2) 5 - 9 yrs (2) 25 - 44 yrs (3) 45 - 54 yrs (2) SEX male (7) female (3) RACE white (8) black (1) Oriental (1) GENHEALTH ng (6) normal - good (4)	PRECAUTION/HISTORY history (1) ng (9) HURRIED ng (9) hurried (1) GOALS leaving tub or stall (5) bathing + playing/ playing (2) shower (2) close shower door (1) ATTENDANCE ng (7) alone (1) parent (2) CONTINUITY ng (8) less than 1 min. interruption (1) continuous but engaged in some- thing else (1) PRESENCE ng (7) other child (3) PRFSLOC ng (9) in tub (1) PRECRIT B reached for towel (1) leave shower stall (1) reached down to pick up soap (1) leaned over side to pick up soap (1) standing (1) sister closed shower door (1) stepped over side of tub (1) leaving tub (1)	CRITUSER slip + lose balance (5) cut (3) hand slipped (1) other (trip + fall included) (1)	POSTA falling down (3) falling down + back (1) falling to side (1) catching thumb in door (1) ng (4)	FIRST DIAG/ FIRST BODY lacerations: arm/elbow (2) head (1) finger (1) lower back (1) abdomen (1) foot (2) fracture nose (1) hematoma finger (1) SEVERITY 2 (6) 4 (3) 5 (1)	DISPOSITION treated + released (10)

ENVIRONMENT DESCRIPTION					
DAYWEEK ng (1) Sunday (1) Monday (2) Wednesday (1) Friday (3) Saturday (2)	AREA in tub (5) inside + outside tub(4) inside shower stall (1)	CRITPROD slippery tub bottom (4) sharp glass door track (3) shower door (1) shower stall door stuck in track (1) soap film on tub bottom (1)	ENERGY tub sliding door track (5) shower stall door (3) bath tub door railing (1) aluminum bar on sliding door (1)		
PHYSICAL tub/shower with glass enclosure (3) tub or tub/shower combination (3) shower stall (2) shower stall w/ door made by Delta Shower Door co., Gardena, CA (1) Standard Mfg. (1)	LIQUID tub wet + empty (no water running)(3) tub/stall empty + dry (2) shower water running (2) tub full (1) tub part full/water not running (1) ng (1)	ADDITIONAL bubble bath present (1) ng (9)			
DETAILED ng (7) 11 - 15 yrs (2) 16 - 20 yrs (1)	SAFETY ng (6) none (1) bath mat (1) bath mat not in use (1) yes (unspecified) (1)				

USER DESCRIPTION	Victims range in age from 1 to 54 years. 7 of the 10 victims were males. Of those who responded, general health was good and not a contributing factor in the accident.	In the 7 incidents involving tub shower combination enclosures, victims were leaving (4), leaning out (1), bending and rising (1) and playing (1). The stall door incident involved leaving (1), playing (1) and closing door (1). Attendance did not appear to be an important factor in the incident.	In 6 of the 7 incidents involving bathtub showers, the victims slipped prior to the accident. 2 of the three shower stall accidents involved closing the shower door.	5 of the 10 cases involved falling, 4 involved forward motion and 2 involved catching fingers in doors.	Injuries included 8 lacerations, 1 fractured nose and 1 hematoma to a finger. NEISS Severity Index levels were: 2 (6) 4 (3) 5 (1)	All ten victims were treated at the hospital and released.
ENVIRONMENT DESCRIPTION	7 incidents involved bathtub shower combination units while 3 involved shower stalls.	The setting included victims in transition from inside to outside the tub shower (4), inside the tub shower (5), and inside the shower stall (1).	Slippery tub bottoms (4) and sharp door track and doors (3) account for the majority of the critical incidents.	In 6 cases involving the tub shower combination, the energy transfer agent was the door track while the other was the horizontal interior door handle bar. With the shower stalls, two cases involved the bottom point of the door and one the edge of the door.		

SCENARIO 16

FREQUENCY 15



PROTRUDING FIXTURES CONTACTS
(OTHER THAN DOOR FRAMES AND GLASS)

Slipping and falling, it can be seen, was a significant factor of event in most scenarios. However, its universality may be somewhat akin to death as always occurring by heart attack. True, slipping occurs in most cases, but is it the result of other factors?

Slips are one issue in the sequence and elimination or reduction of injury can develop at many points in the sequence.

Slips and falls diverged into many sudden stops. While in some scenarios, the bathroom floor, tub or tub/shower combination door was the energy transfer point, in fifteen cases protruding fixtures were interacted with the user.

As such the group separated into a singular pattern.

SCENARIO 16

FREQUENCY 15

PROTRUDING FIXTURES CONTACTS (OTHER THAN DOOR FRAMES AND GLASS)

USER DESCRIPTION

ACCIDENT SETTING FACTORS	PRECITICAL INCIDENT FACTORS	CRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT CONSEQUENCES	INCIDENT RECOVERY CONSEQUENCES
<u>AGE</u> 0 - 1 yrs (2) 2 - 4 yrs (3) 5 - 9 yrs (2) 10 - 19 yrs (1) 25 - 44 yrs (3) 45 - 54 yrs (2) 55 - 64 yrs (1) 65 + yrs (1) <u>SEX</u> male (8) female (7) <u>RACE</u> black (7) white (7) other (1) ng (1) <u>MARITAL</u> over 19 married (3) ng (4) <u>OCCUPATION</u> Over 19 blue collar (4) retired (1) student (1) ng (1)	<u>HURRIED</u> hurried (3) ng (12) <u>HISTORY</u> history (2) ng (13) <u>DISTRACTIONS</u> other children entered tub sim- ultaneously (1) distracted by another (1) ng (13) <u>GOAL</u> bathing (6) leave tub after bath (4) shower (3) leaving tub after shower (2) <u>ATTENDANCE</u> no one (3) parent (3) ng (9) <u>CONTINUITY</u> long interruption (1) continuous but engaged in some- thing else (2) ng (12) <u>PRESENCE</u> other child (3) alone (1) ng (11) <u>PRESLOC</u> in tub (3) ng (12) PRECRIT B	<u>CRITUSER</u> slip + lose balance (1) lose balance (2) ng (2)	<u>POSTA</u> falling down (11) falling to side (1) falling forward (1) falling backward (1) ng (1)	<u>FIRST DIAG/ FIRST BODY</u> lacerations head (10) toe (1) contusion/abrasion back of head (1) lower back (1) fracture of ribs (1) puncture of buttocks (1) <u>SEVERITY</u> 2 (1) 3 (3) 4 (9) 5 (2)	<u>DISPOSITION</u> treated + released (14) hospitalized 1 day (1)

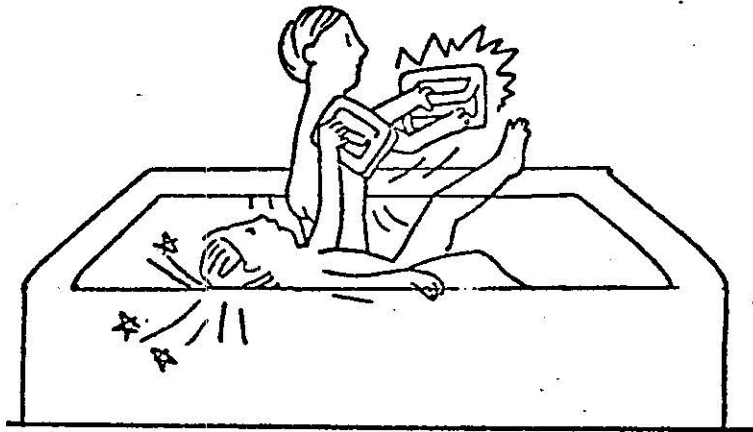
ENVIRONMENT DESCRIPTION

	turning while standing (1) leaving tub (3) stepped on soap (2) reached down to pick up soap (1) climbed over side (1) opened bathroom door (1) ng (1)				
<u>DAYWEEK</u> Monday (1) Tuesday (2) Wednesday (2) Thursday (3) Friday (3) Saturday (4) <u>PHYSICAL</u> Tub/tub shower (10) porcelain over cast iron 4'x4' (1) old fashioned tub w/ feet (1) plastic tub/shower (1) Standard Mfg (1) Gerber Bathtub (1) <u>AGETUB</u> 0 - 3 yrs (3) 7 - 10 yrs (2) over 5 yrs (1) over 10 yrs (1) over 20 yrs (1) ng (7)	<u>AREA</u> in tub (12) on edge of tub (2) inside + outside tub (1) <u>PREPROD</u> soap in tub (4) ng (11) <u>LIQUID</u> water in tub (6) tub wet + empty (3) shower running in tub (2) ng (4) <u>SAFETY</u> bathmat (2) bathmat + non slip surface (1) non slip surface + handrail (1) handrail (1) ng (10)	<u>CRIT PROD</u> slippery tub bottom (10) soap in tub (5) <u>ADDITIONAL</u> bubble bath present (1) soap water in tub (1) porcelain very slippery (1) protruding faucet (1) ng (11)	<u>ENERGY</u> faucets (8) soap dish/handrail (4) drain hole (1) chrome towel rack (1) counter top (1) <u>POSTPROD</u> drain hole uncovered (1) slick tub bottom + linoleum floor (1) ng (13)		

USER DESCRIPTION						
ENVIRONMENT DESCRIPTION	Almost half of the persons involved were children under 10 (8). The rest were between 10 and 83 years old. All were in normal health. All the cases took place in the tub-tub/shower environment.	The goal of the persons was all related to bathing (all children under 10) or showering (predominantly adults). Almost half of the children were being attended by parent (3 of 7). All of the people were in animated motion previous to the critical incident; Standing in tub, leaning over, turning (2), rising up in tub (5), entering - leaving tub (4), stepping in tub (2), and other (2). All the victims were in the tub (12), on edge of tub (2), in transition (1). In (4) cases, soap was involved. In all cases, the tub was wet. It is surprising that in a number of bathtubs there were safety features installed (5 of 15)	All of the people slipped or lost their balance A slippery tub bottom was involved in (10) cases, + soap-soapy liquid (5).	All the victims fell: most downward (11), sideward (1), forward (1), backward (1). The children in falling hit the bathtub accessories within their fall-line: faucets (5), spigot (1), soap dish (1). The adults because their range of fall is greater, fell against a various accessories.	All the children (7) hit their head on an accessory causing a laceration. The adults, however, were injured on the head (4) or midsection or buttocks (3) in a variety of ways. One adult lacerated his toe in the drain (1). The severity according to the NEISS index peaked at severity 4 (9), only (2) were rated as 5.	For the most part, the victims were treated and released in the same day (14). Only one required hospitalization for one day only.

SCENARIO 17

FREQUENCY 7



FIXTURE FAILURES UNDER LOAD (OTHER THAN DOOR FRAMES AND GLASS)

Accident evolution, it has been noted, is sequential in character. Intervention strategies may be applied at various points in the sequence, to prevent initiation or once the initiation of the sequence has begun to change or eliminate the next step, or reduce or eliminate the consequences.

Normal user activities and user self-developed accident prevention strategies involve expectations of performance by products.

In seven case studies, fixtures in use did not perform to normal expectation standards, some directly injured the user while others failed to stop an accident sequence, or actually precipitated a sequence.

The unique character of these patterns suggested their formation into a separate scenario.

SCENARIO 17

FREQUENCY 7

FIXTURE FAILURES UNDER LOAD (OTHER THAN DOOR FRAMES AND GLASS)

USER DESCRIPTION

ACCIDENT SETTING FACTORS	PRECITICAL INCIDENT FACTORS	CRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT FACTORS	POSTCRITICAL INCIDENT CONSEQUENCES	INCIDENT RECOVERY CONSEQUENCES
<u>AGE</u> 5 - 9 yrs (2) 10 - 19 yrs (4) 25 - 44 yrs (1)	<u>UPSETTIED</u> tired (1) ng (6)	<u>CRITUSER</u> user cut (2) lose balance (2) slip and lose balance (1) other (trip and fall included) (1) ng (1)	<u>POSTA</u> falling down (3) falling backwards (1) ng (3)	<u>FIRSTDIAG/FIRSTBODY</u> laceration head (1) hand (3) ankle (1) toe (1) concussion (1)	<u>DISPOSITION</u> treated and released (6) hospitalized for 1 - 5 days (1)
<u>SEX</u> males (4) females (3)	<u>HISTORY</u> history (1) ng (6)			<u>SEVERITY</u> 2 (5) 4 (1) 6 (1)	
<u>RACE</u> white (6) ng (1)	<u>GCAL</u> shower (2) cleaning walls (2) leaving tub (1) entering bathroom (1) playing (1)				
	<u>PRECRI B</u> showering (2) opened bathroom door (1) tightly gripped to turn off complete (1) grasped soap dish (1) leaned on drain handle (1) placed second foot on bathroom rug (1)				

ENVIRONMENT DESCRIPTION

DAYWEEK
Monday (4)
Wednesday (2)
Thursday (1)

PHYSICAL
tub or tub shower (5)
standard mfg. (1)
ng (1)

AGETUB
4 - 6 yrs (1)
7 - 10 yrs (1)
10+ yrs (2)
ng (3)

AREA
in tub (5)
bathroom entrance (1)
ng (1)

PREPRODUCT
soap dish (3)
towel rack (1)
bathroom door (1)
faucet (1)
drain handle (1)

LIQUID
shower water running
in tub (2)
tub or stall empty
and dry (2)
tub draining (1)
ng (2)

CRITPRODUCT
faucets (1)
slippery tub bottom (1)
bath room door broke (1)
soap dish broke (2)
soap dish came off
wall (1)
towel rack broke
and fell on floor (1)

ADDITIONAL
fell off hinges (1)
ng (6)

ENERGY
faucets (and hard-
ware relating to
faucets) (2)
tub side, edge, rim (1)
tub back (1)
soap dish/hand rail (1)
falling soap dish (1)
towel rack (1)

USER DESCRIPTION

ENVIRONMENT DESCRIPTION

Victims range from 5 to 44 years of age with a pre-dominance of (4 of 7) in the 10 - 19 age group.	In all cases the victim is interacting with a product bathroom door + tub (1) faucet (1) drain handle (1) towel rack (1) soap dish (3)	Loses balance due to door coming off turns off faucet lifts self by handle towel rack falls (1) raise by soap dish (2) leaning on soap dish	hits head on tub faucet breaks handle breaks towel rack breaks (a) back of head against back of tub (b) dish breaks	scalp lacerations and knocked unconscious cut hand cut hand lacerates foot concussion lacerates hand Severity levels: 2 (5) 6 (1) 4 (1)	In six cases the victims were treated and release while one case required hospitalization for one to five days.
6 cases immediately involved the bathtub or tub shower area while the seventh either involved the sink area or the shower.	In the case of a glued on fixture falling off, it was reported that a companion fixture had come off recently revealing that only one third of the surface area had had glue initially applied to it.	Cases involved bathroom doors, faucets, drain handle, towel rack and soap dish.	Cases involved tub (2) breakages (5).		

Other Cases

Frequency 4

Those cases which lay outside the seventeen scenarios constructed were of a unique type. The narrative of these cases is reproduced below:

1. Mother was bathing 2 year old male child in apartment bathtub. She left to take cookies out of oven. She returned almost immediately. Child was in a dazed condition and anoxic. Taken to Holyoke Hospital by police cruiser. No bruises on head or body. No water in lungs. Child was treated and released.

Youngster was observed on day of interview. He appeared to be a normal, healthy, active child.

2. Victim's mother stated the accident was the fault of her 2 year old son. She said he was standing on the bathroom floor on the outside of the tub. She said he first dove into the pool, headfirst. She said her other sons do this and he was just imitating them. When he dove in, his chin hit the bottom of the tub, causing a laceration to the chin which required five stitches to close.

3. Female victim, four years old, was taking a shower in a combination bathtub/shower equipped with a Rubbermaid Safety Grip Bath Mat. She reached forward and either slipped or lost her balance, striking a plastic bottle of bath oil which was standing uncapped in bathtub. It is unknown whether rubber mat contributed to accident. Victim could have stepped off of mat prior to slipping (she was reaching for water valves), or she may not have slipped at all, merely losing her balance instead. Also, possible is the case where the mat itself may have slipped (the rubber suction cups were small [1/4" diameter] and worn; and the surface was rough with hard-water deposits. In addition, the mat surface [on which the user stands] was slippery).

Victim fell backwards, striking bottle (which has since been destroyed) and sustaining 1" cut to lower back. Bottle was plastic and did not break. Victim has no history of balance difficulties. Five stitches were taken to close wound.

4. John, four years old, 3'5" - 42 lbs., had just finished eating at 4:45 PM and was told to take a bath and prepare himself for bed. Mrs. D stated that John had been very active that day and she hoped the bath would calm him down. About 5:00 PM, Mrs. D said John came out of the bathroom with blood pouring down his leg. When questioned about what happened to him, John said one of the toy animals he was playing with in the tub had bit him. The tub is the old fashioned type, about 46" long and 25" deep, being half full when John took his bath. Naturally, Mrs. D said she did not believe John and it wasn't until she emptied out the bath water that she saw her hair mirror broken.

John said he did not realize he had broken the mirror (4" x 4") because of the bubble bath he used. He could not see the broken mirror. Mr. D applied a bandage about 5:05 PM and when the bleeding didn't stop they took John to the Chester County Hospital with a cut about 1 1/2" long where he received six sutures and was released.

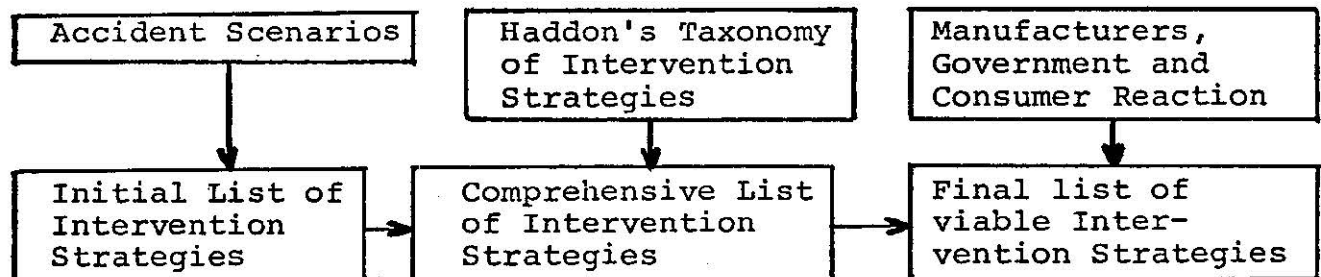
John had no physical disabilities.

3.0 INTERVENTION STRATEGIES

3.1 Approach

As described in the previous section, seventeen accident scenarios were developed by the project team which represented all the major factors associated with bathtub and shower accidents and the way these factors are commonly grouped to form the "accident chain" or scenario. Identification of these basic accident scenarios was necessary in order to proceed to the development of accident prevention measures, or intervention strategies. An intervention strategy may intervene at any point in an accident scenario from the setting to post-critical incident, to prevent an injury from occurring or to minimize the injury. The task of the project team thus became the examination of each component of the accident scenarios for a means to avert injury.

A series of lists of intervention strategies were developed during this phase of the study, as is shown in the following diagram:



The initial list referred to in the diagram was produced in conjunction with the accident scenarios and is responsive to the six parts of the scenarios: accident setting factors, pre-critical incident factors, critical incident factors, postcritical incident consequences, and incident recovery consequences. In this initial list, intervention strategies were specified in one or two sentences, and it was discovered that certain strategies tended to reappear in most of the scenarios. The inter-

vention strategies which would later be singled out for closer study were those which reappeared in this way. Prominent among these strategies were those relating to supervision of children in the bathtub, increasing the coefficient of friction on tub edges and bottom, providing for maintenance of balance (generally through the use of handholds), and anti-scald devices.

The primary result of this initial generation of intervention strategies was that it became apparent that a wide range of measures existed for examination, ranging from changing the design of bathtubs and showers or changing the materials from which they are constructed to designing retrofit products and educating users. Clearly a comprehensive framework was needed with which to examine all these possibilities and within which the intervention strategies might be classified. Examination of the literature showed that one such taxonomy had been developed by Dr. William Haddon¹, and this taxonomy was adapted to the problem of bathtub injuries. The result of working with this classification method was that the team was able to generate a comprehensive list of 436 intervention strategies. Haddon's system is based upon the consideration of an accident scenario as a system where damaging transfer of energy occurs, and intervention strategies thus focus on prevention of this energy transfer. The system of intervention strategies may be summarized as follows:

I. Prevent the initial marshalling of the form of energy

A measure such as nuclear disarmament exemplifies this intervention strategy, which aims at making the environment such that an injury cannot occur because the potential source of damaging energy is not present. The intervention strategies developed for the bathtub in this category included user alternatives to bathing, bathing without water or soap, or bathing without hot water. A number of strategies were proposed to reduce the potential energy of the user, such as

¹William Haddon, Jr., M. D., "Energy Damage and the Ten Countermeasure Strategies," The Journal of Trauma, Vol. 13, No. 4, pp. 321-331, 1973.

designing the bathtub such that the user sits, thus eliminating the possibility of falling from a standing position. The purpose of generating ideas as unconventional as bathing without soap was to thoroughly reexamine the bathing process, so that truly innovative concepts would emerge. For that reason, certain of the intervention strategies are less immediately practical than others; however, these strategies suggest guidelines for future means of making the bathing process safer.

II. Reduce the amount of energy marshalled

This strategy resembles the first one in principle. In bathroom situations in which the marshalling of energy is essential for functional purposes, this strategy of limiting the amount of energy may be applied. For example, although a user might not choose to eliminate hot water entirely, bathing in lukewarm or mildly hot water might be an acceptable and safer substitute.

III. Prevent the release of energy

This principle covers a multitude of intervention strategies. The presence of a responsible attendant will prevent most drownings and burnings of children. Handholds will often prevent slips and falls for users of all ages, and increased friction of bathtub surfaces will also help prevent this release of energy.

IV. Modify the rate or spatial distribution of the release of energy from its source

By modifying the rate or spatial distribution of energy release, the potential for injury will be reduced. For example, construction of protruding fittings from a resilient material would also serve to reduce injuries. Alteration of the shower stream in terms of temperature, volume, or stream shape could serve to minimize possible scalding.