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17. CONSUMER PRODUCTS

17.1. INTRODUCTION

17.1.1. Background

Consumer products may contain toxic or potentially toxic chemical constituents to which people may be exposed as a result of their use. For example, household cleaners can contain ammonia, alcohols, acids, and/or organic solvents that 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. These household consumer products include cleaners, solvents, and paints. Non-users, including children, can be passively exposed to chemicals in these products. Because people 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 about 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 or risk (Steenbekkers, 2001). In addition, the factors that influence these behaviors are not well studied, but some studies have shown that a large variation exists in behavior between persons (Steenbekkers, 2001).

This chapter presents information on the amount of product used, the frequency of use, and the duration of use for various consumer products typically found in consumer households. All tables that present information for these consumer products are located at the end of this chapter.

Note that this chapter does not provide an exhaustive treatment of all consumer products, but rather, it provides some background and data that can be used in an exposure assessment. Also, the data presented may not capture the information needed to assess the highly exposed population (i.e., consumers who use commercial and industrial strength products at home). The studies presented in the following sections represent readily available surveys for which data were collected on the frequency and duration of use and the amount of use of cleaning products, painting products, household solvent products, cosmetic and other personal care products, household equipment, pesticides, and tobacco. Also note that some of the data in this chapter comes from corporate, consortia, or trade organizations.

17.1.2. Additional Sources of Information

There are several sources of information on data relevant to consumer products. 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 the U.S. Environmental Protection Agency (EPA) in 1987, and consumer use of some products listed may have changed (e.g., aerosol product use has declined). Therefore, refer to the Household Product Database of the National Library of Medicine database as a source of more current information on the types of products used. This database contains over 7,000 consumer brands including auto products; products used inside the home; pesticides; landscape and yard; personal care; home maintenance, arts, and crafts; pet care; and home office. The information includes chemical ingredients, specific brands that contain those ingredients, and acute and chronic health effects associated with specific ingredients. The database does not contain any information on frequency or amount of product used.

The Soaps and Detergent 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 the amount of product used. The data used were compiled from a number of sources including cosmetic associations and data from the SDA. The document *Exposure and Risk Screening Methods for Consumer Product Ingredients* can be found on the SDA Web site at http://www.cleaning101.com/files/Exposure_and_Risk_Screening_Methods_for_Consumer_Product_Ingredients.pdf.

Another document has been developed by the U.S. EPA Office of Toxic Substances (1986a, b): *Standard Scenarios for Estimating Exposure to Chemical Substances During Use of Consumer Products – Volumes I and II*. This document presents data and supporting information required to assess consumer exposure to constituents in household cleaners and components of adhesives. Its information includes a description of standard scenarios selected to represent upper bound exposures for each product. Values also are presented for parameters needed to estimate exposure for defined exposure routes and pathways assumed for each scenario.

An additional reference is the Simmons Market Research Bureau's (SMRB's) *Simmons Study of*

Media and Markets. This document provides an example of available marketing data that may be useful in assessing exposure to selected products. The report is published biannually. Data are collected on the buying habits of the U.S. population during the previous 12 months for more than 1,000 consumer products. Data are presented on frequency of use, total number of buyers in each use category, and selected demographics. The consumer product data are presented according to the buyer and not necessarily according to the user (i.e., actively exposed person). Therefore, it may be necessary to adjust the data to reflect potential uses. The reports are available for purchase from the SMRB. Table 17-2 presents a list of product categories in the *Simmons Study of Media and Markets* for which information is available.

17.2. RECOMMENDATIONS

Because of 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. Refer to the information provided by the references of this chapter 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, published three surveys that collected data on the frequency of use of various cosmetic products and selected baby products. In the first survey, CTFA (1983) conducted a 1-week prospective survey of 47 female employees and relatives of employees between ages 13 and 61 years. In the second survey, a cosmetic manufacturer conducted a retrospective survey of 1,129 of its customers. In the third survey, a market research bureau sampled 19,035 female consumers nationwide over a 9½-month period. Of the 19,035 females interviewed, responses from only 9,684 females were tabulated (CTFA, 1983). 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). The third survey also was designed to reflect the socio-demographic (e.g., age, income) characteristics of the entire U.S. population.

To obtain the average frequency of use for each cosmetic product, responses were averaged for each product in each survey. 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 90^{th} percentile frequency of use values were determined by eliminating the top 10% most extreme frequencies of use. Therefore, the highest remaining frequency of use was recorded as the upper 90^{th} percentile value. Table 17-3 presents the amount of product used per application (grams) and the average and 90^{th} percentile frequency of use per day for various cosmetic products for all the surveys. Note that Table 17-3 reports values provided by cosmetic companies, associations, or market research firms.

An advantage of the frequency data obtained from the third survey (by the market research bureau) is that the sample population was more likely to be representative of the U.S. population. Another advantage of the third data set 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 that may 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. The limitations of these surveys are that data were not tabulated by age, are more than 20 years old, and are only representative of products used by babies and female consumers. Another limitation is that these data may not be representative of long-term use patterns.

17.3.2. Westat (1987a)—Household Solvent Products: A National Usage Survey

Westat (1987a) conducted a nationwide survey to determine consumer exposure to common household products believed to contain methylene chloride or its substitutes (i.e., carbon tetrachloride, trichloroethane, trichloroethylene, perchloroethylene, and 1,1,1,2,2,2 -

trichlorotrifluoroethane). The survey methodology was comprised of two phases. In the first phase, the sample population was generated by using a random digit dialing (RDD) procedure, in which telephone numbers of households nationwide were randomly selected by using an unbiased, equal probability of selection method, known as the Waksberg Method (Westat, 1987a). After the respondents in the selected households (18 years and older) agreed to participate in the survey, questionnaires and product pictures were mailed to each respondent. Finally, telephone follow-up calls were made to those respondents who did not respond to the mailed questionnaire within a 4-week period to administer the same questionnaire. Of the 6,700 individuals contacted for the survey, 4,920 individuals either responded to the mailed questionnaire or to a telephone interview (a response rate of 73%). Survey questions included how often the products were used in the last 12 months, when they were last used, how much time was spent using a product (per occasion or year), how long the respondent remained in the room after use, how much of a product was used per occasion or year, and what protective measures were used (Westat, 1987a).

Thirty-two categories of common household products were included in the survey and are presented in Table 17-4. Table 17-4, Table 17-5, Table 17-6, and Table 17-7 provide means, medians, and percentile rankings for the following variables: frequency of use, exposure time, amount of use, and time exposed after use.

An advantage of this study is that the RDD procedure (i.e., Waksberg Method) to identify participants enabled a diverse selection of a representative, unbiased sample of the U.S. population (Westat, 1987a). Also, empirical data on consumer household product use are provided. However, a limitation associated with this study is that the data generated were based on recall behavior. Another limitation is that extrapolation of these data to long-term use patterns may be difficult; the data are more than 20 years old and cannot be broken out by age groups.

17.3.3. Westat (1987c)—National Usage Survey of Household Cleaning Products

Westat (1987c) collected usage data from a nationwide survey to assess the magnitude of exposure of consumers to various products used when performing certain household cleaning tasks. The survey was conducted from the middle of November 1985 to the middle of January 1986. Telephone interviews were conducted with 193 households. According to Westat (1987c), the resulting response rate for this survey was 78%. The Waksberg Method discussed in the Westat (1987a) study also was used in randomly selecting telephone numbers employed in this survey. The survey was designed to obtain information on cleaning activities performed in the interior of the home during the previous year. The person who did the majority of the cleaning in the kitchen and bathroom areas of each household was interviewed. Of those respondents, the primary cleaner was female in 160 households (83%) and male in 30 households (16%); the sex of the respondents in the three remaining households was not ascertained (Westat, 1987c). Data obtained from the survey included the frequency of performing 14 different cleaning tasks, the amount of time (duration) spent at each task, the cleaning product most frequently used, the type of product (i.e., liquid, powder, aerosol, or spray pump) used, and the protective measures taken during cleaning, such as wearing rubber gloves or having a window open or an exhaust fan on (Westat, 1987c).

Table 17-8 through Table 7-12 present the survey data. Table 17-8 presents the mean and median total exposure time of use for each cleaning task and the product type preferred for each task. Table 17-9 presents the percentile rankings for the total time exposed to the products used for 14 cleaning tasks. Table 17-10 presents the mean and percentile rankings of the frequency in performing each task. Table 17-11 shows the mean and percentile rankings for exposure time per event of performing household tasks. Table 17-12 presents the mean and percentile rankings for total number of hours spent per year using the top 10 product groups.

Westat (1987c) randomly selected a subset of 30 respondents from the original survey and re-interviewed them during the first 2 weeks of March 1986 as a reliability check on the recall data from the original phone survey. Frequency and duration data for 3 of the original 14 cleaning tasks were obtained from the re-interviews. In a second effort to validate the phone survey, 50 respondents of the original phone survey participated in a 4-week diary study (between February and March 1986) of 8 of the 14 cleaning tasks originally studied. The diary approach assessed the validity of using a 1-time telephone survey to determine usual cleaning behavior (Westat, 1987c). The data (i.e., frequency and duration) obtained from the re-interviews and the diary approach were lower than the data from the original telephone survey, but were more consistent with one other. Westat (1987c) attributed the significant differences in the data obtained from these surveys to seasonal changes rather than methodological problems.

A limitation of this survey is evident from the reliability and validity check of the data collected by Westat (1987c). The data obtained from the telephone survey may reflect heavier seasonal cleaning because the survey was conducted during the holidays (November through January). Therefore, usage data obtained in this study may be biased and may represent upper bound estimates. Other limitations of this study include the small size of the sample population, the age of the data set, and that the data cannot be broken out by age groups. An advantage of this survey is that the RDD procedure (Waksberg Method) used provides unbiased results of sample selection and reduces the number of unproductive calls. Another advantage of this study is that it provides empirical data on frequency and duration of consumer use.

17.3.4. Westat (1987b)—National Household Survey of Interior Painters

Westat (1987b) conducted a nationwide study between November 1985 and January 1986 to obtain usage information that estimates the magnitude of exposure of consumers to different types of painting and painting-related products used while painting the interior of the home. The study sampled 777 households to determine whether any household member had painted the interior of the home during the 12 months prior to the survey date. Of the sampled households, 208 households (27%) had a household member who had painted during the past 12 months. Based on the households with primary painters, the response rate was 90% (Westat, 1987b). The person in each household who did most of the interior painting during the past 12 months was interviewed over the telephone. The RDD procedure (Waksberg Method) previously described in Westat (1987a) was used to generate sample blocks of telephone numbers in this survey. Questions were asked about the frequency and time spent for interior painting activities, the amount of paint used, and the protective measures used (i.e., wearing gloves, hats, and masks or keeping a window open) (Westat, 1987b). Fifty-three percent of the primary painters in the households interviewed were male, 46% were female, and the sex of the remaining 1% was not ascertained. Three types of painting products were used in this study: latex paint, oil-based paint, and wood stains and varnishes. Of the respondents, 94.7% used latex paint, 16.8% used oil-based paint, and 20.2% used wood stains and varnishes.

Table 17-13, Table 17-14, and Table 17-15 summarize data generated from this survey. Table 17-13 presents the mean, standard deviation, and percentile rankings for the total exposure time for painting activity by paint type. Table 17-14 presents the mean and median exposure times for each painting activity per occasion for each paint type. A painting occasion is defined as a time period from start to cleanup (Westat, 1987b). Table 17-14 also presents the frequency and percentile rankings of painting occasions per year. Table 17-15 presents the total amount of paint used by interior painters.

In addition, 30 respondents from the original survey were re-interviewed in April 1986 as a reliability check on the recall data. There were no significant differences between the data obtained from the re-interviews and the original painting survey (Westat, 1987b).

An advantage of this survey, based on the reliability check conducted by Westat (1987b), is the stability in the painting data obtained. Another advantage of this survey is that the response rate was high (90%), thus minimizing non-response bias. Also, the Waksberg Method employed provides an unbiased equal probability method of RDD. The limitations of the survey are that the data are based on 12-month recall and may not accurately reflect long-term use patterns and the age of the data set.

17.3.5. Abt (1992)—Methylene Chloride Consumer Use Study Survey Findings

As part of a plan to assess the effectiveness of labeling of consumer products containing methylene chloride, Abt (1992) conducted a nationwide telephone survey of nearly 5,000 households. The survey was conducted in April and May of 1991. Three classes of products were included: (1) paint strippers, (2) non-automotive spray paint, and (3) adhesive removers. The survey paralleled a 1986 consumer use survey conducted by Abt for the U.S. EPA.

The survey was conducted to estimate the percentage of the U.S. adult population using paint remover, adhesive remover, and non-automotive spray paint. In addition, an estimate of the population using these products containing methylene chloride was determined. A survey questionnaire was developed to collect product usage data and demographic data. The survey sample was generated using a RDD technique.

A total of 4,997 product screener interviews were conducted for the product interview sections. The number of respondents was 381 for paint strippers, 58 for adhesive removers, and 791 for non-automotive spray paint. Survey responses were weighted to allow estimation at the level of the total U.S. population (Abt, 1992). A follow-up mail survey

also was conducted by using a short questionnaire. Respondents who had used the product in the past year or had purchased the product in the past 2 years and still had the container were asked to respond to the questionnaire (Abt, 1992). Of the 527 mailed questionnaires, 259 were returned. The questionnaire responses included 67 on paint strippers, 6 on adhesive removers, and 186 on non-automotive spray paint. Table 17-16 through Table 17-21 (*N*s are unweighted) present the results of the survey. Data are presented for recent users, who were defined as persons who have used the product within the last year of the survey or who have purchased the product in the past 2 years.

Abt (1992) found the following results when comparing the new data to the 1986 findings:

- A significantly smaller proportion of current survey respondents used a paint stripper, spray paint, or adhesive remover.
- The proportion of the population who used the three products recently (within the past year) decreased substantially.
- Those who used the products reported a significantly longer time since their last use. For all three products, the reported amount used per year was significantly higher in the current survey.

An advantage of this survey is that the survey population was large, and the survey responses were weighted to represent the U.S. population. In addition, the survey was designed to collect data for frequency of product use and amount of product used by sex. Limitations of the survey are that the information may be dated, and that the data were generated based on recall behavior. Extrapolation of these data to accurately reflect long-term use patterns may be difficult.

17.3.6. 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, including 2,000 children. 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. Demographic, including socioeconomic (e.g., sex, age, race, education), geographic (e.g., census region, state), and temporal (i.e., 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 also were collected on duration and frequency of use of selected consumer products. Table 17-22 through Table 17-30 present data on the number of minutes that survey respondents spent in activities working with or being near certain consumer products, including microwave ovens; 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. Table 17-31 through Table 17-35 present data on the number of respondents in these age categories that used fragrances, aerosol sprays, humidifiers, and pesticides (professionally-applied and consumer-applied). 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 reanalyzed by U.S. EPA to generate data for the standardized age categories. Data for subsets of the 1st year of life (e.g., 1 to 2 months, 3 to 5 months, etc.) were not available.

As discussed in previous chapters that used NHAPS as a data source, the primary advantage 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 also may introduce error into the calculation of the mean. Another limitation is that the adult data were not broken down into finer age categories. These data are also based on 24-hour diaries and may not be representative of long-term use patterns.

17.3.7. 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 10 years old in the household and had used a pesticide within the last 6 months were surveyed (Bass et al., 2001). The survey population was composed predominantly of Hispanic females and represented a survey response rate of approximately 74%. Study participants were selected by systematic random sampling. 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 controlling weeds in the garden and repelling animals from the garden. As part of the interview, information was gathered on the pesticides' frequency of use.

Table 17-36 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: about 32% of the households used pesticides once per week or more; about 44% used the products once per month or once in 3 months; and about 19% used the products once in 6 months or 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.

17.3.8. Weegels and van Veen (2001)—Variation of Consumer Contact With Household Products: A Preliminary Investigation

Weegels and van Veen (2001) conducted a survey to determine consumer exposure to common household products used once a day or every other day. Thirty households participated in the study, including 10 families with children, 10 couples, 9 individuals, and 1 household of 6 adults from the city of Delft in The Netherlands. Households were recruited through the Usability Panel of the School of Industrial Design and through public notices and pamphlets.

Three types of products were studied: dishwashing detergent, all-purpose cleaners, and hair-styling products. Three activities in which these products are commonly used were studied in more detail: dishwashing, toilet cleaning, and styling hair. In-home observations, diaries, and measurement of the amount of product utilized were used to collect data. Subjects were visited in their homes and videotaped performing the activities. After 3 weeks, subjects were again visited in their homes and videotaped performing activities, diaries were collected, and the amount of product used was measured.

Table 17-37 presents the survey data. During toilet cleaning, 22 of 29 subjects observed used at least two different products (e.g., toilet cleaner, all-purpose cleaner, and/or abrasive cleaner). The large variation in duration of toilet cleaning was due to the diverse ways in which toilet cleaner was used: some subjects left the toilet cleaner to soak overnight, some left it in the bowl while cleaning the remainder of the toilet, others flushed the toilet immediately after cleaning. The authors noted that the findings of the study suggest that "…individuals have a consistent way of using a product for a particular activity, but there is a large variety in product usage among consumers, with relations among frequency, durations and amount. If this conclusion is confirmed by future research, it suggests that there will be people who exhibit high-end use of products and will, most likely follow their own routine, which may have consequences for the definition of worst-case use of consumer products."

An advantage of this study is that the empirical data generated provide more accurate calculations of exposure than studies relying on recall data. Limitations of the study are the small study population (30 households) and that The Netherlands may not be representative of U.S. population behaviors. Another limitation is that the short duration (3 weeks) may not accurately reflect long-term or seasonal usage patterns.

17.3.9. 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 in 2000 and included 360 study subjects recruited in 10 U.S. cities (i.e., Atlanta, GA; Boston, MA; Chicago, IL; Denver, CO; Houston, TX; Minneapolis, MN; St. Louis, MO; San Bernardino,

CA; Tampa Bay, FL; and Seattle, WA). The survey participants were women, ages 19 to 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 2-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 2-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, 86.4%, 83.3%, and 85.6% completed the study and returned the diaries for lipstick, body lotion, and face cream, respectively (Loretz et al., 2005).

Table 17-38 and Table 17-39 present the survey data. Table 17-38 provides the mean, median, and standard deviations for the frequency of use. Table 17-39 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 United States and that it was not based on recall data. A limitation of the study is that the short duration (2 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.

17.3.10. 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 in 2000 and 2001. A total of 360 women were recruited from 10 U.S. cities (Atlanta, GA; Boston, MA; Chicago, IL; Denver, CO; Houston, TX; Minneapolis, MN; St. Louis, MO; San Bernardino, CA; Tampa Bay, FL; and Seattle, WA). The survey participants were women, ages 19 to 65 years old, who regularly used the test products. Subjects kept daily records on product usage (e.g., 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 areas where these products were applied. For shampoo, subjects recorded information on their hair type (i.e., length, thickness, oiliness, straight or curly, and color treated or not). At the end of the 2-week period, unused portions of products were returned and weighed. Of the 360 subjects recruited per product, the study was completed by 91% of participants for hairspray, 91% for spray perfume, 94% for liquid foundation, and 94% for shampoo, body wash, and solid antiperspirant.

Table 17-40 through Table 17-42 present the survey data. Table 17-40 provides the minimum, maximum, mean, and standard deviations for the frequency of use. Table 17-41 provides percentile values for the amount of product applied per application. Table 17-42 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 United States and that it did not rely on recall data. A limitation of the study is that the short duration (2 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.

17.3.11. Hall et al. (2007)—European Consumer Exposure to Cosmetic Products, a Framework for Conducting Population Exposure Assessments

European cosmetic manufacturers constructed a probabilistic European population model of exposure for six cosmetic products: body lotion, deodorant/antiperspirant, lipstick, facial moisturizer, shampoo, and toothpaste (Hall et al., 2007). Data were collected by using both market information databases and a controlled product use study from 44,100 households and 18,057 individual consumers, creating a sample of the 249 million inhabitants of the 15 countries in the European Union. Tables Table 17-43 through Table 17-50 show the amount used in g/day and mg/kg-day. The study found an inverse correlation between frequency of product use and quantity used per application for body lotion, facial moisturizer, toothpaste, and shampoo, and so the authors cautioned against calculating daily exposure to these products by multiplying the maximum frequency value by the maximum quantity per event value.

The advantage of this study is that it included a large sample size. However, behaviors and activities in the European population may not be representative of the U.S. population, and results were not broken out by age groups.

17.3.12. 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 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. (2006; 2005). A total of 360 women, ages 18 to 69 years, were recruited by telephone to provide diary records of product use during a 2-week period. The study subjects were representative of four U.S. Census regions (i.e., Northeast, Midwest, South, and West). A total of 295, 297, and 299 women 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 applications during a 2-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. Table 17-51 provides data on the number of applications per use day. Table 17-52 shows the average amounts of product applied per use day, while Table 17-53 shows the average amounts of product applied per application.

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. A limitation of the study is that the data were not provided by age group. 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. Data were also collected over a 2-week period and may not be representative of long-term usage patterns.

17.3.13. 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 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, CA; Minneapolis, MN; and Columbia, MO. Although the study was designed to assess exposure to phthalates, the authors collected information on the percentage of the total participants who used the baby products. Data were collected from questionnaire responses of the mothers and at study visits. Table 17-54 shows the characteristics and the percentage of the population using the studied baby products. Of the 163 infants studied, 94% of the participants used baby wipes, and 54% used infant shampoo.

The advantages of this study are that it specifically targeted consumer products used by children, it captured the percentage of the study population using these products, and it collected the data from a diverse ethnic population. The limitation is 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. Also, this study did not contain any information on amount or frequency of product use.

17.4. REFERENCES FOR CHAPTER 17

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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)
Household Maintenance Products	• Adhesive (general) (liquid) • Bleach (household) (liquid) • Bleach (see laundry) • Candles • Cat box litter • Charcoal briquettes • 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 prewash/soak (powder) • Laundry prewash/soak (liquid) • Laundry prewash/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 (e.g., polyurethane, varnishes) • 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. List of Product Categories in the Simmons Study of Media and Markets	
The volumes included in the Media series are as follows:	
M1	Publications: Total Audiences
M2	Publications: Qualitative Measurements and In-Home Audiences
M3	Publications: Duplication of Audiences
M4	Multi-Media Audiences: Adults
M5	Multi-Media Audiences: Males
M6	Multi-Media Audiences: Females and Mothers
M7	Business to Business
M8	Multi-Media Reach and Frequency and Television Attentiveness and Special Events
The following volumes are included in the Product series:	
P1	Automobiles, Cycles, Trucks and Vans
P2	Automotive Products and Services
P3	Travel
P4	Banking, Investments, Insurance, Credit Cards and Contributions, Memberships and Public Activities
P5	Games and Toys, Children's and Babies' Apparel and Specialty Products
P6	Computers, Books, Discs, Records, Tapes, Stereo, Telephones, TV and Video
P7	Appliances, Garden Care, Sewing and Photography
P8	Home Furnishings and Home Improvements
P9	Sports and Leisure
P10	Restaurants, Stores and Grocery Shopping
P11	Direct Mail and Other In-Home Shopping, Yellow Pages, Florist, Telegrams, Faxes and Greeting Cards
P12	Jewelry, Watches, Luggage, Writing Tools and Men's Apparel
P13	Women's Apparel
P14	Distilled Spirits, Mixed Drinks, Malt Beverages, Wine and Tobacco Products
P15	Coffee, Tea, Cocoa, Milk, Soft Drinks, Juices and Bottled Water
P16	Dairy Products, Desserts, Baking and Bread Products
P17	Cereals and Spreads, Rice, Pasta, Pizza, Mexican Foods, Fruits and Vegetables
P18	Soup, Meat, Fish, Poultry, Condiments and Dressings
P19	Chewing Gum, Candy, Cookies and Snacks
P20	Soap, Laundry, Paper Products and Kitchen Wraps
P21	Household Cleaners, Room Deodorizers, Pest Controls and Pet Foods
P22	Health Care Products and Remedies
P23	Oral Hygiene Products, Skin Care, Deodorants and Drug Stores
P24	Hair Care, Shaving Products and Fragrances
P25	Women's Beauty Aids, Cosmetics and Personal Products
P26	Relative Volume of Consumption

Table 17-3. 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 and 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 and 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	–

Table 17-3. Amount and Frequency of Use of Various Cosmetic and Baby Products (continued)

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
Makeup Fixatives	–	0.052	0.12	–	0.14	1.0	–
Sunscreen	3.18	0.003	–	0.002	0.14[e]	–	0.005
Colognes and 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
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	2.9	0.073	0.021	–	0.29	0.14[d]	–
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	0.2	0.052	0.13	–	0.29	0.29	–
Cuticle Softeners	0.7	0.040	0.10	–	0.14	0.29	–
Nail Creams and Lotions	0.6	0.070	0.14	–	0.29	0.43	–
Nail Extenders	–	0.003	0.013	–	0.14[e]	0.14[e]	–
Nail Polish and Enamel	0.3	0.16	0.20	0.07	0.71	0.43	1.0
Nail Polish and Enamel Remover	3.1	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	0.5	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, and 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

Table 17-3. Amount and Frequency of Use of Various Cosmetic and Baby Products (continued)

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
Face, Body and Hand Preps (excluding shaving preps)	3.5	0.65	–	1.12	2.0	–	2.14
Foot Powder and Sprays	–	0.061	0.079	–	0.57[e]	0.29	–
Hormones	–	0.012	0.028	–	0.57[e]	0.14[e]	–
Moisturizers	0.5	0.98	0.88	0.63	2.0	1.71	1.5
Night Skin Care Products	1.3	0.18	0.50	–	1.0	1.0	–
Paste Masks (mud packs)	3.7	0.027	0.20	–	0.14	0.43	–
Skin Lighteners	–	–	0.024	–	–[e]	0.14[e]	–
Skin Fresheners and Astringents	2.0	0.33	0.56	–	1.0	1.43	–
Wrinkle Smoothers (removers)	0.4	0.021	0.15	–	1.0[d]	1.0	–
Facial Cream	0.6	0.0061	–	–	0.0061	–	–
Permanent Wave	101	0.003	–	0.001	0.0082	–	0.005
Hair Straighteners	0.2	0.0007	–	–	0.005[e]	–	–
Hair Dye	–	0.001	–	0.005	0.004[e]	–	0.014
Hair Lighteners	–	0.0003	–	–	0.005[e]	–	–
Hair Bleaches	–	0.0005	–	–	0.02[e]	–	–
Hair Tints	–	0.0001	–	–	0.005[e]	–	–
Hair Rinse (coloring)	–	0.0004	–	–	0.02[e]	–	–
Shampoo (coloring)	–	0.0005	–	–	0.02[e]	–	–
Hair Color Spray	–	–	–	–	–[e]	–	–
Shave Cream	1.73	–	–	0.082	–	–	0.36

[a] Values reported are the averages of the responses reported by the 20 companies interviewed.

[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 is indicated by "1 or more"; also, ranges are used in many cases (i.e., "10-12"). The average, therefore, is underestimated slightly. The "1 or more" designation also skews 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 reflects 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 reflects entire household use.

[g] Usage data reflects total bath product usage.

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

(–) indicate no data available.

Source: CTFA (1983).

Table 17-4. Frequency of Use for Household Solvent Products (users only)

Products	Mean (use/year)	SD	Percentile Rankings for Frequency of Use/Year										
			Min	1	5	10	25	50	75	90	95	99	Max
Spray Shoe Polish	10.28	20.10	1.00	1.00	1.00	1.00	2.00	4.00	8.00	24.30	52.00	111.26	156.00
Water Repellents/Protectors	3.50	11.70	1.00	1.00	1.00	1.00	1.00	2.00	3.00	6.00	10.00	35.70	300.00
Spot Removers	15.59	43.34	1.00	1.00	1.00	1.00	2.00	3.00	10.00	40.00	52.00	300.00	365.00
Solvent-Type Cleaning Fluids or Degreasers	16.46	44.12	1.00	1.00	1.00	1.00	2.00	4.00	12.00	46.00	52.00	300.00	365.00
Wood Floor and Paneling Cleaners	8.48	20.89	1.00	1.00	1.00	1.00	NA	2.00	6.00	24.00	50.00	56.00	350.00
Typewriter Correction Fluid	40.00	74.78	1.00	1.00	1.00	2.00	4.00	12.00	40.00	100.00	200.00	365.00	520.00
Adhesives	8.89	26.20	1.00	1.00	1.00	1.00	2.00	3.00	6.00	15.00	28.00	100.00	500.00
Adhesive Removers	4.22	12.30	1.00	1.00	1.00	1.00	1.00	1.00	3.00	6.00	16.80	100.00	100.00
Silicone Lubricants	10.32	25.44	1.00	1.00	1.00	1.00	2.00	3.00	10.00	20.00	46.35	150.00	300.00
Other Lubricants (excluding automotive)	10.66	25.46	1.00	1.00	1.00	1.00	2.00	4.00	10.00	20.00	50.00	100.00	420.00
Specialized Electronic Cleaners (e.g., for TVs)	13.41	38.16	1.00	1.00	1.00	1.00	2.00	3.00	10.00	24.00	52.00	224.50	400.00
Latex Paint	3.93	20.81	1.00	1.00	1.00	1.00	1.00	2.00	4.00	6.00	10.00	30.00	800.00
Oil Paint	5.66	23.10	1.00	1.00	1.00	1.00	1.00	1.00	3.00	6.00	12.00	139.20	300.00
Wood Stains, Varnishes, and Finishes	4.21	12.19	1.00	1.00	1.00	1.00	1.00	2.00	4.00	7.00	12.00	50.80	250.00
Paint Removers/Strippers	3.68	9.10	1.00	1.00	1.00	1.00	4.00	2.00	3.00	6.00	11.80	44.56	100.00
Paint Thinners	6.78	22.10	0.03	0.03	0.10	0.23	1.00	2.00	4.00	12.00	23.00	100.00	352.00
Aerosol Spray Paint	4.22	15.59	1.00	1.00	1.00	1.00	1.00	2.00	4.00	6.10	12.00	31.05	365.00
Primers and Special Primers	3.43	8.76	1.00	1.00	1.00	1.00	1.00	1.00	3.00	6.00	10.00	50.06	104.00
Aerosol Rust Removers	6.17	9.82	1.00	1.00	1.00	1.00	1.00	2.00	6.00	15.00	24.45	50.90	80.00
Outdoor Water Repellents (for wood or cement)	2.07	3.71	1.00	1.00	1.00	1.00	1.00	2.00	2.00	3.00	5.90	12.00	52.00
Glass Frostings, Window Tints, and Artificial Snow	2.78	21.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	27.20	365.00
Engine Degreasers	4.18	13.72	1.00	1.00	1.00	1.00	1.00	2.00	3.25	6.70	12.00	41.70	300.00
Carburetor Cleaners	3.77	7.10	1.00	1.00	1.00	1.00	1.00	2.00	3.00	6.00	12.00	47.28	100.00
Aerosol Spray Paints for Cars	4.50	9.71	1.00	1.00	1.00	1.00	1.00	2.00	4.00	10.00	15.00	60.00	100.00
Auto Spray Primers	6.42	33.89	1.00	1.00	1.00	1.00	1.00	2.00	3.75	10.00	15.00	139.00	500.00
Spray Lubricant for Cars	10.31	30.71	1.00	1.00	1.00	1.00	2.00	3.00	6.00	20.00	40.00	105.60	365.00
Transmission Cleaners	2.28	3.55	1.00	NA	1.00	1.00	1.00	1.00	2.00	3.00	9.00	NA	26.00
Battery Terminal Protectors	3.95	24.33	1.00	1.00	1.00	1.00	1.00	2.00	2.00	4.00	6.55	41.30	365.00
Brake Quieters Cleaners	3.00	6.06	1.00	NA	1.00	1.00	1.00	2.00	2.00	6.00	10.40	NA	52.00
Gasket Remover	2.50	4.39	1.00	NA	1.00	1.00	1.00	1.00	2.00	5.00	6.50	NA	30.00
Tire/Hubcap Cleaners	11.18	18.67	1.00	1.00	1.00	1.00	2.00	4.00	12.00	30.00	50.00	77.00	200.00
Ignition and Wire Dryers	3.01	5.71	1.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	9.70	44.52	60.00

NA = Not available.

SD = Standard deviation.

Min/Max = Minimum/Maximum.

Source: Westat (1987a).

Table 17-5. Exposure Time of Use for Household Solvent Products (users only)

Products	Mean (minutes)	SD	Percentile Rankings for Duration of Use (minutes)										
			Min	1	5	10	25	50	75	90	95	99	Max
Spray Shoe Polish	7.49	9.60	0.02	0.03	0.25	0.50	2.00	5.00	10.00	18.00	30.00	60.00	60.00
Water Repellents/Protectors	14.46	24.10	0.02	0.08	0.50	1.40	3.00	10.00	15.00	30.00	60.00	120.00	480.00
Spot Removers	10.68	22.36	0.02	0.03	0.08	0.25	2.00	5.00	10.00	30.00	30.00	120.00	360.00
Solvent-Type Cleaning Fluids or Degreasers	29.48	97.49	0.02	0.03	1.00	2.00	5.00	15.00	30.00	60.00	120.00	300.00	1,800.00
Wood Floor and Paneling Cleaners	74.04	128.43	0.02	1.00	5.00	10.00	20.00	30.00	90.00	147.00	240.00	480.00	2,700.00
Typewriter Correction Fluid	7.62	29.66	0.02	0.02	0.03	0.03	0.17	1.00	2.00	10.00	32.00	120.00	480.00
Adhesives	15.58	81.80	0.02	0.03	0.08	0.33	1.00	4.25	10.00	30.00	60.00	180.00	2,880.00
Adhesive Removers	121.20	171.63	0.03	0.03	1.45	3.00	15.00	60.00	120.00	246.00	480.00	960.00	960.00
Silicone Lubricants	10.42	29.47	0.02	0.03	0.08	0.17	0.50	2.00	10.00	20.00	45.00	180.00	360.00
Other Lubricants (excluding automotive)	8.12	32.20	0.02	0.03	0.05	0.08	0.50	2.00	5.00	15.00	30.00	90.00	900.00
Specialized Electronic Cleaners (e.g., for TVs)	9.47	45.35	0.02	0.03	0.08	0.17	0.50	2.00	5.00	20.00	30.00	93.60	900.00
Latex Paint	295.08	476.11	0.02	1.00	22.50	30.00	90.00	180.00	360.00	480.00	810.00	2,880.00	5,760.00
Oil Paint	194.12	345.68	0.02	0.51	15.00	30.00	60.00	12.00	240.00	480.00	579.00	1,702.80	5,760.00
Wood Stains, Varnishes, and Finishes	117.17	193.05	0.02	0.74	5.00	10.00	30.00	60.00	120.00	140.00	360.00	720.00	280.00
Paint Removers/Strippers	125.27	286.59	0.02	0.38	5.00	5.00	20.00	60.00	120.00	240.00	420.00	1,200.00	4,320.00
Paint Thinners	39.43	114.85	0.02	0.08	1.00	2.00	5.00	10.00	30.00	60.00	180.00	480.00	2,400.00
Aerosol Spray Paint	39.54	87.79	0.02	0.17	2.00	5.00	10.00	20.00	45.00	60.00	120.00	300.00	1,800.00
Primers and Special Primers	91.29	175.05	0.05	0.24	3.00	5.00	15.00	30.00	120.00	240.00	360.00	981.60	1,920.00
Aerosol Rust Removers	18.57	48.54	0.02	0.05	0.17	0.25	2.00	5.00	20.00	60.00	60.00	130.20	720.00
Outdoor Water Repellents (for wood or cement)	104.94	115.36	0.02	0.05	5.00	15.00	30.00	60.00	120.00	240.00	300.00	480.00	960.00
Glass Frostings, Window Tints, and Artificial Snow	29.45	48.16	0.03	0.14	2.00	3.00	5.00	15.00	30.00	60.00	96.00	268.80	360.00
Engine Degreasers	29.29	48.14	0.02	0.95	2.00	5.00	10.00	15.00	30.00	60.00	120.00	180.00	900.00
Carburetor Cleaners	13.57	23.00	0.02	0.08	0.33	1.00	3.00	7.00	15.00	30.00	45.00	120.00	300.00
Aerosol Spray Paints for Cars	42.77	71.39	0.03	0.19	1.00	3.00	10.00	20.00	60.00	120.00	145.00	360.00	900.00
Auto Spray Primers	51.45	86.11	0.05	0.22	2.00	5.00	10.00	27.50	60.00	120.00	180.00	529.20	600.00
Spray Lubricant for Cars	9.90	35.62	0.02	0.03	0.08	0.17	1.00	5.00	10.00	15.00	30.00	120.00	720.00
Transmission Cleaners	27.90	61.44	0.17	NA	0.35	1.80	5.00	15.00	30.00	60.00	60.00	NA	450.00
Battery Terminal Protectors	9.61	18.15	0.03	0.04	0.08	0.23	1.00	5.00	10.00	20.00	30.00	120.00	180.00
Brake Quieters/Cleaners	23.38	36.32	0.07	NA	0.50	1.00	5.00	15.00	30.00	49.50	120.00	NA	240.00
Gasket Remover	23.57	27.18	0.33	NA	0.50	2.00	6.25	15.00	30.00	60.00	60.00	NA	180.00
Tire/Hubcap Cleaners	22.66	23.94	0.08	0.71	3.00	5.00	10.00	15.00	30.00	60.00	60.00	120.00	240.00
Ignition and Wire Dryers	7.24	8.48	0.02	0.02	0.08	0.47	1.50	5.00	10.00	15.00	25.50	48.60	60.00

NA = Not available.

SD = Standard deviation.
Min/Max = Minimum/Maximum.

Source: Westat (1987a).

Table 17-6. Amount of Products Used for Household Solvent Products (users only)

Products	Mean (ounces/year)	SD	Percentile Rankings for Amount of Products Used (ounces/year)										
			Min.	1	5	10	25	50	75	90	95	99	Max
Spray Shoe Polish	9.90	17.90	0.04	0.20	0.63	1.00	2.00	4.50	10.00	24.00	36.00	99.36	180.00
Water Repellents/Protectors	11.38	22.00	0.04	0.47	0.98	1.43	2.75	6.00	12.00	24.00	33.00	121.84	450.00
Spot Removers	26.32	90.10	0.01	0.24	0.60	1.00	2.00	5.50	16.00	48.00	119.20	384.00	1,600.00
Solvent-Type Cleaning Fluids or Degreasers	58.30	226.97	0.04	0.50	2.00	3.00	6.50	16.00	32.00	96.00	192.00	845.00	5,120.00
Wood Floor and Paneling Cleaners	28.41	57.23	0.03	0.80	2.45	3.50	7.00	14.00	30.00	64.00	96.00	204.40	1,144.00
Typewriter Correction Fluid	4.14	13.72	0.01	0.02	0.06	0.12	0.30	0.94	2.40	8.00	18.00	67.44	181.80
Adhesives	7.49	55.90	0.01	0.02	0.05	0.12	0.35	1.00	3.00	8.00	20.00	128.00	1,280.00
Adhesive Removers	34.46	96.60	0.25	0.29	1.22	2.80	6.00	10.88	32.00	64.00	138.70	665.60	1,024.00
Silicone Lubricants	12.50	27.85	0.02	0.20	0.69	1.00	2.25	4.50	12.00	24.00	41.20	192.00	312.00
Other Lubricants (excluding automotive)	9.93	44.18	0.01	0.18	0.30	0.52	1.00	2.25	8.00	18.00	32.00	128.00	1,280.00
Specialized Electronic Cleaners (e.g., for TVs)	9.48	55.26	0.01	0.05	0.13	0.25	0.52	2.00	6.00	12.65	24.00	109.84	1,024.00
Latex Paint	371.27	543.86	0.03	4.00	12.92	32.00	64.00	256.00	384.00	857.60	1,280.00	2,560.00	6,400.00
Oil Paint	168.92	367.82	0.02	0.33	4.00	8.00	25.20	64.00	148.48	384.00	640.00	1,532.16	5,120.00
Wood Stains, Varnishes, and Finishes	65.06	174.01	0.12	1.09	4.00	4.00	8.00	16.00	64.00	128.00	256.00	768.00	3,840.00
Paint Removers/Strippers	63.73	144.33	0.64	1.50	4.00	8.00	16.00	32.00	64.00	128.00	256.00	512.00	2,560.00
Paint Thinners	69.45	190.55	0.03	0.45	3.10	4.00	8.00	20.48	64.00	128.00	256.00	640.00	3,200.00
Aerosol Spray Paint	30.75	52.84	0.02	0.75	2.01	3.25	7.00	13.00	32.00	65.00	104.00	240.00	1,053.00
Primers and Special Primers	68.39	171.21	0.01	0.09	1.30	3.23	8.00	16.00	60.00	128.00	256.00	867.75	1,920.00
Aerosol Rust Removers	18.21	81.37	0.09	0.25	1.00	1.43	2.75	8.00	13.00	32.00	42.60	199.80	1,280.00
Outdoor Water Repellents (for wood or cement)	148.71	280.65	0.01	0.37	3.63	8.00	16.00	64.00	128.00	448.00	640.00	979.20	3,200.00
Glass Frostings, Window Tints, and Artificial Snow	13.82	14.91	1.00	1.40	2.38	3.25	6.00	12.00	14.00	28.00	33.00	98.40	120.00
Engine Degreasers	46.95	135.17	0.04	1.56	4.00	6.00	12.00	16.00	36.00	80.00	160.00	480.00	2,560.00
Carburetor Cleaners	22.00	50.60	0.10	0.50	1.50	3.00	5.22	12.00	16.00	39.00	75.00	212.00	672.00
Aerosol Spray Paints for Cars	44.95	89.78	0.04	0.14	1.50	3.00	6.12	16.00	48.00	100.80	156.00	557.76	900.00
Auto Spray Primers	70.37	274.56	0.12	0.77	3.00	4.00	9.00	16.00	48.00	128.00	222.00	1,167.36	3840.00
Spray Lubricant for Cars	18.63	54.74	0.08	0.40	0.96	1.00	2.75	6.00	15.50	36.00	64.00	240.00	864.00
Transmission Cleaners	35.71	62.93	2.00	NA	3.75	4.00	8.00	15.00	32.00	77.00	140.00	NA	360.00
Battery Terminal Protectors	16.49	87.84	0.12	0.13	0.58	1.00	2.00	4.00	8.00	15.00	24.60	627.00	1,050.00
Brake Quieters/Cleaners	11.72	13.25	0.50	NA	1.00	2.00	3.02	8.00	14.25	32.00	38.60	NA	78.00
Gasket Remover	13.25	22.35	0.50	NA	1.00	1.00	3.75	7.75	16.00	24.00	58.40	NA	160.00
Tire/Hubcap Cleaners	31.58	80.39	0.12	0.50	1.82	3.00	6.00	12.00	28.00	64.00	96.00	443.52	960.00
Ignition and Wire Dryers	9.02	14.59	0.13	0.32	1.09	1.50	3.00	6.00	10.75	16.00	20.55	113.04	120.00

NA = Not available.
SD = Standard deviation.
Min/Max = Minimum/Maximum.

Source: Westat (1987a).

Table 17-7. Time Exposed After Duration of Use for Household Solvent Products (users only)

Products	Mean (minutes)	SD	Percentile Rankings for Time Exposed After Duration of Use (minutes)										
			Min.	1	5	10	25	50	75	90	95	99	Max
Spray Shoe Polish	31.40	80.50	0.00	0.00	0.00	0.00	0.00	5.00	20.00	120.00	120.00	480.00	720.00
Water Repellents/Protectors	37.95	111.40	0.00	0.00	0.00	0.00	0.00	3.00	20.00	120.00	240.00	480.00	1,800.00
Spot Removers	43.65	106.97	0.00	0.00	0.00	0.00	1.00	5.00	30.00	120.00	240.00	480.00	1,440.00
Solvent-Type Cleaning Fluids or Degreasers	33.29	90.39	0.00	0.00	0.00	0.00	0.00	3.00	28.75	60.00	180.00	480.00	1,440.00
Wood Floor and Paneling Cleaners	96.75	192.88	0.00	0.00	0.00	0.00	5.00	30.00	120.00	240.00	480.00	1,062.00	1,440.00
Typewriter Correction Fluid	124.70	153.46	0.00	0.00	1.00	5.00	30.00	60.00	180.00	360.00	480.00	600.00	1,800.00
Adhesives	68.88	163.72	0.00	0.00	0.00	0.00	1.00	10.00	60.00	180.00	360.00	720.00	2,100.00
Adhesive Removers	94.12	157.69	0.00	0.00	0.00	0.00	1.75	20.00	120.00	360.00	480.00	720.00	720.00
Silicone Lubricants	30.77	107.39	0.00	0.00	0.00	0.00	0.00	0.00	10.00	60.00	180.00	480.00	1,440.00
Other Lubricants (excluding automotive)	47.45	127.11	0.00	0.00	0.00	0.00	0.00	2.00	30.00	120.00	240.00	485.40	1,440.00
Specialized Electronic Cleaners (e.g., for TVs)	117.24	154.38	0.00	0.00	0.00	1.00	10.00	60.00	180.00	300.00	480.00	720.00	1,440.00
Latex Paint	91.38	254.61	0.00	0.00	0.00	0.00	0.00	5.00	60.00	240.00	480.00	1,440.00	2,880.00
Oil Paint	44.56	155.19	0.00	0.00	0.00	0.00	0.00	0.00	30.00	120.00	240.00	480.00	2,880.00
Wood Stains, Varnishes, and Finishes	48.33	156.44	0.00	0.00	0.00	0.00	0.00	1.00	30.00	120.00	240.00	694.00	2,880.00
Paint Removers/Strippers	31.38	103.07	0.00	0.00	0.00	0.00	0.00	0.00	20.00	60.00	180.00	541.20	1,440.00
Paint Thinners	32.86	105.62	0.00	0.00	0.00	0.00	0.00	0.00	15.00	60.00	180.00	480.00	1,440.00
Aerosol Spray Paint	12.70	62.80	0.00	0.00	0.00	0.00	0.00	0.00	1.00	30.00	60.00	260.50	1,440.00
Primers and Special Primers	22.28	65.57	0.00	0.00	0.00	0.00	0.00	0.00	10.00	60.00	120.00	319.20	720.00
Aerosol Rust Removers	15.06	47.58	0.00	0.00	0.00	0.00	0.00	0.00	5.00	60.00	60.00	190.20	600.00
Outdoor Water Repellents (for wood or cement)	8.33	43.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	58.50	309.60	420.00
Glass Frostings, Window Tints, and Artificial Snow	137.87	243.21	0.00	0.00	0.00	0.00	3.00	60.00	180.00	360.00	480.00	1,440.00	1,800.00
Engine Degreasers	4.52	24.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.50	120.00	360.00
Carburetor Cleaners	7.51	68.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	30.00	120.60	1,800.00
Aerosol Spray Paints for Cars	10.71	45.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.50	60.00	282.00	480.00
Auto Spray Primers	11.37	45.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	77.25	360.00	360.00
Spray Lubricant for Cars	4.54	30.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	15.00	70.20	420.00
Transmission Cleaners	5.29	29.50	0.00	NA	0.00	0.00	0.00	0.00	0.00	5.00	22.50	NA	240.00
Battery Terminal Protectors	3.25	17.27	0.00	NA	0.00	0.00	0.00	0.00	0.00	2.90	15.00	120.00	180.00
Brake Quieters/Cleaners	10.27	30.02	0.00	NA	0.00	0.00	0.00	0.00	0.00	30.00	120.00	NA	120.00
Gasket Remover	27.56	58.54	0.00	NA	0.00	0.00	0.00	0.00	12.50	120.00	180.00	NA	240.00
Tire/Hubcap Cleaners	1.51	20.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	480.00
Ignition and Wire Dryers	6.39	31.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	30.00	216.60	240.00

NA = Not available.
SD = Standard deviation.
Min/Max = Minimum/Maximum.

Source: Westat (1987a).

Table 17-8. Total Exposure Time of Performing Task and Product Type Used by Task for Household Cleaning Products

Tasks	Mean (hours/year)	Median (hours/year)	Product Type Used	Percent of Preference
Clean Bathroom Sinks and Tubs	44	26	Liquid	29%
			Powder	44%
			Aerosol	16%
			Spray pump	10%
			Other	1%
Clean Kitchen Sinks	41	18	Liquid	31%
			Powder	61%
			Aerosol	2%
			Spray pump	4%
			Other	2%
Clean Inside of Cabinets (e.g., kitchen)	12	5	Liquid	68%
			Powder	12%
			Aerosol	2%
			Spray pump	16%
			Other	2%
Clean Outside of Cabinets	21	6	Liquid	61%
			Powder	8%
			Aerosol	16%
			Spray pump	13%
			Other	2%
Wipe Off Kitchen Counters	92	55	Liquid	67%
			Powder	13%
			Aerosol	2%
			Spray pump	15%
			Other	3%
Thoroughly Clean Counters	24	13	Liquid	56%
			Powder	21%
			Aerosol	5%
			Spray pump	17%
			Other	1%
Clean Bathroom Floors	20	9	Liquid	70%
			Powder	21%
			Aerosol	2%
			Spray pump	4%
			Other	3%
Clean Kitchen Floors	31	14	Liquid	70%
			Powder	27%
			Aerosol	2%
			Spray pump	1%
			Other	-
Clean Bathroom or Other tilted or Ceramic Walls	16	9	Liquid	37%
			Powder	18%
			Aerosol	17%
			Spray pump	25%
			Other	3%

Table 17-8. Total Exposure Time of Performing Task and Product Type Used by Task for Household Cleaning Products (continued)

Tasks	Mean (hours/year)	Median (hours/year)	Product Type Used	Percent of Preference
Clean Outside of Windows	13	6	Liquid	27%
			Powder	2%
			Aerosol	6%
			Spray pump	65%
			Other	-
Clean Inside of Windows	18	6	Liquid	24%
			Powder	1%
			Aerosol	8%
			Spray pump	66%
			Other	2%
Clean Glass Surfaces Such as Mirrors and Tables	34	13	Liquid	13%
			Powder	1%
			Aerosol	8%
			Spray pump	76%
			Other	2%
Clean Outside of Refrigerator and Other Appliances	27	13	Liquid	48%
			Powder	3%
			Aerosol	7%
			Spray pump	38%
			Other	4%
Clean Spots or Dirt on Walls or Doors Finishes	19	8	Liquid	46%
			Powder	15%
			Aerosol	4%
			Spray pump	30%
			Other	4%

- Indicates value is less than 1%.

Source: Westat (1987c).

Table 17-9. Percentile Rankings for Total Exposure Time in Performing Household Tasks

	Percentile Rankings for Total Exposure Time Performing Task (hours/year)							
Tasks	Min	10th	25th	50th	75th	90th	95th	Max
Clean Bathroom Sinks and Tubs	0.4	5.2	13	26	52	91.3	121.7	365
Clean Kitchen Sinks	0.3	3.5	8.7	18.3	60.8	97.6	121.7	547.5
Clean Inside of Kitchen Cabinets	0.2	1	2	4.8	12	32.5	48	208
Clean Outside of Cabinets	0.1	1	2	6	17.3	36	78.7	780
Wipe Off Kitchen Counters	1.2	12	24.3	54.8	91.5	231.2	456.3	912.5
Thoroughly Clean Counters	0.2	1.8	6	13	26	52	94.4	547.5
Clean Bathroom Floors	0.1	2	4.3	8.7	26	36.8	71.5	365
Clean Kitchen Floors	0.5	4.3	8.7	14	26	52	97	730
Clean Bathroom or Other Tilted or Ceramic Walls	0.2	1	3	8.7	26	36	52	208
Clean Outside of Windows	0.1	1.5	2	6	11.5	24	32.6	468
Clean Inside of Windows	0.2	1.2	3	6	19.5	36	72	273
Clean Glass Surfaces Such as Mirrors and Tables	0.2	1.7	6	13	26	60.8	104	1460
Clean Outside Refrigerator and Other Appliances	0.1	1.8	4.3	13	30.4	91.3	95.3	365
Clean Spots or Dirt on Walls or Doors	0.1	0.6	2	8	24	52	78	312

Min = Minimum.
Max = Maximum.

Source: Westat (1987c).

Table 17-10. Mean Percentile Rankings for Frequency of Performing Household Tasks

Tasks	Mean	Percentile Rankings							
		Min	10th	25th	50th	75th	90th	95th	Max
Clean Bathroom Sinks and Tubs	3 ×/week	0.2 ×/week	1 ×/week	1 ×/week	2 ×/week	3.5 ×/week	7 ×/week	7 ×/week	42 ×/week
Clean Kitchen Sinks	7 ×/week	0 ×/week	1 ×/week	2 ×/week	7 ×/week	7 ×/week	15 ×/week	21 ×/week	28 ×/week
Clean Inside of Cabinets Such as Those in the Kitchen	9 ×/year	1 ×/year	1 ×/year	1 ×/year	2 ×/year	12 ×/year	12 ×/year	52 ×/year	156 ×/year
Clean Outside of Cabinets	3 ×/month	0.1 ×/month	0.1 ×/month	0.3 ×/month	1 ×/month	4 ×/month	4 ×/month	22 ×/month	30 ×/month
Wipe Off Counters Such as Those in the Kitchen	2 ×/day	0 ×/day	0.4 ×/day	1 ×/day	1 ×/day	3 ×/day	4 ×/day	6 ×/day	16 ×/day
Thoroughly Clean Counters	8 ×/month	0.1 ×/month	0.8 ×/month	1 ×/month	4 ×/month	4 ×/month	30 ×/month	30 ×/month	183 ×/month
Clean Bathroom Floors	6 ×/month	0.2 ×/month	1 ×/month	2 ×/month	4 ×/month	4 ×/month	13 ×/month	30 ×/month	30 ×/month
Clean Kitchen Floors	6 ×/month	0.1 ×/month	1 ×/month	2 ×/month	4 ×/month	4 ×/month	13 ×/month	30 ×/month	30 ×/month
Clean Bathroom or Other Tiled or Ceramic Walls	4 ×/month	0.1 ×/month	0.2 ×/month	1 ×/month	2 ×/month	4 ×/month	9 ×/month	13 ×/month	30 ×/month
Clean Outside of Windows	5 ×/year	1 ×/year	1 ×/year	1 ×/year	2 ×/year	4 ×/year	12 ×/year	12 ×/year	156 ×/year
Clean Inside of Windows	10 ×/year	1 ×/year	1 ×/year	2 ×/year	4 ×/year	12 ×/year	24 ×/year	52 ×/year	156 ×/year
Clean Other Glass Surfaces such as Mirrors and Tables	7 ×/month	0.1 ×/month	1 ×/month	2 ×/month	4 ×/month	4 ×/month	17 ×/month	30 ×/month	61 ×/month
Clean Outside of Refrigerator and Other Appliances	10 ×/month	0.2 ×/month	1 ×/month	2 ×/month	4 ×/month	13 ×/month	30 ×/month	30 ×/month	61 ×/month
Clean Spots or Dirt on Walls or Doors	6 ×/month	0.1 ×/month	0.2 ×/month	0.3 ×/month	1 ×/month	4 ×/month	13 ×/month	30 ×/month	152 ×/month

Min = Minimum.
Max = Maximum.

Source: Westat (1987c).

Table 17-11. Mean and Percentile Rankings for Exposure Time per Event of Performing Household Tasks

Tasks	Mean (minutes/event)	Percentile Rankings (minutes/event)							
		Min	10th	25th	50th	75th	90th	95th	Max
Clean Bathroom Sinks and Tubs	20	1	5	10	15	30	45	60	90
Clean Kitchen Sinks	10	1	2	3	5	10	15	20	480
Clean Inside of Cabinets Such as Those in the Kitchen	137	5	24	44	120	180	240	360	2,880
Clean Outside of Cabinets	52	1	5	15	30	60	120	180	330
Wipe Off Counters Such as Those in the Kitchen	9	1	2	3	5	10	15	30	120
Thoroughly Clean Counters	25	1	5	10	15	30	60	90	180
Clean Bathroom Floors	16	1	5	10	15	20	30	38	60
Clean Kitchen Floors	30	2	10	15	20	30	60	60	180
Clean Bathroom or Other Tiled or Ceramic Walls	34	1	5	15	30	45	60	120	240
Clean Outside of Windows	180	4	30	60	120	240	420	480	1,200
Clean Inside of Windows	127	4	20	45	90	158	300	381	1,200
Clean Other Glass Surfaces Such as Mirrors and Tables	24	1	5	10	15	30	60	60	180
Clean Outside of Refrigerator and Other Appliances	19	1	4	5	10	20	30	45	240
Clean Spots or Dirt on Walls or Doors	50	1	5	10	20	60	120	216	960

Min = Minimum.
Max = Maximum.
Source: Westat (1987c).

Table 17-12. Total Exposure Time for Ten Product Groups Most Frequently Used for Household Cleaning[a]

Products	Mean (hours/year)	Percentile Rankings of Total Exposure Time (hours/year)							
		Min	10th	25th	50th	75th	90th	95th	Max
Dish Detergents	107	0.2	6	24	56	134	274	486	941
Glass Cleaners	67	0.4	3	12	29	62	139	260	1,508
Floor Cleaners	52	0.7	4	7	22	52	102	414	449
Furniture Polish	32	0.1	0.3	1	12	36	101	215	243
Bathroom Tile Cleaners	47	0.5	2	8	17	48	115	287	369
Liquid Cleansers	68	0.2	2	9	22	52	122	215	2,381
Scouring Powders	78	0.3	9	17	35	92	165	281	747
Laundry Detergents	66	0.6	8	14	48	103	174	202	202
Rug Cleaners/Shampoos	12	0.3	0.3	0.3	9	26	26	26	26
All Purpose Cleaners	64	0.3	4	9	26	77	174	262	677

[a] The data in Table 17-12 reflect only the 14 tasks included in the survey. Therefore, many of the durations reported in the table underestimate the hours of the use of the product group. For example, use of dish detergents to wash dishes is not included.
Min = Minimum.
Max = Maximum.
Source: Westat (1987c).

Table 17-13. Total Exposure Time of Painting Activity of Interior Painters (hours)

Types of Paint	Mean (hours)	SD	Percentile Rankings for Duration of Painting Activity (hours)							
			Min	10	25	50	75	90	95	Max
Latex	12.2	11.3	1	3	4	9	15	24	40	248
Oil-Based	10.7	15.6	1	1.6	3	6	10	21.6	65.6	72
Wood Stains and Varnishes	8.6	10.9	1	1	2	4	9.3	24	40	42

SD = Standard deviation.
Min = Minimum.
Max = Maximum.

Source: Westat (1987b).

Table 17-14. Exposure Time of Interior Painting Activity/Occasion (hours) and Frequency of Occasions Spent Painting per Year

	Duration of Painting/Occasion (hours)		Frequency of Occasions Spent Painting/Year		Percentile Rankings for Frequency of Occasions Spent Painting							
Types of Paint	Mean	Median	Mean	SD	Min	10	25	50	75	90	95	Max
Latex	3.0	3	4.2	5.5	1	1	2	3	4	9	10	62
Oil-Based	2.1	3	5.1	12.0	1	1	1	2	4	8	26	72
Wood Stains and Varnishes	2.2	2	4.0	4.9	1	1	1	2	4	9	20	20

SD = Standard deviation.
Min = Minimum.
Max = Maximum.

Source: Westat (1987b).

Table 17-15. Amount of Paint Used by Interior Painters

Types of Paint	Median (gallons)	Mean (gallons)	SD	Percentile Rankings for Amount of Paint Used (gallons)							
				Min	10	25	50	75	90	95	Max
Latex	3.0	3.9	4.6	0.1	1	2	3	5	8	10	50
Oil-Based	2.0	2.6	3.0	0.1	0.3	0.5	2	3	7	12	12
Wood Stains and Varnishes	0.8	0.9	0.8	0.1	0.1	0.3	0.8	1	2	2	4.3

SD = Standard deviation.
Min = Minimum.
Max = Maximum.

Source: Westat (1987b).

Table 17-16. Frequency of Use and Amount of Product Used for Adhesive Removers

	No. of Times Used Within the Last 12 Months $N = 58$	Minutes Using $N = 52$	Minutes in Room After Using[a] $N = 51$	Minutes in Room After Using[b] $N = 5$	Amount Used in Past Year (fluid oz.) $N = 51$	Amount per Use (fluid oz.) $N = 51$
Mean	1.66	172.87	13.79	143.37	96.95	81.84
Standard Deviation	1.67	304.50	67.40	169.31	213.20	210.44
Minimum Value	1.00	5.00	0.00	5.00	13.00	5.20
1st Percentile	1.00	5.00	0.00	5.00	13.00	5.20
5th Percentile	1.00	10.00	0.00	5.00	13.00	6.50
10th Percentile	1.00	15.00	0.00	5.00	16.00	10.67
25th Percentile	1.00	29.50	0.00	20.00	16.00	16.00
Median Value	1.00	120.00	0.00	120.00	32.00	26.00
75th Percentile	2.00	240.00	0.00	420.00	96.00	64.00
90th Percentile	3.00	480.00	0.00	420.00	128.00	128.00
95th Percentile	5.00	1,440.00	120.00	420.00	384.00	192.00
99th Percentile	12.00	1,440.00	420.00	420.00	1,280.00	1,280.00
Maximum Value	12.00	1,440.00	420.00	1,440.00	1,280.00	1,280.00

[a] Includes those who did not spend any time in the room after use.
[b] Includes only those who spent time in the room.

Source: Abt (1992).

Table 17-17. Adhesive Remover Usage by Sex

	Sex	
	Males $N = 25$	Females $N = 33$
Mean number of months since last time adhesive remover was used – includes all respondents (unweighted $N = 240$).	35.33	43.89
Mean number of uses of product in the past year.	1.94	1.30
Mean number of minutes spent with the product during last use.	127.95	233.43
Mean number of minutes spent in the room after last use of product. (Includes all recent users.)	19.76	0
Mean number of minutes spent in the room after last use of product. (Includes only those who did not leave immediately.)	143.37	0
Mean ounces of product used in the past year.	70.48	139.71
Mean ounces of product used per use in the past year.	48.70	130.36

Source: Abt (1992).

Table 17-18. Frequency of Use and Amount of Product Used for Spray Paint

	No. of Times Used Within the Last 12 Months *N* = 775	Minutes Using *N* = 786	Minutes in Room After Using[a] *N* = 791	Minutes in Room After Using[b] *N* = 35	Amount Used in Past Year (fluid oz.) *N* = 778	Amount per Use (fluid oz.) *N* = 778
Mean	8.23	40.87	3.55	65.06	83.92	19.04
Standard Deviation	31.98	71.71	22.03	70.02	175.32	25.34
Minimum Value	1.00	1.00	0.00	1.00	13.00	0.36
1st Percentile	1.00	1.00	0.00	1.00	13.00	0.36
5th Percentile	1.00	3.00	0.00	1.00	13.00	3.47
10th Percentile	1.00	5.00	0.00	10.00	13.00	6.50
25th Percentile	1.00	10.00	0.00	15.00	13.00	9.75
Median Value	2.00	20.00	0.00	30.00	26.00	13.00
75th Percentile	4.00	45.00	0.00	60.00	65.00	21.67
90th Percentile	11.00	90.00	0.00	120.00	156.00	36.11
95th Percentile	20.00	120.00	0.00	120.00	260.00	52.00
99th Percentile	104.00	360.00	120.00	300.00	1,170.00	104.00
Maximum Value	365.00	960.00	300.00	300.00	1,664.00	312.00

[a] Includes those who did not spend any time in the room after use.
[b] Includes only those who spent time in the room.

Source: Abt (1992).

Table 17-19. Spray Paint Usage by Sex

	Sex	
	Males *N* = 405	Females *N* = 386
Mean number of months since last time spray paint was used – includes all respondents (unweighted *N* = 1724).	17.39	26.46
Mean number of uses of product in the past year.	10.45	4.63
Mean number of minutes spent with the product during last use.	40.87	40.88
Mean number of minutes spent in the room after last use of product. (Includes all recent users.)	5.49	0.40
Mean number of minutes spent in the room after last use of product. (Includes only those who did not leave immediately.)	67.76	34.69
Mean ounces of product used in the past year.	103.07	59.99
Mean ounces of product used per use in the past year.	18.50	19.92

Source: Abt (1992).

Table 17-20. Frequency of Use and Amount of Product Used for Paint Removers/Strippers

	No. of Times Used Within the Last 12 Months *N* = 316	Minutes Using *N* = 390	Minutes in Room After Using[a] *N* = 390	Minutes in Room After Using[b] *N* = 39	Amount Used in Past Year (fluid oz.) *N* = 307	Amount per Use (fluid oz.) *N* = 307
Mean	3.54	144.59	12.96	93.88	142.05	64.84
Standard Deviation	7.32	175.54	85.07	211.71	321.73	157.50
Minimum Value	1.00	2.00	0.00	1.00	15.00	0.35
1st Percentile	1.00	5.00	0.00	1.00	15.00	2.67
5th Percentile	1.00	15.00	0.00	1.00	16.00	8.00
10th Percentile	1.00	20.00	0.00	3.00	16.00	10.67
25th Percentile	1.00	45.00	0.00	10.00	32.00	16.00
Median Value	2.00	120.00	0.00	60.00	64.00	32.00
75th Percentile	3.00	180.00	0.00	120.00	128.00	64.00
90th Percentile	6.00	360.00	10.00	180.00	256.00	128.00
95th Percentile	12.00	480.00	60.00	420.00	384.00	192.00
99th Percentile	50.00	720.00	180.00	1,440.00	1,920.00	320.00
Maximum Value	70.00	1,440.00	1,440.00	1,440.00	3,200.00	2,560.00

[a] Includes those who did not spend any time in the room after use.
[b] Includes only those who spent time in the room.

Source: Abt (1992).

Table 17-21. Paint Stripper Usage by Sex

	Sex	
	Males *N* = 156	Females *N* = 162
Mean number of months since last time paint stripper was used – includes all respondents (unweighted *N* = 1724).	32.07	47.63
Mean number of uses of product in the past year.	3.88	3.01
Mean number of minutes spent with the product during last use.	136.70	156.85
Mean number of minutes spent in the room after last use of product. (Includes all recent users.)	15.07	9.80
Mean number of minutes spent in the room after last use of product. (Includes only those who did not leave immediately.)	101.42	80.15
Mean ounces of product used in the past year.	160.27	114.05
Mean ounces of product used per use in the past year.	74.32	50.29

Source: Abt (1992).

Table 17-22. Number of Minutes Spent Using Any Microwave Oven (minutes/day)

Age Group	Percentiles												
	N	1	2	5	10	25	50	75	90	95	98	99	Max
5 to 11 years	62	0	0	0	1	1	2	5	10	15	20	30	30
12 to 17 years	141	0	0	0	1	2	3	5	10	15	30	30	60
18 to 64 years	1,686	0	0	1	2	3	5	10	15	25	45	60	121
> 64 years	375	0	0	1	2	3	5	10	20	30	60	60	70

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 17-23. 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	Max
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
> 64 years	20	0	0	0	3	18	90	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 17-24. 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	Max
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
> 64 years	127	0	0	0	1	3	5	15	30	60	120	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 17-25. 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	Max
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
> 64 years	34	0	0	0	2	5	10	20	35	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 17-26. Number of Minutes Spent in Activities Working With or Near Glue (minutes/day)

Age Group	Percentiles												
	N	1	2	5	10	25	50	75	90	95	98	99	Max
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
> 64 years	10	0	0	0	0	0	4	60	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 17-27. 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	Max
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
> 64 years	21	0	0	0	0	2	5	15	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 17-28. 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	Max
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
> 64 years	9	0	0	0	0	2	3	15	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 17-29. 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	Max
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
> 64 years	26	2	2	2	3	10	25	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 17-30. 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	Max
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
> 64 years	764	31	0	0	0	02	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 17-31. Number of Respondents Using Cologne, Perfume, Aftershave, or Other Fragrances at Specified Daily Frequencies

Age Group	Total *N*	Number of Times Used in a Day				
		1 to 2	3 to 5	6 to 9	10+	Do Not 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
> 64 years	285	277	8	0	0	0

* = Missing data.
N = Number of respondents.

Source: U.S. EPA (1996).

Table 17-32. Number of Respondents Using Any Aerosol Spray Product or 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
> 64 years	175	141	27	4	0	0	0	0	0	1	2

N = Number of respondents.

Source: U.S. EPA (1996).

Table 17-33. 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
> 64 years	120	42	10	10	53	5

N = Number of respondents.

Source: U.S. EPA (1996).

Table 17-34. Number of Respondents Indicating 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 6-month period that pesticides were applied by a professional)					
		None	1 to 2	3 to 5	6 to 9	10+	Don't Know
<1 year	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
18 to 64 years	1,264	660	387	89	97	15	16
> 64 years	243	146	55	15	19	3	5

N = Number of respondents.

Source: U.S. EPA reanalysis of NHAPS (U.S. EPA, 1996) data.

Table 17-35. 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 6-month period that pesticides were applied by a resident)					
		None	1 to 2	3 to 5	6 to 9	10+	Don't Know
<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
18 to 64 years	1,264	473	477	192	48	55	19
> 64 years	243	94	85	31	15	9	9

N = Number of respondents.

Source: U.S. EPA reanalysis of NHAPS (U.S. EPA, 1996) data.

Table 17-36. Household Demographics and Pesticide Types, Characteristics, and Frequency of Pesticide Use

	Number[a]	Percent[a]
Survey Population Demographics		
Sex		
Female	90	84.1
Male	17	15.9
Language of Interview		
Spanish	72	67.3
English	35	32.7
Reading Skills		
Able to read English	71	66.4
Able to read Spanish	95	88.8
Number in Household		
2 to 3 people	25	23.3
4 to 5 people	59	55.1
6 to 8 people	23	21.4
Children under 10 years		
1 child	37	34.6
2 children	45	42.1
3 to 5 children	25	23.3
Type of Home		
Single family detached	75	70.1
Multi-family	9	8.4
Trailer/mobile home	9	8.4
Single-family attached	8	7.5
Apartment/other	4	3.7
Pets		
Pets kept in household	55	51.4
Pesticides used on pets	22	40.0
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 up to 107 participants or 148 products, and percentages may not add up to 100 because of some non-responses to survey questions.

Source: Bass et al. (2001).

Table 17-37. Amount and Frequency of Use of Household Products

Product Type	Overall						Per Subject	
	Mean	SD	Min	Max	Subjects	Events	Min	Max
Dishwashing Liquid								
Frequency of use per day	0.63	0.79	0	5	45	596	0.05	2.29
Duration of contact (minutes)	11	5	1	60	45	596	2	35
Amount used per contact (grams)	5	3	1	16	13	163	2	10
All-Purpose Cleaner								
Frequency of use per day	0.35	0.70	0	4	28	218	0.050	1.82
Duration of contact (minutes)	20	22	1	135	28	204	5	60
Amount used per contact (grams)	27	30	1	123	12	105	2	74
Toilet Cleaner								
Frequency of use per day	0.28	0.55	0	2	18	105	0.05	1.67
Duration of contact (minutes)	74	204	1	1,209	28	101	2[a]	24[a]
Amount used per contact (grams)	-	-	-	-	-	-	9	153
Hair Spray								
Frequency of use per day	0.76	0.68	0	3	9	143	0.29	1.76
Amount used per contact (grams)	-	-	-	-	-	-	1.0	11.6
Duration of release (seconds)	11	6	5	25	12	-	-	-
Duration of contact with nebula (seconds)	23	11	5	41	12	-	-	-
Duration of contact with nebula × gram released (seconds × grams)	48	48	5	150	10	-	-	-

[a] Excludes durations over 30 minutes.

- Indicates insufficient sample size to estimate average use.

Source: Weegels and van Veen (2001).

Table 17-38. 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 and 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 17-39. 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			
10^{th}	0.026	0.003	0.001
20^{th}	0.063	0.005	0.003
30^{th}	0.082	0.008	0.004
40^{th}	0.110	0.010	0.004
50^{th}	0.147	0.013	0.005
60^{th}	0.186	0.016	0.006
70^{th}	0.242	0.021	0.009
80^{th}	0.326	0.029	0.011
90^{th}	0.655	0.055	0.024
95^{th}	0.986	0.087	0.037
99^{th}	2.427	0.191	0.089
Best Fit Distributions and 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			
10^{th}	36.74	3.33	1.30
20^{th}	51.99	4.68	1.73
30^{th}	68.43	5.71	2.32
40^{th}	82.75	6.74	2.76
50^{th}	96.41	7.63	3.45
60^{th}	110.85	9.25	4.22
70^{th}	134.20	10.90	4.93
80^{th}	160.26	12.36	6.14

Table 17-39. Amount of Test Product used (grams) for Lipstick, Body Lotion and Face Cream (continued)

Summary Statistics	Total Amount Applied	Average[a] Amount Applied per Use Day	Average[b] Amount Applied per Application
90th	182.67	14.39	8.05
95th	190.13	16.83	10.22
99th	208.50	27.91	21.71
Best Fit Distributions and 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 and 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 17-40. Frequency of Use of Personal Care Products

Product Type	*N*	Average Number of Applications per Use Day[a]			
		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 17-41. 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 GSD = 2.40	GM = 2.44 GSD = 2.67	GM = 0.21 GSD = 3.01	GM = 0.33 GSD = 2.99	GM = 9.32 GSD = 2.02	Location = 0.51 Scale = 3.92 Shape = 2.76	GM = 0.43 GSD = 2.37
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 (>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).
SD = Standard deviation.
GM = Geometric mean.
GSD = Geometric standard deviation.

Source: Loretz et al. (2006).

Table 17-42. 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	12.82	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 GSD = 2.37	GM = 3.45 GSD = 2.70	GM = 0.30 GSD = 3.36	GM = 0.40 GSD = 3.10	Location = 0.38 Scale = 5.79 Shape = 2.15	Location = 0.67 Scale = 4.89 Shape = 2.84	GM = 0.56 GSD = 2.41
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 (>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).
SD = Standard deviation.
GM = Geometric mean.
GSD = Geometric standard deviation.

Source: Loretz et al. (2006).

Table 17-43. Body Lotion Exposure for Consumers Only (males and females)

Distribution Parameter	Amount (g/day)	Parameter SD	Amount (mg/kg-day)	Parameter SD
Mean	4.543	0.012	67.869	0.228
Standard Deviation	2.707	0.013	43.866	0.307
Median	4.556	0.023	64.265	0.369
Minimum	0.005	0.000	0.043	0.003
Maximum	21.081	1.264	401.371	46.215
Percentile				
*p*01	0.005	0.000	0.079	0.003
*p*02.5	0.017	0.000	0.250	0.011
*p*05	0.556	0.008	8.066	0.191
*p*10	1.129	0.006	15.055	0.293
*p*20	1.948	0.018	27.535	0.330
*p*30	2.907	0.024	40.763	0.359
*p*40	3.737	0.027	53.072	0.357
*p*50	4.556	0.023	64.265	0.369
*p*60	5.246	0.023	75.114	0.374
*p*70	5.898	0.021	86.751	0.404
*p*80	6.645	0.024	101.024	0.495
*p*90	7.822	0.033	123.227	0.715
*p*92	8.183	0.038	130.177	0.868
*p*94	8.651	0.042	139.085	0.968
*p*95	8.951	0.047	144.797	1.072
*p*96	9.326	0.054	151.892	1.211
*p*97.5	10.191	0.081	167.036	1.559
*p*98	10.655	0.096	174.414	1.768
*p*99	12.261	0.155	198.018	2.888
*p*99.5	13.893	0.221	222.667	4.420
*p*99.9	16.991	0.413	282.959	10.304

Source: Hall et al. (2007).

Table 17-44. Deodorant/Antiperspirant Spray Exposure for Consumers Only (males and females)—Under Arms Only

Value	Amount (g/day)	Parameter SD	Amount (mg/kg-day)	Parameter SD
Mean	3.478	0.007	49.07	0.13
Standard Deviation	2.051	0.009	31.00	0.22
Median	3.153	0.012	43.52	0.19
Minimum	0.045	0.005	0.59	0.10
Maximum	23.663	1.724	379.03	63.23
Percentile				
*p*01	0.228	0.012	3.08	0.13
*p*02.5	0.373	0.008	5.08	0.12
*p*05	0.598	0.011	8.23	0.16
*p*10	1.135	0.014	15.31	0.20
*p*20	1.951	0.012	25.75	0.17
*p*30	2.425	0.010	32.38	0.17
*p*40	2.796	0.011	37.96	0.17
*p*50	3.153	0.012	43.52	0.19
*p*60	3.548	0.013	49.73	0.22
*p*70	4.049	0.015	57.50	0.27
*p*80	4.804	0.019	68.59	0.32
*p*90	6.095	0.029	87.79	0.49
*p*92	6.477	0.031	93.94	0.58
*p*94	6.955	0.037	101.93	0.71
*p*95	7.262	0.040	107.01	0.81
*p*96	7.645	0.047	113.29	0.91
*p*97.5	8.537	0.064	126.91	1.24
*p*98	9.005	0.076	133.46	1.40
*p*99	10.451	0.107	154.31	1.98
*p*99.5	11.628	0.132	175.01	2.80
*p*99.9	13.843	0.277	222.53	7.29

Source: Hall et al. (2007).

Table 17-45. Deodorant/Antiperspirant Spray Exposure for Consumers Only (male sand females) Using Product Over Torso and Under Arms

Value	Amount (g/day)	Parameter SD	Amount (mg/kg-day)	Parameter SD
Mean	3.732	0.008	52.47	0.14
Standard Deviation	2.213	0.010	32.94	0.23
Median	3.383	0.012	46.66	0.20
Minimum	0.044	0.005	0.59	0.10
Maximum	24.662	2.057	389.12	66.91
Percentile				
*p*01	0.239	0.014	3.19	0.14
*p*02.5	0.384	0.009	5.30	0.15
*p*05	0.639	0.015	8.80	0.18
*p*10	1.214	0.015	16.47	0.23
*p*20	2.078	0.013	27.71	0.18
*p*30	2.580	0.012	34.76	0.17
*p*40	2.986	0.011	40.73	0.18
*p*50	3.383	0.012	46.66	0.20
*p*60	3.819	0.014	53.26	0.21
*p*70	4.364	0.016	61.50	0.27
*p*80	5.156	0.021	73.25	0.35
*p*90	6.543	0.030	93.70	0.53
*p*92	6.969	0.036	100.24	0.60
*p*94	7.505	0.042	108.70	0.73
*p*95	7.839	0.048	114.08	0.81
*p*96	8.263	0.053	120.73	0.92
*p*97.5	9.213	0.069	135.17	1.24
*p*98	9.711	0.080	142.13	1.42
*p*99	11.263	0.117	164.14	2.31
*p*99.5	12.544	0.157	186.13	3.14
*p*99.9	14.898	0.300	235.47	7.01

Source: Hall et al. (2007).

Table 17-46. Deodorant/Antiperspirant Non-Spray for Consumers Only (males and females)

Value	Amount (g/day)	Parameter SD	Amount (mg/kg-day)	Parameter SD
Mean	0.898	0.002	12.95	0.04
Standard Deviation	0.494	0.002	7.34	0.05
Median	0.820	0.003	11.77	0.05
Minimum	0.000	0.000	0.00	0.00
Maximum	4.528	0.300	73.91	7.48
Percentile				
*p*01	0.064	0.002	0.90	0.04
*p*02.5	0.123	0.004	1.75	0.05
*p*05	0.221	0.004	3.12	0.06
*p*10	0.363	0.003	5.08	0.05
*p*20	0.509	0.003	7.26	0.05
*p*30	0.617	0.003	8.85	0.05
*p*40	0.718	0.003	10.30	0.05
*p*50	0.820	0.003	11.77	0.05
*p*60	0.934	0.004	13.36	0.05
*p*70	1.068	0.004	15.25	0.07
*p*80	1.238	0.005	17.77	0.08
*p*90	1.509	0.007	22.08	0.12
*p*92	1.598	0.008	23.51	0.14
*p*94	1.722	0.010	25.37	0.17
*p*95	1.806	0.011	26.57	0.19
*p*96	1.912	0.013	28.05	0.21
*p*97.5	2.134	0.016	31.18	0.28
*p*98	2.233	0.017	32.67	0.32
*p*99	2.515	0.025	37.25	0.48
*p*99.5	2.771	0.033	41.93	0.72
*p*99.9	3.426	0.088	52.79	1.63

Source: Hall et al. (2007).

Table 17-47. Lipstick Exposure for Consumers Only (females)

Value	Amount (mg/day)	Parameter SD	Amount (mg/kg-day)	Parameter SD
Mean	24.61	0.17	0.39	0.00
Standard Deviation	24.05	0.25	0.40	0.01
Median	17.11	0.18	0.26	0.00
Minimum	0.13	0.04	0.00	0.00
Maximum	217.53	26.01	3.88	0.55
Percentile				
*p*01	0.57	0.04	0.01	0.00
*p*02.5	1.00	0.07	0.02	0.00
*p*05	1.68	0.07	0.03	0.00
*p*10	2.95	0.07	0.04	0.00
*p*20	5.69	0.11	0.09	0.00
*p*30	9.20	0.14	0.14	0.00
*p*40	12.93	0.15	0.20	0.00
*p*50	17.11	0.18	0.26	0.00
*p*60	22.37	0.24	0.34	0.00
*p*70	29.43	0.33	0.46	0.01
*p*80	39.70	0.47	0.62	0.01
*p*90	56.53	0.66	0.90	0.01
*p*92	61.66	0.72	0.98	0.01
*p*94	68.29	0.86	1.10	0.02
*p*95	72.51	0.95	1.17	0.02
*p*96	77.78	1.08	1.26	0.02
*p*97.5	89.08	1.34	1.46	0.03
*p*98	94.46	1.52	1.55	0.03
*p*99	110.98	2.06	1.84	0.04
*p*99.5	126.71	2.93	2.13	0.06
*p*99.9	160.06	6.33	2.78	0.14

Source: Hall et al. (2007).

Table 17-48. Facial Moisturizer Exposure for Consumers Only (males and females)

Value	Amount (g/day)	Parameter SD	Amount (mg/kg-day)	Parameter SD
Mean	0.906	0.003	13.62	0.05
Standard Deviation	0.533	0.004	8.63	0.08
Median	0.851	0.004	12.42	0.06
Minimum	0.001	0.000	0.02	0.00
Maximum	4.751	0.380	92.75	11.80
Percentile				
*p*01	0.055	0.002	0.73	0.04
*p*02.5	0.079	0.004	1.13	0.03
*p*05	0.138	0.001	1.89	0.04
*p*10	0.261	0.004	3.67	0.06
*p*20	0.472	0.004	6.63	0.05
*p*30	0.603	0.003	8.66	0.05
*p*40	0.721	0.003	10.51	0.06
*p*50	0.851	0.004	12.42	0.06
*p*60	0.990	0.004	14.47	0.07
*p*70	1.131	0.004	16.78	0.07
*p*80	1.289	0.005	19.65	0.10
*p*90	1.536	0.007	24.14	0.14
*p*92	1.617	0.008	25.57	0.17
*p*94	1.727	0.010	27.46	0.19
*p*95	1.801	0.012	28.68	0.22
*p*96	1.897	0.014	30.23	0.25
*p*97.5	2.129	0.022	33.73	0.35
*p*98	2.251	0.027	35.52	0.43
*p*99	2.653	0.043	41.63	0.71
*p*99.5	3.040	0.057	48.23	1.08
*p*99.9	3.714	0.108	63.35	2.62

Source: Hall et al. (2007).

Table 17-49. Shampoo Exposure for Consumers Only (males and females)

Value	Amount (g/day)	Parameter SD	Amount (mg/kg-day)	Parameter SD
Mean	6.034	0.014	85.888	0.223
Standard Deviation	3.296	0.015	48.992	0.278
Median	5.503	0.020	77.895	0.294
Minimum	0.344	0.036	3.826	0.461
Maximum	29.607	0.669	528.361	65.887
Percentile				
*p*01	1.071	0.000	12.781	0.148
*p*02.5	1.268	0.023	16.367	0.181
*p*05	1.482	0.024	21.059	0.182
*p*10	2.178	0.019	29.737	0.269
*p*20	3.236	0.016	44.415	0.242
*p*30	3.843	0.019	55.58	0.253
*p*40	4.777	0.023	66.502	0.27
*p*50	5.503	0.020	77.895	0.294
*p*60	6.416	0.022	90.255	0.332
*p*70	7.390	0.026	104.537	0.373
*p*80	8.597	0.028	122.6	0.461
*p*90	10.456	0.039	150.488	0.642
*p*92	11.013	0.054	159.046	0.73
*p*94	11.721	0.041	169.939	0.846
*p*95	12.181	0.063	176.768	0.922
*p*96	12.705	0.064	185.092	1.08
*p*97.5	13.765	0.073	202.349	1.396
*p*98	14.194	0.091	210.49	1.551
*p*99	15.637	0.110	235.613	2.142
*p*99.5	16.992	0.149	260.624	3.009
*p*99.9	20.397	0.443	320.47	6.689

Source: Hall et al. (2007).

Table 17-50. Toothpaste Exposure for Consumers Only (males and females)

Value	Amount (g/day)	Parameter SD	Amount (mg/kg-day)	Parameter SD
Mean	2.092	0.001	29.85	0.04
Standard Deviation	0.577	0.001	10.34	0.05
Median	2.101	0.003	28.67	0.06
Minimum	0.069	0.012	0.93	0.18
Maximum	4.969	0.159	98.77	8.19
Percentile				
*p*01	0.777	0.011	10.14	0.14
*p*02.5	1.049	0.006	13.34	0.08
*p*05	1.204	0.004	15.47	0.06
*p*10	1.370	0.003	17.96	0.06
*p*20	1.591	0.003	21.29	0.05
*p*30	1.790	0.003	23.94	0.05
*p*40	1.958	0.003	26.32	0.06
*p*50	2.101	0.003	28.67	0.06
*p*60	2.237	0.003	31.15	0.06
*p*70	2.383	0.003	34.00	0.07
*p*80	2.551	0.003	37.62	0.08
*p*90	2.749	0.003	43.29	0.12
*p*92	2.809	0.004	45.03	0.14
*p*94	2.895	0.005	47.23	0.16
*p*95	2.960	0.006	48.61	0.17
*p*96	3.052	0.008	50.27	0.20
*p*97.5	3.323	0.010	53.70	0.25
*p*98	3.447	0.015	55.28	0.26
*p*99	3.760	0.006	60.12	0.39
*p*99.5	3.956	0.026	64.77	0.52
*p*99.9	4.303	0.049	74.84	1.10

Source: Hall et al. (2007).

Table 17-51. 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.] See 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).

Table 17-52. Average Amount of Product Applied per Use Day (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	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 GM = 3.26 GSD = 1.12	Lognormal Distribution GM = 3.21 GSD = 2.03	Lognormal Distribution GM = 3.35 GSD = 1.86	Lognormal Distribution GM = 10.28 GSD = 2.20	Lognormal Distribution GM = 0.01 GSD = 3.61
p-value (chi-square test)	0.1251	0.4429	0.4064	0.8595	<0.0001

[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)]. See http://www/cdc.gov/nchs/about/major/nhanes/nhanes3/nh3gui.pdf.

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

Source: Loretz et al. (2008).

Table 17-53. 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]
99thb	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 Scale = 1.12	Loc = 0.28 Scale = 1.29	Mode = 1.92 Scale = 1.03	GM = 9.78 GSD = 2.20	GM = 0.01 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).
SD = Standard deviation.
GM = Geometric mean.
GSD = Geometric standard deviation.

Source: Loretz et al. (2008).

Table 17-54. Characteristics of the Study Population and the Percentage Using Selected Baby Care Products

Characteristic	Sample Number (%)
Number of Participants	
Los Angeles, CA	43 (26)
Minneapolis, MN	77 (47)
Columbia, MO	43 (26)
Sex	
Male	84 (52)
Female	79 (48)
Age (months)	
2 to 8	42 (26)
9 to 16	82 (50)
17 to 24	30 (18)
24 to 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	% Using
Baby Lotion	36
Baby Shampoo	54
Baby Powder	14
Diaper Cream	33
Baby Wipes	94

Source: Sathyanarayana et al. (2008)