Chapter One

Introduction

This report describes the nutrition and health characteristics of the Nation's older adults—men and women aged 60 years and older, using data from the Third National Health and Nutrition Examination Survey (NHANES-III). The NHANES survey is the primary source of information used in monitoring the Nation's nutrition and health status. NHANES-III was completed between 1988 and 1994 and provides data for a large nationally representative sample of individuals.[1]

The report compares and contrasts older adults (also referred to as seniors) in three different income groups: income at or below 130 percent of poverty (lowest income), income between 131 and 185 percent of poverty (low income), and income greater than 185 percent of poverty (higher income). The lowest-income group corresponds to the criterion used to define income eligibility for the Food Stamp Program (FSP).

Two previous volumes in this series compare participants and nonparticipants in major Federal food and nutrition assistance programs (volume I: the Food Stamp Program (Fox and Cole, 2004a) and volume II: the WIC Program (Cole and Fox, 2004)).[2] It was not possible to build this report around a comparison of participants and nonparticipants in the Federal food assistance program that targets older adults—the Elderly Nutrition Program (ENP)—because the

proportion of the older adult population that reported participation in the ENP in NHANES-III was too small (4.4%).

This research was designed to establish a baseline from which to monitor the nutrition and health characteristics of older Americans over time, particularly those in the lowest- and low-income groups, and to generate questions and hypotheses for future research. The data presented in this report provide useful background information for researchers interested in studying the nutrition and health characteristics of older adults and/or the impact of participation in food and nutrition assistance programs, or other variables, on nutrition and health characteristics. The data also provide important insights for individuals who plan and implement nutrition or health programs for older adults.

A broad array of measures is used to describe the nutrition and health characteristics of the older adult population. Nutritional status is examined through measures of dietary intake, body weight, selected nutritional biochemistries, and bone density. Important health-related behaviors are also examined, including physical activity, alcohol and tobacco consumption, and socialization. Health status is assessed on the basis of self-reported and physician-assessed general health status, the prevalence of chronic disease, risk of coronary heart disease, functional status, and dental health. Finally, data on health insurance coverage and use of regular health care locations and providers are used to assess access to health care services.

This introductory chapter provides an overview of the special issues that confront the aging population as well as a brief description of the NHANES-III data and the general approach to

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[1] Beginning in 1999, NHANES became a continuing survey, without breaks between data collection cycles. Similar sampling and data collection procedures are used, although at least two years of data are necessary to have adequate sample sizes for subgroup analyses (Flegal et al., 2002). Data for the first two continuous years of the ongoing NHANES (1999-2000) have been released since the time the tabulations presented in this report were prepared. Data for subsequent years are expected in mid-2005.

[2] The series also includes another volume, which focuses on school-age children (Fox and Cole, 2004b).

the analysis. The six chapters that follow present data on the nutrition and health characteristics identified previously. Details on data and methodology may be found in appendices referenced throughout the report.

The Aging Population

Older adults are a growing segment of the population. The most significant growth is occurring among the oldest members of the population—those 85 years and older. Between 1990 and 2000, the number of adults 65 years of age and older increased by 12 percent, from 31.2 million to 35 million (Hetzel and Smith, 2001). Over the same time period, the number of adults 85 years and older increased by about 38 percent, from 3.1 million to 4.2 million. In contrast, the population of 75-84-year-olds increased by 23 percent and the population of 65-74-year-olds increased by less than 2 percent (Hetzel and Smith, 2001).

It is estimated that by 2030, when the last baby boomers turn 65, there will be more than 8.5 million citizens 85 years and older (Centers for Disease Control and Prevention (CDC), 1999). As a result of this so-called "graying of America," analysts project that health care costs for this older population will be $400 to $500 billion higher than today's costs if health and disease patterns remain the same (CDC, 1999).

Chronic diseases such as heart disease, cancer, and stroke are common among older adults. Traditionally, attention to these problems has tended to focus on disease management rather than on promoting lifestyle changes that can mitigate or lessen the symptoms of chronic disease (CDC, 1999). In recent years, the focus has begun to shift to prevention—that is, to ensuring that all older adults consume diets that are consistent with public health recommendations, are physically and socially active, and avoid potentially harmful behaviors such as smoking and excessive alcohol consumption.

For older adults who already have a chronic disease, the emphasis is on comprehensive treatment to maintain the highest quality of life possible. Food and nutrition assistance programs can play an important role in meeting these objectives by ensuring that seniors receive adequate nutrition and maintain their ability to live independently for as long as possible.

The Third National Health and Nutrition Examination Survey

NHANES-III was conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC) between 1988 and 1994. The survey included interviews and physical examinations, and was designed to provide national estimates of the health and nutrition status of the civilian, noninstitutionalized population in the 50 United States.

NHANES-III was based on a complex multistage probability sample design (NCHS, 1994). Persons were selected on the basis of sex, age, and race or ethnicity. Children under 6 years of age, adults over 60 years of age, and black and Mexican American persons were oversampled. NHANES-III collected data from 33,994 persons 2 months of age and older. Response rates were 85.6 percent for the household interviews and 78.8 percent for the physical examinations (NCHS, 1996). The total sample of adults 60 years and older is 6,956.

Interviews were conducted in respondents' homes and physical examinations and measurements were completed in a Mobile Exam Center (MEC). The MEC examination included a physical exam, dietary interview, health interview, blood tests, body measurements, and a dental exam. To increase response rates, a home examination was offered as an alternative to the MEC exam for adults 60 and over who were in a wheelchair or were primarily bedridden. The home examination included a subset of the measures conducted in the MEC.

The dietary interview included a single 24-hour dietary recall.[3] The recall collected quantitative data on foods and beverages consumed during the preceding 24 hours. NCHS staff used these data to calculate nutrient intakes, using food composition data from the Survey Nutrient Database maintained by the U.S. Department of Agriculture's (USDA) Agricultural Research Service (ARS).

Analytic Approach

Older adults (60 years and over) in the NHANES-III sample were divided into three groups on the basis of household income: income at or below 130 percent of poverty (lowest income), income between 131 and 185 percent of poverty (low income), and income greater than 185 percent of poverty (higher income). Individuals who resided in households participating in the Food Stamp Program (FSP) were considered members of the lowest-income group (at or below 130 percent of poverty), regardless of reported income. This approach is consistent with the classification scheme used in the companion reports in this series (Cole and Fox, 2004, Fox and Cole, 2004a, and Fox and Cole, 2004b), and gives precedence to reported program participation.[4]

The three income strata were further divided on the basis of gender and age into 36 subgroups.

Six age groups were used divide the population by 5-year intervals, from 60-64 years through 85 years and older. For analyses involving dietary outcomes (Chapters Two and Three), the two oldest age groups (80-84 years and 85 and older) were collapsed because the sample of seniors 85 years and older was too small for estimation of usual energy and nutrient intakes (see appendix C).

For each variable examined, detailed tables were produced showing estimates for each of the 36 subgroups. Separate estimates were also produced for the total population, for each age group (both genders combined), and for each gender (all ages combined). Readers interested in comparing data for older adults to the population as a whole or to other subgroups of the population are referred to volume I in this series (Fox and Cole, 2004a). The detailed tables that accompany that volume include data for the entire population as well as for 72 gender-and-age specific subgroups.

Table 1 illustrates the format used in the detailed tabulations. Columns show data for all older adults as well as for older adults in each of the three income groups. Rows show data for the age-specific subgroups, overall and by gender. Table 1 also shows the maximum sample size for each table cell. The three columns included under each of the income groups (Household Interview, MEC Examined, and Home + MEC Examined) show cell sizes for the three NHANES-III samples. The Household Interview sample contains all respondents. The MEC Examined sample contains the subsample of all respondents examined in the MEC, and the Home Examined sample is a supplement to the MEC sample for a limited number of data items.

Tables include footnotes that clearly identify data source(s). Brief descriptions of the various NHANES-III data files used in the analysis are provided in appendix A. Tables also include footnotes, as appropriate, that identify reference

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[3]For adults (17 years and older), NHANES-III also included a food frequency questionnaire, which was administered as part of the household interview. The food frequency had a 1-month reference period and was designed to collect qualitative information about dietary patterns. Data from the food frequency were not analyzed for this series of reports.

[4]NHANES-III data include individuals who reported participation in the FSP and reported household incomes above the 130 percent of poverty cutoff used to define income eligibility for the FSP. This was true for 12.6 percent of those reporting FSP participation. Several factors may contribute to conflicting data on income and program participation. For example, NHANES-III measures income as a range rather than as an exact value and uses the midpoint of the range to compare household income to the poverty line; FSP eligibility is based on contemporaneous measures of household income, while NHANES-III measured income retrospectively (over the past 12 months); and NHANES-III interviewers and FSP eligibility workers may have used different probes or techniques to ascertain household income.

Table 1—Number of NHANES-III respondents: Older adults

	Total persons			Income ≤ 130% poverty			Income 131-185% poverty			Income > 185% poverty		
	Household Interview	MEC Examined	MEC+Home Examined	Household Interview	MEC Examined	MEC+Home Examined	Household Interview	MEC Examined	MEC+Home Examined	Household Interview	MEC Examined	MEC+Home Examined
Both sexes												
60-64 years	1,344	1,210	1,229	417	378	384	159	143	146	632	574	582
65-69 years	1,264	1,099	1,137	389	340	355	153	135	139	597	521	537
70-74 years	1,278	1,065	1,125	368	307	328	207	171	181	585	499	522
75-79 years	878	686	741	282	220	238	149	121	131	327	267	283
80-84 years	1,134	814	931	366	262	303	179	132	147	412	315	357
85 + years	698	428	561	234	150	198	109	74	90	219	150	188
Total	6,596	5,302	5,724	2,056	1,657	1,806	956	776	834	2,772	2,326	2,469
Male												
60-64 years	672	606	613	194	179	181	77	71	72	340	304	308
65-69 years	626	560	572	174	154	160	72	67	68	324	290	295
70-74 years	611	524	549	153	136	143	105	83	90	305	268	277
75-79 years	382	299	323	112	90	98	63	52	56	159	125	135
80-84 years	540	410	455	144	107	123	89	68	73	233	189	206
85 + years	286	188	244	82	57	73	55	38	48	107	73	94
Total	3,117	2,587	2,756	859	723	778	461	379	407	1,468	1,249	1,315
Female												
60-64 years	672	604	616	223	199	203	82	72	74	292	270	274
65-69 years	638	539	565	215	186	195	81	68	71	273	231	242
70-74 years	667	541	576	215	171	185	102	88	91	280	231	245
75-79 years	496	387	418	170	130	140	86	69	75	168	142	148
80-84 years	594	404	476	222	155	180	90	64	74	179	126	151
85 + years	412	240	317	152	93	125	54	36	42	112	77	94
Total	3,479	2,715	2,968	1,197	934	1,028	495	397	427	1,304	1,077	1,154

Source: NHANES-III, 1988-94.

standards used in interpreting NHANES-III data. Reference standards are described in appendix B. To the extent possible, standards are based on those used in the *Healthy People 2010* objectives (U.S. Department of Health and Human Services (U.S. DHHS), 2000a).

Age Adjustment

Data shown in the "total" rows of all detailed tables are age-adjusted, or standardized according to the age distribution of the U.S. population in the year 2000. Age-adjustment is important for comparisons between subgroups and for trend analyses between NHANES surveys. When comparing subgroups such as the lowest-income and low-income older adults at a point in time, age-adjustment eliminates between-group differences that are due solely to differences in the age distributions of the groups (U.S. DHHS, 2000b).

It is important to understand that age-adjusted estimates do not represent the *true* or raw estimates for a given population or subgroup. Rather, the age-adjusted estimates should be viewed as constructs or indices that provide information on the relative comparability of two or more populations (in this case, older adults in different income groups) on a particular measure (U.S. DHHS, 2000b).[5]

The choice of a standard population for age-adjusted estimates is somewhat arbitrary. For this report, adjustments are based on year 2000 Census estimates. Use of year 2000 population estimates facilitates comparison of NHANES-III estimates with estimates from NHANES 1999-2000. Population estimates are shown in table 2. The year 2000 age distribution shown in column 1 of table 2 was applied to each group of older adults.

Statistical Tests

The statistical significance of differences between the lowest-income group and the two other income groups was tested using t-tests. When multiple outcome categories were examined simultaneously, the Bonferroni adjustment was used to adjust for multiplicity (Lohr, 1999). Nonetheless, because of the large number of t-tests conducted, caution must be exercised in interpreting results. In general, findings discussed in the text are limited to those with strong statistical significance (1 percent level or better) or those that are part of an obvious trend or pattern in the data.

Text discussions generally focus on differences between the lowest-income group and one or both of the other income groups. Reference may be made to other between-group differences—most often males vs. females—when the differences are noteworthy. The statistical significance of these secondary comparisons has not been tested, however, and this fact is noted in the text. Statistical tests were not performed on these second-level differences because of the expansive number of statistical tests performed in the main analysis and because these comparisons are not the focus of the report.

Additional information about the analytic approach, including use of NHANES-III sampling weights, calculation of standard errors, age standardization, and guidelines used to flag point estimates deemed to be statistically unreliable, is provided in appendix C. Individual point estimates may be deemed statistically unreliable because of small sample size or a large coefficient of variation. In keeping with NHANES-III reporting guidelines, such estimates are reported in detailed tables and are clearly flagged.

The chapters that follow summarize key findings. Graphics are used to illustrate observed differences between older adults in different income groups. Differences that are statistically significant at the 5 percent level or better are

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[5]Estimates for gender-and-age-specific subgroups are not adjusted and do represent *true* or raw estimates for the specific subgroup.

Table 2—Age distribution of Older Adults in NHANES-III sample frame and year 2000 population

| | Year 2000 population distribution | | NHANES-III sample frame | | | | | | | |
| | Total Persons | | Total persons[1] | | Lowest income: ≤ 130% poverty | | Low-income: 131-185% poverty | | Higher-income: > 185% poverty | |
	Population (thousands)	Percent	Population (thousands)	Percent	Population (thousands)	Percent	Population (thousands)	Percent	Population (thousands)	Percent
Both sexes										
60-64 years	10,610	23.4	9,256	25.8	1,665	20.4	1,078	20.3	6,513	29.1
65-69 years	9,437	20.8	9,176	25.6	1,731	21.2	1,045	19.6	6,400	28.6
70-74 years	8,746	19.3	7,439	20.7	1,587	19.4	1,236	23.2	4,616	20.6
75-79 years	7,408	16.3	4,977	13.9	1,330	16.3	1,026	19.3	2,621	11.7
80-84 years	4,879	10.8	3,075	8.6	1,081	13.2	572	10.8	1,422	6.4
85 + years	4,272	9.4	1,963	5.5	773	9.5	359	6.8	830	3.7
Total	45,353	100.0	35,885	100.0	8,166	100.0	5,318	100.0	22,401	100.0
Male										
60-64 years	–	23.4	4,208	26.8	645	24.1	390	17.9	3,173	29.3
65-69 years	–	20.8	4,358	27.8	656	24.5	457	20.9	3,245	29.9
70-74 years	–	19.3	3,302	21.0	486	18.2	567	26.0	2,249	20.7
75-79 years	–	16.3	2,040	13.0	397	14.8	402	18.4	1,241	11.4
80-84 years	–	10.8	1,138	7.2	289	10.8	226	10.4	624	5.8
85 + years	–	9.4	661	4.2	206	7.7	141	6.5	314	2.9
Total	–	100.0	15,706	100.0	2,678	100.0	2,183	100.0	10,845	100.0
Female										
60-64 years	–	23.4	5,048	25.0	1,020	18.6	688	22.0	3,340	28.9
65-69 years	–	20.8	4,818	23.9	1,075	19.6	588	18.8	3,154	27.3
70-74 years	–	19.3	4,138	20.5	1,101	20.1	670	21.4	2,367	20.5
75-79 years	–	16.3	2,937	14.6	933	17.0	624	19.9	1,380	11.9
80-84 years	–	10.8	1,937	9.6	792	14.4	347	11.1	798	6.9
85 + years	–	9.4	1,302	6.4	567	10.3	219	7.0	517	4.5
Total	–	100.0	20,179	100.0	5,488	100.0	3,135	100.0	11,556	100.0

[1] Total includes persons with missing food stamp participation or income.
– Population by gender not available. Overall age distribution was used to adjust both male and female totals.
Source: NHANES-III, 1988-94. Year 2000 population from U.S. Census Bureau, *Monthly Estimates of the United States Population*, April 2000.

highlighted. Detailed tables provided in appendix D differentiate three levels of statistical significance ($p < .001$, $.01$, and $.05$). It is important to note that differences between income groups may be statistically significant even if point estimates are unreliable. When this occurs, the text describes the existence and direction of the significant difference and identifies the group(s) for which point estimates are unreliable.