



NUTRIENT AND FOOD INTAKES OF AMERICANS: NHANES 2001-2002 DATA

Catherine M. Champagne, PhD, RD

& H. Raymond Allen, PhD

Pennington Biomedical Research Center

Louisiana State University System

Baton Rouge, LA

Research Objective

- **To determine how well Americans achieved recommended nutrient intakes, despite limitations of the research design.**
- **A second objective was to look at beverage consumption, especially fruit juices, since they have been under some scrutiny in the obesity epidemic.**

What are the limitations?

- **The fact that we used only 1 24-hr recall, therefore we were only able to characterize the group.**
- **We used as an index the table from Dietary Reference Intakes: Applications in Dietary Assessment (2000), published by the Institute of Medicine, albeit not perhaps as it was intended to be used!**

Study Population

- **9598 subjects who completed the 1-day intake from NHANES 2001-2002, breast fed infants excluded.**
- **We included all ages, with breakdown in groupings identical to those for which the IOM recommendations were identified.**

Basis of Adherence to Specific Health Recommendations

- **Fat at 30% of energy or less**
- **Saturated fat at 10% of energy or less**
- **Cholesterol, 300 mg or less**
- **Sodium, 2400 mg or less**
- **Dietary fiber, 25 g or more**
- **Protein at 12-15% of energy**

Percentage of individuals with diets meeting government recommendations for total fat, saturated fat, cholesterol, fiber, sodium and protein intakes, by sex and age, NHANES 2001-2002 (*breast fed infants excluded*)

Sex and age	Total Fat 30% of kcal or less	Saturated fat 10% of kcal or less	Cholesterol 300 mg or less	Sodium 2400 mg or less	Dietary Fiber 25 g or more	Protein 12-15% of kcal
<i>Percentage of Individuals</i>						
Males and Females:						
• 6 months and under	4.8	2.7	100.0	100.0	---	5.4
• 6 months to 1 year	21.9	15.1	94.8	96.4	---	19.8
• 1 to 3 years	41.1	29.7	82.3	66.3	1.6	46.2
• 4 to 8 years	36.7	37.2	79.8	40.7	3.8	43.6
Males:						
• 9 to 13 years	35.9	37.6	73.5	25.1	10.3	40.8
• 14 to 18 years	39.5	44.8	64.5	22.0	13.1	37.6
• 19 to 30 years	46.7	56.0	55.6	22.3	19.2	39.9
• 31 to 50 years	39.1	50.4	49.0	21.4	22.3	36.8
• 51 to 70 years	36.1	55.9	57.6	30.4	19.2	37.0
• 71 years and older	34.4	51.5	69.6	37.5	14.8	36.2
Females:						
• 9 to 13 years	37.7	39.7	78.4	40.5	5.9	43.9
• 14 to 18 years	39.9	48.2	76.6	42.4	5.4	39.8
• 19 to 30 years	40.5	50.3	74.3	35.8	7.7	37.5
• 31 to 50 years	35.6	49.7	69.3	41.0	11.5	34.7
• 51 to 70 years	38.6	57.5	75.7	51.2	13.2	36.4
• 71 years and older	39.4	58.3	83.4	60.6	10.9	34.8
Pregnant Females:						
• <= 18 years	36.4	39.4	63.6	39.4	24.2	33.3
• 19 to 30 years	46.0	43.8	66.4	43.8	11.5	36.7
• 31 to 50 years	39.6	41.8	61.5	41.8	20.9	40.7

Mean intakes as percentages of the current recommended intakes, by sex and age, NHANES 2001-2002 (*breast fed infants excluded*)

Sex and age	Calcium (AI)	Magnesium (RDA)	Phosphorus (RDA)	Selenium (RDA)	Folate (RDA)	Vitamin B12 (RDA)
	<i>Percent of Recommendation</i>					
Males and Females						
• 6 months and under	307	289	431	136	277	477
• 6 months to 1 year	305	181	251	198	336	548
• 1 to 3 years	191	236	232	335	270	496
• 4 to 8 years	114	160	231	276	258	395
Males:						
• 9 to 13 years	80	104	112	260	209	337
• 14 to 18 years	84	67	122	207	164	266
• 19 to 30 years	102	79	230	235	164	297
• 31 to 50 years	98	80	233	247	160	268
• 51 to 70 years	68	71	193	207	139	284
• 71 years and older	64	63	171	178	133	220
Females:						
• 9 to 13 years	67	89	92	212	176	255
• 14 to 18 years	59	58	87	152	121	177
• 19 to 30 years	75	74	163	170	125	172
• 31 to 50 years	73	75	163	167	115	177
• 51 to 70 years	56	74	149	153	118	178
• 71 years and older	55	68	135	139	115	179
• Pregnant <18 yrs	71	69	110	180	111	198
• Pregnant 19-30 yrs	104	77	199	176	108	217
• Pregnant 31-50 yrs	109	83	208	175	111	270

Source for nutrient recommendations: *Dietary Reference Intakes: Applications in Dietary Assessment, Institute of Medicine, National Academy of Sciences, 2000.*

Mean Intakes as percentages of the current recommended intakes, by sex and age, NHANES 2001-2002 (*breast fed infants excluded*)

Sex and age	Vitamin B6 (RDA)	Thiamin (RDA)	Riboflavin (RDA)	Niacin (RDA)	Vitamin C (RDA)	Vitamin E (RDA)
<i>Percent of Recommendation</i>						
Males and Females						
• 6 months and under	530	443	403	527	233	277
• 6 months to 1 year	302	371	412	349	224	187
• 1 to 3 years	269	240	395	227	648	67
• 4 to 8 years	253	240	341	228	353	72
Males:						
• 9 to 13 years	186	199	267	193	202	59
• 14 to 18 years	165	160	192	164	143	48
• 19 to 30 years	175	161	187	179	139	52
• 31 to 50 years	177	160	195	178	121	54
• 51 to 70 years	116	138	176	147	117	50
• 71 years and older	111	130	164	129	102	44
Females:						
• 9 to 13 years	156	164	219	159	191	50
• 14 to 18 years	123	136	176	134	136	39
• 19 to 30 years	122	131	158	143	122	40
• 31 to 50 years	117	123	165	133	107	41
• 51 to 70 years	104	118	161	129	130	41
• 71 years and older	99	116	158	116	111	38
• Pregnant < 18 yrs	112	125	151	145	176	49
• Pregnant 19-30 yrs	102	127	165	124	146	42
• Pregnant 31-50 yrs	111	129	174	130	150	51

Source for nutrient recommendations: *Dietary Reference Intakes: Applications in Dietary Assessment*, Institute of Medicine, National Academy of Sciences, 2000.

Percentage of individuals with diets meeting 100% of the current recommended intakes, by sex and age, NHANES 2001-2002 (breast fed infants excluded)

Sex and age	Calcium (AI)	Magnesium (RDA)	Phosphorus (RDA)	Selenium (RDA)	Folate (RDA)	Vitamin B12 (RDA)
<i>Percent of Recommendation</i>						
Males and Females						
• 6 months and under	100.0	98.4	100.0	71.0	99.5	99.5
• 6 months to 1 year	97.9	90.1	96.4	85.4	96.4	97.9
• 1 to 3 years	81.7	94.7	95.0	98.5	91.2	97.0
• 4 to 8 years	52.8	82.4	94.1	97.2	92.1	92.9
Males:						
• 9 to 13 years	25.4	46.5	51.4	93.4	79.6	88.5
• 14 to 18 years	30.9	15.4	57.2	85.8	66.0	79.4
• 19 to 30 years	39.5	26.3	87.7	89.1	67.0	77.7
• 31 to 50 years	37.7	25.6	92.1	92.1	69.8	79.0
• 51 to 70 years	19.5	15.8	87.7	88.3	62.4	75.7
• 71 years and older	17.1	9.7	85.2	82.1	55.6	73.7
Females:						
• 9 to 13 years	16.6	35.0	36.2	89.3	76.4	82.2
• 14 to 18 years	14.3	8.8	32.4	71.0	48.9	66.6
• 19 to 30 years	25.1	21.4	80.0	77.4	56.2	64.2
• 31 to 50 years	21.3	21.9	80.4	78.8	48.6	63.2
• 51 to 70 years	10.7	19.1	76.5	75.3	51.5	61.1
• 71 years and older	8.9	12.3	69.9	69.9	47.7	59.9
• Pregnant 18 yrs	27.3	27.3	45.5	72.7	36.4	78.8
• Pregnant 19-30 yrs	47.8	19.0	88.5	85.0	40.3	74.8
• Pregnant 31-50 yrs	50.5	24.2	91.2	86.8	51.6	75.8

Source for nutrient recommendations: *Dietary Reference Intakes: Applications in Dietary Assessment*, Institute of Medicine, National Academy of Sciences, 2000.

Percentage of individuals with diets meeting 100% of the current recommended intakes, by sex and age, NHANES 2001-2002
(breast fed infants excluded)

Sex and age	Vitamin B6 (DRI)	Thiamin (DRI)	Riboflavin (DRI)	Niacin (DRI)	Vitamin C (DRI)	Vitamin E (DRI)
<i>Percent of Recommendation</i>						
Males and Females						
• 6 months and under	100.0	100.0	100.0	100.0	97.3	98.9
• 6 months to 1 year	97.4	99.5	99.5	98.4	84.9	76.6
• 1 to 3 years	94.7	94.7	98.6	90.7	88.6	15.2
• 4 to 8 years	92.3	94.9	97.7	93.9	77.6	20.5
Males:						
• 9 to 13 years	81.2	86.8	94.6	84.5	58.5	11.5
• 14 to 18 years	71.4	71.3	79.5	74.1	45.1	5.4
• 19 to 30 years	75.4	70.5	78.6	76.6	42.2	7.6
• 31 to 50 years	79.7	72.6	84.6	81.3	38.0	8.4
• 51 to 70 years	52.5	68.4	79.3	71.9	39.9	7.2
• 71 years and older	47.7	62.8	78.1	62.2	41.6	4.8
Females:						
• 9 to 13 years	71.4	79.4	88.8	75.9	57.5	6.9
• 14 to 18 years	54.2	62.4	74.7	64.4	42.4	3.8
• 19 to 30 years	54.4	65.4	73.1	68.0	41.5	4.1
• 31 to 50 years	53.8	58.0	78.9	64.8	36.2	4.6
• 51 to 70 years	44.3	56.9	78.5	63.0	46.2	5.0
• 71 years and older	34.4	56.6	77.2	51.0	45.7	4.6
• Pregnant < 18 yrs	48.5	54.5	66.7	60.6	54.5	9.1
• Pregnant 19-30 yrs	43.4	59.3	75.2	60.2	51.8	4.9
• Pregnant 31-50 yrs	56.0	69.2	79.1	65.9	58.2	6.6

Source for nutrient recommendations: *Dietary Reference Intakes: Applications in Dietary Assessment*, Institute of Medicine, National Academy of Sciences, 2000.

Contribution of All Fruit Juices to Energy and Nutrient Intakes, NHANES 2001-2002 (breast fed infants excluded)

Sex and age	Energy	Vitamin C	Vitamin A (RE)	Vitamin B6	Thiamin	Riboflavin	Niacin	Folate	Magnesium	Calcium	Iron
	<i>As % of Intake</i>										
Males and Females											
• 0 to 5 months	1.9	14.3	0.2	2.0	0.4	0.6	0.3	0.2	1.5	0.7	0.6
• 6 to 11 months	5.0	31.3	0.6	5.1	2.4	1.5	1.1	1.9	4.9	2.9	2.1
• 1 to 3 years	6.2	44.0	1.1	7.9	6.1	2.5	2.7	4.6	7.4	2.4	5.7
• 4 to 8 years	3.2	32.8	1.0	5.1	3.8	1.6	1.5	3.0	4.9	1.2	3.2
Males:											
• 9 to 13 years	2.3	31.3	1.0	4.2	3.1	1.3	1.2	2.8	4.2	1.0	2.4
• 14 to 18 years	2.2	34.4	1.4	4.4	3.5	1.4	1.3	3.2	4.4	1.0	2.6
• 19 to 30 years	2.1	29.8	1.3	3.8	3.6	1.4	1.1	3.5	3.9	1.1	2.4
• 31 to 50 years	1.6	24.0	1.0	2.8	2.6	1.0	0.9	2.5	2.7	0.9	1.7
• 51 to 70 years	2.0	25.3	0.8	3.3	3.0	1.1	1.0	2.8	3.0	1.0	2.1
• 71 yrs or older	1.9	26.6	0.9	3.1	2.8	1.0	1.1	2.8	3.0	0.9	1.9
Females:											
• 9 to 13 years	2.8	32.0	1.0	4.7	3.5	1.5	1.4	2.8	4.6	1.4	2.9
• 14 to 18 years	2.7	31.3	1.2	5.0	3.9	1.7	1.4	3.4	4.7	1.4	2.9
• 19 to 30 years	2.2	27.1	1.1	3.9	3.3	1.5	1.2	3.2	3.9	1.5	2.3
• 31 to 50 years	2.0	27.3	1.0	3.7	3.0	1.2	1.2	2.8	3.2	1.3	2.2
• 51 to 70 years	2.2	24.6	0.8	3.4	3.2	1.2	1.1	2.8	3.1	1.2	2.1
• 71 yrs or older	2.5	28.5	0.9	4.4	3.5	1.3	1.4	3.2	3.8	1.0	2.5
• Pregnant < 18 yrs	3.4	28.4	2.2	5.6	4.5	2.2	1.6	2.9	5.1	1.5	3.9
• Pregnant 19-30 yrs	3.8	37.6	1.3	6.0	4.9	2.1	1.9	4.4	6.0	1.7	3.5
• Pregnant 31-50 yrs	3.8	35.4	1.1	5.8	4.9	2.0	1.9	4.1	5.5	2.5	3.6

Most Significant Findings

- Those meeting specific health recommendations varied
 - Only **38%** (range 34-47%) achieved a total dietary fat intake of <30% of kcals
 - **45%** (range 30-58%) achieved saturated fat recommendations
 - **72%** (range 49-83%) met cholesterol recommendations

Most Significant Findings

- Depending on the age group, more variation was noted for
 - Sodium (range 22-66%)
 - Fiber (range 5-24%)
- Approximately 35% met the AI for calcium
- 37% met the RDA for magnesium

Most Significant Findings

- Vitamin E intakes ranged from **39% to 72%** for individuals above 1 year of age
- Fruit juices contributed **only 2-3% of kcals**
- Fruit juice is still a significant source of vitamin C in the diet, meeting approximately **1/3** of the daily requirement

Limitations

- **Notably, the one day of a recall is a problematic**
- **We chose this as an attempt to have data on more individuals**
- **We are looking at ways to continue to address the population and the recommended guidelines in a more satisfactory maner**

Conclusions

- **Despite the limitations of the dataset, it is apparent that dietetic professionals still need to counsel individuals and educate the public to achieve a healthy diet.**
- **Fruit juices did not significantly impact overall calorie consumption, however more research is needed on other beverages (e.g. soft drinks and fruit drinks) which may factor into the obesity epidemic more significantly.**