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To the Graduate Council:

I am submitting herewith a dissertation written by Martha B. Rider entitled "Alcohol and Analgesic Use in the Baby Boomer Cohort." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Human Ecology.

Diane Austin Klein, Major Professor

We have read this dissertation and recommend its acceptance:

Mark Littmann, Michael Singletary, Robert J. Pursley, Eugene C. Fitzhugh

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Diane Austrin Klein
Major Professor

We have read this dissertation
and recommend its acceptance:

Mark Littmann____

Michael Singletary_

Robert J. Pursley___

Eugene C. Fitzhugh_

Accepted for the Council:

Anne Mayhew_____
Vice Chancellor and
Dean of Graduate Studies

(Original signatures are on file with official student records)

Alcohol and Analgesic Use

in the

Baby Boomer Cohort

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Martha B. Rider

May 2006

DEDICATED

to

the two people who are

most grateful that this too has passed

my

Mother, Daisy A. Holsapple,

who exemplifies that there is no end to a woman's growth and

who is an inspiration to all who know her.

and

Son, Derek S. Rider,

whose cheerful patience and understanding reflect the wonderful man he has become.

You are absolutely T.G.O.T.E.W.

May angels always dance in your dreams.

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ABSTRACT

If the population bubble known as the Baby Boomers continue to consume alcohol at higher than expected levels as they age into the middle and older adult categories it could have a substantial impact on future health care needs. This problem will be compounded if Boomers also take analgesic (pain-relief) medications when consuming alcohol. The objective of this study is to determine the prevalence of alcohol and analgesic usage in the Baby Boomer cohort and to ascertain whether there is an association between alcohol, analgesics, and pain. Drinking alcohol while also taking analgesics can have serious health consequences and, depending on the type of analgesic, could result in acute liver failure or other serious health problems. Data were analyzed from the 1999-2000 National Health and Nutrition Examination Survey (NHANES) for participants born during the Baby Boomer cohort years of 1946-1964. Analysis by SUDAAN indicated that approximately 67% of the Boomers are drinking alcohol beyond what is considered a moderate level by the CDC and NIAAA. More than half the respondents had used analgesics daily or almost every day for at least a month (females = 58.7%; males = 40.5%) and Boomers who are currently using analgesics (females = 19.35%; males = 16.34%). There was a significant association for respondents who reported consuming 12 or more drinks during the past 12 months and who were currently taking analgesics ($p = 0.02$). A statistically significant association found for respondents who reported experiencing persistent pain in the past 12 months and who had binged (5 or more drinks) at least once during the past 12 months with taking RX analgesics (CMH: $p = 0.03$, $df = 1$).

TABLE OF CONTENTS

1. INTRODUCTION 1

2. BACKGROUND 3

3. METHODOLOGY 11

INSTRUMENT 11
PARTICIPANTS 11
ANALYSIS 12

4. RESULTS 15

DEMOGRAPHICS 15
ALCOHOL 17
PAIN 28

5. DISCUSSION 39

REFERENCES 43

APPENDICES 50

APPENDIX A 51
APPENDIX B 75
APPENDIX C 103
APPENDIX D 111

VITA 114

LIST OF TABLES

Table 1: POPULATION DEMOGRAPHICS FOR THE BABY BOOMER COHORT NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 1999-2000.... 16

Table 2: POPULATION MEANS FOR AGE 17

Table 3: ALCOHOL CONSUMPTION LEVELS 18

Table 4: AVERAGE NUMBER OF DRINKS WHEN DRINKING 19

Table 5: PERCENTAGE BY GENDER OF THE NUMBER OF DRINKS PER DAY DURING THE PAST 12 MONTHS..... 21

Table 6: AVERAGE NUMBER OF DRINKS BY DEMOGRAPHIC VARIABLES..... 22

Table 7: ANALGESIC MEDICATION USAGE FOR BABY BOOMERS AND FOR ALL RESPONDENTS AGES 20-85 AND OVER 23

Table 8: CONSUMED 12 OR MORE DRINKS IN THE PAST YEAR AND CURRENTLY USING ANALGESICS 24

Table 9: AVERAGE NUMBER OF ALCOHOLIC DRINKS AND ANALGESIC COUNTS..... 25

Table 10: AVERAGE NUMBER OF ALCOHOLIC DRINKS, OTC ANALGESICS, AND GENDER..... 26

Table 11: NUMBER OF DAYS TAKING RX ANALGESICS 26

Table 12: CONSUMED 12 OR MORE DRINKS IN THE PAST YEAR AND NUMBER OF DAYS TAKING RX ANALGESIC MEDICATION..... 27

Table 13: AVERAGE NUMBER OF ALCOHOLIC DRINKS AND RX COUNTS..... 27

Table 14: PAIN IN THE BABY BOOMERS AND FOR AGES 20-85 AND OVER..... 29

Table 15: AVERAGE NUMBER OF WEEKS FOR JOINT PAIN/ACHING/STIFFNESS IN PAST YEAR..... 31

Table 16: CONSUMED 12 OR MORE DRINKS IN THE PAST YEAR AND JOINT PAIN/ACHING/STIFFNESS DURING THE PAST YEAR 31

Table 17: CONSUMED 365 OR MORE DRINKS IN THE PAST YEAR AND THE NUMBER OF DAYS WITH JOINT PAIN IN THE PAST 12 MONTHS 32

Table 18: CONSUMED >12 DRINKS: SEVERE HEADACHES OR MIGRAINES 33

Table 19: CONSUMED 12 OR MORE DRINKS IN THE PAST YEAR AND EXPERIENCED PERSISTENT PAIN DURING THE PAST YEAR..... 34

Table 20: ALL RESPONDENTS: JOINT PAIN/ACHING/STIFFNESS IN PAST YEAR, NON-TO-LIGHT DRINKERS, AND CURRENTLY TAKING ANALGESICS 111

Table 21: ALL RESPONDENTS: SEVERE HEADACHES OR MIGRAINES, NON-TO-LIGHT DRINKERS, AND CURRENTLY TAKING ANALGESICS 112

Table 22: ALL RESPONDENTS: PAIN LASTING 24 HOURS OR LONGER, NON-TO-LIGHT DRINKERS, AND CURRENTLY TAKING ANALGESICS 113

LIST OF FIGURES

Figure 1: TOTAL U.S. PER CAPITA ETHANOL CONSUMPTION FROM 1935-2003 4

Figure 2: CURRENT, BINGE, AND HEAVY ALCOHOL USE, PERSONS BY AGE, 2004..... 59

Figure 3: U.S. PER YEAR CAPITA CONSUMPTION, AGES 14 AND OLDER..... 60

Figure 4: HIGH SCHOOL SENIORS CONSUMED ALCOHOL PAST 30 DAYS, 1980-2003..... 60

Figure 5: HIGH SCHOOL SENIORS BINGE DRINKING, PAST 2 WEEKS, 1980-2003 61

Figure 6: HIGH SCHOOL SENIORS EVER CONSUMED ALCOHOL, 1980-2003 61

1. INTRODUCTION

Alcohol is the number one drug problem in the United States according to the National Institute on Alcoholism and Alcohol Abuse (NIAAA, 2005). And over-the-counter (OTC) analgesics (pain-relief medication like acetaminophen, non-steroidal anti-inflammatory drugs [NSAIDs] such as ibuprofen, naproxen, and aspirin) are the most commonly used medicinal drugs in the United States with sales increasing annually (Ajani, Ford, Greenland, Giles, & Mokdad, 2006). The mix of alcohol and analgesics can have serious health consequences, including acute liver failure (Lawson et al., 2005; Lee, 2003; Draganov, Durrence, Cox, & Reuben, 2000). If the large population bubble known as the Baby Boomers continues to consume alcohol while also taking analgesics and other medications, future health needs may change and place demands on a system that is already unable to meet the health needs of the American people.

One of the leading causes of acute liver failure is the combination of drinking alcohol while also taking the analgesic acetaminophen. The percentages of incidents of acute liver failure attributed to the mix of alcohol and acetaminophen have increased from 28% in 1998 to 51% in 2003 (Lawson et al., 2005). Lee (2003) found that acetaminophen toxicity is involved in more than 50% of cases of acute liver failure and is the number one reason for calls to the Poison Control Centers (>100,000/year).

Acetaminophen and other analgesics are found in many products (pain-relief, sleep-aids, sinus, flu, and others). Since 2001 sales of one of these products, OTC sleep-aids, has increased by 55%. Alcohol interferes with sleep and there is concern that

people who drink may be a substantial proportion of those using sleep-aids. Consumers are not always aware that many sleep-aids can also contain analgesics and should not be taken when drinking alcohol. Another OTC product, Tylenol, generates more than $1 billion in annual sales. As mentioned previously, alcohol and acetaminophen can be a lethal mix. The pharmacokinetic effect of this and other types of analgesics if combined with moderate levels of alcohol has not been well researched and is a growing health concern.

Unprecedented numbers of adults, coming from the first of the Baby Boomer cohort (born in 1946-1964), reached the 60-year-old milestone in 2006. The premise that with age alcohol consumption will decline is derived from cross-sectional studies and is now in question since results may reflect a cohort or period rather than aging (Gilhooly, 2005). Baby Boomers began drinking at an earlier age and drank more than previous cohorts who were surveyed in these cross-sectional studies.

Recent studies by the NIAAA (2004) indicate that of 60% of all adults in the U.S. (approximately 200 million) consume alcohol regularly. Of those, 16 million (SAMSHA, 2003) meet the criteria for alcohol abuse or dependence. Many substance abuse programs and alcohol prevention programs are focused on under-aged or younger adults.

Patterson and Jeste (1999) stated that it was important to identify the extent of the Baby Boomer cohort's alcohol consumption levels. Furthermore, the diagnostic criterion presently in use is inadequate, as it was developed to address the problems of a much younger cohort. Patterson and Jeste (1999) recommend that national survey data should be analyzed to provide accurate estimates of alcohol prevalence among Baby Boomers.

2. BACKGROUND

A plethora of research studies has evaluated under-aged populations for prevalence of alcohol and other substance abuse problems. Few studies have addressed middle-aged and older adults in spite of the growing number of reports of problems with substance abuse in the older adult populations. Survey statistics, especially self-reported alcohol consumption statistics, should be kept on a short lease of inference. There are numerous methodological issues with obtaining valid and comparable consumption rates and even more difficulty in defining what level of alcohol use constitutes a substance abuse problem.

Zablocki, Aidala, and White (1988) found that the Baby Boomer cohort reported higher prevalence rates of alcohol and other types of substance abuse than previous generations. Frequently with age comes an increase in physical co-morbidities like arthritis. This is frequently accompanied by an upswing in use of OTC and RX medications.

Current research indicates a significant association between the age of first drink and the likelihood of life-long drinking and alcohol abuse (40% of those who begin drinking before age 15 will have a difficulty with alcohol during their life [NIAAA, 2001]). As indicated in Figure 1, per capita alcohol consumption began increasing in the early 1960's until about 1981 when alcohol consumption levels peaked. People who were born in 1946 would be 21 years old in 1967; those born in 1964 would be 21 years in

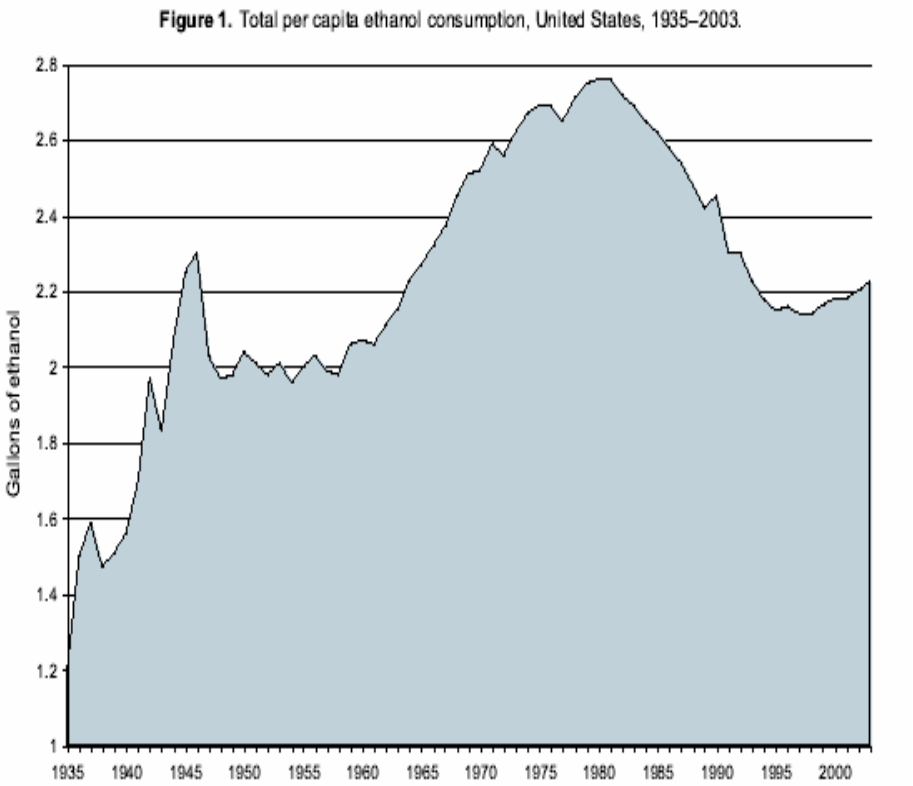

Figure 1: TOTAL U.S. PER CAPITA ETHANOL CONSUMPTION FROM 1935-2003
SOURCE: National Institute of Alcohol and Alcohol Abuse, 2005.
Retrieved online from www.niaaa.gov.

1985; the big bubble in alcohol consumption in Figure 1 is the period when the majority of the Baby Boomer cohort reached the legal drinking age.

Zablocki, Aidala, and White (1988) reported that the Baby Boomer cohort had higher rates of substance abuse than any previous generation. They advised that based on the sheer numbers of Baby Boomers and the already established prevalence rates that there is a need for periodic follow-ups on drinking prevalence and related behaviors that may contribute to future health problems in this cohort.

One reason given for consuming alcohol regularly is the health benefits derived from moderate drinking, but these findings are complicated and contradictory (NIAAA,

2005; Gaziano et al., 2000; Klatsky, 2002). The barrage of publicity by the media and others touting the health benefits of moderate alcohol consumption may be a contributing factor to increased consumption, in spite of the inconsistency of scientific findings. Higher than expected alcohol consumption rates in aging Baby Boomers combined with frequent use of some analgesics may result in unexpected health problems in unexpected numbers.

Physicians and pharmaceutical drug companies are encouraging adults to take aspirin and other OTC medications regularly to improve or protect health. Their campaign has been effective. There is a growing body of evidence indicating that Baby Boomers are taking increasing amounts of OTC and prescription (RX) medications. Consumer spending on OTC and RX drugs has more than doubled between 1989 and 1999 (CDC, 2005), especially analgesics.

Roper Starch Worldwide (2001) found that 82% of adult females and 71% of adult males have consumed nonprescription drugs during the past six months. In this same survey, 73% of participants reported that they preferred to treat themselves at home and 62% stated they were more likely to self-medicate for health problems in the future. Increasing health care cost and decreasing health insurance coverage for aging adults may further drive the desire for the lower cost of OTC or self-medication.

Analgesic and other pain-relief medication use will continue to increase as the number of people suffering with pain continues to rise. For example, close to 40 million people in the U.S. suffer from joint pain (CDC, 1996) with arthritis being the most prevalent type (National Academy on an Aging Society, 2000; Staebler, 1989). The most

commonly recommended medications for this condition are analgesics. In 1990, joint pain afflicted 2.8% of the population. The CDC (1994) expects the rate to increase to 3.6% by 2020 and unless a cure is discovered the prevalence of joint pain is expect to continue growing.

Pain has been demonstrated to be a dependable predictor of future pain and for seeking medical care (Alcaron & Glover, 1994; Beckham et al., 1992). In a study investigating back pain, alcohol, and narcotic analgesics, Booker, Haig, Geisser, and Yamakawa (2003) found that despite the potential for adverse interactions, people who are experiencing back pain and who also report consuming alcohol at a level considered to be heavy drinkers take as many narcotic analgesics as do respondents who are light drinkers. Participants in this study did not decrease drinking alcohol when taking narcotic analgesic despite the potential of developing a serious health problem.

Lifestyle choices, body composition, and genetics can all play a role in developing health problems that can be influenced by alcohol consumption (Bondy et al., 1999; Thun et al., 1997). Mixing just one drink with some types of herbal, OTC, or RX medications could have serious health consequences (Mukamal & Rimm, 2001). This is a growing health concern as the ageing populace uses increasing amounts of analgesics.

Ajani et al. (2006) reported that one analgesic (aspirin) was taken every other day or daily by 29.1% of subjects ages 35-64 in the 2003 Behavioral Risk Factors Surveillance System (BRFSS). When compared to the 1999 BRFSS data, this was an overall increase in aspirin consumption of 20% in four years. Drinking alcohol while

taking aspirin can damage the lining in the stomach and intestine and prolong bleeding. Aspirin can also increase the blood-alcohol level (Weathermon & Crabb, 1999).

In addition to using analgesics and other medications more frequently, Weathermon and Crabb (1999) discovered unexpected side effects with some of these drugs. McKeever et al. (2005) has demonstrated an association in an analysis of NHANES III data, between the use of analgesic acetaminophen and chronic obstructive pulmonary disease (COPD), decreased lung function, and asthma. Stevenson and Masters (2005) reported that older women who take two or more OTC drugs regularly were more likely to abuse or misuse alcohol.

Zimmerman and Maddrey (1995) established that 31% of alcoholics use acetaminophen regularly, many daily. They found that 10% of alcoholics regularly consume doses beyond recommended dosage. Slattery, Nelson, and Thummel (1996) found the overall mortality rate in alcohol-acetaminophen syndrome to be 18% to 19%.

Analysis of the *National Longitudinal Alcohol Epidemiologic Survey* for 1992 by Blow, Barry, Welsh, and Booth (2003) on alcohol and drug use in different age groups found that, like this study, males were more likely than females to report recent alcohol use. Additional analyses in 2004 reaffirmed that males continue to drink more than females when 56.9% of males aged 12 or older reported being current drinkers compared with 44% of females.

Korper and Raskin (2005) express concern for the potential demand and expense on the health care system from levels of substance abuse unanticipated in aging Baby Boomers in their discussion of *Substance Abuse and Mental Health Services*

Administration's (SAMHSA) Substance Abuse by Older Adults: Estimates of Future Impact on the Treatment System. Middle-aged and older adults will need substance abuse prevention and interventions with the focus, content, and delivery specialized to the unique needs of the Boomer cohort.

Draganov, Durrence, Cox, and Reuben (2000) examined non-users and long-time alcohol users who used the analgesic acetaminophen in modest to excessive doses. They reported an increase in hepatic injury or acute liver failure (which has a 75% mortality rate) for long-time alcohol users who regularly used acetaminophen. Draganov et al. (2000) stated that there is no known minimum safe dosage amount for acetaminophen for chronic alcohol users and that additional research is needed to determine whether there is a safe dosage amount for moderate drinkers. Taking any type of analgesics with alcohol is not recommended. The question is; do Baby Boomers who drink alcohol also take analgesics?

The purpose of the following study is to determine the prevalence rates for alcohol and analgesic use in the Baby Boomer cohort, to ascertain if there is an association between respondents who consume alcohol and respondents who use analgesics, and if gender is a predictive variable. Analysis of NHANES 1999-2000 data will be focused on answering the following research questions:

1. What is the prevalence of alcohol use by the Baby Boomer cohort (ages 35-54)?
2. What is the prevalence of analgesic (pain-relief medication) use by the Baby Boomer cohort?

3. What are the self-reported patterns of pain, as indicated by: joint pain/aching/stiffness, severe headache or migraines, persistent pain (24 hrs or longer), experienced by the Baby Boomer cohort?
4. Is there an association between alcohol consumption and analgesics use?
5. Does gender play a role in alcohol and analgesic consumption levels?

Theoretical perspective for this project is based in the multifarious causality of alcohol consumption that is addressed by the Ecological Model. Position statements by the National Institutes of Health, Institute of Medicine, *Healthy People 2010, Ottawa Charter on Health Promotion,* and the National Academy of Sciences identify the Ecological model as an appropriate framework for evaluating population based surveys (Satariano, 2006). The ecological model is a social environmental approach to health behavior and interventions. Emphasis of this theory is on the influence of biological functioning, genetic predisposition, social and familial relationships, environmental contingencies, and cultural, social and economic trends on the health of individuals. Making behavioral choices such as drinking alcohol or drinking alcohol while taking medications should be seen holistically if it is to be fully understood.

Three assumptions for this study are:

- NHANES data is valid and reliable.
- Participant's responses to survey questions are truthful.
- Sample is representative of the population under study

Limitations include:

- Self-reported questionnaire responses may or may not accurately reflect the respondent's actual behavior.
- Although professionals experienced in data collection for large population-based surveys minimized this limitation, alcohol consumption is frequently under-reported.
- In cross-sectional designed studies, direction of causality is not always clear-cut.

Appropriate clearances have been secured from the University of Tennessee Institutional Review Board (IRB) to work with the National Health and Nutrition Examination Survey (NHANES). The data is publicly available online for secondary data analysis and eliminates the ability to link data, directly or indirectly, to any participant. This complies with 45 CFR 46.101 (b) placing the participants at minimal risk as defined by the regulations.

Executive decisions and budget appropriations in private and public health care organizations use research and surveys to determine priorities. The need for valid and reliable information concerning lifestyle choices that have a direct impact on the health of our aging population can make a major impact on our budget and policy decisions. Risky behaviors like alcohol consumption and mixing alcohol with OTC, herbal, and RX products have not been adequately investigated in middle-aged and older adults. The Baby Boomer cohort may create unusual health care needs as they continue to step outside the norm of expected behavior.

3. METHODOLOGY

INSTRUMENT

Data obtained from National Health and Nutrition Evaluation Survey (NHANES) for the years 1999-2000 will be the basis for this study. Trained interviewers collected data for the NHANES, which is conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention. NHANES is a cross-sectional survey of the non-institutional population in the United States that is statistically weighted due to differential probabilities of selection, and stratified to match population control levels (NHANES, 2004). It is considered representative reference data for the U.S. population.

PARTICIPANTS

Only participants who reported that they were born in 1946-1964, known as the Baby Boomer cohort (ages 35-54 at the time of the interview), and who gave valid answers to one or more of the survey questions concerning alcohol, pain, and use of analgesics were included in this study. Information collected included age, income, gender, race/ethnicity, self-reported pain, alcohol consumption, and use of analgesics. Hispanics and lower income were the two relevant populations of the groups that the NHANES 1999-2000 over-sampled in order to provide reliable estimates (NHANES, 2004). Bilingual interviewers were available during the survey and questionnaires were provided in both English and Spanish. Age is defined as age in years at the time of the survey. Non-response adjustments and weighting were provided by NHANES.

ANALYSIS

Whether to define drinking behavior as light, moderate, heavy, or binge is typically contingent on the pattern of behavior reflected by the quantity of alcohol (number of drinks), amount of time to consume drinks, along with gender and age. A moderate level of alcohol consumption as defined by the National Institute on Alcoholism and Alcohol Abuse (NIAAA) is drinking that usually does not cause problems, either for the drinker or for society. The number of drinks per day considered moderate drinking by the Centers for Disease Control and Prevention (CDC, 2005) and the NIAAA (2004) for females = $\leq$1 drink, males = $\leq$2 drinks, and older adults = $\leq$1 drink per day. If those amounts are exceeded than the drinking level is considered heavy drinking.

SUrvey DAta ANalysis (SUDAAN) was used for analyses of data. To account for the stratified sampling design, prevalence and logistic estimates were weighted according to NHANES specifications to provide nationally representative demographic and use patterns. Weighting data was recommended by NHANES to account for the differential probabilities of selection. Standard errors were approximately 70% greater than for NHANES III due to the smaller sample size (NHANES, 2005). Subjects were unaware of the purpose of this study at the time of data collection thus eliminating the possibility of response bias.

This study utilized 1,411 interviews of adults age 35–54 at the time of the survey. The total sample of respondents ages 20-85 years and above are occasionally included for comparison purposes only and are not the focus of the study. Response rates vary due to

participants who did not give a valid response to every survey item. Descriptive statistics were performed for the population demographics: age, gender, race/ethnicity, marital status, household income, and education level, and each of the factors under study. Those variables are alcohol consumption, analgesic use, and pain. Significance was determined at alpha = .05.

Cochran-Mantel Haenszel (CMH) Test of Independence for stratified data was used to examine associations between independent and dependent variables for categorical variables or t-test for continuous variables. Regression was used to ascertain the predictive value for each factor with analgesic use. Sample sizes were sufficient in most cases to detect a meaningful association among alcohol, analgesics, and pain.

Three categories of demographic data were recoded for convenience. For race/ethnicity NHANES provides multiple categories of ethnic groups which were recoded as follows: White into White; Black and African American into Black; Puerto Rican, Dominican (Republic), Mexican/Mexicano, Mexican American, Chicano, Cuban, Cuban American, Central or South American, other Latin American, and other Hispanic into Hispanic; Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, other Asian, Indian (American), Alaskan Native, Native Hawaiian, Guamanian, Samoan, and other Pacific Islanders into Other.

Also under demographic data, annual household income was recoded from thirteen levels of income into three levels to simplify analyses: $0 - $19,999, $20,000 - $44,999, and $45,000 and over. [Please note the median household income in the U.S. was $40,816 in 1999 (U.S. Census Bureau, 2005)]. Recoding was based on being

compatible with NHANES categories for respondents earning less than $20,000 or more than $20,000. Income data was collected for households, not individuals, so low, middle, and upper are arbitrary.

Alcohol consumption was measured in several questions by NHANES. Alcohol consumption is defined as ingesting any type of alcohol including liquor, beer, wine, or any combination of alcoholic beverages. Alcohol data were based on two different self-reported consumption periods. Those questions asked either, during the past twelve months or at anytime during the respondents life. Definitions for consumption levels for each analysis are provided with results. Survey questions for alcohol, analgesics, and pain that were used in this study are provided in the appendix.

The NHANES Analytic Guidelines update released in December 2005 stated that software statistical products like SAS, SUDAAN, or STATA could be used to analyze NHANES and estimate sampling errors by the Taylor series (linearization) method. Weighting provided by NHANES that was used in this study was WTINT2YR. It is the most appropriate as it was designed for the variables from household interview data and for the two years of data collected in 1999-2000 that were used in this study. Demographics were weighted for the update population estimates provided by the Bureau of the Census and recommended for the 1999-2000 data analysis.

4. RESULTS

DEMOGRAPHICS

Adults age 20 and over accounted for 4,444 of the 9,965 surveyed in 1999-2000 NHANES. Of those, 1,411 were within ages 35-54 who responded to one or more of the survey responses addressed in this study. Average age of respondents was 43.6 years with 52.2% female (N=747) and 47.8% male (N=664) (Table 1). Most were married (65.7%), White (69%), had graduate high school or beyond (80%), and overall (58.5%) earned a household income was $45,000 or more (Table 1).

GENDER

For females, 68% of respondents were White, 14% Hispanic, and 12% Black; the majority of respondents (61%) were married, 19% divorced, 10% never married, 1.2% widowed, 4.6% separated, and 3.3% living with a partner; 80% had a high school education or beyond and over 50% lived in a household earning more than $45,000 per year. Males were closely matched, with 70% White, 14% Hispanic, and 11% Black; a higher percentage reported being married (71%), only 9% were divorced and 12% reported never being married; 80% had graduated from high school or beyond, and 59% lived in households earning $45,000 or more. Details for counts (N = number) and percentages for gender, race/ethnicity, marital status, education, and annual household income are provided in Table 1.

Table 1: POPULATION DEMOGRAPHICS FOR THE BABY BOOMER COHORT
NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 1999-2000

	TOTAL		FEMALES		MALES	
	N	**%**	**N**	**%**	**N**	**%**
Participants	1411	100				
Females	747	52.2	724	100		
Males	664	47.8			664	100
Race/Ethnicity						
Hispanic (all)	482	13.9	263	14.0	219	13.8
White	564	69.1	288	68.0	276	70.3
Black	314	11.7	166	12.3	148	11.1
Other	51	5.3	30	5.7	21	4.8
Marital Status						
Married	773	65.7	377	61.0	396	71.1
Widowed	29	1.2	23	1.9	6	0.5
Divorced	165	14.2	114	18.9	51	8.9
Separated	81	4.6	51	5.2	30	3.9
Never married	143	11.0	76	10.1	67	12.0
Living with a partner	57	3.3	27	3.1	30	3.6
Education						
Less than high school	465	19.9	244	19.6	221	20.3
High school / GED	328	26.6	178	27.5	150	25.5
More than high school	616	53.5	324	52.9	292	54.3
Annual household income						
$0 - $19,999	354	14.8	146	18.7	107	12.4
$20,000 - $44,999	368	26.7	201	37.2	167	26.1
$45,000 and over	600	58.5	274	52.5	282	58.7

Table 2: POPULATION MEANS FOR AGE

Variable	Number	Mean	Std Error
Age			
Total	1411	43.57	0.23
Female	747	43.74	0.33
Male	664	43.75	0.26

Population means for age and gender (Table 2) indicates that there was little difference between the mean ages of females (43.74 $\pm$ SD years) and males (43.75 $\pm$ SD years).

ALCOHOL

NHANES investigated alcohol-drinking behavior in several survey questions. The respondents who indicated that they had not consumed any alcoholic beverages in the past 12 months were excluded from questions ALQ's #130 (average number of drinks when drinking), ALQ #140 (number of day binged in past 12 months), and ALQ #150 (ever binged almost every day).

When the respondents were asked: "In any one year, (have you/has SP) had at least 12 drinks of any type of alcoholic beverage? By a drink I mean a 12 oz. beer, a 5 oz. glass of wine, or one and a half ounces of liquor?" Of the Baby Boomer respondents who answered this question, 76.3% said yes (females = 66.4%, males = 86.8%) (Table 3).

It is difficult to compare these findings with other prevalence rates because

Table 3: ALCOHOL CONSUMPTION LEVELS

	Number	**Percentage**	**Female:N(%)**	**Male: N (%)**
Had at least 12 drinks in past 12 mos.				
Yes	946	76.3	406 (66.42)	540 (86.81)
No	374	23.7	284 (33.58)	90 (13.18)
Total	1320			
Ever drink ≥ 5 drinks almost every day				
Yes	234	19.0	61 (10.13)	173 (27.65)
No	941	81.0	515 (89.87)	426 (72.35)
Total	1175			

different studies use varying age categories. The National Study on Drug Use and Health (SAMSHA, 2004) asked whether respondents had consumed alcohol in the past month rather than the past 12 months used by NHANES. Their findings indicated that approximately 60% of those surveyed used alcohol within the past month for ages 35-54 (Appendix, Figure 5).

Bingeing is defined as five or more drinks on one occasion. NHANES asked two questions that addressed bingeing. For the question: "Was there ever a time or times in {your/SP's} life when (you/he/she) drank 5 or more drinks of any kind of alcoholic beverage almost everyday?" Of the Boomer cohort respondents who gave valid responses to this question, 19% of the total group said yes, with females = 10.1%, males = 27.6%, (Table 3).

Table 4: AVERAGE NUMBER OF DRINKS WHEN DRINKING

Variable	Number	Mean	Std Error
Avg # drinks/day in past 12 mos.			
Total	951	2.44	0.167
Female	459	1.76	0.17
Male	492	3.08	0.19

For respondents who drink, males reported averaging slightly more than three alcoholic beverages per day (M = 3.08) and females reported almost two drinks per day (M = 1.76) when drinking during the past 12 months (Table 4). These amounts are higher than established as the moderate drinking levels (females ≤ 1 drink per day; males ≤ 2 drinks per day) by the CDC or the NIAAA (CDC, 2005, NIAAA, 2005, NIH, 2005). Demographic differences for drinking ≥12 drinks in past year were:

White:	N = 441 (46.6%)	< H.S. = 292 (30.9%)
Hispanic:	N = 305 (32.2%)	H.S. = 213 (22.5%)
Black:	N = 178 (18.8%)	> H.S. = 441 (46.6%)
Other:	N = 22 (2.3%)	

Respondents who gave a valid reply to: was there ever a time in your life when you drank five or more alcoholic beverages almost every day:

White:	N = 87 (40.9%)	< H.S. = 109 (51.2%)
Hispanic:	N = 73 (34.3%)	H.S. = 46 (21.6%)

Black: N = 47 (22.1%) > H.S. = 58 (23.2%)

Other: N = 6 (2.8%)

Participants who drink indicated they consumed more than a moderate amount of alcohol. Overall 22% of respondents consumed four or more drinks per day when drinking during the past 12 months. Around 56% of females averaged two or more drinks per day, double the recommended amount (one drink or less per day); 77% of males consumed two or more drinks per day with almost 32% averaging four or more drinks per day (Table 5).

Analyses were performed to determine if the independent variables gender, race/ethnicity, education, average household income, or marital status might predict the average number of drinks consumed per day in the past year. Results were somewhat comparable with what is known about the predictive value of demographics associated with alcohol consumption. Gender is highly significant for males ($p = 0.0005$). Race/ethnicity has a tendency for an association ($df = 3$, $p = 0.09$), but not for Black ($p = 0.7$). Educational level does have a significant association ($df = 1$, $\leq$ HS = 0.01, HS = 0.04). Marital status ($df = 2$) has a significant association for married ($p = 0.02$), widowed ($p = 0.06$), and single ($p = 0.04$). Household income ($df = 1$) indicated a significant association ($p = 0.0001$). Pain did not have a significant association with alcohol (Table 5).

Table 5: PERCENTAGE BY GENDER OF THE NUMBER OF DRINKS PER DAY DURING THE PAST 12 MONTHS

	Number	**Percentage**	**Female: N (%)**	**Male: N (%)**
Number of Drinks				
1 or less	297	33.2	189 (43.69)	108 (23.04)
2	269	30.25	133 (31.24)	136 (29.30)
3	146	14.19	68 (12.59)	78 (15.72)
4 or more	242	22.4	71 (12.48)	171 (31.94)
Total	954			

ANALGESICS

Analgesics (pain-relief) medication usage was investigated to determine whether the respondents:

- regularly consumed analgesics,
- were currently using analgesics,
- if using analgesics, whether OTC, RX, or both,
- on average, the number of doses/pills taken daily.

For the purposes of this study, chronic use of analgesics is defined by NHANES as ‘use nearly every day for as long as a month’ (NHANES, 2002).

As indicated in Tables 6 and 7, results demonstrate that slightly more than half of the respondents had, at one time in their life, used analgesics for more than a month (females = 58.7%; males = 40.5%). Boomers indicated a higher percentage compared to all respondents' ages 20+, who indicated that only 33% had taken analgesics for one month or longer. When questioned if the respondent was currently taking any form of

Table 6: AVERAGE NUMBER OF DRINKS BY DEMOGRAPHIC VARIABLES

Independent Variables Effects	Beta Coeff.	SE Beta	DEF Beta #4	T-Test B=0	P-value T-Test B=0
Intercept	4.9534	1.2269	1.2733	4.0372	0.0012
Gender					
Male	1.1944	0.2684	1.7617	4.4510	0.0005
Female	0.0000	0.0000	.	.	.
Ethnic					
Hispanic	1.1096	0.6273	1.0198	1.7690	0.0987
White	1.0484	0.5895	1.0192	1.7785	0.0970
Black	0.2281	0.5817	0.7582	0.3921	0.7009
Other	0.0000	0.0000	.	.	.
Education					
< HS	1.0345	0.3494	1.3500	2.9607	0.0103
HS	0.6857	0.3145	1.6223	2.1799	0.0468
>HS	0.0000	0.0000	.	.	.
Marital Status					
Married	-1.7101	0.6753	1.3900	-2.5324	0.0239
Widowed	-2.2254	0.6888	0.3165	-3.2307	0.0060
Divorced	-1.3881	0.8333	1.8751	-1.6659	0.1179
Single	-1.6725	0.7580	1.0416	-2.2064	0.0446
Never Married	-1.2580	0.8654	1.8613	-1.4538	0.1681
Live w/other	0.0000	0.0000	.	.	.
Joint pain/aching/stiffness in past year					
yes	0.1720	0.2859	1.8424	0.6017	0.5570
no	0.0000	0.0000	.	.	.
Severe headaches or migraines					
yes	-0.0289	0.4434	3.0215	-0.0652	0.9490
no	0.0000	0.0000	.	.	.
Pain problem lasting more than 24 hrs					
yes	0.1286	0.3276	1.8724	0.3927	0.7005
no	0.0000	0.0000	.	.	.
Age at Screening	-0.0306	0.0189	1.1127	-1.6214	0.1272
ANA_COUNTS	-0.2586	0.1952	1.0882	-1.3246	0.2065
HHINC	-0.1983	0.0383	0.9246	-5.1748	0.0001

SOURCE: SUDAAN table from author analysis

Table 7: ANALGESIC MEDICATION USAGE FOR BABY BOOMERS AND FOR ALL RESPONDENTS AGES 20-85 AND OVER

Ever take analgesics daily or almost daily for at least one month	**Number (%)**	**Female:N(%)**	**Males: N (%)**
Baby Boomers			
Yes	628 (50.1%)	391 (58.7)	237 (40.5)
No	778 (49.9%)	353 (41.3)	425 (59.5)
Total	1406 (100%)		
All Respondent ages ≥20-85			
Yes	1202 (33.7%)		
No	3855 (76.0%)		
Total	5060 (100%)		
Currently take analgesics daily or almost daily			
Baby Boomers			
Yes	219 (17.9%)	127 (19.4)	92 (16.3)
No	1190 (82.1%)	619 (80.6)	571 (83.7)
Total	1409 (100%)		
All Respondents ages ≥20-85	Missing: N = 3879		
Yes	776 (15.29%)		
No	417 (8.22%)		
Total	1193 (23.51%)		

analgesics, the total population for NHANES ages 20+ indicated that 15.29% were.

Boomers had a higher rate, with a higher percentage of females using than males (females = 19.35%; males = 16.34%).

In order to see the difference in whether drinkers (≥12 per yr) or non-drinkers (≤11 per year) would be more likely to be currently using analgesics daily or nearly every day in the past month, results from CMH found a significant association (Chi-Sq = 6.54, df = 1, p = 0.0228).

To test for the strength of association of the relationships between types of analgesics, alcoholic consumption and gender; analgesics were recoded to discriminate

RX from OTC analgesic medication. Regression analysis was performed using Multiple R-Square to assess the percent of the dependent explained by the independents (A.T.S., 2006). The independent variable of average number of drinks/day-past 12 months was utilized to determine whether alcohol consumption levels and gender would predict for OTC or RX analgesic use.

Results for the average number of drinks per day and all analgesics usage shows no association ($p = 0.2065$) between the number of drinks and the use of analgesics. When examining only OTC analgesics use, no statistical significance ($p = 0.7542$) was found. For gender, the strength of the relationship between the number of drinks and the use of analgesics found that females ($\beta = 0.00$) had no association, while males had a tendency ($\beta = 0.8872$).

Analgesic (OTC and RX) counts (average number taken per day) were analyzed with Multiple R-Square and average number of drinks per day during the past 12 months for predicting number of drinks from OTC analgesic use. No association was indicated (Chi-Sq = 0.34, df = 1, $p = 0.5676$), (Table 8).

Table 8: CONSUMED 12 OR MORE DRINKS IN THE PAST YEAR AND CURRENTLY USING ANALGESICS

≥12 Drinks /Year	**Total**	**Yes**	**No**
Total	1319	215 (18.65%)	1104 (81.35%)
Yes	945	165 (19.20%)	780 (80.80%)
No	374	50 (16.89%)	324 (83.11%)

Analyses by Multiple R-Square of the number of days taking OTC pain-relief products nearly every day and average number of drinks consumed when drinking indicated that OTC analgesic usage did not predict alcohol consumption (p = 0.7542) (Tables 9 and 10).

Analyses of the number of days taking RX analgesic medication for all participants (ages 20-85+) indicated that on average females (M = 1009.58) took medication for more days then males (M = 883.24), Table 10. CMH analyses found a significant association for drinkers vs. non-drinkers who had taken RX medication in the past month (Chi-Sq = 6.64, df = 1, p = 0.0228). T-Tests were used for drinkers (≥12 yr) vs. nondrinkers (≤11 yr) based on number of drinks consumed in past year and the number of days they reported using RX analgesic medication. Results did not indicate a significant association (t = 1.21, p = 0.24) (Tables 11, 12, 13).

Table 9: AVERAGE NUMBER OF ALCOHOLIC DRINKS AND ANALGESIC COUNTS

Variables & Effects	**Beta Coeff.**	**SE Beta**	**DEFF Beta #4**	**T-Test B=0**	**P-value T-Test B=0**
Intercept	3.1138	0.1818	1.1171	17.1242	0.0000
Gender					
Female	0.0000	0.0000			
Male	0.8829	0.1351	0.4011	6.5338	0.0000
Analgesic Counts	0.0776	0.1522	0.5870	0.5098	0.6181

Table 10: AVERAGE NUMBER OF ALCOHOLIC DRINKS, OTC ANALGESICS, AND GENDER

Variables & Effects	Beta Coeff.	SE Beta	DEFF Beta #4	T-Test B=0	P-value T-Test B=0
Intercept	3.1121	0.1803	1.1063	17.2635	0.0000
Gender					
Female	0.0000	0.0000			
Male	0.8872	0.1364	0.4106	6.5044	0.0000
Analgesic Counts	0.0673	0.2106	0.9301	0.3194	0.7542

Table 11: NUMBER OF DAYS TAKING RX ANALGESICS

Variable	Number	Mean	Std Error
# of days take RX analgesics			
Total	616	961.13	70.35
Females	385	1009.58	107.27
Males	231	883.24	124.63

Table 12: CONSUMED 12 OR MORE DRINKS IN THE PAST YEAR AND NUMBER OF DAYS TAKING RX ANALGESIC MEDICATION

Variable	Number	Mean	SE Mean
≥ 12 drinks in past 12 mos.			
Total	589	975.44	69.10
Yes	401	1008.77	86.13
No	188	884.53	73.92

Table 13: AVERAGE NUMBER OF ALCOHOLIC DRINKS AND RX COUNTS

Variables & Effects	Beta Coeff.	SE Beta	DEFF Beta #4	T-Test B=0	P-value T-Test B=0
Intercept	3.1137	0.2126	1.6949	14.6448	0.0000
Gender					
Female	0.0000	0.0000			
Male	0.8890	0.1323	0.3902	6.7205	0.0000
RX Counts	0.6050	1.2707	2.4469	0.4761	0.6414

RX analgesic counts (average number taken per day) in Table 11 were analyzed with Multiple R-Square and average number of drinks per day during the past 12 months for predicting number of drinks from RX analgesic use. No association was indicated ($p = 0.6414$) (Table 12).

PAIN

Self-reported pain data is based on persistence (pain lasting for 24 hours or longer), number of months symptoms were present, and location (joint pain/aching/stiffness or severe headaches/migraines). For all respondents, 43.47% of those ages 35-54 year reported experiencing joint pain/aching/stiffness within the past 12 months (females = 43.4%; males = 40.8%). More than 37% of all respondents who reported joint pain had experienced joint pain for one year or longer.

In comparison, there was only a slight decrease for the entire NHANES age 20-85+ data set, with 40.2% reporting joint pain/aching/stiffness within the past 12 months (Table 13). Of those who answered yes to joint pain and who also gave a valid response to taking analgesics there was a significant association (CMH: $p = .001$). There was also a general association for joint pain, drinking $\geq$12 drinks in past year, and taking analgesics ($p = .05$, $df = 1$)

Severe headaches or migraines in the past 12 months occurred in 24.08% of the total Baby Boomer group interviewed, with females experiencing headaches more often (females = 32.7%) than males (males = 14.6%). Fewer in the complete age group range 20-85+ reported headaches (19.7%). Of those who reported experiencing severe headaches or migraines during the past 12 months there was a significant likelihood that

they would also use analgesics (CMH: p = .01)

Table 14 shows prevalence of persistent pain. Respondents who experienced persistent pain (24 hours or longer) that occurred at least once during the past 12 months reported fewer incidents in the 20-85+ age group (21.2%) than in the Baby Boomer group (29.41%). Females (33.1%) reported more frequent occurrence for persistent pain than males (25.4%). Of those who reported experiencing persistent pain within the past 12 months, there was a highly significant probability that they would take analgesics (CMH: p = 0.01, df = 1, N = 111)

On average, the Baby Boomer respondents reported they experienced an average of 24.61 weeks of joint pain/aching/stiffness in the past 12 months. There was not a substantial difference in the mean scores for average number of weeks between females 24.99 weeks and males 24.35 weeks (Table 15).

There were 397 respondents who reported drinking at least 12 drinks during the past 12 months and experiencing joint pain/aching/stillness in the past 12 months. Of those who report joint pain (44%), over 43% consume alcoholic beverages. Participants who did not report joint pain (56%) over 57% drink (Table 16). No significant association was found between joint pain/aching/stiffness and alcohol consumption (CMH = 1.18, df = 1, p = 0.29).

Table 14: PAIN IN THE BABY BOOMERS AND FOR AGES 20-85 AND OVER

Variable	Total N (%)	Female N (%)	Male N (%)
Joint Pain/Aching/Stiffness In Past Year			
Baby Boomers			
Yes	585 (43.37%)	331 (43.4)	254 (40.81)
No	826 (56.63%)	416 (56.6)	410 (59.19)
Total	1411		
All Respondents Ages 20-85+			
Yes	1962 (40.2%)		
No	2913 (59.7%)		
Total	4875		
Severe Headaches/Migraines			
Baby Boomers			
Yes	353 (24.08%)	249 (32.7)	104 (14.6)
No	1058 (75.92%)	498 (67.3)	560 (85.4)
Total	1411		
All Respondents Ages 20+			
Yes	963 (19.7%)		
No	3909 (80.1%)		
Total	4874		
Persistent Pain			
Baby Boomers			
Yes	373 (29.41%)	216 (33.1)	157 (25.4)
No	1037 (70.59%)	530 (66.9)	507 (74.6)
Total	1410		
All Respondents Ages 20+			
Yes	1036 (21.2%)		
No	3836 (78.6%)		
Total	4875		

Table 15: AVERAGE NUMBER OF WEEKS FOR JOINT PAIN/ACHING/STIFFNESS IN PAST YEAR

Variable	Number	Mean	Std. Error
Avg # weeks with joint pain			
Total	188	24.61	1.63
Females	81	24.99	3.21
Males	107	24.35	2.52

Table 16: CONSUMED 12 OR MORE DRINKS IN THE PAST YEAR AND JOINT PAIN/ACHING/STIFFNESS DURING THE PAST YEAR

Alcohol	Joint Pain/Aching/Stiffness Past Year		
≥12 drinks in the past year	Total	Yes	No
Total			
Number	1320	559	761
Percentage	100%	44.09%	55.91%
Yes			
Number	946	397	549
Percentage	76.31%	43.13%	56.87%
No			
Number	374	162	212
Percentage	23.69%	47.18%	52.82%

When analyzing the total number of days in the past 12 months that Boomer respondents reported experiencing joint pain/aching/stiffness and controlling for drinkers who reported an average of one drink or more per day (≥365 yr) and nondrinkers who reported consuming less than one drink per day (≤364 yr) during the past 12 months; results did not indicate a significant association for amount of alcohol consumed. The number of weeks experiencing joint pain at the alpha = .05 level (CMH = 1.18, df = 1, p = 0.29; t-test = 0.17, p = 0.86) in Table 17.

Table 18 indicates results for the analyses for respondents who consumed 12 or more drinks in the past year and severe headaches or migraines. About 24% of the respondents reported severe headaches or migraines, of those 16% were drinkers. CMH analyses found a significant association between headaches and alcohol consumption (Chi-Sq = 16.69, df = 1, p = 0.0011).

Respondents who reported that they had experienced persistent pain which lasted 24 hours or longer within the past year and also reported drinking ≥12 drinks during the

Table 17: CONSUMED 365 OR MORE DRINKS IN THE PAST YEAR AND THE NUMBER OF DAYS WITH JOINT PAIN IN THE PAST 12 MONTHS

Number of weeks w/joint pain	**N**	**Mean**	**Std Error**
Total	179	24.79	1.81
Yes	142	24.96	1.65
No	37	24.04	5.34

Table 18: CONSUMED ≥12 DRINKS: SEVERE HEADACHES OR MIGRAINES

	Severe Headaches or Migraines		
≥12 drinks in past year	**Total**	**Yes**	**No**
All Respondents			
Number	1320	331	986
Percentage	100%	23.94%	76.06%
Yes			
Number	946	207	739
Percentage	76.31%	21.23%	78.77%
No			
Number	374	124	250
Percentage	23.69%	32.66%	67.34%

past year were analyzed. Of those who experienced pain (30% of Boomers), over 29% were also drinkers; 71% of those who did not have pain were drinkers (Table 19). CMH indicated no significant association (Chi-Sq = 1.50, df = 1, p = 0.2414).

ALCOHOL, ANALGESICS, AND PAIN

CMH analyses for joint pain, drinking ≥12 drinks in past year, and ever taken analgesics nearly every day for as long as a month (p = .004, df = 1). A general association was found for the variables: ≥12 drinks in the past year, currently taking analgesics, and controlling for migraines severe headaches or migraines (p = .01). There was a statistically significant association found for respondent who reported experiencing persistent pain in the past 12 and who had binged at least once during the past 12 months with taking RX analgesics (CMH; p = 0.03, df = 1, N = 50).

Alcohol consumption responses were recoded into two new groups for additional testing with the Cochran-Mantel-Haenszel Test of Association (CMH). Light to nondrinkers were those who reported that they had consumed less than12 in one year and/or respondents who averaged less than one drink per day during the past 12 months (≤364 yr.). Moderate to heavy drinkers were respondents who said yes to drank 12 or more drinks during one year and/or averaged more than one drink per day (≥365 yr.) during the previous 12 months. Binge drinkers were those who had ever had a period in their life when they consumed 5 or more drinks on one occasion or had consumed 5 or more drinks on at least one occasion during the past 12 months.

CMH was used to investigate whether there is an association between levels of alcohol consumption, types of pain, and use of analgesics. When evaluated at the p = .05

Table 19: CONSUMED 12 OR MORE DRINKS IN THE PAST YEAR AND EXPERIENCED PERSISTENT PAIN DURING THE PAST YEAR

	Persistent Pain (≥24 hrs)		
≥12 drinks in past year	**Total**	**Yes**	**No**
All Respondents			
Number	1320	359	960
Percentage	100%	30.11%	69.89%
Yes			
Number	946	256	689
Percentage	76.31%	29.09%	70.91%
No			
Number	374	103	271
Percentage	23.69%	33.40%	66.60%

level, there was no significant association (CMH = 3.22, df = 1, p = 0.09) between drinking 12 drinks or more drinks and taking analgesics when controlling for all respondents for joint pain/aching/stiffness. No significant association was found for the use of analgesics for respondents when controlling for severe headaches or migraines and for pain lasting 24 hours or longer in the past 12 months.

Joint pain	CMH = 3.22,	p=.0942
Migraine	CMH = 1.40,	p=.2526
Persistent pain	CMH = 1.75,	p=.2072

Since there was a slight tendency (at alpha = 0.10) for joint pain/aching/stiffness to have an association with analgesics and drinking further analysis was performed

controlling for gender. Female respondents did not have an association (p = 0.54) for drinking, joint pain, and analgesics, but there was a significant association for male respondents (p = 0.04).

Females: controlling for joint pain CMH = 0.38, df = 1, p=.5495

Males: controlling for joint pain CMH = 5.05, df = 1, p=.0413

No association was found between analgesic consumption for those who drink less than 12 alcoholic drinks in the past 12 months when controlling for:

Joint pain: CMH = 0.55, df = 1, p=.4725

Migraine: CMH = 1.21, df = 1, p=.2893

Persistent pain: CMH = 0.68, df = 1, p=.4246

Analgesic use was not significantly associated with those who had consumed 5 or more (bingeing) alcoholic drinks almost every day at any time during their life when controlling for:

Joint pain: CMH = 1.40, df = 1, p=.2568

Migraine: CMH = 3.28, df = 1, p=.0915

Persistent pain: CMH = 1.58, df = 1, p=.2294

Since a slight tendency (if using p = 0.10) was found for severe headaches and migraines and binge drinking, additional analysis was performed to control for gender. No significant association was detected for gender differences:

Females: CMH = 2.67, df = 1, p=.1248

Males: CMH = 0.94, df = 1, p=.3484

All variables for pain were removed and data were analyzed using CMH to look at: gender and less than12 drinks per year and analgesics (CMH = 1.94, p=.19); gender and 12 or more drinks per year and analgesics (CMH = 0.89, p=.2611); gender and ever

had 5 or more drinks and analgesics (CMH = 3.94, p=.0671) which suggests a tendency (p = 0.10) for an association between binge status and analgesics when controlling for gender. Overall gender differences indicated no association with females (CMH = 1.74, p = .21); for males there was a slight tendency for bingeing and use of analgesics (CMH = 3.56, p =.08).

Further analysis for demographics and alcohol was performed to ascertain if the level of alcohol consumption might be predicted by these categories: gender, race/ethnicity, marital status, education, pain, household income, analgesics. Responses to four alcohol questions where used to create three levels of consumption: non-to-light drinkers, moderate drinkers and binge drinkers.

T-tests were used to analyze demographic information to predict light drinkers found that gender (t-test: p = 0.001) and education (t-test: <HS, p = 0.009; HS, p =0.004) were associated. There was an association in the light vs. moderate level of alcohol consumption that was statistically significant in predicting from demographic data for select ethnic groups (df = 3): Hispanics (p = 0.0002) and White (p = 0.0001).

Moderate drinkers who also reported persistent pain could be predicted by gender and ethnicity if Hispanic or White at the 95% confidence level. T-test for moderate drinkers indicated ethnicity of Hispanic (p = 0.0002) or White (p = 0.0005), marital status if married (p = 0.01) or never married (p = 0.03), and household income (p = 0.01) was statistically significant although marital status was not.

Binge vs. Non-Binge were obtained by categorizing respondents into two groups: those who answered yes to either or both of the questions on binge drinking and those

who answered no to one or both of the questions. In those respondents who reported they had less than a high school education, education was a good predictor of binge drinking ($p = 0.0004$) and household income for incomes $19,999 or less ($p = 0.0007$).

5. DISCUSSION

The purpose of this study was to assess the prevalence of alcohol and analgesic use among Baby Boomers and to determine whether Boomers who drink alcohol in moderate or greater amounts were also taking analgesics more often. Factors that might contribute to drinking alcohol and taking analgesics and that were controlled for are joint pain/aching/stiffness, severe headaches, or migraines, and pain lasting 24 hours or longer. There is not an accepted or scientifically accurate measurement for personal alcohol consumption for large surveys. In most cross-sectional studies alcohol consumption levels are based on self-reported behavior. This and the many different ways alcohol consumption questions are designed (age, time frame, memory, amount of ethanol in a drink, and so on) can make it is difficult to compare results from one research study to another. Regardless, as to the difficulty in obtaining an accurate assessment of alcohol consumption levels, in this study many Baby Boomers are drinking at levels beyond what is generally deemed moderate.

Data analyzed in this study indicated that 76.3% of Boomer respondents reported drinking more than 12 drinks in the past year (females = 66.4%, males = 86.8%) while overall participants reported almost 15% less (ages 20-85+ = 61.9%). In comparison with findings reported by the NIAAA (2005), 72% of respondents (ages 14 and above) reported drinking 11 or less drinks per year; for NHANES, 31.6% of participants (age 20-85+) and 23.7% of Boomers (age 35-54) consumed 11 or less drinks per year. Both NHANES and the NIAAA studies were cross-sectional national surveys and slight differences in questionnaire phrasing would not account for the large differences in

percentages, but the difference in the ages of the participants surveyed may.

Levels of alcohol consumption that are of greater concern are those that exceed the standards for moderate drinking. The NIAAA found that 50% of respondents exceeded either daily levels of moderate drinking (females = 1 or less drinks; males= 2 or less drinks per day) or weekly levels (females = 7 or less, males = 14 or less). In NHANES, Boomers females (2 drinks or less per day = 56.3%) and males (3 drinks or less per day = 47.7%) reported drinking beyond a moderate level. Their alcohol consumption rate in this study is higher than that found by NIAAA.

Bingeing is usually considered the bailiwick of college students, yet 18.9% of Boomers stated they had binged almost every day at least once during their life (females = 10.1%, males = 27.6%). When queried about recent bingeing, which indicates a serious problem with alcohol, 12.5% of females and 32% of males stated that they had binged at least once during the past 12 months. In this study, about 22% reported regularly drinking 4 or more drinks when drinking, which is much higher than the Addiction Research foundation (ARF) estimates that one in twenty drinkers in the U.S. has an alcohol dependency problem. Results from this analysis indicate that the Baby Boomer cohort is consuming alcohol at levels higher than previous populations when they were at same age.

Jennison (1999) predicted that the percentage of older adults who consume alcohol will increase as the Baby Boomer cohort ages and that the detrimental affects would be compounded by an increase in drug use (prescription, over-the-counter, illegal). Zimmerman and Maddrey (1995) established that 31% of alcoholics use acetaminophen

regularly, many daily.

More than half the respondents had used analgesics daily or almost every day for at least a month (females = 58.7%; males = 40.5%). Less than 20% of Boomers were currently using analgesics at the time of the survey; gender differences indicated that females (19.35%) were more likely to be taking analgesics than males (16.34%).

Fillingim (2000) also found that females were more likely to take prescription (62.2%) and non-prescription medicine (65.3%) than males. There was a significant association for respondents who had consumed 12 or more drinks in the past year and who were currently taking analgesics ($p = 0.02$). Alcohol and analgesics can be a dangerous mix that can result in serious health problems that should be investigated further with a goal towards prevention.

Frequently, incidents of pain increase with age. Brennan, Schutte, and Moos (2005) found that few studies have addressed the association of pain and alcohol in older adults aged 62-72 years. Findings from this study indicated a larger percentage of problem drinkers (43%) had moderate to severe pain than those who are considered non-problem drinkers (30%) and that problem drinkers were more likely to use alcohol (38%) to manage pain than were non-problem drinkers (14 %). A higher percentage of problem drinkers reported moderate to very severe pain (problem drinkers = 58%; non-problem drinkers = 21%). Using alcohol to manage pain was a good predictor of future chronic health problems and injuries in males. In a three-year follow-up, alcohol consumption in females was found to be a good predictor for problematic drinking. This study found an association with alcohol and analgesics and alcohol and severe headache or migraine, but

not for joint or persistent pain. When just testing for RX analgesics a statistically significant association was found for respondent who reported experiencing persistent pain in the past 12 and who had binged at least once during the past 12 months with taking RX analgesics (CMH: $p = 0.03$)

Approximately 80-90% of health care resources in the U.S. are utilized by just 10-20% of the population (Meek, Lyon, May, & Lynch, 2000). This disparity mandates discovering predisposing factors that place people at high risk for ill health. Due to the unprecedented numbers and the lifestyle choices, the Baby Boomer cohort is of particular concern for increased demands on the health care system.

Future research investigating alcohol and analgesic use in the Baby Boomer cohort should carefully evaluate how alcohol consumption is measured. Whether a participant drinks 11 or less drinks per year or 12 or more drinks per year contributes very little information. Unfortunately, there is a need to establish comparable instrument to measure alcohol consumption that is universally acceptable.

The cohort of Baby Boomers is well established and a popular term in the media. When examining specific health behaviors such as substance abuse, the twenty-year time span may be too broad. The experiences of persons born in 1946 are simply not similar to the experiences of those born in 1964. It is well established that Vietnam Veterans have unique problems with substance abuse. There may be health issues that are distinctive to a sub-set of Baby Boomers that has yet to be noticed due to diluting by a too large cohort.

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APPENDICES

APPENDIX A

EXTENDED LITERATURE REVIEW

When the National Minimum Drinking Age Act was signed into law on July 17, 1984, it was too late to have any real impact on the Baby Boomers who had grown up with the controversy over being too young to drink, but old enough to go to war. Many Boomers began drinking before they were of legal age and are continuing to drink today. Research in the past suggested that alcohol consumption levels decline steadily with age, but recent studies indicate that this might not be the case with the Boomers. Researchers are now beginning to question the linear association with maturation and a decrease in alcohol consumption. This premise is based on cross-sectional surveys, but longitudinal studies might reveal a different story.

Although it is generally assumed that the findings from cross-sectional studies indicate that the consumption of alcohol declines because of factors associated with aging, survey results such as these could be measuring a cohort or period effect, rather than an aging effect. It may be that the current cohort of older adults drank less when they were young and have merely continued this drinking pattern as they aged. It may not be the case that it is normal to drink less alcohol as we grow older. If the Baby Boomers continue their drinking habits as they age, there may not be adequate programs or funding to provide treatment for the increase in alcohol-related health problems.

Problems relating to alcohol consumption were written about as early as 2,225 B.C. when the Code of Hammurabi pointed out the tribulations of alcohol abuse. Today,

alcohol continues to be a public health concern and places an increasingly heavy financial burden on private and public health care agencies. Alcohol is the number one drug problem in the U.S. (NIAAA, 2005) and if combined with some herbal, over-the-counter (OTC), or prescription (RX) medications, it can be deadly.

Typically, the older an individual is the more likely they will use medications. A report by the Special Committee on Aging (1987) stated that older adults use prescription medications almost three times as often as the general population. OTC medications were used by this cohort at even higher rates (Kofoed, 1988). OTC analgesic-based medications are the most commonly used drugs in the United States with usage rates expected to continue rising. A number of medications serve dual purposes and treat pain as well as other symptoms such as sinusitis or insomnia.

One of the problems with taking any medication is the consumers' misunderstanding and misuse of the product. It is not always clear to consumers exactly what is in the pills they are taking. Many consumers do not realize there is a difference with the side effects and complications with the different types of analgesics (Weathermon & Crabb, 1999). As previously mentioned, Ajani, Ford, Greenland, Giles, and Mokdad (2006) reported 29% of Boomers in the BRFSS reported using aspirin daily. This is a 20% increase in four years on just one type of OTC analgesic medication (aspirin), based on a comparison with the 1999 BRFSS data.

Maves (CHPA, 2001) determined that 80% of Americans used OTC drugs during the past year. A.C. Nielsen (2005) reported U.S. sales of OTC drugs, excluding Wal-Mart, exceeded $15.1 billion in 2004 (CHPA reported $19 billion in 2001). One

pharmaceutical company alone, Pfizer, plans to spend over $100 million studying the safety and side effects of analgesics and other pain-reliever medications (AP, 2005). Brigham and Women's Hospital (Forman, 2005) found that frequent use of the analgesics acetaminophen and NSAIDs increased the risk of high blood pressure in 60-90% of women studied. Marshal et al. (2005) studied 114, 460 women and found an increased risk of breast cancer with Ibuprofen use.

Long-term aspirin consumption was also associated with an increased risk of estrogen receptor-negative breast cancer (Marshal et al., 2005). Like NSAIDs, moderate alcohol consumption may also be linked to breast cancer. Estrogen receptor-positive (ER-positive) breast cancers account for almost 60% of all breast cancers. Suzuki (2005) analyzed close to 52,000 postmenopausal women and found that moderate alcohol use (one or less drinks per day for females) increased the risk of ER-positive breast cancers.

Approximately 18 million Americans have a problem with alcohol (Hanson, 2005). A 1990 nationwide Gallup poll indicated that 79% of adults surveyed reported they had consumed one or more alcoholic beverages (Addiction Research Foundation, 1991). The analysis by Hennekens, Coroni-Huntley, Kohout, Leo, Scherr, and Woltz (2005) of the NIA's *Established Populations of Epidemiologic Studies of the Elderly (EPESE)* determined regular use of alcohol in older adult males ranged from 46% to 68% and with older adult females 23% to 51%.

Annual cost for alcohol and drug-related problems in the U.S. are roughly $276 billion per year and growing according to the NIAAA (2005). In a 1994 report on Medicaid cost, the Center on Addiction and Substance Abuse estimated that between

25% and 40% of all hospitalized patients (excluding maternity and intensive care) are being treated for complications resulting from alcohol. Estimates by the NIAAA (2005) place alcohol-medication interactions as a factor in at least 25% of all emergency room admissions.

Hospitalization and other per capita health care costs in the U.S. are the highest in the world. According to the Office of the Actuary at the Centers for Medicare and Medicaid Services (2005), the national health expenditures are projected to increase from $1,150.9 billion in 1998 to $3,585.7 billion in 2014. Thus far, the U.S.'s investment has not resulted in the greatest longevity (Japan leads) or healthy life years mainly due to chronic disease. On average, 10-20% of the population uses 80-90% of healthcare dollars, mostly older adults, and frequently due to poor lifestyle choices resulting in chronic disease. Alcohol, depression, smoking, and lack of exercise are the dominant risk factors in unsuccessful aging (Meek, Lyon, May, & Lynch, 2000).

The World Health Organization (WHO, 2005) states that there is no scientific evidence that indicates a safe level of alcohol consumption for any age and that a causal relationship exists between alcohol consumption and over 60 types of disease and injury. If and at what consumption level alcohol has a positive or negative impact on health is debatable as the research is ambiguous. Grant et al. (2004) stated that identifying people who consume even moderate amounts of alcohol is important as even "non-risky" levels of drinking may have a detrimental affect on health.

Health science and prevention programs must keep one-step ahead of changing demographics in order to address the public health needs. Grant (1997) stated that each

population cohort has its own attitudes, social structure, experiences, and expectancies. In 2006, the first of the Baby Boomer cohort will reach age 60. For the first time in history, older adults are beginning to outnumber the young (Cohen, 2005). The Boomer's experiences during the Vietnam War were very different from the same age cohort's experiences during World War I or II. Grant (1997) maintained that the patterns of substance abuse for those born after WWII would be substantially different from those born before.

Understanding the causes of disease, disability, and mortality in the aging human population is becoming increasingly important as the number of people and years of life increase (Adults age 65 have an average life expectancy of an *additional* 18.2 years (19.5 years for females and 16.6 years for males [AOA, 2005]). Thus far, the Baby Boomers have exhibited higher than expected levels of substance abuse as young and now middle-age adults. Baby Boomers may not to follow the drinking patterns (due to aging) observed in the past (Barry & Ackerman, 1999). If Baby Boomers continue to consume alcohol at increased levels when they become older adults, they will place unexpected unique and costly demands on the health care industry. Complicating this is their increased use of OTC and RX medications.

Creating health care for this rapidly growing population requires education and prevention of alcohol-related health problems. Approximately 30% of females and 60% of males will experience one or more adverse alcohol-related events during their life, most frequently involving unintentional injury or an adverse reaction to the mixture of drugs and alcohol. The incidents of acute liver failure have also been increasing as the

overall population mean ages. Natural changes in body composition and liver function due to aging can reduce tolerance to alcohol and drugs resulting in an increase in health problems (NIAAA, 1998).

A study conducted by Booth and Blow (2005) on alcohol and drug substance abuse in Baby Boomer Vietnam War Veterans during the years 1988, 1991, 1994, and 1998 found that substance abuse remained the same or increased for this cohort during the years studied. They concluded that the "aging-out" (declining due to age established in earlier studies) for treatment typical in past cohorts did not hold true for the Baby Boomer cohort. One limitation of this study is the Vietnam Era Baby Boomers who are unique in their persistence to substance abuse.

Mundt, French, Roebuck, Manwell, Barry (2005) found that older adults who are considered problem drinkers usually require more comprehensive and expensive treatment interventions than do younger adults do. Korper and Raskin (2005) in their conclusions of SAMHSA's *Substance Abuse by Older Adults: Estimates of Future Impact on the Treatment System*, expressed concern for the potential demand and expense on the health care system from unexpected levels of substance abuse in aging Baby Boomers. Further research was recommended to assist policy makers in decision-making, as the cost of caring for the multifarious problems resulting from substance abuse in the aging population will be expensive.

Studies on alcohol consumption do not always yield the similar results. Douglass, Schuster, and McClelland (1988) conducted an epidemiological study that discovered that older adults were more likely to abstain from alcohol than younger adults. Younger

adults are more likely to engage in binge drinking (five or more drinks on the same occasion). Surprisingly, the percentages were comparable for both older and younger who choose to consume alcohol daily. Whether the younger adults who are bingeing will continue to binge as they, age is unknown.

In tandem with the rising population of older adults is an increase in reported incidences of alcohol-related problem in older adults (Adams & Cox, 1997). Rates and effects of alcohol consumption in older adults have not been examined adequately according to the National Institute on Aging (NIA, 2005) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA, 2005). Alcohol abuse is a hidden problem in older adults (Robinson & Schonfeld, 1990) and is of increasing concern as the total number and percentages of older adults increase in the U.S.

Gupta (1993) estimated that there were approximately ten million alcoholics with around three million being 60 years of age or older. Grant et al. (2004) found that 44% of 5,980 people ages 50 and older surveyed used alcohol. If Grant's findings are representative of the age 50 and older U.S. population (81 million), then today at least 36 million older adults consume alcohol.

Substance Abuse and Mental Health Services Administration's (SAMHSA, 2003) study estimated that alcohol and drug abuse in older adults (50 and older) would triple by 2020. Based on a 50% increase in the older adult population and a 70% increase in the rate of treatment needed, the 1.7 million older adults in 2001 who suffered from substance abuse problems will grow to 4.4 million in 2020. Jennison (1999) predicted that the percentage of older adults who will consume alcohol would increase as the Baby

Boomer cohort ages and that the detrimental affects would be compounded by an increase in drug use (prescription, over-the-counter, illegal).

Trends specified by the DASIS Report (2005) on *Older Adults in Substance Abuse Treatment*, which included data from the SAMHSA's Treatment Episode Data Set (TEDS), indicated an increase of admissions for treatment of all types of substance abuse in adults ages 55 and older of 32% between 1995 and 2002. Alcohol, the most frequently reported primary type of substance abuse, had admissions that increased by 19% for men (33,100 to 39,300) and by 24% for women (7,000 to 8,700). Other types of drug admissions increased 106% for men (6,200 to 12, 800) and 119% for women (1,600 women to 3,500).

Hays (2002) states that it is unclear whether reported changes in substance abuse rates can be attributed to the aging baby boomer cohort (increased numbers), improved detection, or if drug and alcohol consumption is on really increasing. He adds that although estimates for just alcohol abuse center around 10%, some studies indicate a significantly higher rate for older adults at 17%. Hays' results indicate almost 2.5 million older adults and 21% of older hospital patients have problems related to alcohol consumption.

The National Study on Drug Use and Health (NIAAA, 2005), as indicated by Figure 1, found 50.1% of those surveyed consumed one or more drinks within the past 30 days. Consumption levels decreased with increasing age from the highest level for ages 21-25 at 70%, declining to 54.7% for ages 50-54, and 34.4% ages 65 or older.

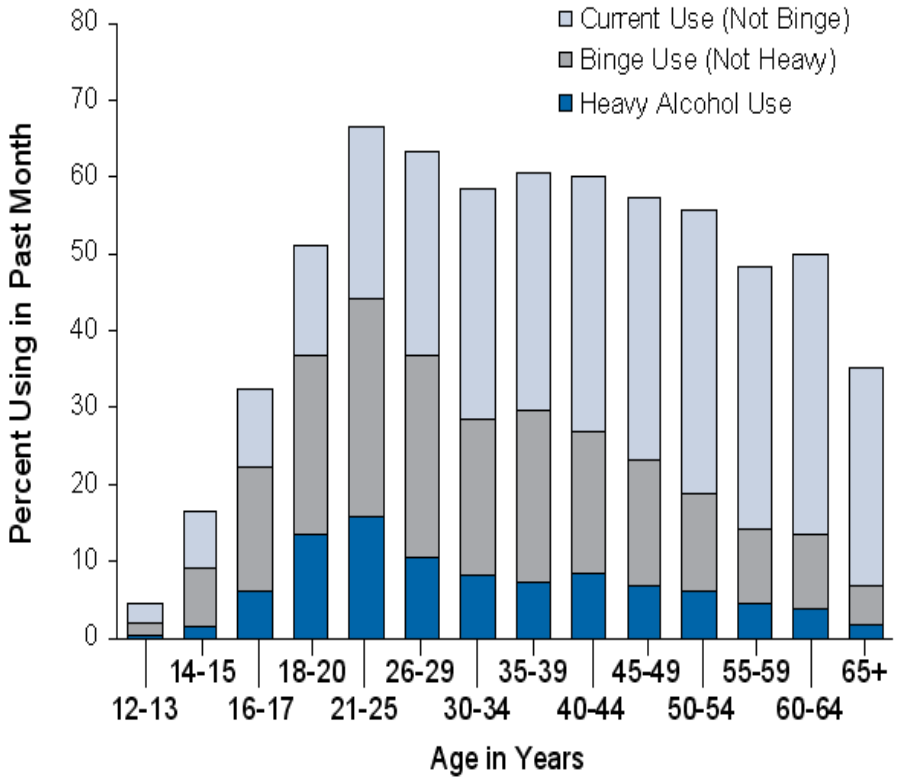

Figure 2: CURRENT, BINGE, AND HEAVY ALCOHOL USE, PERSONS BY AGE, 2004

SOURCE: National Study on Drug Use and Health, NIAAA, (2005)
Retrieved online from www.niaaa.gov.

If overall alcohol consumption, based on sales (Figure 1), is decreasing over time, why do many studies point to an increase in consumption? Hanson (2005) in Figure 3, found a decrease in consumption levels for ages 14 years and older based on data from the NIAAA. The younger generation, who typically consume at higher rates, are consuming less than in the earlier decades. The previously cited SAMSHA study (Figure 2) in 2004 found that about 50% of ages 18-20 consumes alcohol. This is consistent with the findings from Figure 4 that are based on a NIAAA study of high school seniors.

1980	2.76 gallons
1990	2.43 gallons
2000	2.18 gallons

Figure 3: U.S. PER YEAR CAPITA CONSUMPTION, AGES 14 AND OLDER
Source: NIAAA, 2005
Retrieved online from www.niaaa.gov.

If alcohol is considered a chronic disease, with peak onset by the age of 18 as previously reported by Fiellin, Reid, and O'Connor (2000), then the age at which Baby Boomers began to drink is important. The last waves of Baby Boomers are the high schools students in Figures 3, 4, and 5 below. In 1980, they reported the highest levels of consumption during of the past 23 years at 72%. Binge drinking rates within the past two decades have dropped from 41.2% in 1980 to 27.9% in 2003. High school seniors who have never tried alcohol increased from 6.8% of the 1980 Baby Boomers to 23.4% in 2003.

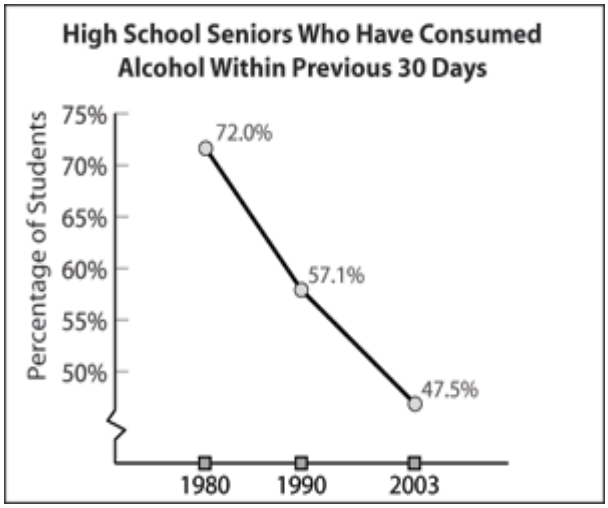

Figure 4: HIGH SCHOOL SENIORS CONSUMED ALCOHOL PAST 30 DAYS, 1980-2003
Source: NIAAA, 2005
Retrieved online from www.niaaa.gov.

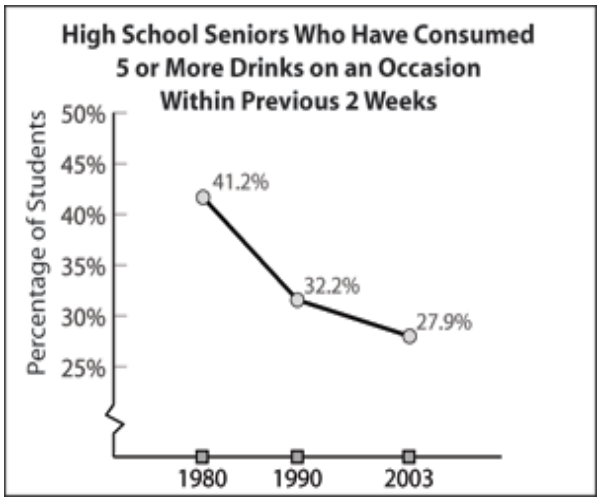

Figure 5: HIGH SCHOOL SENIORS BINGE DRINKING, PAST 2 WEEKS, 1980-2003
Source: NIAAA, 2005
Retrieved online from www.niaaa.gov.

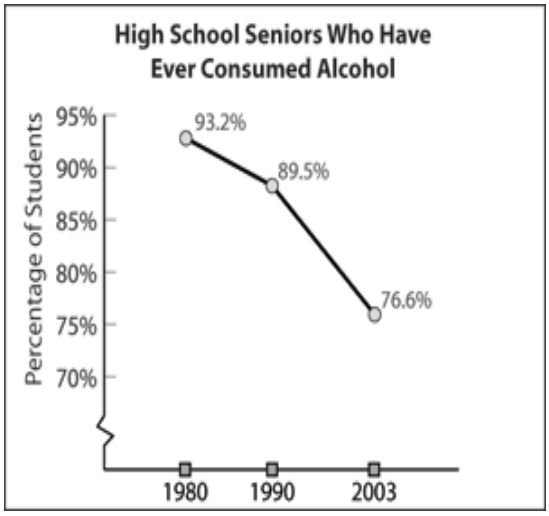

Figure 6: HIGH SCHOOL SENIORS EVER CONSUMED ALCOHOL, 1980-2003
Source: NIAAA, 2005
Retrieved online from www.niaaa.gov.

Blow, Barry, Welsh, and Booth (2003) analyzed the National Alcohol Epidemiologic Survey (NLAES) 1992 data set for alcohol and drug use by age group. They reported the mean drinks per week were consistent with NHANES (failed to specify which data set/year) except in respondents age 55 and older. The NLAES data indicated higher levels of consumption for older adults than NHANES data indicated. However, rates for consumption for both data sets indicated that alcohol consumption dropped rapidly after age 60.

MEASURING ALCOHOL CONSUMPTION

Researching alcohol consumption is difficult and results are not always comparable. Many assessment instruments presently in use are based on younger subjects who were hospitalized for substance abuse problems and may not be accurate with an older, non-hospitalized group (Blow, Barry, Welsh, & Booth, 2003; CSAT, 1998). Defining terms like “alcohol abuse,” “alcohol dependence,” “light,” “moderate,” “heavy,” and “problem” drinkers is arbitrary and the effects of alcohol are individualist (many variables like age, gender, and weight influence an individual's responses to ethanol).

Measuring an individual's blood alcohol concentration (BAC) can be accomplished with a blood test or by a Breathalyzer. Results from both devices are influenced by age, gender, physical condition, metabolism, time since last drink, amount of food, drugs, and medication consumed. BAC can only indicate recent consumption of ethanol. It is difficult to determine chronic consumption, which has a greater impact on health. Blood may also be analyzed for Gamma Glutamyltransaminase (*y*-GT), presently

the most sensitive enzymatic indicator of liver disease. It is a considered one of the more accurate test for alcoholism, but results can be due to reasons other than alcohol.

Self-reported consumption is the methodology most often employed to ascertain alcohol consumption information and is believed to be under-reported (Ellison, 1990). This is a reasonable assumption as alcohol affects memory and can result in blackouts and total loss of memory when intoxicated. Another reason for under-reporting is the social stigma attached to drinking by some individuals.

The amount of alcohol in "one drink" varies. Reporting how many drinks a respondent consumed may not be an accurate indication of the amount of alcohol consumed. A glass of wine, expected to be 5oz, may be more or less depending on who is pouring. One mixed drink or cocktail can contain one ounce of alcohol or, as in the case of a Long Island Iced Tea, several. Beverages contain differing amounts of alcohol, from 3.5% to 6% alcohol by volume for beer, to 10% to 14% for wine, and 40% or higher for liquor or spirits such as whiskey, gin, rum, and others.

The study in Figures 3, 4, and 5 questioned whether the students had consumed alcohol "ever," in the "past month," or "within the past two weeks." Questions in other surveys may ask drinking frequency for different periods such as "current" or, as in the case of NHANES, "within the past year." Lack of consistency in what constitutes a "drink" and the time-period surveyed makes it difficult to compare research results and to ascertain validity or reliability.

Belief that alcohol consumption levels declined with age is based on cross-sectional research design. Results from this methodology may not truly reflect what is occurring

because of aging, as it cannot control for a cohort or period effect. For example, data might reflect heavier drinking by a younger cohort, which may leave a different age cohort looking as if they are drinking less, when their drinking habits have not changed. A longitudinal research design would be more effective in determining if individuals choose to drink less because of aging. A cross-sectional study cannot determine this, but it can indicate behavioral choices within a cohort or for a specific period in time.

PHYSICAL EFFECTS OF ALCOHOL

The detrimental physical and psychological effects of alcohol use are numerous and can be life threatening. Primary consequences due to direct prolonged exposure may result in damage to the liver, heart and other organs, pneumonia, some types of cancer, acute alcohol poisoning, fetal alcohol syndrome, unintentional injury, homicide, and suicide. Secondary or indirect consequences include loss of appetite, vitamin deficiencies, infections, and sexual impotence or menstrual irregularities.

A few of the reasons that aging adults continue to drink include relaxation, habit, belief that alcohol improves health, pain-relief, depression, isolation, loss of a loved one, and loss of employment. Research indicates that alcohol can be beneficial or harmful to personal health depending on the amount, age, and other characteristics of the person consuming the alcohol, and the specific circumstances (i.e. unintentional injury or adverse reaction to medication). Physical effects of alcohol in older adults that are of particular concern by the National Institute of Alcohol Abuse and Alcoholism (2005) and others include:

1. Decrease in cognitive ability. May diminish memory or be misdiagnosed as

dementia. In contrast, Luchsinger, Tang, Siddiqui, Shea, and Mayeux (2004) found that up to three servings of wine daily lowered the risk of Alzheimer's disease.

2. Decrease in coordination and reaction time that may increase falls and unintentional injury. Thirty percent of older adults fall each year with 20%-30% of those suffering moderate to severe injuries. Falls are the most frequent cause of injury-related morbidity and mortality (Baker, O'Neill, & Karpf, 1984).
3. Heavy drinking over time will permanently damage the brain and central nervous system, may cause cirrhosis of the liver, peptic ulcers, and gastritis; create additional problems with the kidneys, heart, stomach, bones; and may cause cancer (Wells, Burnam, Benjamin, & Golding, 1990). Alcoholism is associated with rheumatism, osteoporosis, and several rare musculoskeletal complications. (Alcohol Abuse in the Elderly is Nothing to Wink At, 1995). Approximately half of all cases of cirrhosis, nonischemic cardiomyopathy, pancreatitis, and cancers of the esophagus, larynx, and mouth are attributable to alcohol (Harwood, 2000).
4. Ability to metabolize alcohol (tolerance) decreases with age. For example: 1 oz of 80-proof alcohol (one drink) consumed by a 60 year old would result in a 20% higher blood alcohol level than in a 20 year old. A person who is 90 years old would have a 50% higher blood alcohol level than a 20 year old who drank the same amounts.
5. May increase the incidence of suicide. Alcohol is considered a depressant although a few studies have found that moderate drinking was associated with a decrease in the incidents of suicide. Pinquart and Soerensen (2001) reported that the Baby

Boomer cohort has a higher prevalence of depression and other mental disorders than do the other cohorts like the GI Generation and Depression era cohorts.

6. Drinking alcohol can interfere with the diagnosis of other medical problems such as Alzheimer's disease and heart attacks.
7. Alcohol can change how prescription and over-the-counter drugs are assimilated. There may be an additive (compounding), synergistic (enhancing), or antagonistic (reducing) effect when combining alcohol with medications or other drugs. The results may cause medications to be ineffective, adversely affect bodily functioning, and may even result in death (Fraser, 1997). In a study of older adults who were referred for prescription drug abuse, more than 60% also had indicators for alcohol abuse (Jinks & Raschko, 1990).
8. Drinking alcohol may interfere with food consumption and result in malnutrition.

Rehm, Monteiro, Room, Gmel, Jernigan, Frick, and Graham (2001), in a comparative risk analysis of the 2000 Global Burden of Disease Study, found over 60 disease conditions attributed to alcohol consumption. Chronic conditions seem to be reflecting volume of consumption (excluding coronary heart disease and ischemic stroke). Acute conditions are influenced by volume and pattern of drinking behavior. Integration of methodology using aggregate data indicated that males suffered more health problems due to drinking than females.

A study of older adults (mean age 70 years), Sacco et al. (1999) found contradictory results with moderate alcohol consumption (defined as 2 drinks or less per day) was independently associated with a decreased risk of ischemic stroke. Heavy

alcohol consumption (averaging seven or more drinks per day) resulted in an increase chance for ischemic stokes.

Borgatta, Montgomery, and Borgatta (1982) reported that although alcohol consumption decreased in the latter stages of life, it continues to be a common problem. Problem drinkers in older adults fall into two main categories: chronic (early onset) and situational (late onset).

Chronic alcohol abusers are people who have consumed heavily for several years. Many chronic abusers die by middle age as the result of unintentional injury or disease, although others survive into old age. The majority of older adults whose drinking interferes with their life and health are chronic drinkers. Older adults who begin drinking as a response to an adverse life event such as death of a spouse, retirement, or loneliness are known as situational alcohol abusers (NIAAA, 2005).

OTC ANALGESICS AND ALCOHOL CONSUMPTION

Many people who consume alcohol also take medications, at least occasionally. Few studies are available that assess moderate to light alcohol consumption and OTC drug interactions. Most studies only investigated chronic or heavy alcohol use. In 1993, the FDA addressed the problem of mixing OTC pain medications with alcohol. They announced in 1997 (FDA, 1997) that, after public review, warnings would be required on all OTC pain relievers (aspirin, other salicylates, acetaminophen, ibuprofen, ketoprofen, and naproxen sodium) alerting consumers of the possible health risks associated with heavy alcohol use.

Draganov, Durrence, Cox, and Reuben (2000) examined non-users and long-time alcohol users who consume acetaminophen in modest to excessive doses for hepatic injury or acute liver failure (75% mortality rate). They wrote that there is no known minimum safe dosage amount for acetaminophen for chronic alcohol users. Draganov et al. (2000) recommended further research as data is unavailable in moderate drinkers. Zimmerman and Maddrey (1995) found that 31% of alcoholics use acetaminophen regularly, many every day. They reported that 10% of alcoholics consume doses of acetaminophen beyond recommended levels. Reported overall mortality in alcohol-acetaminophen syndrome is 18% to 19% of all cases according to Slattery, Nelson, and Thummel (1996).

Weathermon and Crabb (1999) found that adverse interactions between alcohol and medications could occur at even moderate levels of alcohol consumption. They explain that two types of interactions may happen if alcohol is combined with drugs. Pharmacokinetic interactions happen in the liver and can affect the metabolism of drugs. For example, alcohol can affect the metabolism of acetaminophen by converting the mixture into a toxic product that could potentially cause serious liver damage even acute liver failure. Other pharmacokinetic interactions may occur if alcohol amplifies the effects of medications. An example would be sleeping medications and alcohol. Herbal as well as OTC and RX medications can be adversely altered by alcohol.

OTC analgesics containers have warnings stating that anyone who drinks three or more alcoholic beverages per day should consult with a physician before taking the product (FDA, 2005). Research on human subjects to develop a “gold standard” by using

a randomized, double-blind, placebo-controlled study would not be ethical considering the potential toxic effects of mixing alcohol and analgesics at even moderate levels. Kuffner and Dart (2001) enlisted 230 participants (clinically sober) from a drug detoxification center for a two-group, randomized study to test the differences in a placebo and 1000mg acetaminophen, taken four times per day for two days as measured by laboratory liver function tests. They found no measurable differences in liver toxicity between the two groups in this limited period. No adverse effects were reported when taken within the recommended doses. Kuffner and Dart were not really testing the interaction of alcohol with acetaminophen, as alcohol was not present in the subjects.

THEORY

Health science has developed a number of theoretical models to facilitate understanding of human behavior as it relates to unhealthy lifestyle choices such as tobacco use, poor food selections, lack of exercise, and substance abuse. A few of the more prominent theories include the:

Health Locus of Control theorizes that people believe control over their health outcomes may be from internal (the individual controls behavior and is responsible for health outcomes) or external sources (God, fate, another person or something else exerts control over health outcomes for lifestyle choices or behavior). The most popular measure for health-specific measures is the Multidimensional Health Locus of Control Scales developed by Wallston, Wallston, and DeVellis in 1978.

Protection Motivation Theory involves an individual's assessment of the level of perceived threat with how they cope with the threat. Four factors contribute to perceived

ability of protecting oneself from the threat. First, the severity of the threat (e.g., slight weight gain or morbid obesity). Next, the probability or vulnerability of threat occurring. Third, the perceived response efficacy (will response to threat resolve the threat). Fourth, the perceived self-efficacy or the level of confidence in the individual's ability to perform the preventive behavior (e.g. can I control my eating?).

Health Belief Model was developed in the early 1950's and is one of the most popular conceptual frameworks for understanding health behavior. It involves six determinants of health behavior: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, health motivation, and cues to action. The Health Belief Model is frequently incorporated in behavioral change projects and hypothesizes that health behaviors depend upon the interaction of four factors: belief that a health problem may affect them, can be avoided, that taking action will rectify the health problem, and that she/he will be successful.

- Theory of Planned Behavior addresses deliberate behavior and is based on free will and proposes an individual's behavior is determined by her/his choice or plan to exhibit the behavior. The planned behavior is a function of attitude toward the behavior and the subjective norm. Intention is the cognitive representation of an individual's readiness to exhibit a behavior. Intention is the immediate antecedent of behavior and is derived from attitude toward the planned behavior, subjective norms, and perceived control over behavior.
- Self-Efficacy for the health sciences has evolved from Bandura's Social Cognitive Theory. Bandura targeted three dominant sources of influence that determine an

individual's decisions for lifestyle behaviors which is a reciprocal triad of behavior, personal (cognitive, affective, biological), and environmental factors. The dynamics of the reciprocity between factors varies by situation, individual, or time. An individual's belief or self-efficacy encapsulates their perceived capability create a level of performance that will influence events that affect their life. This determines how individuals think, feel, and their motivation and behaviors.

Many of these models incorporate an individual's attitude and perceptions in a more complex viewpoint of behavioral choices in contrast to genetic or stimulus-response theories of behavior. The theory that is deemed most appropriate for the purposes of this study is the Ecological Model from a public health, epidemiological, and aging standpoint. (Satariano, 2006).

- Ecological Model proposes a social–ecological view of the determinants of health and is a multidisciplinary approach that incorporates physical environment, social environment, biology, and behavior. It was created in an attempt to explain why some people age well while others suffer from disease and disability that cannot be attributed to merely the influence of genetics. Satariano theorized that patterns of health and well-being are affected by a dynamic interplay of biological, behavioral, social, and environmental factors and that this interaction of variables unfolds during the courses of an individual's life and affects social groups like families, neighborhoods, and communities. Lifestyle choices can play a major role in length as well as quality of life. Choosing to drink alcohol when it may do harm results from

the multi-level influences of physical, social, and biological stimuli and requires a holistic theory to understand it. Position statements by the National Institute of Health, Institute of Medicine, *Healthy People 2010, Ottawa Charter on Health Promotion,* and the National Academy of Sciences identify the Ecological Model as an appropriate framework for evaluating population-based surveys (Satariano, 2006).

Need for this study is founded on the evolving demographics of the aging population and the unanticipated changes in the behavior of the Baby Boomer cohort.

1. There is a growing need to understand the relationship between pain, alcohol, and analgesics consumption in aging Baby Boomers. This large population cohort is consuming alcohol and pain medication at higher rates than expected. If taken together, these products may have serious adverse effects on health that will be compounded by aging.
2. Most substance abuse education campaigns are oriented towards young adults (under-aged drinking and binge drinking). "Don't drink and drive" may be the only alcohol prevention campaign oriented towards all adults.
3. A nationwide campaign such as, "Don't drink and $R_{X,}$" might increase the awareness middle-aged and older adults of the potential health dangers of combining "safe" OTC analgesics with alcohol and prevent health problems.

INSTRUMENT

The National Health and Nutrition Examination Survey (NHANES) is a nationwide ongoing survey that collects data on health-related variables. NHANES utilizes three collection methodologies: personal interviews by trained interviewers some

of which were bilingual (Spanish), clinical tests and physical examinations, and written surveys (English and Spanish). Presently, this data collection system is the responsibility of the National Center for Health Statistics (NCHS), a division of the Centers for Disease Control and Prevention (CDC). Their purpose is to assess and provide representative reference data on the health and nutritional status of the civilian, non-institutionalized population in the United States.

NHANES was first developed in 1956 by the National Health Survey Act to provide current statistical data on the amount, distribution, and effects of illness and disability in the United States. The first National Health Examination I (NHES I) survey was conducted in 1960-1962 and focused on chronic disease in ages 18-79. Since then, the survey has expanded to include all ages and increased the focus on the relationship of nutrition to health (CDC, 2005).

NHANES 1999-2000 Internet data release contains data for 9,965 non-institutionalized participants living in the U.S., ages 0 to 85 (CDC, 2005). Over-sampling germane to this study includes minorities and people with lower income. Statistical weighting was provided by NHANES.

PUBLIC HEALTH OBJECTIVES

Health objectives for measuring alcohol consumption as stated by NHANES that will be addressed in this study are:

"Alcohol consumption contributes significantly to the cause, course, and outcome of a multitude of physical, psychological, behavioral, nutritional, and social problems. Alcohol dependence, alcoholic psychosis, alcohol abuse, and liver cirrhosis are core

health problems related to alcohol consumption. Alcohol also influences overall quality of diet and nutrient intake, especially energy (calories). Analysis of premature deaths demonstrates that alcohol plays a particularly prominent role in mortality. Moderate alcohol consumption has been related to an increased risk of certain cancers and a decreased risk of coronary heart disease. The economic cost to society due to alcohol abuse is extreme when we consider lost employment, reduced productivity, treatment, and health support services for alcohol related illnesses."

"The data will be used to: 1. Produce population reference data on alcohol intake for the total U.S. population subgroup; 2. Assess the proportion of the population who consume amounts of alcohol that exceed the *Dietary Guidelines for Americans*; 3. Investigate the relationship between alcohol intake and health conditions" (NHANES, 2003).

APPENDIX B

EXTENDED BIBLIOGRAPHY

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APPENDIX C

NHANES QUESTIONNAIRE

I. ALCOHOL QUESTIONS:

1. In any one year, {have you/has SP} had at least 12 drinks of any type of alcoholic beverage? By a drink, I mean a 12 oz. beer, a 5 oz. glass of wine, or one and half ounces of liquor.

Yes 1
No..... 2
Refused ... 7
Don't know .....…..... 9

2. In {your/SP's} entire life, {have you/has he/has she} had at least 12 drinks of any type of alcoholic beverage?

Yes 1
No 2
Refused .....…..... 7
Don't know .....…..... 9

3. In the past 12 months, how often did {you/SP} drink any type of alcoholic beverage? PROBE: How many days per week, per month, or per year did {you/SP} drink?
Enter '0' for never.
|___|___|___|
<u>Enter quantity</u>

Refused 777
Don't know 999
Enter Unit
Week..... 1

Month 2

Year..... 3

Refused .....…..... 7

Don't know .....…..... 9

4. In the past 12 months, on those days that {you/SP} drank alcoholic beverages, on the average, how many drinks did {you/he/she} have?

If less than one drink, enter '1'.

If 95 drinks or more, enter '95'.

|___|___|___|

Enter # of drinks

Refused..... 777

Don't know 999

5. In the past 12 months, on how many days did {you/SP} have 5 or more drinks of any alcoholic beverage? PROBE: How many days per week, per month, or per year did {you/SP} have 5 or more drinks in a single day?

Enter '0' for none.

|___|___|___|

Enter quantity

Refused 777

Don't know 999

Enter unit

Week.....1

Month.....…..... 2

Year.....…..... 3

Refused .....…..... 7

Don't know .....…..... 9

.

6. Was there ever a time or times in {your/SP's} life when {you/he/she} drank 5 or more drinks of any kind of alcoholic beverage almost every day?

Yes 1

No..... 2

Refused .....…..... 7

Don't know .....…..... 9

II. MISCELLANEOUS PAIN QUESTIONS:

1. MPQ.010 During the past 12 months, {have you/has SP} had pain, aching, stiffness or swelling in or around a joint? [Do not include neck pain.]

YES 1

NO 2 (MPQ.060)

REFUSED 7 (MPQ.060)

DON'T KNOW 9 (MPQ.060)

2. MPQ.020 Were these symptoms present on most days for at least 1 month?

YES 1

NO 2

REFUSED 7

DON'T KNOW 9

3. MPQ.030 Did these symptoms begin only because of an injury?

YES 1

NO 2 (MPQ.050)

REFUSED 7 (MPQ.050)

DON'T KNOW 9 (MPQ.050)

4. MPQ.100 During the past month, {have you/has SP} had a problem with pain that lasted more than 24 hours?

YES 1

NO . . . . . 2 (END OF SECTION)

REFUSED . . . . . 7 (END OF SECTION)

DON'T KNOW . . . . . 9 (END OF SECTION)

5. MPQ.110 For how long {have you/has SP} experienced this pain? Would you say . . .

less than a month, ... 1

at least 1 month but less than 3 months, . . 2

at least 3 months but less than 1 year, or . . 3

greater than 1 year? 4

REFUSED 7

DON'T KNOW 9

III. ANALGESIC (PAIN-RELIEF MEDICATION) QUESTIONS:

1. RXQ.300 The next questions are about certain prescription and over the counter pain relievers that {you/SP} may be using now or may have used in the past on a regular basis. You may have told me about some of these pain relievers earlier. I have some different questions specifically about pain relievers.

{Have you/has SP} ever taken any of these prescription or over-the-counter pain relievers nearly every day for as long as a month?

HAND CARD DSQ2

YES 1

NO . . . . . 2 (BOX 18)

REFUSED . . . . . 7 (BOX 18)

DON'T KNOW . . . . . 9 (BOX 18)

2. RXQ.310 Which products {have you/has SP} taken?

CODE ALL THAT APPLY

HAND CARD DSQ2

CAPI INSTRUCTION:DISPLAY PRODUCT LIST OF PAIN RELIEVING PRODUCTS. (ADD "—ALSO ALEVE" AFTER "NAPROSYN" IN THE RESPONSE CATEGORIES.)

BOX 16 LOOP 4: ASK RXQ.320-RXQ.331 FOR EACH PRODUCT SELECTED AT RXQ.310.

Hand Card: Respondents were asked a series of questions about lifetime and current chronic use of specific prescription and nonprescription pain medication that were identified on a hand card shown to the participant by the interviewer (refer below). Chronic use was defined as 'use nearly every day for as long as a month.' A hand card listed the following pain-relieving products:

Aspirin – also buffered aspirin products such as Anacin, Bayer, Bufferin, Midol, Ascripton, Ecotrin, Pabrin, and Alka Seltzer (OTC)

Tylenol – also other acetaminophen products, including sinus products such as Anacin-3, Dristan, AF, and Comtrex (OTC)

Ibuprofen – also Advil, Nuprin, Motrin IB (including cold and sinus products containing ibuprofen) (OTC)

Excedrin (OTC)

Vanquish (OTC)

Feldene (RX)

Voltarin (RX)

Clinoril (RX)

Indocin (RX)

Naprosyn (RX) – also Aleve (OTC)

Tolectin (RX)

3. RXQ.320 Please think about {your/SP's} use of pain reliever products during {your/his/her} lifetime. For how many years did {you/s/he} use {PRODUCT NAME}

nearly every day? Please do not count the months or years when {you were/s/he was} not taking the medicine.

|___|___|

ENTER NUMBER OF YEARS

LESS THAN 1 YEAR 666

REFUSED 777

DON'T KNOW 999

4. RXQ.330 {Do you/Does SP} currently use or take {PRODUCT NAME} daily or nearly every day?

YES 1

NO . . . . . 2 (BOX 17)

REFUSED . . . . . 7 (BOX 17)

DON'T KNOW . . . . . 9 (BOX 17)

5. RXQ.331 On average, how many pills or doses of {PRODUCT NAME} {do you/does SP} take in a single day?

|___|___|___|

ENTER NUMBER OF PILLS OR DOSES

REFUSED 777

DON'T KNOW 999

ENTER UNIT

PILLS 1

DOSES 2

REFUSED 7

DON'T KNOW 9

BOX 17 END LOOP 4: ASK RXQ.320 - RXQ.331 FOR NEXT PAIN RELIEVER. IF NO NEXT PAIN RELIEVER, GO TO BOX 18.

APPENDIX D

SUPPLEMENTARY TABLES

Table 20: ALL RESPONDENTS: JOINT PAIN/ACHING/STIFFNESS IN PAST YEAR, NON-TO-LIGHT DRINKERS, AND CURRENTLY TAKING ANALGESICS

		Currently Using Analgesics	
Non/light drink and Total - Joint Pain	Total	Yes	No
Total	950	157 (18.53%)	793 (81.47%)
No	297 (33.24%)	52 (22.43%)	245 (77.66%)
Yes, drink non/light drinkers and Yes joint pain	653 (66.76%)	105 (16.64%)	548 (83.36%)
Total	392	99 (25.76%)	293 (74.24%)
No	114 (32.81%)	28 (29.86%)	86 (70.14%)
Yes, drink non/light drinkers and No joint pain	278 (67.19%)	71 (23.75%)	207 (76.25%)
Total	558	58 (13.15%)	500 (86.85%)
No	183 (33.55%)	24 (16.86%)	159 (83.14%)
Yes, drink	375 (66.45%)	34 (11.28%)	341 (88.72%)

Table 21: ALL RESPONDENTS: SEVERE HEADACHES OR MIGRAINES, NON-TO-LIGHT DRINKERS, AND CURRENTLY TAKING ANALGESICS

Non/light drinkers and Headache/Migraine	Total	Currently Using Analgesics Yes	No
Total	950	157 (18.53%)	793 (81.47%)
No	297 (33.24%)	52 (22.43%)	245 (77.66%)
Yes, drink non/light drinkers and Yes serious headache or migraine	653 (66.76%)	105 (16.64%)	548 (83.36%)
Total	214	60 (31.65%)	154 (68.35%)
No	81 (43.37%)	22 (34.56%)	59 (65.44%)
Yes, drink non/light drink and No – serious headache or migraine	133 (56.63%)	38 (29.43%)	95 (70.57%)
Total	736	97 (15.04%)	639 (84.96%)
No	216 (30.54%)	30 (17.72%)	186 (82.28%)
Yes, drink	520 (69.46%)	67 (13.86%)	453 (86.14%)

Table 22: ALL RESPONDENTS: PAIN LASTING 24 HOURS OR LONGER, NON-TO-LIGHT DRINKERS, AND CURRENTLY TAKING ANALGESICS

Non/light drink and Total – persistent pain ≥24 hrs	Total	Currently Using Analgesics	
		Yes	No
Total	950	157 (18.53%)	793 (81.47%)
No	297 (33.24%)	52 (22.43%)	245 (77.66%)
Yes, drink non/light drink and Yes – persistent pain ≥24 hrs	653 (66.76%)	105 (16.64%)	548 (83.36%)
Total	244	76 (31.84%)	168 (68.16%)
No	79 (36.96%)	24(35.36%)	55 (64.68%)
Yes, drink non/light drink and No – persistent pain ≥24 hrs	165 (63.04%)	52 (29.80%)	113 (70.20%)
Total	706	81 (13.51%)	625 (86.49%)
No	218 (31.83%)	28 (16.65%)	190 (83.35%)
Yes, drink	488 (68.17%)	53 (12.04%)	435 (87.96%)

VITA

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