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17.1   INTRODUCTION

Consumer products may contain toxic or potentially toxic chemical constituents to which children may be exposed as a result of their use. For example, household cleaners can contain ammonia, alcohols, acids, and/or organic solvents which may pose health concerns. Potential routes of exposure to consumer products or chemicals released from consumer products during use include ingestion, inhalation, and dermal contact. Children can be in environments where adults use household consumer products such as cleaners, solvents, and paints. As such, children can be passively exposed to chemicals in these products. Since children spend a large amount of time indoors, the use of household chemicals in the indoor environment can be a principal source of exposure (Franklin, 2008).

Very little information is available on the exact way the different kinds of products are used by consumers, including the many ways in which these products are handled, the frequency and duration of contact, and the measures consumers may take to minimize exposure/risk (Steenbekkers, 2001). In addition, the factors that influence these behaviors are not well studied, but some studies have shown there is a large variation in behavior between persons (Steenbekkers, 2001). This chapter presents available information on the amounts, frequency, and duration of use for various consumer products found in typical households.

The studies presented in the following sections represent readily available surveys from which data were collected on the frequency and duration of use and amount of use of cleaning products, household solvent products, cosmetic and other personal care products, and pesticides. For a more detailed presentation of data on the use of consumer products among the general population, the reader is referred to the *Exposure Factors Handbook* (U.S. EPA, 1997).

The National Library of Medicine Household Products Database is a consumer guide that provides information on the potential health effects of chemicals contained in more than 7,000 common household products used inside and around the home. Although, this database does not provide exposure factor information, it contains information on chemical ingredients and their percentages in consumer products, which products contain specific chemical ingredients, acute and chronic effects of chemical ingredients, and manufacturer information. These data could be useful when conducting an exposure assessment for a specific chemical/active ingredient. The product categories are: auto products, inside the home, pesticides, landscape/yard, personal care, home maintenance, arts and crafts, pet care, and home office. The database can be searched by product name, product type, manufacturer, and ingredient. This database can be found at http://hpd.nlm.nih.gov. Table 17-1 provides a list of household consumer products found in some U.S. households (U.S. EPA, 1987). It should be noted, however, that this list was compiled by U.S. EPA in 1987 and consumer use of some products listed may have changed (e.g., aerosol product use has declined). Therefore, the reader is referred to the National Library of Medicine database as a source of more current information.

The U.S. EPA Source Ranking Database (SRD) is another source of information on consumer products, but does not provide exposure factor data. SRD can be used to perform systematic screening-level reviews of more than 12,000 potential indoor pollution sources to identify high-priority product and material categories for further evaluation. It also can be used to identify products that contain a specific chemical. Information on the SRD can be found at: http://www.epa.gov/oppt/exposure/pubs/srd.htm.

The Soaps and Detergents Association (SDA) developed a peer-reviewed document that presents methodologies and specific exposure information that can be used for screening-level risk assessments from exposures to high production volume chemicals. The document addresses the use of consumer products, including laundry, cleaning, and personal care products. It includes data for daily frequency of use, and amount of product used. The data used were compiled from a number of sources including, the *Exposure Factors Handbook* (U.S. EPA, 1997), cosmetic associations, and data from the SDA. The document entitled "Exposure and Risk Screening Methods for Consumer Product Ingredients" can be found on the SDA website under: http://www.cleaning101.com/files/Exposure_and_ Risk_Screening_Methods_for_Consumer_Product_ Ingredients.pdf.

17.2   RECOMMENDATIONS

Due to the large range and variation among consumer products and their exposure pathways, it is not feasible to recommend specific exposure values as has been done in other chapters of this handbook. The user is referred to the contents/references of this chapter and Chapter 17 of the *Exposure Factors Handbook* (U.S. EPA, 1997) to derive appropriate exposure factors. The following sections of this chapter provide summaries of data from surveys involving the use of consumer products.

17.3   CONSUMER PRODUCTS USE STUDIES

17.3.1   CTFA, 1983 - Cosmetic, Toiletry, and Fragrance Association, Inc. - Summary of Results of Surveys of the Amount and Frequency of Use of Cosmetic Products by Women

The Cosmetic, Toiletry, and Fragrance Association Inc. (CTFA, 1983), a major manufacturer and a market research bureau, conducted surveys to obtain information on frequency of use of various cosmetic products. Three surveys were conducted to collect data on the frequency of use of various cosmetic products and selected baby products. In the first of these three surveys CTFA (1983) conducted a one-week prospective survey of 47 female employees and relatives of employees between the ages of 13 and 61 years. In the second survey, a cosmetic manufacturer conducted a retrospective survey of 1,129 of its customers. The third survey was conducted by a market research bureau which sampled 19,035 female consumers nationwide over a 9-1/2 month period. Of the 19,035 females interviewed, responses from only 9,684 females were tabulated (CTFA, 1983). The third survey was designed to reflect the sociodemographic (i.e., age, income, etc) characteristics of the entire U.S. population. The respondents in all three surveys were asked to record the number of times they used the various products in a given time period (i.e., a week, a day, a month, or a year).

To obtain the average frequency of use for each cosmetic product, responses were averaged for each product in each survey. Thus, the averages were calculated by adding the reported number of uses per given time period for each product, dividing by the total number of respondents in the survey, and then dividing again by the number of days in the given time

period (CTFA, 1983). The average frequency of use of cosmetic products was determined for both "users" and "non-users." The frequency of use of baby products was determined among "users" only. The upper 90th percentile frequency of use values were determined by eliminating the top ten percent most extreme frequencies of use. Therefore, the highest remaining frequency of use was recorded as the upper 90th percentile value. Table 17-2 presents the amount of product used per application (grams) and the average and 90th percentile frequency of use per day for baby products and various cosmetic products for all the surveys.

An advantage of the frequency data obtained from the third survey (market research bureau) is that the sample population was more likely to be representative of the U.S. population. Another advantage of the third dataset is that the survey was conducted over a longer period of time when compared with the other two frequency datasets. Also, the study provided empirical data which will be useful in generating more accurate estimates of consumer exposure to cosmetic products. In contrast to the large market research bureau survey, the CTFA employee survey is very small and both that survey and the cosmetic company survey are likely to be biased toward high end users. Therefore, data from these two surveys should be used with caution. While the data in this study were not tabulated by age of the population, the study included some individuals in the age groups of interest for this handbook.

17.3.2   U.S. EPA, 1996 - National Human Activity Pattern Survey (NHAPS)

U.S. EPA (1996) collected data on the duration and frequency of selected activities and the time spent in selected microenvironments via 24-hour diaries as part of the National Human Activity Pattern Survey (NHAPS). More than 9,000 individuals from various age groups in 48 contiguous states participated in NHAPS. Children represented approximately 2,000 of the respondents (499 respondents under 5 years of age; 703 respondents between 5 and 11 years; 589 respondents between 12 and 17 years; and 799 respondents between 18 and 24 years). The survey was conducted between October 1992 and September 1994. Individuals were interviewed to categorize their 24-hour routines (diaries) and/or to answer follow-up

questions that were related to exposure events. For children under 10 years of age, adult members of the households gave proxy interviews. Demographic, including socioeconomic (gender, age, race, education, etc.), geographic (census region, state, etc.), and temporal (day of week, month, season) data were included in the study. Data were collected for a maximum of 82 possible microenvironments and 91 different activities.

As part of the survey, data were also collected on duration and frequency of use of selected consumer products. Tables 17-3 through 17-10 present data on the number of minutes that survey respondents spent in activities working with or being near certain consumer products, including: freshly applied paints; household cleaning agents such as scouring powders or ammonia; floor wax, furniture wax, or shoe polish; glue; solvents, fumes, or strong smelling chemicals; stain or spot removers; gasoline, diesel-powered equipment, or automobiles; and pesticides, bug sprays, or bug strips. These data are presented according to the age categories used in NHAPS (1 to 4 years, 5 to11 years, 12 to17 years, and 18 to 64 years). Table 17-11 through 17-15 present data on the number of respondents in these age categories that used fragrances, aerosol sprays, pesticides (professionally-applied and consumer-applied), and humidifiers. Because the age categories used by the study authors did not coincide with the standardized age categories recommended in U.S. EPA (2005) and used elsewhere in this handbook, the source data from NHAPS on pesticide use (professionally applied and consumer-applied) were re-analyzed by U.S. EPA to generate data for the standardized age categories. These data are presented in Tables 17-16 and 17-17 for age groups less than 1 year, 1 to <2 years, 2 to <3 years, 3 to <6 years, 6 to <11 years, 11 to <16 years, and 16 to <21 years. Data for subsets of the first year of life (e.g., 1 to 2 months, 3 to 5 months, etc.) were not available.

As discussed in previous chapters of this handbook that used NHAPS as a data source, the primary advantage of NHAPS is that the data were collected for a large number of individuals and the survey was designed to be representative of the U.S. general population. However, due to the wording of questions in the survey, precise data were not available for consumers who spent more than 60 or 120 minutes (depending on the activity) using some consumer products. This prevents accurate characterization of the high end of the distribution and may also introduce error into the calculation of the mean.

17.3.3 Bass et al., 2001 - What's Being Used at Home: A Household Pesticide Survey

Bass et al. (2001) conducted a survey to assess the use of pesticide products in homes with children in March 1999. The study obtained information on what pesticides were used, where they were used, and how frequently they were used. A total of 107 households in Arizona that had a least one child less than ten years of age in the household, and had used a pesticide within the last six months, were surveyed (Bass et al., 2001). The survey population was predominantly female Hispanic and represented a survey response rate of approximately 74 percent. Study participants were selected by systematic random sampling. Among the households sampled, 3 percent had one child less than 10 years old, 42 percent had two children less than 10 years old, and 23 percent had three to five children in this age bracket. Pesticide use was assessed by a one-on-one interview in the home. Survey questions pertained to household pesticides used inside the house for insect control and outside the house for the control of weeds in the garden and to repel animals from the garden. As part of the interview, information was gathered on the frequency of use.

Table 17-18 presents information on the type, characteristics, and frequency of pesticide use, as well as information on the demographics of the survey population. A total of 148 pesticide products were used in the 107 households surveyed. Respondents had used pesticides in the kitchen, bathroom, floors, baseboards, and cabinets with dishes or cookware. The frequency of use data showed the following: 13.5 percent of the households used pesticides more than once per week; 18.2 percent used the products once per week; 28.4 percent used the products once per month; 15.5 percent used the products once in three months; 10.8 percent used the products once in six months; and 8.8 percent used the products once per year (Bass et al., 2001).

Although this study was limited to a selected area in Arizona, it provides useful information on the frequency of use of pesticides among households with children. This may be useful for populations in similar geographical locations where site-specific data are not

available. However, these data are the result of a community-based survey and are not representative of the U.S. general population.

17.3.4 Loretz et al., 2005 - Exposure Data for Cosmetic Products: Lipstick, Body Lotion, and Face Cream

Loretz et al. (2005) conducted a nationwide survey to estimate the usage (i.e., frequency of application and amount used per application) of lipstick, body lotion, and face cream. The study was conducted from April to June 2000. Three hundred and sixty study subjects were recruited in ten U.S. cities (Atlanta, Georgia; Boston, Massachusetts; Chicago, Illinois; Denver, Colorado; Houston, Texas; Minneapolis, Minnesota; St. Louis, Missouri; San Bernadino, California; Tampa, Florida; and Seattle, Washington). The survey participants were women, ages 19-65 years, who regularly used the products of interest. Typical cosmetic formulations of the three product types were weighed and provided to the women for use over a two-week period. Subjects recorded information on product usage (e.g., whether the product was used, number of applications, time of applications) on a daily basis in a diary provided to them. At the end of the two-week period, unused portions of product were returned and weighed. The amount of product used was estimated as the difference between the weight of product at the beginning and end of the survey period. Of the 360 subjects recruited, 86.4 percent, 83.3 percent, and 85.6 percent completed the study and returned the diaries for lipstick, body lotion, and face cream, respectively (Loretz et al., 2005).

The survey data are presented in Table 17-19 and 17-20. Table 17-19 provides the mean, median, and standard deviations for the frequency of use. Table 17-20 provides distribution data for the total amount applied, the average amount applied per use day, and the average amount applied per application.

An advantage of this study is that the survey population covered a diverse geographical area of the U.S. and was not based on recall data. A limitation of the study is that the short duration (two weeks) may not accurately reflect long-term usage patterns. Another limitation is that the study only included women who already used the products; therefore, the usage patterns are not representative of the entire

female population. Also, the data are not presented by age group, but the study does provide information on a population that includes the ages of interest for this document. Data for children could not be separated from that of the rest of the survey population.

17.3.5 Loretz et al., 2006 - Exposure Data for Personal Care Products: Hairspray, Spray Perfume, Liquid Foundation, Shampoo, Body Wash, and Solid Antiperspirant

Loretz et al. (2006) conducted a nationwide survey to determine the usage (i.e., frequency of use and amount used) of hairspray, spray perfume, liquid foundation, shampoo, body wash, and solid antiperspirant. The survey was similar to that described by Loretz et al. (2005). This study was conducted between October 2001 and October 2002. A total of 360 women were recruited from ten U.S. cities (Atlanta, Georgia; Boston, Massachusetts; Chicago, Illinois; Denver, Colorado; Houston, Texas; Minneapolis, Minnesota; St. Louis, Missouri; San Bernadino, California; Tampa, Florida; and Seattle, Washington). The survey participants were women, ages 19-65 years old, who regularly used the test products. Subjects kept daily records on product usage (whether the product was used, number of applications, time of applications) in a diary. For spray perfume, liquid foundation, and body wash, subjects recorded the body area(s) where these products were applied. For shampoo, subjects recorded information on their hair type (length, thickness, oiliness, straight or curly, and color treated or not). At the end of the two week period, unused portions of products were returned and weighed. Of the 360 subjects recruited per product, the study was completed by 329 participants for hairspray, 327 for spray perfume, 326 for liquid foundation, and 340 participants for shampoo, body wash, and solid antiperspirant.

The survey data are presented in Tables 17-21 through 17-23. Table 17-21 provides the minimum, maximum, mean, and standard deviations for the frequency of use. Table 17-22 provides percentile values for the amount of product applied per application. Table 17-23 provides distribution data for the amount applied per use day.

An advantage of this study is that the survey population covered a diverse geographical range of the U.S. and did not rely on recall data. A limitation of

the study is that the short duration (two weeks) may not accurately reflect long-term usage patterns. Another limitation is that the study only included women who already used these products; therefore, the usage patterns are not entirely representative of the entire female population. Also, the data are not presented by age group, but the study does provide information on a population that includes the ages of interest for this document. Data for children could not be separated from that of the rest of the survey population.

17.3.6 Loretz et al., 2008 - Exposure Data for Cosmetic Products: Facial Cleanser, Hair Conditioner, and Eye Shadow

Loretz et al. (2008) used the data from a study conducted in January 2005 to estimate frequency of use and usage amount for facial cleanser, hair conditioner, and eye shadow. The study was conducted in a similar manner as Loretz et al. (2005; 2006). A total of 360 women, ages 18 to 69 years of age, were recruited by telephone to provide diary records of product use over a two-week period. The study subjects were representative of four U.S. Census regions (Northeast, Midwest, South, and West). A total of 295, 297, and 299 completed the study for facial cleanser, hair conditioner, and eye shadow, respectively.

The participants recorded daily in a diary whether the product was used that day, the number of applications, and the time of application(s) over a two-week period. Products were weighed at the start and completion of the study to determine the amount used. A statistical analysis of the data was conducted to provide summary distributions of use patterns, including number of applications, amount used per day, and amount of product used per application for each product. Data on the number of applications per day are provided in Table 17-24. The average amounts of product applied per use day are shown in Table 17-25, and the average amounts of product applied per application are shown in Table 17-26.

The advantages of this study are that it is representative of the U.S. female population for users of the products studied, it provides data for frequency of use and amount used, and it provides distribution data. The limitations of the study are that the data were not provided by age group, but included ages in the study group that are relevant for this handbook. In addition, the participants were regular users of the product, so the amount applied and the frequency of use may be higher than for other individuals who may use the products. According to Loretz et al. (2008) "variability in amount used by the different subjects is high, but consistent with the data from other cosmetic and personal care studies." The authors also noted that it was not clear if the high-end users of products represented true usage.

17.3.7 Sathyanarayana et al., 2008 - Baby Care Products; Possible Sources of Infant Phthalate Exposure

Sathyanarayana et al. (2008) investigated dermal exposure to phthalates via the dermal application of personal care products. The study was conducted on 163 infants born between the year 2000 and 2005. The products studied were baby lotion, baby powder, baby shampoo, diaper cream, and baby wipes. Infants were recruited through Future Families, a multicenter pregnancy cohort study, at prenatal clinics in Los Angeles, California; Minneapolis, Minnesota; and Columbia, Missouri. Although the study was designed to assess exposure to phthalates, the authors collected information on the percentage of the total participants that used the baby products. Data were collected from questionnaire responses of the mothers and at study visits. The characteristics and the percent of the population using the studied baby products are shown in Table 17-27. Of the 163 infants studied, 94 percent of the participants used baby wipes and 54 percent used infant shampoo.

The advantages of this study are that it specifically targeted consumer products used by children. The percent of the study population using these products was captured and the data were collected from a diverse ethnic population. The limitations are that these data may not be entirely representative of the U.S. population because the study population was from only three states and the sample size was small.

17.4 REFERENCES FOR CHAPTER 17

Bass, J.; Ortega, L.; Rosales, C.; Petersen, N., Philen, R. (2001) What's being used at home: a household pesticide survey. Pub Health 9(3):138-144.

Cosmetic, Toiletry and Fragrance Association (CTFA). (1983) Summary of the results of surveys of the amount and frequency of use of cosmetic products by women. Prepared by Environ Corporation, Washington, DC for CTFA Inc., Washington, DC.

Franklin, P. (2008) Household chemicals: good housekeeping or occupational hazard. Eur Respir J 31:489-491.

Loretz, L.; Api, A.; Barraj, L.; Burdick, J.; Dressler, W.; Gettings, S.; Hsu, H.; Pan, Y.; Re, T.; Renskers, K.; Rothenstein, A.; Scrafford, C.; Sewall, C. (2005) Exposure data for cosmetic products: lipstick, body lotion, and face cream. Food Chem Toxicol 43:279-291.

Loretz, L.; Api, A.; Barraj, L.; Burdick, J.; Davis, D.; Dressler, W.; Gilberti, E.; Jarrett, G.; Mann, S.; Pan, Y.; Re, T.; Renskers, K.; Scrafford, C.; Vater, S. (2006) Exposure data for personal care products: Hairspray, spray perfume, liquid foundation, shampoo, body wash, and solid antiperspirant. Food Chem Toxicol 44:2008-2018.

Loretz, L.; Api, A.; Babcock, L; Barraj, L.; Burdick, J.; Cater, K.; Jarrett, G.; Mann, s.; Pan, Y.; Re, T.; Renskers, K.; Scrafford, C. (2008) Exposure data for cosmetic products: Facial cleanser, hair conditioner, and eye shadow. Food Chem Toxicol 46:1516-1524.

Sathyanarayana, S.; Karr, C.; Lozano, P., Brown, E.; Calafat, M. (2008) Baby care products; possible sources of infant phthalate exposure. Pedriatrics 121:260-268.

Steenbekkers, L.P. (2001) Methods to study everyday use of products un households: The Wageningen mouthing study. Am Occup Hyg 45(1001):125-129.

U.S. EPA (1987) Methods for assessing exposure to chemical substances - Volume 7 - Methods for assessing consumer exposure to chemical substances. Washington, DC: Office of Toxic Substances. EPA/560/5-85/007.

U.S. EPA (1996) Descriptive statistics tables from a detailed analysis of the National Human Activity Pattern Survey (NHAPS) data. Washington, DC: Office of Research and Development. EPA/600/R-96/148.

U.S. EPA (1997) Exposure Factors Handbook. Washington, DC: National Center for Environmental Assessment, Office of Research and Development. EPA/600/P-95/002FC.

U.S. EPA. (2005) Guidance on Selecting Age Groups for Monitoring and Assessing Childhood Exposures to Environmental Contaminants. U.S. Environmental Protection Agency, Washington, DC: EPA/630/P-03/003F.

Table 17-1. Consumer Products Commonly Found in Some U.S. Households[a]	
Consumer Product Category	Consumer Product
Cosmetics Hygiene Products	Adhesive bandages Bath additives (liquid) Bath additives (powder) Cologne/perfume/aftershave Contact lens solutions Deodorant/antiperspirant (aerosol) Deodorant/antiperspirant (wax and liquid) Depilatories Facial makeup Fingernail cosmetics Hair coloring/tinting products Hair conditioning products Hairsprays (aerosol) Lip products Mouthwash/breath freshener Sanitary napkins and pads Shampoo Shaving creams (aerosols) Skin creams (non-drug) Skin oils (non-drug) Soap (toilet bar) Sunscreen/suntan products Talc/body powder (non-drug) Toothpaste Waterless skin cleaners
Household Furnishings	Carpeting Draperies/curtains Rugs (area) Shower curtains Vinyl upholstery, furniture
Garment Conditioning Products	Anti-static spray (aerosol) Leather treatment (liquid and wax) Shoe polish Spray starch (aerosol) Suede cleaner/polish (liquid and aerosol) Textile water-proofing (aerosol)

Table 17-1. Consumer Products Commonly Found in Some U.S. Households[a] (continued)	
Consumer Product Category	Consumer Product
Household Maintenance Products	Adhesive (general) (liquid)
	Bleach (household) (liquid)
	Bleach (see laundry)
	Candles
	Cat box litter
	Charcoal briquets
	Charcoal lighter fluid
	Drain cleaner (liquid and powder)
	Dishwasher detergent (powder)
	Dishwashing liquid
	Fabric dye (DIY)[b]
	Fabric rinse/softener (liquid)
	Fabric rinse/softener (powder)
	Fertilizer (garden) (liquid)
	Fertilizer (garden) (powder)
	Fire extinguishers (aerosol)
	Floor polish/wax (liquid)
	Food packaging and packaged food
	Furniture polish (liquid)
	Furniture polish (aerosol)
	General cleaner/disinfectant (liquid)
	General cleaner (powder)
	General cleaner/disinfectant (aerosol and pump)
	General spot/stain remover (liquid)
	General spot/stain remover (aerosol and pump)
	Herbicide (garden-patio) (liquid and aerosol)
	Insecticide (home and garden) (powder)
	Insecticide (home and garden) (aerosol and pump)
	Insect repellent (liquid and aerosol)
	Laundry detergent/bleach (liquid)
	Laundry detergent (powder)
	Laundry pre-wash/soak (powder)
	Laundry pre-wash/soak (liquid)
	Laundry pre-wash/soak (aerosol and pump)
	Lubricant oil (liquid)
	Lubricant (aerosol)
	Matches
	Metal polish
	Oven cleaner (aerosol)
	Pesticide (home) (solid)
	Pesticide (pet dip) (liquid)
	Pesticide (pet) (powder)
	Pesticide (pet) (aerosol)
	Pesticide (pet) (collar)
	Petroleum fuels (home (liquid and aerosol)
	Rug cleaner/shampoo (liquid and aerosol)
	Rug deodorizer/freshener (powder)
	Room deodorizer (solid)
	Room deodorizer (aerosol)
	Scouring pad
	Toilet bowl cleaner
	Toiler bowl deodorant (solid)
	Water-treating chemicals (swimming pools)

Table 17-1. Consumer Products Commonly Found in Some U.S. Households[a] (continued)	
Consumer Product Category	Consumer Product
Home Building/Improvement Products (DIY)[b]	Adhesives, specialty (liquid)
	Ceiling tile
	Caulks/sealers/fillers
	Dry wall/wall board
	Flooring (vinyl)
	House Paint (interior) (liquid)
	House Paint and Stain (exterior) (liquid)
	Insulation (solid)
	Insulation (foam)
	Paint/varnish removers
	Paint thinner/brush cleaners
	Patching/ceiling plaster
	Roofing
	Refinishing products (polyurethane, varnishes, etc.)
	Spray paints (home) (aerosol)
	Wall paneling
	Wall paper
	Wall paper glue
Automobile-related Products	Antifreeze
	Car polish/wax
	Fuel/lubricant additives
	Gasoline/diesel fuel
	Interior upholstery/components, synthetic
	Motor oil
	Radiator flush/cleaner
	Automotive touch-up paint (aerosol)
	Windshield washer solvents
Personal Materials	Clothes/shoes
	Diapers/vinyl pants
	Jewelry
	Printed material (colorprint, newsprint, photographs)
	Sheets/towels
	Toys (intended to be placed in mouths)

[a]   A subjective listing based on consumer use profiles.
[b]   DIY = Do It Yourself.

Source: U.S. EPA, 1987.

Table 17-2. Amount and Frequency of Use of Various Cosmetic and Baby Products						
Product Type	Amount of Product Per Application[a] (grams)	Average Frequency of Use (per day)			Upper 90th Percentile Frequency of Use (per day)		
		Survey Type			Survey Type		
		CTFA	Cosmetic Co.	Market[b] Research Bureau	CTFA	Cosmetic Co.	Market Research Bureau
Baby Lotion - baby use[c]	1.4	0.38	1.0	–	0.57	2.0	--
Baby Lotion - adult use	1.0	0.22	0.19	0.24[d]	0.86	1.0	1.0[d]
Baby Oil - baby use[c]	1.3	0.14	1.2	–	0.14	3.0	--
Baby Oil - adult use	5.0	0.06	0.13	–	0.29	0.57	--
Baby Powder - baby use[c]	0.8	5.36	1.5	0.35[d]	8.43	3.0	1.0[d]
Baby Powder - adult use	0.8	0.13	0.22	–	0.57	1.0	--
Baby Cream - baby use[c]	–	0.43	1.3	–	0.43	3.0	--
Baby Cream - adult use	–	0.07	0.10	–	0.14	0.14[e]	--
Baby Shampoo - baby use[c]	0.5	0.14	–	0.11[f]	0.14	--	0.43[f]
Baby Shampoo - adult use	5.0	0.02	–	–	0.86[e]	--	--
Bath Oils	14.7	0.08	0.19	0.22[g]	0.29	0.86	1.0[g]
Bath Tablets	–	0.003	0.008	–	0.14[e]	0.14[e]	--
Bath Salts	18.9	0.006	0.013	–	0.14[e]	0.14[e]	--
Bubble Baths	11.8	0.088	0.13	–	0.43	0.57	--
Bath Capsules	–	0.018	0.019	–	0.29[e]	0.14[e]	--
Bath Crystals	–	0.006	–	–	0.29[e]	0.14[e]	--
Eyebrow Pencil	–	0.27	0.49	–	1.0	1.0	--
Eyeliner	–	0.42	0.68	0.27	1.43	1.0	1.0
Eye Shadow	–	0.69	0.78	0.40	1.43	1.0	1.0
Eye Lotion	–	0.094	0.34	–	0.43	1.0	--
Eye Makeup Remover	–	0.29	0.45	–	1.0	1.0	--
Mascara	–	0.79	0.87	0.46	1.29	1.0	1.5
Under Eye Cover	–	0.79	–	–	0.29	--	--
Blusher & Rouge	0.011	1.18	1.24	0.55	2.0	1.43	1.5
Face Powders	0.085	0.35	0.67	0.33	1.29	1.0	1.0
Foundations	0.265	0.46	0.78	0.47	1.0	1.0	1.5
Leg and Body Paints	–	0.003	0.011	–	0.14[e]	0.14[e]	--
Lipstick & Lip Gloss	–	1.73	1.23	2.62	4.0	2.86	6.0
Makeup Bases	0.13	0.24	0.64	–	0.86	1.0	--
Makeup Fixatives	–	0.052	0.12	–	0.14	1.0	--
Sunscreen	3.18	0.003	–	0.002	0.14[e]	–	0.005
Colognes & Toilet Water	0.65	0.68	0.85	0.56	1.71	1.43	1.5
Perfumes	0.23	0.29	0.26	0.38	0.86	1.0	1.5

Product Type	Amount of Product Per Application[a] (grams)	Average Frequency of Use (per day)			Upper 90th Percentile Frequency of Use (per day)		
		Survey Type			Survey Type		
		CTFA	Cosmetic Co.	Market[b] Research Bureau	CTFA	Cosmetic Co.	Market Research Bureau
Powders	2.01	0.18	0.39	–	1.0	1.0	--
Sachets	0.2	0.0061	0.034	–	0.14[e]	0.14[e]	--
Fragrance Lotion	–	0.0061	--	--	0.29[e]	–	--
Hair Conditioners	12.4	0.4	0.40	0.27	1.0	1.0	0.86
Hair Sprays	–	0.25	0.55	0.32	1.0	1.0	1.0
Hair Rinses	12.7	0.064	0.18	–	0.29	1.0	--
Shampoos	16.4	0.82	0.59	0.48	1.0	1.0	1.0
Tonics and Dressings	2.85	0.073	0.021	–	0.29	0.14[e]	--
Wave Sets	2.6	0.003[h]	0.040	--	--[h]	0.14	--
Dentifrices	–	1.62	0.67	2.12	2.6	2.0	4.0
Mouthwashes	–	0.42	0.62	0.58	1.86	1.14	1.5
Breath Fresheners	–	0.052	0.43	0.46	0.14	1.0	0.57
Nail Basecoats	0.23	0.052	0.13	–	0.29	0.29	--
Cuticle Softeners	0.66	0.040	0.10	–	0.14	0.29	--
Nail Creams & Lotions	0.56	0.070	0.14	–	0.29	0.43	--
Nail Extenders	–	0.003	0.013	--	0.14[e]	0.14[e]	--
Nail Polish & Enamel	0.28	0.16	0.20	0.07	0.71	0.43	1.0
Nail Polish & Enamel Remover	3.06	0.088	0.19	–	0.29	0.43	--
Nail Undercoats	–	0.049	0.12	–	0.14	0.29	--
Bath Soaps	2.6	1.53	0.95	–	3.0	1.43	--
Underarm Deodorants	0.52	1.01	0.80	1.10	1.29	1.29	2.0
Douches	–	0.013	0.089	0.085	0.14[e]	0.29	0.29
Feminine Hygiene Deodorants	–	0.021	0.084	0.05	1.0[e]	0.29	0.14
Cleansing Products (cold creams, cleansing lotions liquids & pads)	1.7	0.63	0.80	0.54	1.71	2.0	1.5
Depilatories	–	0.0061	0.051	0.009	0.016	0.14	0.033
Face, Body & Hand Preps (excluding shaving preps)	3.5	0.65	–	1.12	2.0	–	2.14
Foot Powder & Sprays	–	0.061	0.079	--	0.57[e]	0.29	--
Hormones	–	0.012	0.028	--	0.57[e]	0.14[e]	--
Moisturizers	0.53	0.98	0.88	0.63	2.0	1.71	1.5
Night Skin Care Products	1.33	0.18	0.50	–	1.0	1.0	–

Table 17-2. Amount and Frequency of Use of Various Cosmetic and Baby Products (ontinued)

Table 17-2. Amount and Frequency of Use of Various Cosmetic and Baby Products (continued)							
Product Type	Amount of Product Per Application[a] (g)	Average Frequency of Use (per day)			Upper 90th Percentile Frequency of Use (per day)		
		Survey Type			Survey Type		
		CTFA	Cosmetic Co.	Market[b] Research Bureau	CTFA	Cosmetic Co.	Market Research Bureau
Paste Masks (mud packs)	3.7	0.027	0.20	–	0.14	0.43	--
Skin Lighteners	--	–	0.024	–	–[d]	0.14[d]	--
Skin Fresheners & Astringents	2.0	0.33	0.56	–	1.0	1.43	--
Wrinkle Smoothers (removers)	0.38	0.021	0.15	–	1.0[d]	1.0	--
Facial Cream	0.55	0.0061	–	–	0.0061	–	--
Permanent Wave	101	0.003	–	0.001	0.0082	–	0.005
Hair Straighteners	0.156	0.0007	–	--	0.005[d]	–	--
Hair Dye	--	0.001	–	0.005	0.004[d]	–	0.014
Hair Lighteners	--	0.0003	–	–	0.005[d]	–	--
Hair Bleaches	--	0.0005	–	–	0.02[d]	–	--
Hair Tints	–	0.0001	–	–	0.005[d]	–	--
Hair Rinse (coloring)	–	0.0004	–	–	0.02[d]	–	--
Shampoo (coloring)	–	0.0005	–	–	0.02[d]	–	--
Hair Color Spray	--	–	–	–	–[d]	–	--
Shave Cream	1.73	–	–	0.082	--	–	0.36

[a]   Values reported are the averages of the responses reported by the twenty companies interviewed. (--'s) indicate no data available.

[b]   The averages shown for the Market Research Bureau are not true averages - this is due to the fact that in many cases the class of most frequent users were indicated by "1 or more" also ranges were used in many cases, i.e., "10-12." The average, therefore, is underestimated slightly. The "1 or more" designation also skew the 90th percentile figures in many instances. The 90th percentile values may, in actuality, be somewhat higher for many products.

[c]   Average usage among users only for baby products.

[d]   Usage data reflected "entire household" use for both baby lotion and baby oil.

[e]   Fewer than 10% of individuals surveyed used these products. Value listed is lowest frequency among individuals reporting usage. In the case of wave sets, skin lighteners, and hair color spray, none of the individuals surveyed by the CTFA used this product during the period of the study.

[f]   Usage data reflected "entire household" use.

[g]   Usage data reflected total bath product usage.

[h]   None of the individuals surveyed reported using this product.

Source: CTFA, 1983.

Table 17-3. Number of Minutes Spent in Activities Working With or Near Freshly Applied Paints
(minutes/day)

Age Group		Percentiles											
	N	1	2	5	10	25	50	75	90	95	98	99	100
1 to 4 years	7	3	3	3	3	5	15	121	121	121	121	121	121
5 to 11 years	12	5	5	5	15	20	45	120	120	121	121	121	121
12 to 17 years	20	0	0	0.5	3	8	45	75	121	121	121	121	121
18 to 64 years	212	0	0	1	2	11	60	121	121	121	121	121	121

Note: A value of "121" for number of minutes signifies that more than 120 minutes were spent; N = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: U.S. EPA, 1996.

Table 17-4. Number of Minutes Spent in Activities Working With or Near Household Cleaning
Agents Such as Scouring Powders or Ammonia (minutes/day)

Age Group		Percentiles											
	N	1	2	5	10	25	50	75	90	95	98	99	100
1 to 4 years	21	0	0	0	0	5	10	15	20	30	121	121	121
5 to 11 years	26	1	1	2	2	3	5	15	30	30	30	30	30
12 to 17 years	41	0	0	0	0	2	5	10	40	60	60	60	60
18 to 64 years	672	0	0	1	2	5	10	20	60	121	121	121	121

Note: A value of "121" for number of minutes signifies that more than 120 minutes were spent; N = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: U.S. EPA, 1996.

Table 17-5. Number of Minutes Spent in Activities (at home or elsewhere) Working With
or Near Floorwax, Furniture Wax or Shoe Polish (minutes/day)

Age Group		Percentiles											
	N	1	2	5	10	25	50	75	90	95	98	99	100
1 to 4 years	13	0	0	0	5	10	15	20	60	121	121	121	121
5 to 11 years	21	0	0	2	2	3	5	10	35	60	120	120	120
12 to 17 years	15	0	0	0	1	2	10	25	45	121	121	121	121
18 to 64 years	238	0	0	2	3	5	15	30	120	121	121	121	121

Note: A value of "121" for number of minutes signifies that more than 120 minutes were spent; N = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: U.S. EPA, 1996.

Table 17-6. Number of Minutes Spent in Activities Working With or Near Glue (minutes/day)													
						Percentiles							
	N	1	2	5	10	25	50	75	90	95	98	99	100
1 to 4 years	6	0	0	0	0	30	30	30	50	50	50	50	50
5 to 11 years	36	2	2	3	5	5	12.5	25	30	60	120	120	120
12 to 17 years	34	0	0	1	2	5	10	30	30	60	120	120	120
18 to 64 years	207	0	0	0	1	5	20	90	121	121	121	121	121

Note: A value of "121" for number of minutes signifies that more than 120 minutes were spent; N = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: U.S. EPA, 1996.

Table 17-7. Number of Minutes Spent in Activities Working With or Near Solvents, Fumes or Strong Smelling Chemicals (minutes/day)													
Age Group						Percentiles							
	N	1	2	5	10	25	50	75	90	95	98	99	100
1 to 4 years	7	0	0	0	0	1	5	60	121	121	121	121	121
5 to 11 years	16	0	0	0	2	5	5	17.5	45	70	70	70	70
12 to 17 years	38	0	0	0	0	5	10	60	121	121	121	121	121
18 to 64 years	407	0	0	1	2	5	30	121	121	121	121	121	121

Note: A Value of "121" for number of minutes signifies that more than 120 minutes were spent; N = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: U.S. EPA, 1996.

Table 17-8. Number of Minutes Spent in Activities Working With or Near Stain or Spot Removers (minutes/day)													
Age Group						Percentiles							
	N	1	2	5	10	25	50	75	90	95	98	99	100
1 to 4 years	3	0	0	0	0	0	0	3	3	3	3	3	3
5 to 11 years	3	3	3	3	3	3	5	5	5	5	5	5	5
12 to 17 years	7	0	0	0	0	5	15	35	60	60	60	60	60
18 to 64 years	87	0	0	0	0	2	5	15	60	121	121	121	121

Note: A value of "121" for number of minutes signifies that more than 120 minutes were spent; N = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: U.S. EPA, 1996.

Table 17-9. Number of Minutes Spent in Activities Working With or Near Gasoline or Diesel-powered Equipment, Besides Automobiles (minutes/day)													
Age Group		Percentiles											
	N	1	2	5	10	25	50	75	90	95	98	99	100
1 to 4 years	14	0	0	0	1	5	22.5	120	121	121	121	121	121
5 to 11 years	12	1	1	1	3	7.5	25	50	60	60	60	60	60
12 to 17 years	25	2	2	5	5	13	35	120	121	121	121	121	121
18 to 64 years	312	0	0	1	3	15	60	121	121	121	121	121	121

Note: A value of "121" for number of minutes signifies that more than 120 minutes were spent; N = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: U.S. EPA, 1996.

Table 17-10. Number of Minutes Spent in Activities Working With or Near Pesticides, Including Bug Sprays or Bug Strips (minutes/day)													
Age Group		Percentiles											
	N	1	2	5	10	25	50	75	90	95	98	99	100
1 to 4 years	6	1	1	1	1	3	10	15	20	20	20	20	20
5 to 11 years	16	0	0	0	0	1.5	7.5	30	121	121	121	121	121
12 to 17 years	10	0	0	0	0	2	2.5	40	121	121	121	121	121
18 to 64 years	190	0	0	0	1	2	10	88	121	121	121	121	121

Note: A value of "121" for number of minutes signifies that more than 120 minutes were spent; N = doer sample size; percentiles are the percentage of doers below or equal to a given number of minutes.

Source: U.S. EPA, 1996.

Table 17-11. Number of Respondents Using Cologne, Perfume, Aftershave or Other Fragrances at Specified Daily Frequencies						
Age Group		Number of Times Used in a Day				
	Total N	1-2	3-5	6-9	10+	Don't Know
5 to 11 years	26	24	2	*	*	*
12 to 17 years	144	133	9	*	1	1
18 to 64 years	1,735	1,635	93	3	1	3

* = Missing Data.
N = Number of respondents.

Source: U.S. EPA, 1996.

Table 17-12. Number of Respondents Using Any Aerosol Spray Product for Personal Care Item Such as Deodorant or Hair Spray at Specified Daily Frequencies											
Age Group	Total N	Number of Times Used in a Day									
		1	2	3	4	5	6	7	10	10+	Don't Know
1 to 4 years	40	30	9	0	0	1	0	0	0	0	0
5 to 11 years	75	57	14	1	1	1	1	0	0	0	0
12 to 17 years	103	53	31	12	4	1	0	0	1	1	0
18 to 64 years	1,071	724	263	39	15	13	1	1	2	8	5

N = Number of respondents..

Source: U.S. EPA, 1996.

Table 17-13. Number of Respondents Using a Humidifier at Home						
Age Group	Total N	Frequency				
		Almost Every Day	3-5 Times a Week	1-2 Times a Week	1-2 Times a Month	Don't Know
1 to 4 years	111	33	16	7	53	2
5 to 11 years	88	18	10	12	46	2
12 to 17 years	83	21	7	5	49	1
18 to 64 years	629	183	77	70	287	12

N = Number of respondents.

Source: U.S. EPA, 1996.

Table 17-14. Number of Respondents Indicating that Pesticides Were Applied by the Professional at Home to Eradicate Insects, Rodents, or Other Pests at Specified Frequencies							
Age Group	Total N	Number of Times Over a 6-month Period Pesticides Were Applied by Professionals					
		None	1-2	3-5	6-9	10+	Don't Know
1 to 4 years	113	60	35	11	6	1	*
5 to 11 years	150	84	37	10	18	1	*
12 to 17 years	143	90	40	5	6	*	2
18 to 64 years	1,264	660	387	89	97	15	16

* = Missing data.
N = Number of respondents.

Source: U.S. EPA, 1996.

Table 17-15. Number of Respondents Reporting Pesticides Applied by the Consumer at Home To Eradicate Insects, Rodents, or Other Pests at Specified Frequencies							
Age Group	Total N	Number of Times Over a 6-month Period Pesticides Applied by Resident					
		None	1-2	3-5	6-9	10+	Don't Know
1 to 4 years	113	46	46	15	3	3	*
5 to 11 years	150	50	70	24	1	4	1
12 to 17 years	143	45	64	21	5	8	*
18 to 64 years	1,264	473	477	192	48	55	19

Note: * = Missing Data
N = Number of respondents.

Source: U.S. EPA, 1996.

Table 17-16. Number of Respondents Indicating that Pesticides Were Applied by a Professional at Home to Eradicate Insects, Rodents, or Other Pests at Specified Frequencies							
Age Group	Total N	Frequency (number of times over a six-month period that pesticides were applied by a professional)					
		None	1 to 2	3 to 5	6 to 9	10+	Don't Know
0 to <1 years	15	9	4	1	1	0	0
1 to <2 years	23	13	5	3	1	1	0
2 to <3 years	32	9	15	5	3	0	0
3 to <6 years	80	51	22	5	2	0	0
6 to <11 years	106	59	22	7	17	1	0
11 to <16 years	115	68	35	4	6	0	2
16 to <21 years	87	40	36	2	5	1	3

N = Number of respondents.

Source: U.S. EPA re-analysis of NHAPS (U.S. EPA, 1996) data.

Table 17-17. Number of Respondents Reporting Pesticides Applied by the Consumer at Home to Eradicate Insects, Rodents, or Other Pests at Specified Frequencies							
Age Group	Total N	Frequency (number of times over a six-month period that pesticides were applied by a resident)					
		None	1 to 2	3 to 5	6 to 9	10+	Don't Know
0 to <1 year	15	4	8	2	0	1	0
1 to <2 years	23	11	10	1	0	1	0
2 to <3 years	32	18	9	2	2	1	0
3 to <6 years	80	26	35	18	1	0	0
6 to <11 years	106	37	49	14	1	4	1
11 to <16 years	115	37	50	18	4	6	0
16 to <21 years	87	36	33	9	4	4	1

N = Number of respondents.

Source: U.S. EPA re-analysis of NHAPS (U.S. EPA, 1996) data.

Table 17-18. Household Demographics, and Pesticide Types, Characteristics, and Frequency of Pesticide Use		
Survey Population Demographics		
	Number[a]	Percent[a]
Gender		84.1
female	90	15.9
male	17	
Language of Interview		67.3
Spanish	72	32.7
English	35	
Reading Skills		66.4
able to read English	71	88.8
able to read Spanish	95	
Number in household		23.3
2-3 people	25	55.1
4-5 people	59	21.4
6-8 people	23	
Children under 10 years		34.6
1 child	37	42.1
2 children	45	23.3
3 to 5 children	25	
Type of home		70.1
single family detached	75	8.4
multi-family	9	8.4
trailer/mobile home	9	7.5
single-family attached	8	3.7
apartment/other	4	
Pets		51.4
pets kept in household	55	40.0
pesticides used on pets	22	
Pesticide Use		
Type of pesticide		
insecticide	135	91.2
rodenticide	10	6.8
herbicide	3	2.0
Storage of pesticide		
kitchen	67	45.3
garage/shed	30	20.3
laundry/washroom	14	9.4
other, inside home	11	7.4
other, outside home	7	4.7
bathroom	7	4.7
basement	4	2.7
closet	4	2.7
Storage precautions		
child-resistant container	83	56.1
pesticide locked away	55	37.2
Storage risks		
< 4 feet from ground	72	48.6
kept near food	5	3.4
kept near dishes/cookware	5	3.4
Disposal		
throw it away	132	89.2
wrap in separate container, throw away	10	6.8
other	5	3.4
Frequency of use		
more than once/week	20	13.5
once/week	27	18.2
once/month	42	28.4
once every 3 months	23	15.5
once every 6 months	16	10.8
once/year	13	8.8
Time stored in home		
< 6 months	75	50.7
6 to 12 months	24	15.2
12 to 24 months	17	11.5
> 24 months	16	10.8

[a]   Totals may not add to 107 participants or 148 products, and percentages may not add to 100 due to some non-responses to survey questions.

Source: Bass et al., 2001.

Table 17-19. Frequency of Use of Cosmetic Products				
Product Type	N	Number of Applications per Day		
		Mean	Median	SD
Lipstick	311	2.35	2	1.80
Body lotion, hands	308	2.12	2	1.59
Body lotion, arms	308	1.52	1	1.30
Body lotion, feet	308	0.95	1	1.01
Body lotion, legs	308	1.11	1	0.98
Body lotion, neck & throat	308	0.43	0	0.82
Body lotion, back	308	0.26	0	0.63
Body lotion, other	308	0.40	0	0.76
Face cream	300	1.77	2	1.16

N = Number of subjects (women, ages 19 to 65 years).
SD = Standard deviation.

Source: Loretz et al., 2005.

Table 17-20. Amount of Test Product used (grams) for Lipstick, Body Lotion and Face Cream			
Summary Statistics	Total Amount Applied	Average[a] Amount Applied per Use Day	Average[b] Amount Applied per Application
Lipstick			
Minimum	0.001	0.000	0.000
Maximum	2.666	0.214	0.214
Mean	0.272	0.024	0.010
SD	0.408	0.034	0.018
Percentiles			
10th	0.026	0.003	0.001
20th	0.063	0.005	0.003
30th	0.082	0.008	0.004
40th	0.110	0.010	0.004
50th	0.147	0.013	0.005
60th	0.186	0.016	0.006
70th	0.242	0.021	0.009
80th	0.326	0.029	0.011
90th	0.655	0.055	0.024
95th	0.986	0.087	0.037
99th	2.427	0.191	0.089
Best Fit Distributions & Parameters[c]	Lognormal Distribution GM = 0.14 GSD = 3.56 P-value (Gof) = 0.01	Lognormal Distribution GM = 0.01 GSD = 3.45 P-value (Gof) <0.01	Lognormal Distribution GM = 0.01 GSD = 3.29 P-value (Gof) <0.01
Body Lotion			
Minimum	0.67	0.05	0.05
Maximum	217.66	36.31	36.31
Mean	103.21	8.69	4.42
SD	53.40	5.09	4.19
Percentiles			
10th	36.74	3.33	1.30
20th	51.99	4.68	1.73
30th	68.43	5.71	2.32
40th	82.75	6.74	2.76
50th	96.41	7.63	3.45
60th	110.85	9.25	4.22
70th	134.20	10.90	4.93
80th	160.26	12.36	6.14

Summary Statistics	Total Amount Applied	Average[a] Amount Applied per Use Day	Average[b] Amount Applied per Application
	Table 17-20. Amount of Test Product Used (grams) for Lipstick, Body Lotion and Face Cream (continued)		
90th	182.67	14.39	8.05
95th	190.13	16.83	10.22
99th	208.50	27.91	21.71
Best Fit Distributions & Parameters[c]	Beta Distribution[c] Alpha = 1.53 Beta = 1.77 Scale = 222.01 P-value (GoF) = 0.06	Gamma Distribution Location = -0.86 Scale = 2.53 Shape = 3.77 P-value (GoF) = 0.37	Lognormal Distribution GM = 3.26 GSD = 2.25 P-value (GoF) = 0.63
Face Cream			
Minimum	0.04	0.00	0.00
Maximum	55.85	42.01	21.01
Mean	22.36	2.05	1.22
SD	14.01	2.90	1.76
Percentiles			
10th	5.75	0.47	0.28
20th	9.35	0.70	0.40
30th	12.83	1.03	0.53
40th	16.15	1.26	0.67
50th	19.86	1.53	0.84
60th	23.79	1.88	1.04
70th	29.31	2.23	1.22
80th	36.12	2.90	1.55
90th	44.58	3.50	2.11
95th	48.89	3.99	2.97
99th	51.29	12.54	10.44
Best Fit Distributions & Parameters[c]	Triangle Distribution Minimum = -1.09 Maximum = 58.71 Likeliest = 7.53 P-value (GoF) = 0.27	Lognormal Distribution[c] GM = 1.39 GSD = 2.58 P-value (GoF) <0.01	Lognormal Distribution[c] GM = 0.80 GSD = 2.55 P-value (GoF) = 0.02

[a] Derived as the ratio of the total amount used to the number of use days.
[b] Derived as the ratio of the total amount used to the total number of applications during the survey.
[c] None of the tested distributions provided a good fit.
GM = Geometric mean.
GSD = Geometric standard deviation.
Gof = Goodness of fit.
Note: Data are for women, ages 19 to 65 years.

Source: Loretz et al., 2005.

Table 17-21. Frequency of Use of Personal Care Products					
		Average Number of Applications per Use Day[a]			
Product Type	N	Mean	SD	Min	Max
Hairspray (aerosol)	165[b]	1.49	0.63	1.00	5.36
Hairspray (pump)	162	1.51	0.64	1.00	4.22
Liquid Foundation	326	1.24	0.32	1.00	2.00
Spray Perfume	326	1.67	1.10	1.00	11.64
Body wash	340	1.37	0.58	1.00	6.36
Shampoo	340	1.11	0.24	1.00	2.14
Solid antiperspirant	340	1.30	0.40	1.00	4.00

[a]   Derived as the ratio of the number of applications to the number of use days.
[b]   Subjects who completed the study but did not report their number of applications were excluded.
N   = Number of subjects (women, ages 18 to 65 years).
SD   = Standard deviation.

Source: Loretz et al., 2006.

Table 17-22. Average Amount of Product Applied per Application [a] (grams)

Summary Statistics	Hairspray (aerosol)	Hairspray (pump)	Spray Perfume	Liquid Foundation	Shampoo	Body Wash	Solid Antiperspirant
N	163[b]	161[b]	310[b]	321[b]	340	340	340
Mean	2.58	3.64	0.33	0.54	11.76	11.3	0.61
SD	2.26	3.50	0.41	0.52	8.77	6.9	0.56
Minimum	0.05	0.00	0.00	0.00	0.39	1.1	0.00
Maximum	14.08	21.44	5.08	2.65	67.89	58.2	5.55
Percentiles							
10th	0.66	0.70	0.06	0.08	3.90	4.6	0.14
20th	0.94	1.01	0.10	0.14	5.50	5.8	0.22
30th	1.26	1.59	0.13	0.19	6.78	7.1	0.30
40th	1.56	2.14	0.18	0.26	8.27	8.5	0.37
50th	1.83	2.66	0.23	0.36	9.56	9.5	0.45
60th	2.38	3.43	0.28	0.48	11.32	11.4	0.55
70th	2.87	3.84	0.36	0.63	13.29	13.4	0.69
80th	3.55	5.16	0.49	0.86	16.07	16.0	0.89
90th	5.33	7.81	0.68	1.23	22.59	21.1	1.25
95th	7.42	10.95	0.94	1.70	27.95	24.3	1.67
97.5th	8.77	14.68	1.25	2.07	35.65	28.4	2.15
99th[c]	11.30	15.52	1.73	2.36	51.12	35.1	2.52
Best fit distributions and parameters	Lognormal Distribution	Lognormal Distribution	Lognormal Distribution	Lognormal Distribution	Lognormal	Gamma	Lognormal Distribution
	GM = 1.84	GM = 2.44	GM =0.21	GM = 0.33	GM = 9.32	Location = 0.51	GM = 0.43
	GSD = 2.40	GSD = 2.67	GSD = 3.01	GSD. = 2.99	GSD = 2.02	Scale = 3.92	GSD = 2.37
						Shape = 2.76	
P-value (Kolmogorov-Smirnov)	0.06	0.07	0.077	0.041	0.1328	0.486	0.339

[a] Derived as the ratio of the total amount used to the total number of applications.
[b] Subjects who completed the study, but did not report their number of applications, or who did not return the unused portion of the product, were excluded.
[c] Estimate does not meet the minimum sample size criteria (N=800) as set by the National Center for Health Statistics. For upper percentile (>0.75), the minimum sample size (N) satisfies the following rule: n [8/(1-p)]. http://www.cdc.gov/nchs/about/major/nhanes/nhanes3/nh3gui.pdf.

N = Number of subjects (women, ages 19 to 65 years).
GM = Geometric mean.
GSD = Geometric standard Deviation.

Source: Loretz et al., 2006.

Table 17-23. Average Amount of Product Applied per Use Day [a] (grams)

Summary Statistics	Hairspray (aerosol)	Hairspray (pump)	Spray Perfume	Liquid Foundation	Shampoo	Body Wash	Solid Antiperspirant
N	163[b]	161[b]	310[b]	321[b]	340	340	340
Mean	3.57	5.18	0.53	0.67	12.80	14.5	0.79
SD	3.09	4.83	0.57	0.65	9.11	8.5	0.78
Minimum	0.05	0.00	0.00	0.00	0.55	1.3	0.00
Maximum	18.25	24.12	5.08	3.00	67.89	63.4	5.55
Percentiles							
10th	0.84	0.91	0.08	0.10	4.12	5.7	0.17
20th	1.35	1.48	0.12	0.16	5.80	7.6	0.29
30th	1.65	2.33	0.19	0.23	7.32	9.3	0.38
40th	2.23	2.66	0.26	0.30	9.09	10.9	0.46
50th	2.71	3.74	0.34	0.45	10.75	12.9	0.59
60th	3.30	4.71	0.45	0.58	12.72	14.8	0.70
70th	3.89	5.67	0.61	0.76	14.73	17.4	0.86
80th	4.86	7.38	0.81	1.04	17.61	20.7	1.08
90th	7.73	12.22	1.45	1.76	23.63	25.5	1.70
95th	9.89	15.62	1.77	2.18	29.08	29.1	2.32
97.5th	13.34	19.41	1.86	2.40	36.46	35.6	3.33
99th[c]	15.05	23.98	2.01	2.70	51.12	43.5	4.42
Best fit distributions and parameters	Lognormal Distribution	Lognormal Distribution	Lognormal Distribution	Lognormal Distribution	Lognormal	Gamma	Lognormal Distribution
	GM= 2.57	GM = 3.45	GM= 0.30	GM = 0.40	Location = 0.38	Location = 0.67	GM = 0.56
	GSD = 2.37	GSD = 2.70	GSD = 3.36	GSD. = 3.10	Scale= 5.79	Scale= 4.89	GSD = 2.41
					Shape = 2.15	Shape = 2.84	
P-value (Kolmogorov-Smirnov)	0.05	0.05	0.075	0.047	0.8208	0.760	0.293

a   Derived as the ratio of the total amount used to the total number of applications.
b   Subjects who completed the study, but did not report their number of applications , or who did not return the unused portion of the product, were excluded.
c   Estimate does not meet the minimum sample size criteria (n=800) as set by the National Center for Health Statistics. For upper percentile (>0.75), the minimum sample size (n) satisfies the following   rule: n [8/(1-p)]. http://www.cdc.gov/nchs/about/major/nhanes/nhanes3/nh3gui.pdf.

N   = Number of subjects (women, ages 19 to 65 years).
GM   = Geometric mean.
GSD   = Geometric standard deviation.

Source: Loretz et al., 2006.

Table 17-24. Average Number of Applications Per Use Day[a]			
Summary Statistics	Facial Cleanser (Lathering and Non-Lathering)	Hair Conditioner	Eye Shadow
N	295	297	299
Mean	1.6	1.1	1.2
SD	0.52	0.19	0.33
Minimum	1.0	1.0	1.0
Maximum	3.2	2.4	2.7
Percentiles			
10th	1.0	1.0	1.0
20th	1.0	1.0	1.0
30th	1.2	1.0	1.0
40th	1.4	1.0	1.1
50th	1.7	1.0	1.1
60th	1.9	1.0	1.1
70th	2.0	1.0	1.2
80th	2.0	1.1	1.4
90th	2.2	1.2	1.7
95th	2.4	1.4	2.0
97.5th	2.9[b]	1.8[b]	2.2[b]
99th[b]	3.1[b]	2.1[b]	2.5[b]

[a] Derived as the ratio of the number of applications to the number of use days.
[b] Estimate does not meet the minimum sample size criteria (n=800) as set by the National Center for Health Statistics. For upper percentile (>0.75), the minimum sample size (n) satisfies the following rule: n [8/(1-p.]
http://www.cdc/gov/nchs/about/major/nhanes/nhanes3/nh3gui.pdf..
N   = Number of subjects (women, ages 18 to 69 years).
SD = Standard deviation.

Source: Loretz et al., 2008.

Summary Statistics	Facial Cleanser (Lathering and Non-Lathering)	Facial Cleanser (Lathering)	Facial Cleanser (Non-Lathering)	Hair Conditioner	Eye shadow
N	295	174	121	297	299
Mean	4.06	4.07	4.05	13.77	0.04
SD	2.78	2.87	2.67	11.50	0.11
Minimum	0.33	0.33	0.83	0.84	0.001
Maximum	16.70	15.32	16.70	87.86	0.74
Percentiles					
10th	1.41	1.23	1.50	3.71	0.003
20th	1.79	1.72	1.94	5.54	0.005
30th	2.18	2.15	2.22	6.95	0.007
40th	2.66	2.64	2.80	8.73	0.009
50th	3.25	3.19	3.33	10.62	0.010
60th	3.86	3.84	3.88	12.61	0.013
70th	4.62	4.71	4.59	15.54	0.017
80th	6.24	6.33	5.92	20.63	0.025
90th	8.28	8.24	8.40	28.20	0.052
95th	9.93	10.50	9.37[b]	33.19	0.096
97.5th	10.71[b]	11.47[b]	10.26[b]	45.68[b]	0.525[b]
99th[b]	12.44[b]	13.07[b]	15.29[b]	60.20[b]	0.673[b]
Best fit distributions and parameters	Lognormal distribution	Lognormal distribution	Lognormal distribution	Lognormal distribution	Lognormal distribution
	GM = 3.26	GM = 3.21	GM = 3.35	GM = 10.28	GM = 0.01
	GSD = 1.12	GSD = 2.03	GSD = 1.86	GSD - 2.20	GSD = 3.61
P-value (Chi-square test)	0.1251	0.4429	0.4064	0.8595	<0.0001

Table 17-25. Average Amount of Product Applied Per Use Day (grams)[a]

[a]   Derived as the ratio of the total amount used to the number of use days.

[b]   Estimate does not meet the minimum sample size criteria (n=800) as set by the National Center for Health Statistics. For upper percentile (>0.75), the minimum sample size (n) satisfies the following rule: n [8/(1-p)]. http://www.cdc.gov/nchs/about/major/nhanes/nhanes3/nh3gui.pdf.

N   = Number of subjects (women, ages 18 to 69 years).
GM   = Geometric mean.
GSD   = Geometric standard deviation.

Source: Loretz et al., 2008.

Table 17-26. Average Amount of Product Applied Per Application (grams)[a]					
Summary Statistics	Facial Cleanser (Lathering and Non-Lathering)	Facial Cleanser (Lathering)	Facial Cleanser (Non-Lathering)	Hair Conditioner	Eye Shadow
N	295	174	121	297	299
Mean	2.57	2.56	2.58	13.13	0.03
SD	1.78	1.78	1.77	11.22	0.10
Minimum	0.33	0.33	0.57	0.84	0.0004
Maximum	14.61	10.67	14.61	87.86	0.69
Percentiles					
10th	0.92	0.83	1.10	3.48	0.003
20th	1.32	1.26	1.35	5.34	0.004
30th	1.57	1.55	1.59	6.71	0.006
40th	1.85	1.84	1.89	8.26	0.007
50th	2.11	2.11	2.15	10.21	0.009
60th	2.50	2.50	2.51	12.24	0.011
70th	2.94	2.96	2.96	14.54	0.015
80th	3.47	3.56	3.40	18.88	0.022
90th	4.81	5.10	4.52	27.32	0.041
95th	5.89	6.37	5.11[b]	32.43	0.096
97.5th	7.16[b]	7.77[b]	6.29[b]	45.68[b]	0.488[b]
99th[b]	9.44[b]	9.61[b]	15.46[b]	60.20[b]	0.562[b]
Best fit distributions and parameters	Extreme value	Gamma	Extreme value	Lognormal distribution	Lognormal distribution
	Mode = 1.86	Loc = 0.28	Mode = 1.92	GM = 9.78	GM = 0.01
	Scale = 1.12	Scale = 1.29	Scale = 1.03	GSD = 2.20	GSD = 3.59
P-value (Chi-square test)	0.0464	0.6123	0.5219	0.9501	<0.0001

[a] Derived as the ratio of the total amount used to the total number of applications.
[b] Estimate does not meet the minimum sample size criteria (n=800) as set by the National Center for Health Statistics. For upper percentile (>0.75), the minimum sample size (n) satisfies the following rule: n [8/(1-p)]. Http://www.cdc.gov/nchs/about/major/nhanes/nhanes3/nh3gui.pdf.

N   = Number of subjects (women, ages 18 to 69 years).
GM   = Geometric mean.
SD   = Geometric standard deviation.

Source: Loretz et al., 2008.

Table 17-27. Characteristics of the Study Population and the Percent Using Selected Baby Care Products	
Characteristic	Sample Number (percent)
Number of Participants	
Los Angeles, California	43 (26)
Minneapolis, Minnesota	77 (47)
Columbia, Missouri	43 (26)
Gender	
Male	84 (52)
Female	79 (48)
Age (months)	
2-8	42 (26)
9-16	82 (50)
17-24	30 (18)
24-28	9 (6)
Infant Weight (kg)	
?10	84 (52)
> 10	79 (48)
Race	
White	131 (80)
Hispanic/Latino	17 (10)
Native American	3 (2)
Asian	8 (5)
Black	4 (3)
Product Use	Percent Using
Baby Lotion	36
Baby Shampoo	54
Baby Powder	14
Diaper Cream	33
Baby Wipes	94
Source: Sathyanarayana et al., 2008.	