

4. Isoflavones and Lignans

Isoflavones

- Genistein
- Daidzein
- Equol
- O-Desmethylangolensin

Lignans

- Enterodiol
- Enterolactone

Isoflavones and Lignans

Background Information

Sources and Physiological Functions. Isoflavones and lignans are secondary plant metabolites frequently encountered in the diet. When ingested and metabolized, these compounds have the potential to act as phytoestrogens, a class of compounds that have weak estrogenic effects. This report considers urinary concentrations of four isoflavones (daidzein, genistein, O-desmethyngolensin [ODMA], and equol) and two lignans (enterodiol and enterolactone).

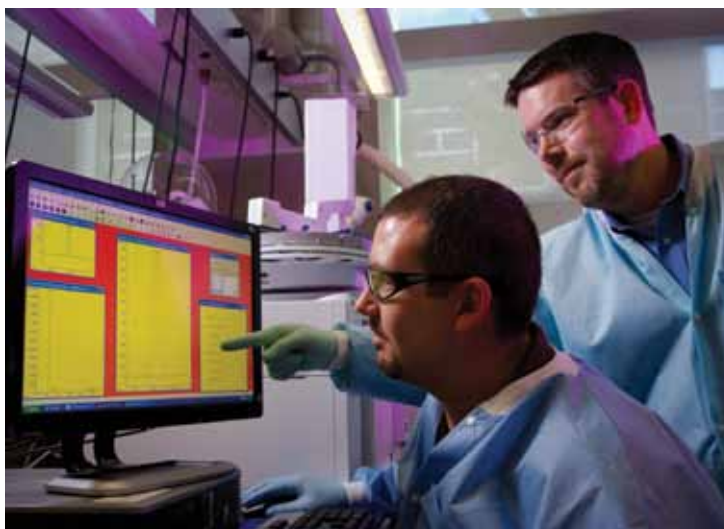
Diet is the primary source of human exposure to phytoestrogens. Plant sources of isoflavones include legumes, with the largest contribution coming from soy-based foods. Since soy flour and soy protein isolates may be added to processed meats, meat substitutes, breads, and protein-food bars, these items can be a major source of isoflavones (Lampe 1999; Grace 2004). However, the isoflavone content of soy protein preparations can vary widely, and it is affected by production techniques (Erdman 2004). Daidzein and genistein are the main soy isoflavones. Kudzu root, used in some dietary supplements, also contains appreciable amounts of daidzein. Naringenin, a precursor to genistein, is found in some citrus fruits. Formononetin and biochanin A are methylated isoflavones found in clover, which may be used in red clover dietary supplements, and they are metabolized in the body to daidzein and genistein, respectively. Lignans are found in flax seeds, whole wheat flour, tea, some fruits, and other cereal grains. Lignans include matairesinol and secoisolariciresinol, which are transformed by intestinal bacteria into the estrogenic compounds enterolactone and enterodiol, respectively (Rowland 2003; Cornwell 2004). Enterodiol may also convert into enterolactone and vice versa. Isoflavone intake is typically higher in Asian populations than in Western populations, primarily due to the higher soy consumption and the significant role that such fermented food products as tempeh, miso, or natto play in Asian diets (Mortensen 2009). Lignan intake varies greatly from country to country because of different dietary sources; however, completeness of food composition data is also a confounding factor in interpreting these data (Peterson 2010).

The absorption and metabolism of phytoestrogens varies considerably among individuals. The variation may relate to differences in absorption, enterohepatic circulation, and metabolism by intestinal bacteria. Isoflavones and lignans occur primarily as glycosides in unfermented foods with a small percentage of aglycones present. Aglycones represent a larger portion of the phytoestrogens present in fermented foods due to bacterial hydrolysis of the glycosides. Glycosidic forms are hydrolyzed to their aglycones in the intestine, absorbed, and then linked in the intestinal wall and liver with glucuronic acid to make them more water-soluble, a process known as glucuronidation. The glucuronidated metabolites of isoflavones predominate in blood and urine (Doerge 2000; Rowland 2003; Clavel 2006; Nielsen 2007). Ingested daidzein is further metabolized to ODMA and to equol by intestinal bacteria. Equol, but not ODMA, has estrogenic activity. About 30 percent of adults produce equol and have higher serum equol concentrations after they consume daidzein (Setchell 2003a; Cassidy 2006). This ability to produce equol may be related to an individual's intestinal microflora and influenced by dietary habits and genetic factors (Rowland 2000; Setchell 2002; Setchell 2006). It is unclear whether the ability to produce equol results in any health-related effects (Vafeiadou 2006).

Generally, phytoestrogens are much less potent than endogenously produced estrogens, but phytoestrogens can be present in much greater quantities (100 to 1000 times the concentration of endogenous estrogens). Additionally, phytoestrogens bind less tightly to steroid-hormone serum-

transport proteins than do endogenous estrogens (Nagel 1998). Equol has more potent estrogen activity than its precursor daidzein and has been proposed to be most important in explaining the possible mechanism of action of isoflavones in disease prevention (Setchell 2002).

Health Effects. The dietary consumption of phytoestrogens is believed to be associated with a reduced risk of hormone-dependent cancers, such as breast (Dong 2010; Buck 2010) and prostate cancer (Yan 2009; Hamilton-Reeves 2010), due to antagonistic mechanisms related to hormone receptor binding. Other health benefits related to the consumption of phytoestrogen-rich diets have also been proposed: reduced severity of menopause-related symptoms (Howes 2006; Jacobs 2009); cardiovascular health (Pan 2009; Peterson 2010); and modulation of osteoporosis (Liu 2010). A report from the Agency for Healthcare Research and Quality (Balk 2005) about the effects of soy on health outcomes reported that there is no conclusive evidence of a dose-response effect of either soy protein or isoflavone on cardiovascular diseases, menopausal symptoms, endocrine function, cancer, bone health, reproductive health, kidney diseases, cognitive function, or glucose metabolism. For reducing low-density lipoprotein concentrations, however, soy protein could possibly have a dose-response effect. As for lignan intake, flaxseed has been shown to significantly reduce LDL- and total cholesterol depending on the type of intervention, sex, and lipid profiles of the subjects (Pan 2009).



Adverse effects on fertility have been observed in animals that graze on red clover. Results of chronic feeding studies in pregnant animals suggest that high doses of phytoestrogens alter the fetal hormonal environment (Cornwell 2004). Infants who consume soy-based formula can have plasma concentrations of isoflavones that are 13,000–22,000 times higher than concentrations of endogenous estrogen in infants (Setchell 1997). Yet, studies of children who had been fed soy-based formula as infants and who were followed through adolescence (Klein 1998) and young adulthood (Strom 2001) found no adverse reproductive or endocrine effects. A meta-analysis of 32 studies in which adult men consumed soy foods, isolated soy protein, or isoflavone extracts (from soy or red clover) found that neither soy foods nor isoflavone supplements alter measures of bioavailable testosterone concentrations in men (Hamilton-Reeves 2010). In vitro and animal studies also suggest that soy isoflavones may have immunologic and thyroid effects (Doerge 2002). The Center for the Evaluation of Risks to Human Reproduction (CERHR) of the National Toxicology Program reviewed the developmental and reproductive toxicity of both soy formula and genistein and concluded that available data were inadequate to determine the effects of soy formula on developmental or reproductive toxicity (Rozman 2006a). The expert review panel expressed negligible concern for adverse effects in the general population of consuming dietary sources of genistein: under current exposure conditions, adults would be unlikely to consume sufficient daily levels of genistein to cause adverse reproductive and/or developmental effects (Rozman 2006b). A subsequent review by CERHR that included new study data from 2006–2009 and focused specifically on the developmental toxicity of soy infant formula and its major isoflavone components found minimal concern for adverse effects on development in infants who consume soy infant formula (McCarver 2011).

Biochemical Indicators and Methods. A systematic review of intervention studies has shown that urinary concentrations of daidzein, genistein, and enterolactone are good biomarkers of dietary intake (Pearson $r = 0.78\text{--}0.87$) as compared to equol, ODMA (0.38–0.40) and enterodiol (–0.14) (Pérez-Jiménez 2010). Linear dose-response relations are typically observed for the lignans (Nesbitt 1999; Hutchins 2000). Saturation in urine recovery has been observed with the isoflavones (Setchell 2003a). Isoflavones and lignans have been measured in biologic matrices such as plasma, serum, and urine by use of high performance liquid chromatography (HPLC) or gas chromatography (GC) with various modes of detection (Hoikkala 2003; Prasain 2004). Liquid chromatography coupled to tandem mass spectrometry (LC-MS/MS) methods that measure isoflavones and lignans concentrations after deconjugation of glucuronides and sulfates are most commonly used at present.

Data in NHANES. Phytoestrogens have been measured in NHANES since 1999. In NHANES 1999–2000, CDC scientists detected enterolactone in the highest concentration, and daidzein was detected with the highest frequency among the six measured phytoestrogens (Valentin-Blasini 2005). CDC's Fourth National Report on Human Exposure to Environmental Chemicals presented geometric means and selected percentiles (50th, 75th, 90th, and 95th) for concentrations of phytoestrogens by age, sex, or race/ethnicity for participants in NHANES 1999–2000, 2001–2002, and 2003–2004 (U.S. Centers for Disease Control and Prevention 2009).

Urinary daidzein, genistein, equol, ODMA, enterolactone, and enterodiol data presented in this report were generated by use of LC-MS/MS using electrospray ionization (ESI) for NHANES 2003–2004 (Rybak 2008) and LC-MS/MS using atmospheric pressure photoionization (APPI) for NHANES 2005–2006 (Parker 2011). Crossover studies comparing samples analyzed by LC-ESI-MS/MS and LC-APPI-MS/MS demonstrated high correlation coefficients ($r > 0.99$) and regression slopes approximately equal to 1 and intercepts close to 0 (U.S. Centers for Disease Control and Prevention 2011).

For more information about soy isoflavones, see the fact sheet from the National Institutes of Health, Office of Dietary Supplements (http://ods.od.nih.gov/Health_Information/Information_About_Individual_Dietary_Supplements.aspx).

Highlights

Urinary isoflavone and lignan concentrations in the U.S. population showed the following demographic patterns and characteristics:

- No consistent patterns were observed with regard to age, gender, or race/ethnicity.
- Concentrations have been relatively similar from 1999–2006.

Urinary isoflavone and lignan concentrations showed only small variations by demographic variables, such as age, gender, or race/ethnicity, or by survey cycle. However, as reported previously (Valentin-Blasini 2005), we observed large differences in the concentration of different urinary phytoestrogens. The enterolactone concentration was approximately one order of magnitude higher than the concentrations of genistein, daidzein, and enterodiol, which in turn were approximately one order of magnitude higher than the concentrations of equol and ODMA (Figure H.4.a). These phytoestrogens were detected in >99% of all samples, with the exception of ODMA, which was detected in only 93% of all samples.

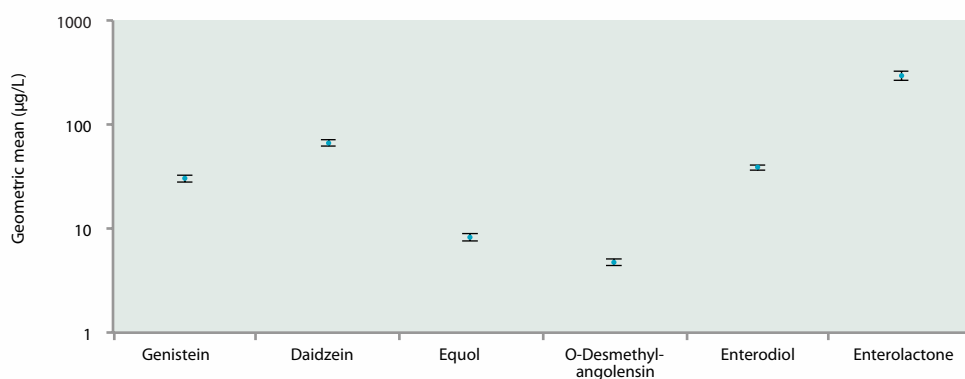


Figure H.4.a. Geometric mean concentrations of urinary isoflavones and lignans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

Error bars represent 95 percent confidence intervals. The y-axis is displayed on the logarithmic scale.

Detailed Observations

The selected observations mentioned below are derived from the uncorrected tables and figures presented next. The NHANES population is of sufficient size to allow group comparisons based on uncorrected data. Statements about categorical differences between demographic groups noted below are based on non-overlapping confidence limits from univariate analysis without adjusting for demographic variables (i.e., age, sex, race/ethnicity) or other determinants of these urine concentrations (i.e., dietary intake, supplement usage, smoking, BMI). A multivariate analysis may alter the size and statistical significance of these categorical differences. Furthermore, additional significant differences of smaller magnitude may be present despite their lack of mention here (e.g., if confidence limits slightly overlap or if differences are not statistically significant before covariate adjustment has occurred). For a selection of citations of descriptive NHANES papers related to these biochemical indicators of diet and nutrition, see [Appendix G](#).

Geometric mean concentrations (NHANES 2003–2006):

- Urinary concentrations of daidzein (Table 4.3.a.1 and Figure 4.3.a), equol (Table 4.5.a.1 and Figure 4.5.a), and ODMA (Table 5.7.a.1 and Figure 5.7.1) were highest in children and adolescents than for other age groups, while urinary concentrations of genistein and the two lignans were similar across age groups (Tables 4.1.a.1, 4.9.a.1, 5.11.a.1 and Figures 4.1.a, 4.9.a, 4.11.a).
- Males and females had similar phytoestrogen concentrations with the exception of daidzein and genistein concentrations which were lower in females.
- Urinary concentrations of phytoestrogens were similar across the three race/ethnic groups, with the exception of ODMA concentrations, which were lowest in Mexican Americans.

Changes in geometric mean concentrations across survey cycles:

- Urinary genistein, equol, ODMA, and enterolactone concentrations were similar across the four survey cycles (Tables 4.1.b, 4.5.b, 4.7.b, and 4.11.b).
- Urinary daidzein concentrations were lower in 2001–2002 than in the other three survey cycles (Table 4.3.b).
- Urinary enterodiol concentrations were lower in 1999–2000 than in the other three survey cycles (Table 4.9.b).

Table 4.1.a.1. Urinary genistein: Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
		2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	29.9 (28.0 – 31.8)	1.51 (1.24 – 1.78)	2.45 (2.14 – 2.78)	26.1 (23.8 – 28.5)	523 (459 – 578)	852 (706 – 1,060)	5,122
Age group							
6–11 years	36.0 (30.9 – 41.9)	3.05 (1.06 – 3.78)	4.20 (2.59 – 5.15)	31.7 (26.6 – 35.8)	414 (357 – 819)	846 (579 – 2,730)	692
12–19 years	34.4 (30.7 – 38.6)	2.39 (1.92 – 2.78)	3.33 (2.72 – 3.84)	27.6 (23.6 – 33.2)	514 (409 – 651)	946 (659 – 1,510)	1,422
20–39 years	28.5 (25.0 – 32.5)	1.54 (1.04 – 1.95)	2.27 (1.68 – 3.27)	23.7 (20.4 – 27.5)	516 (412 – 596)	810 (639 – 1,280)	1,137
40–59 years	28.1 (25.1 – 31.5)	1.33 (1.04 – 1.73)	2.17 (1.68 – 2.72)	26.2 (20.7 – 30.2)	589 (423 – 703)	767 (631 – 1,500)	901
60 years and older	29.5 (26.1 – 33.3)	1.15 (< LOD – 1.48)	2.16 (1.41 – 2.69)	27.5 (22.4 – 31.7)	435 (341 – 559)	794 (558 – 2,580)	970
Gender							
Males	32.9 (30.2 – 35.7)	1.96 (1.41 – 2.35)	3.22 (2.55 – 3.62)	28.5 (25.7 – 32.0)	544 (461 – 591)	805 (701 – 1,120)	2,496
Females	27.2 (24.9 – 29.9)	1.25 (1.05 – 1.53)	2.01 (1.76 – 2.31)	23.8 (20.8 – 27.0)	514 (398 – 618)	867 (654 – 1,150)	2,626
Race/ethnicity							
Mexican Americans	29.3 (26.8 – 32.0)	1.67 (1.10 – 2.05)	2.47 (1.90 – 3.28)	25.8 (22.2 – 29.0)	570 (434 – 695)	929 (763 – 1,290)	1,287
Non-Hispanic Blacks	31.8 (27.1 – 37.3)	1.88 (1.21 – 2.30)	3.03 (2.34 – 3.53)	27.8 (23.0 – 34.7)	466 (387 – 743)	899 (642 – 1,260)	1,343
Non-Hispanic Whites	28.8 (26.7 – 31.1)	1.38 (1.13 – 1.65)	2.18 (1.84 – 2.71)	25.3 (22.3 – 28.3)	502 (417 – 589)	761 (682 – 1,100)	2,108

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.1.a. Urinary genistein: Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

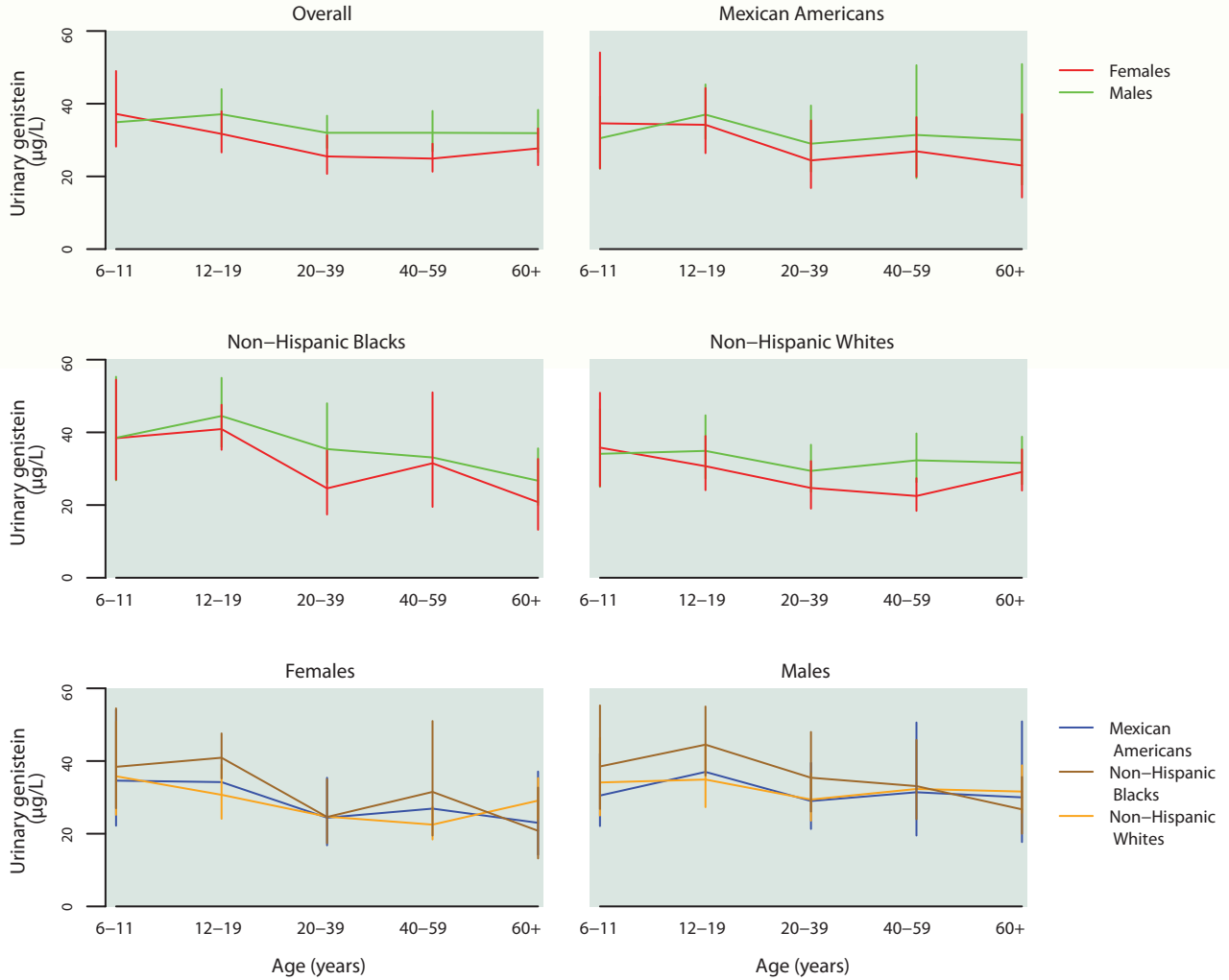


Table 4.1.a.2. Urinary genistein: Total population

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	29.9 (28.0 – 31.8)	4.18 (3.88 – 4.51)	26.1 (23.8 – 28.5)	274 (246 – 304)	5,122
6–11 years	36.0 (30.9 – 41.9)	6.11 (4.50 – 7.43)	31.7 (26.6 – 35.8)	276 (215 – 355)	692
12–19 years	34.4 (30.7 – 38.6)	4.87 (4.11 – 5.91)	27.6 (23.6 – 33.2)	303 (237 – 367)	1,422
20–39 years	28.5 (25.0 – 32.5)	4.25 (3.30 – 5.01)	23.7 (20.4 – 27.5)	237 (185 – 322)	1,137
40–59 years	28.1 (25.1 – 31.5)	3.76 (3.33 – 3.96)	26.2 (20.7 – 30.2)	307 (242 – 374)	901
60 years and older	29.5 (26.1 – 33.3)	4.09 (3.31 – 4.77)	27.5 (22.4 – 31.7)	244 (212 – 311)	970
Males					
Total, 6 years and older	32.9 (30.2 – 35.7)	4.91 (4.35 – 5.39)	28.5 (25.7 – 32.0)	301 (247 – 337)	2,496
6–11 years	34.9 (28.9 – 42.1)	6.44 (4.51 – 8.48)	29.8 (22.4 – 35.8)	215 (177 – 369)	340
12–19 years	37.1 (31.3 – 44.0)	5.45 (4.48 – 6.96)	31.9 (24.2 – 42.5)	261 (209 – 402)	728
20–39 years	32.0 (27.8 – 36.7)	4.95 (3.48 – 5.71)	25.9 (21.5 – 32.0)	300 (197 – 397)	499
40–59 years	32.0 (26.9 – 38.0)	4.14 (3.42 – 5.17)	29.1 (21.7 – 34.2)	324 (227 – 510)	451
60 years and older	31.9 (26.6 – 38.3)	4.73 (3.78 – 5.83)	28.9 (20.6 – 36.6)	230 (183 – 337)	478
Females					
Total, 6 years and older	27.2 (24.9 – 29.9)	3.73 (3.23 – 4.07)	23.8 (20.8 – 27.0)	253 (222 – 302)	2,626
6–11 years	37.2 (28.2 – 49.0)	5.55 (3.39 – 7.52)	34.9 (25.3 – 44.7)	278 (239 – 407)	352
12–19 years	31.7 (26.6 – 37.9)	3.85 (3.34 – 5.15)	24.3 (20.0 – 31.7)	321 (220 – 413)	694
20–39 years	25.5 (20.7 – 31.3)	3.81 (2.25 – 4.32)	22.1 (18.9 – 26.9)	208 (154 – 318)	638
40–59 years	24.9 (21.3 – 29.0)	3.14 (2.70 – 3.91)	20.4 (16.6 – 27.0)	256 (175 – 408)	450
60 years and older	27.7 (23.1 – 33.2)	3.34 (2.11 – 4.74)	26.6 (19.2 – 32.0)	243 (208 – 322)	492

Table 4.1.a.3. Urinary genistein: Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/L) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	29.3 (26.8 – 32.0)	4.38 (3.48 – 5.15)	25.8 (22.2 – 29.0)	301 (242 – 341)	1,287
6–11 years	32.4 (24.4 – 43.1)	5.65 (4.27 – 6.93)	27.5 (19.2 – 35.8)	293 (127 – 645)	231
12–19 years	35.6 (29.8 – 42.6)	5.60 (4.70 – 6.58)	30.7 (26.9 – 36.0)	315 (171 – 493)	445
20–39 years	26.8 (23.1 – 31.0)	4.03 (2.23 – 5.44)	21.3 (16.7 – 26.1)	325 (229 – 461)	282
40–59 years	29.1 (21.9 – 38.8)	4.18 (2.24 – 5.48)	27.5 (17.8 – 38.2)	253 (132 – 506)	157
60 years and older	25.9 (20.6 – 32.6)	3.09 (2.42 – 3.67)	29.8 (17.7 – 35.2)	228 (138 – 335)	172
Males					
Total, 6 years and older	30.9 (26.4 – 36.3)	4.76 (3.89 – 5.84)	25.9 (21.4 – 31.5)	304 (200 – 457)	625
6–11 years	30.5 (22.1 – 42.0)	6.04 (3.33 – 7.64)	23.1 (17.9 – 34.9)	212 (101 – 566)	112
12–19 years	37.0 (30.3 – 45.3)	6.17 (4.86 – 7.61)	31.6 (26.1 – 40.7)	243 (160 – 424)	228
20–39 years	29.0 (21.3 – 39.5)	4.54 (2.37 – 5.97)	21.0 (15.5 – 36.1)	331 (185 – 646)	117
40–59 years	31.4 (19.5 – 50.6)	3.89† (1.51 – 6.76)	27.8 (13.3 – 43.9)	259† (86.0 – 4,840)	85
60 years and older	30.0 (17.7 – 50.9)	3.47† (1.78 – 5.40)	34.5 (16.9 – 56.7)	178† (97.8 – 2,730)	83
Females					
Total, 6 years and older	27.5 (23.3 – 32.5)	3.76 (2.76 – 4.71)	25.2 (19.3 – 31.2)	286 (206 – 371)	662
6–11 years	34.6 (22.2 – 54.1)	5.17 (2.04 – 6.90)	34.0 (21.2 – 44.3)	303 (118 – 2,670)	119
12–19 years	34.2 (26.4 – 44.3)	5.03 (3.49 – 6.31)	29.4 (19.4 – 38.1)	407 (192 – 554)	217
20–39 years	24.4 (16.8 – 35.4)	3.41 (1.71 – 4.29)	20.3 (15.3 – 34.0)	251 (97.7 – 827)	165
40–59 years	26.9 (19.9 – 36.3)	4.15† (1.15 – 5.49)	26.5 (18.5 – 43.2)	199† (79.1 – 832)	72
60 years and older	23.0 (14.2 – 37.1)	2.53† (< LOD – 4.40)	17.8 (12.5 – 36.4)	258† (108 – 681)	89

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.1.a.4. Urinary genistein: Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	31.8 (27.1 – 37.3)	5.01 (4.16 – 5.69)	27.8 (23.0 – 34.7)	269 (206 – 331)	1,343
6–11 years	38.4 (29.9 – 49.4)	5.60 (3.37 – 7.09)	34.7 (25.1 – 46.0)	311 (215 – 640)	207
12–19 years	42.7 (37.0 – 49.2)	6.66 (5.91 – 7.91)	35.3 (29.1 – 44.4)	286 (227 – 400)	496
20–39 years	29.0 (22.5 – 37.4)	5.04 (3.86 – 6.11)	24.7 (17.2 – 33.2)	198 (152 – 390)	249
40–59 years	32.2 (24.2 – 43.0)	4.30 (2.56 – 6.18)	29.9 (20.7 – 45.8)	318 (167 – 547)	231
60 years and older	22.9 (17.5 – 30.0)	3.42 (3.12 – 4.54)	20.6 (14.9 – 32.7)	171 (99.8 – 326)	160
Males					
Total, 6 years and older	35.4 (30.1 – 41.7)	5.67 (4.64 – 6.71)	30.4 (26.5 – 36.3)	293 (214 – 401)	661
6–11 years	38.5 (26.8 – 55.3)	4.06† (1.87 – 7.03)	36.7 (18.6 – 54.7)	360† (205 – 747)	99
12–19 years	44.5 (36.0 – 55.0)	6.90 (4.87 – 8.70)	35.4 (27.4 – 48.1)	282 (193 – 844)	258
20–39 years	35.4 (26.1 – 48.0)	6.47 (4.28 – 9.07)	27.4 (18.8 – 43.5)	310 (158 – 413)	116
40–59 years	33.1 (24.0 – 45.8)	4.50 (2.29 – 7.00)	30.7 (20.4 – 47.7)	265 (153 – 434)	114
60 years and older	26.7 (20.0 – 35.6)	4.67† (3.31 – 6.20)	24.1 (17.1 – 35.7)	145† (110 – 525)	74
Females					
Total, 6 years and older	29.1 (23.5 – 35.9)	4.46 (3.51 – 5.35)	24.9 (19.1 – 35.1)	249 (172 – 336)	682
6–11 years	38.4 (27.0 – 54.5)	6.52† (4.22 – 7.95)	31.4 (19.2 – 45.9)	272† (170 – 1,510)	108
12–19 years	40.9 (35.2 – 47.6)	6.54 (4.59 – 8.23)	35.2 (26.4 – 47.9)	286 (223 – 376)	238
20–39 years	24.6 (17.4 – 35.0)	4.47 (1.60 – 5.45)	20.2 (13.7 – 31.3)	165 (103 – 387)	133
40–59 years	31.5 (19.5 – 51.0)	3.75 (2.08 – 6.18)	27.6 (15.3 – 58.7)	349 (148 – 870)	117
60 years and older	20.8 (13.2 – 32.7)	3.22† (2.12 – 4.03)	18.2 (9.40 – 33.0)	170† (50.8 – 19,800)	86

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.1.a.5. Urinary genistein: Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	28.8 (26.7 – 31.1)	4.00 (3.69 – 4.23)	25.3 (22.3 – 28.3)	257 (229 – 302)	2,108
6–11 years	34.9 (28.4 – 42.9)	5.95 (4.33 – 7.79)	29.1 (22.3 – 41.7)	247 (179 – 378)	193
12–19 years	32.8 (28.4 – 37.9)	4.48 (3.60 – 5.63)	24.7 (20.4 – 32.0)	298 (223 – 368)	378
20–39 years	26.9 (22.6 – 32.2)	3.82 (2.28 – 4.71)	22.8 (19.1 – 27.9)	218 (163 – 319)	494
40–59 years	27.0 (23.4 – 31.1)	3.44 (2.90 – 3.98)	26.0 (18.7 – 30.3)	307 (225 – 421)	448
60 years and older	30.2 (26.6 – 34.2)	4.23 (3.01 – 5.32)	28.0 (22.3 – 32.2)	242 (211 – 308)	595
Males					
Total, 6 years and older	31.8 (28.5 – 35.5)	4.75 (4.15 – 5.31)	27.0 (22.4 – 31.9)	274 (227 – 340)	1,035
6–11 years	34.1 (25.0 – 46.4)	6.75† (4.40 – 9.87)	26.6 (18.1 – 42.0)	209† (154 – 400)	99
12–19 years	34.9 (27.3 – 44.7)	5.07 (4.12 – 7.35)	25.4 (19.0 – 41.1)	262 (205 – 392)	191
20–39 years	29.4 (23.6 – 36.6)	4.32 (2.26 – 5.49)	23.6 (18.7 – 32.9)	233 (155 – 418)	217
40–59 years	32.3 (26.3 – 39.7)	4.15 (3.03 – 5.45)	29.0 (21.1 – 37.1)	336 (225 – 590)	229
60 years and older	31.6 (25.7 – 38.8)	4.77 (3.79 – 6.83)	28.5 (19.5 – 39.4)	220 (172 – 341)	299
Females					
Total, 6 years and older	26.2 (23.4 – 29.2)	3.30 (2.72 – 3.94)	23.6 (19.4 – 27.3)	243 (207 – 306)	1,073
6–11 years	35.8 (25.2 – 50.9)	4.98† (1.29 – 7.17)	39.3 (20.8 – 54.2)	271† (153 – 919)	94
12–19 years	30.7 (24.1 – 39.0)	3.62 (2.73 – 5.14)	22.4 (17.2 – 33.7)	311 (207 – 416)	187
20–39 years	24.7 (19.0 – 32.1)	3.18 (1.91 – 4.28)	22.2 (16.3 – 29.1)	210 (149 – 353)	277
40–59 years	22.5 (18.4 – 27.4)	2.93 (1.90 – 3.80)	18.3 (14.9 – 26.8)	232 (154 – 472)	219
60 years and older	29.1 (24.0 – 35.3)	3.67 (1.76 – 5.32)	27.5 (21.6 – 32.3)	244 (197 – 336)	296

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.1.b. Urinary genistein: Concentrations by survey cycle

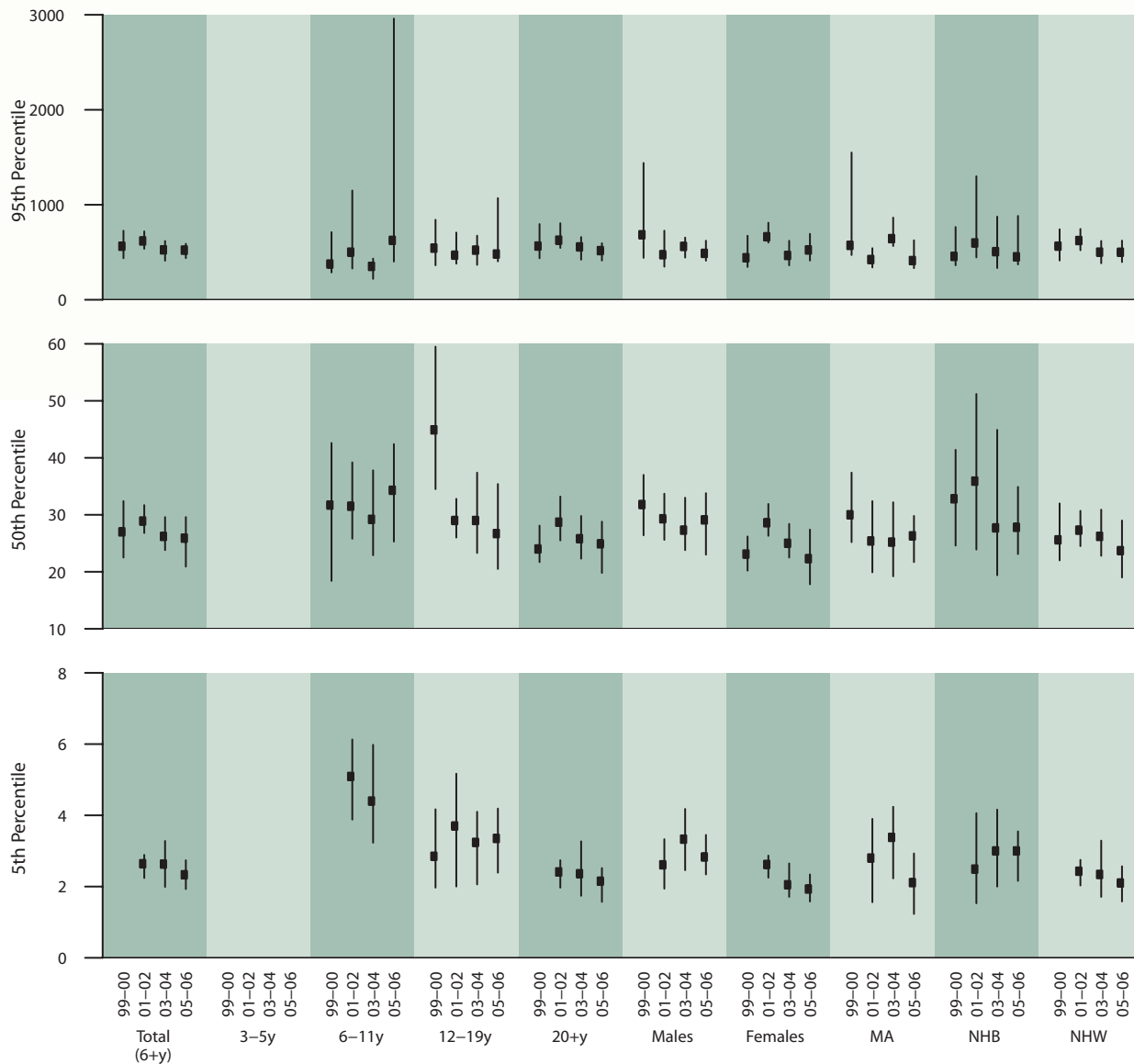
Geometric mean and selected percentiles of urine concentrations (in µg/L) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	24.4 (19.7 – 30.3)	< LOD	27.0 (22.5 – 32.4)	563 (437 – 727)	2,557
2001–2002	33.0 (30.1 – 36.2)	2.64 (2.24 – 2.89)	28.9 (26.8 – 31.7)	619 (536 – 720)	2,794
2003–2004	31.1 (29.0 – 33.3)	2.63 (1.99 – 3.28)	26.2 (23.8 – 29.6)	525 (411 – 619)	2,594
2005–2006	28.7 (25.8 – 32.0)	2.33 (1.93 – 2.74)	25.9 (20.9 – 29.6)	522 (438 – 590)	2,528
Age group					
6–11 years					
1999–2000	27.6 (21.1 – 36.1)	.922 (< LOD – 3.07)	31.7 (18.4 – 42.6)	376 (287 – 712)	331
2001–2002	39.2 (33.4 – 46.0)	5.09 (3.88 – 6.13)	31.5 (25.8 – 39.2)	501 (329 – 1,150)	396
2003–2004	33.6 (27.8 – 40.6)	4.40 (3.23 – 5.98)	29.2 (22.9 – 37.8)	351 (220 – 433)	341
2005–2006	38.6 (29.8 – 49.9)	3.84 (< LOD – 5.12)	34.3 (25.3 – 42.4)	625 (402 – 2,960)	351
12–19 years					
1999–2000	43.7 (34.2 – 55.7)	2.85 (1.97 – 4.17)	44.9 (34.5 – 59.5)	543 (363 – 842)	754
2001–2002	34.1 (27.2 – 42.8)	3.70 (2.00 – 5.17)	29.0 (26.0 – 32.8)	469 (380 – 708)	744
2003–2004	34.7 (29.3 – 41.0)	3.24 (2.06 – 4.10)	29.0 (23.3 – 37.4)	522 (367 – 675)	729
2005–2006	34.1 (28.8 – 40.5)	3.35 (2.39 – 4.19)	26.7 (20.5 – 35.4)	481 (404 – 1,070)	693
20–39 years					
1999–2000	28.7 (21.7 – 37.8)	< LOD	28.5 (23.2 – 35.8)	704 (453 – 1,540)	536
2001–2002	34.4 (28.2 – 41.9)	2.42 (1.37 – 3.16)	30.4 (25.3 – 38.5)	611 (489 – 797)	604
2003–2004	29.1 (24.5 – 34.6)	2.41 (1.40 – 3.83)	24.9 (21.0 – 29.6)	436 (396 – 567)	554
2005–2006	27.9 (22.7 – 34.4)	2.16 (1.42 – 3.27)	22.3 (18.6 – 29.0)	556 (412 – 938)	583
40–59 years					
1999–2000	15.5 (10.1 – 23.7)	< LOD	21.3 (13.0 – 28.2)	464 (313 – 1,320)	420
2001–2002	32.9 (27.6 – 39.4)	2.74 (.916 – 3.38)	29.3 (24.3 – 34.7)	719 (541 – 1,210)	531
2003–2004	32.4 (27.6 – 38.1)	2.44 (1.75 – 3.38)	27.3 (20.8 – 33.1)	664 (535 – 1,110)	452
2005–2006	24.5 (20.8 – 29.0)	2.06 (1.14 – 2.70)	24.9 (17.5 – 30.1)	466 (348 – 637)	449
60 years and older					
1999–2000	21.7 (16.9 – 27.9)	< LOD	22.5 (17.7 – 30.3)	352 (279 – 904)	516
2001–2002	26.7 (21.8 – 32.7)	1.94 (1.26 – 2.56)	25.0 (20.0 – 32.2)	496 (280 – 1,240)	519
2003–2004	28.6 (24.2 – 33.9)	2.13 (1.26 – 2.66)	25.9 (20.1 – 34.2)	386 (314 – 575)	518
2005–2006	30.3 (25.2 – 36.5)	2.18 (1.17 – 3.21)	28.8 (22.1 – 33.0)	469 (318 – 867)	452
Gender					
Males					
1999–2000	29.8 (22.2 – 40.0)	< LOD	31.8 (26.4 – 37.0)	684 (441 – 1,440)	1,222
2001–2002	32.2 (27.9 – 37.2)	2.61 (1.94 – 3.33)	29.3 (25.6 – 33.7)	474 (348 – 727)	1,375
2003–2004	33.7 (29.6 – 38.4)	3.33 (2.46 – 4.18)	27.3 (23.8 – 33.0)	561 (444 – 655)	1,244
2005–2006	32.0 (28.6 – 36.0)	2.83 (2.34 – 3.45)	29.1 (23.0 – 33.8)	488 (411 – 622)	1,252
Females					
1999–2000	20.3 (17.0 – 24.2)	< LOD	23.1 (20.2 – 26.2)	442 (345 – 674)	1,335
2001–2002	33.7 (30.9 – 36.8)	2.62 (2.25 – 2.87)	28.6 (26.3 – 31.9)	663 (602 – 811)	1,419
2003–2004	28.7 (25.5 – 32.4)	2.05 (1.71 – 2.65)	25.0 (22.5 – 28.4)	466 (362 – 621)	1,350
2005–2006	25.9 (22.3 – 29.9)	1.93 (1.58 – 2.34)	22.3 (17.8 – 27.4)	524 (413 – 694)	1,276
Race/ethnicity					
Mexican Americans					
1999–2000	31.1 (25.1 – 38.5)	.628 (< LOD – 2.04)	30.0 (25.2 – 37.4)	572 (471 – 1,550)	819
2001–2002	28.3 (22.0 – 36.4)	2.80 (1.56 – 3.90)	25.4 (19.9 – 32.4)	423 (340 – 543)	679
2003–2004	31.1 (27.5 – 35.2)	3.38 (2.23 – 4.24)	25.2 (19.2 – 32.2)	643 (566 – 865)	653
2005–2006	27.6 (24.4 – 31.2)	2.11 (1.23 – 2.93)	26.3 (21.7 – 29.8)	412 (333 – 626)	634
Non-Hispanic Blacks					
1999–2000	26.5 (19.0 – 36.9)	< LOD	32.8 (24.6 – 41.4)	456 (363 – 766)	597
2001–2002	37.9 (27.3 – 52.6)	2.49 (1.53 – 4.06)	35.9 (23.9 – 51.2)	598 (446 – 1,300)	692
2003–2004	32.6 (24.2 – 44.0)	3.00 (2.00 – 4.16)	27.7 (19.4 – 44.9)	506 (334 – 875)	681
2005–2006	31.0 (26.7 – 36.1)	3.00 (2.16 – 3.55)	27.8 (23.1 – 34.9)	452 (372 – 883)	662
Non-Hispanic Whites					
1999–2000	23.7 (19.1 – 29.4)	< LOD	25.6 (22.0 – 32.0)	564 (413 – 742)	901
2001–2002	30.9 (27.7 – 34.3)	2.43 (2.03 – 2.75)	27.3 (24.5 – 30.7)	623 (521 – 746)	1,211
2003–2004	30.9 (28.4 – 33.6)	2.34 (1.71 – 3.29)	26.2 (22.8 – 30.9)	501 (384 – 619)	1,069
2005–2006	26.9 (23.6 – 30.6)	2.10 (1.58 – 2.57)	23.7 (19.0 – 29.0)	500 (397 – 623)	1,039

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.1.b. Urinary genistein: Concentrations by survey cycle

Selected percentiles in $\mu\text{g/L}$ (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.2.a.1. Urinary genistein (creatinine corrected): Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
		2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	28.5 (26.9 – 30.2)	2.22 (1.97 – 2.46)	3.14 (2.83 – 3.45)	23.8 (21.6 – 26.1)	534 (438 – 627)	910 (796 – 1,210)	5,122
Age group							
6–11 years	39.0 (33.7 – 45.1)	3.68 (1.15 – 4.62)	5.09 (3.51 – 6.16)	34.5 (27.4 – 38.3)	626 (412 – 1,060)	1,240 (740 – 2,140)	692
12–19 years	25.6 (23.0 – 28.5)	2.25 (1.60 – 2.74)	3.36 (2.73 – 3.66)	20.4 (17.8 – 24.8)	367 (293 – 440)	730 (439 – 1,120)	1,422
20–39 years	24.3 (21.8 – 27.1)	2.14 (1.81 – 2.43)	2.81 (2.37 – 3.50)	20.7 (17.8 – 23.6)	355 (291 – 530)	749 (563 – 1,220)	1,137
40–59 years	28.4 (25.2 – 32.1)	1.89 (1.35 – 2.35)	2.66 (2.10 – 3.14)	23.6 (19.1 – 27.8)	645 (445 – 1,020)	1,210 (779 – 1,970)	901
60 years and older	34.5 (31.4 – 38.0)	2.97 (< LOD – 3.38)	3.82 (3.36 – 4.47)	28.6 (24.5 – 32.6)	576 (464 – 668)	913 (661 – 1,470)	970
Gender							
Males	26.1 (24.0 – 28.3)	2.12 (1.80 – 2.48)	3.03 (2.60 – 3.42)	22.1 (19.5 – 24.9)	422 (348 – 557)	811 (629 – 1,140)	2,496
Females	31.1 (28.3 – 34.1)	2.35 (1.97 – 2.77)	3.20 (2.80 – 3.76)	25.8 (22.9 – 28.1)	617 (448 – 778)	1,000 (853 – 1,610)	2,626
Race/ethnicity							
Mexican Americans	26.4 (24.2 – 28.8)	1.87 (1.19 – 2.49)	2.97 (2.24 – 3.47)	22.4 (19.5 – 24.6)	441 (355 – 656)	955 (723 – 1,330)	1,287
Non-Hispanic Blacks	22.3 (19.6 – 25.5)	2.02 (1.38 – 2.51)	2.76 (2.31 – 3.16)	19.1 (15.7 – 22.2)	319 (261 – 488)	561 (489 – 793)	1,343
Non-Hispanic Whites	29.3 (27.3 – 31.4)	2.21 (1.84 – 2.54)	3.08 (2.67 – 3.58)	24.9 (22.1 – 27.7)	594 (437 – 687)	915 (834 – 1,250)	2,108

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.2.a. Urinary genistein (creatinine corrected): Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

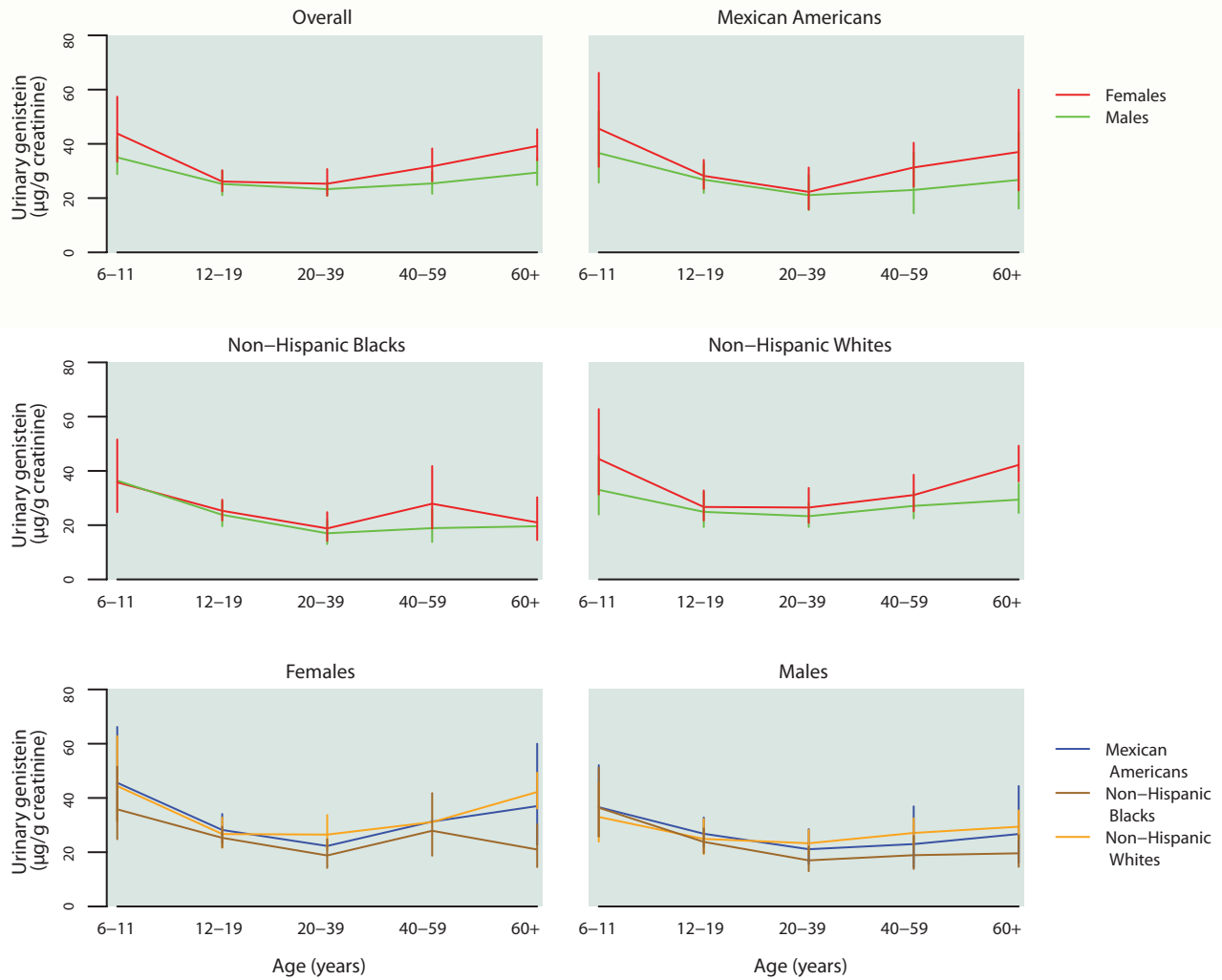


Table 4.2.a.2. Urinary genistein (creatinine corrected): Total population

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	28.5 (26.9 – 30.2)	4.53 (4.29 – 4.79)	23.8 (21.6 – 26.1)	236 (210 – 270)	5,122
6–11 years	39.0 (33.7 – 45.1)	6.68 (5.55 – 8.43)	34.5 (27.4 – 38.3)	271 (216 – 388)	692
12–19 years	25.6 (23.0 – 28.5)	4.36 (3.90 – 4.67)	20.4 (17.8 – 24.8)	189 (151 – 236)	1,422
20–39 years	24.3 (21.8 – 27.1)	4.15 (3.81 – 4.55)	20.7 (17.8 – 23.6)	184 (144 – 236)	1,137
40–59 years	28.4 (25.2 – 32.1)	4.04 (3.52 – 4.65)	23.6 (19.1 – 27.8)	270 (207 – 415)	901
60 years and older	34.5 (31.4 – 38.0)	5.51 (4.85 – 6.21)	28.6 (24.5 – 32.6)	287 (226 – 398)	970
Males					
Total, 6 years and older	26.1 (24.0 – 28.3)	4.29 (4.03 – 4.56)	22.1 (19.5 – 24.9)	205 (179 – 237)	2,496
6–11 years	35.0 (28.8 – 42.4)	6.30 (5.10 – 7.99)	29.8 (21.2 – 38.2)	272 (158 – 503)	340
12–19 years	25.2 (21.1 – 30.0)	4.38 (3.66 – 4.66)	20.3 (17.0 – 29.0)	154 (128 – 256)	728
20–39 years	23.3 (20.8 – 26.1)	3.96 (3.39 – 4.38)	20.0 (16.0 – 24.4)	204 (149 – 244)	499
40–59 years	25.4 (21.6 – 29.8)	3.68 (3.27 – 4.51)	20.2 (16.8 – 25.5)	228 (155 – 386)	451
60 years and older	29.4 (24.8 – 34.7)	5.20 (4.11 – 6.32)	25.0 (20.0 – 30.4)	200 (151 – 259)	478
Females					
Total, 6 years and older	31.1 (28.3 – 34.1)	4.80 (4.35 – 5.45)	25.8 (22.9 – 28.1)	274 (230 – 320)	2,626
6–11 years	43.8 (33.4 – 57.4)	8.16 (4.38 – 10.4)	37.7 (26.4 – 50.0)	270 (212 – 798)	352
12–19 years	26.1 (22.5 – 30.3)	4.35 (3.72 – 5.23)	20.6 (16.5 – 24.8)	208 (164 – 269)	694
20–39 years	25.3 (20.9 – 30.7)	4.50 (3.83 – 5.53)	21.0 (17.6 – 26.9)	170 (124 – 289)	638
40–59 years	31.7 (26.2 – 38.3)	4.34 (2.99 – 5.61)	26.6 (21.3 – 32.6)	340 (210 – 631)	450
60 years and older	39.2 (33.9 – 45.4)	5.70 (4.76 – 6.64)	31.6 (25.8 – 39.0)	361 (289 – 530)	492

Table 4.2.a.3. Urinary genistein (creatinine corrected): Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	26.4 (24.2 – 28.8)	4.25 (3.81 – 4.70)	22.4 (19.5 – 24.6)	212 (186 – 275)	1,287
6–11 years	40.7 (31.0 – 53.5)	7.48 (5.51 – 9.00)	31.6 (22.8 – 44.7)	304 (161 – 1,100)	231
12–19 years	27.5 (23.7 – 32.0)	5.58 (4.31 – 6.56)	22.4 (18.9 – 26.4)	208 (139 – 366)	445
20–39 years	21.6 (18.6 – 25.2)	3.65 (2.96 – 4.28)	16.2 (13.1 – 20.9)	204 (138 – 255)	282
40–59 years	26.7 (20.1 – 35.4)	3.71 (2.37 – 4.69)	25.4 (16.8 – 33.8)	229 (131 – 629)	157
60 years and older	32.0 (23.9 – 42.9)	5.10 (2.91 – 6.94)	31.2 (22.8 – 40.4)	233 (141 – 535)	172
Males					
Total, 6 years and older	24.4 (20.6 – 28.9)	4.10 (3.50 – 4.54)	22.2 (17.2 – 26.4)	203 (136 – 275)	625
6–11 years	36.6 (25.7 – 52.1)	7.40 (5.50 – 9.04)	30.2 (19.7 – 43.0)	251 (129 – 659)	112
12–19 years	26.8 (21.9 – 32.8)	5.68 (4.54 – 6.56)	23.0 (16.8 – 30.7)	151 (116 – 347)	228
20–39 years	21.1 (15.6 – 28.5)	3.54 (2.60 – 4.32)	17.2 (12.4 – 23.3)	199 (112 – 328)	117
40–59 years	23.0 (14.4 – 36.9)	3.31† (1.22 – 4.36)	20.9 (8.19 – 31.2)	192† (92.0 – 2,070)	85
60 years and older	26.7 (16.1 – 44.4)	4.18† (1.75 – 7.13)	29.0 (10.9 – 49.6)	159† (59.4 – 4,830)	83
Females					
Total, 6 years and older	28.7 (25.0 – 32.9)	4.59 (3.67 – 5.88)	22.9 (18.5 – 27.1)	262 (189 – 391)	662
6–11 years	45.6 (31.5 – 66.2)	7.46 (4.51 – 9.99)	37.3 (20.3 – 68.7)	311 (166 – 1,460)	119
12–19 years	28.2 (23.4 – 34.1)	5.47 (2.84 – 7.19)	21.7 (17.8 – 28.9)	269 (155 – 425)	217
20–39 years	22.3 (15.8 – 31.3)	3.60 (2.14 – 6.28)	15.8 (12.0 – 23.4)	199 (116 – 728)	165
40–59 years	31.3 (24.2 – 40.4)	4.10† (.565 – 6.37)	32.5 (18.1 – 44.1)	296† (151 – 594)	72
60 years and older	37.0 (22.8 – 60.0)	5.54† (< LOD – 8.83)	31.6 (13.4 – 82.7)	261† (142 – 745)	89

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.2.a.4. Urinary genistein (creatinine corrected): Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	22.3 (19.6 – 25.5)	3.95 (3.34 – 4.63)	19.1 (15.7 – 22.2)	159 (137 – 211)	1,343
6–11 years	36.1 (28.1 – 46.3)	6.36 (4.62 – 7.24)	25.2 (22.0 – 37.0)	325 (198 – 811)	207
12–19 years	24.5 (21.6 – 27.9)	4.32 (3.87 – 5.01)	22.0 (16.7 – 25.6)	150 (125 – 214)	496
20–39 years	17.9 (14.7 – 21.9)	3.49 (2.75 – 4.31)	14.0 (11.3 – 19.5)	123 (82.7 – 209)	249
40–59 years	23.4 (18.7 – 29.3)	3.30 (2.54 – 4.71)	21.4 (17.4 – 26.3)	173 (128 – 458)	231
60 years and older	20.4 (16.4 – 25.5)	4.39 (3.33 – 4.93)	17.5 (11.4 – 22.8)	130 (84.1 – 218)	160
Males					
Total, 6 years and older	20.7 (17.9 – 23.8)	3.40 (2.80 – 4.38)	17.6 (13.9 – 21.4)	173 (137 – 213)	661
6–11 years	36.4 (25.8 – 51.2)	4.60† (3.12 – 7.24)	24.9 (19.2 – 47.2)	396† (214 – 869)	99
12–19 years	23.8 (19.6 – 28.8)	3.95 (3.32 – 4.73)	21.2 (14.5 – 25.8)	159 (122 – 246)	258
20–39 years	17.0 (13.0 – 22.1)	3.20 (2.32 – 3.87)	12.6 (9.92 – 20.3)	150 (86.4 – 209)	116
40–59 years	18.9 (13.8 – 26.0)	2.97 (1.59 – 4.57)	17.4 (9.55 – 25.7)	140 (86.9 – 359)	114
60 years and older	19.6 (14.6 – 26.3)	3.86† (2.60 – 5.06)	18.3 (11.1 – 25.0)	112† (65.3 – 220)	74
Females					
Total, 6 years and older	23.8 (19.8 – 28.6)	4.65 (3.49 – 5.61)	20.4 (16.4 – 25.3)	156 (123 – 244)	682
6–11 years	35.8 (24.8 – 51.6)	6.98† (5.89 – 8.65)	25.0 (20.5 – 37.1)	261† (113 – 1,290)	108
12–19 years	25.3 (21.7 – 29.4)	4.87 (3.83 – 5.77)	22.7 (15.5 – 28.5)	143 (105 – 292)	238
20–39 years	18.8 (14.2 – 24.8)	3.79 (2.53 – 5.95)	14.3 (10.5 – 21.9)	119 (77.3 – 252)	133
40–59 years	27.9 (18.7 – 41.8)	3.62 (2.57 – 5.58)	24.7 (17.9 – 34.9)	221 (114 – 570)	117
60 years and older	21.0 (14.5 – 30.3)	4.51† (2.75 – 6.49)	16.5 (9.90 – 29.0)	134† (83.9 – 254)	86

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.2.a.5. Urinary genistein (creatinine corrected): Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	29.3 (27.3 – 31.4)	4.55 (4.17 – 4.93)	24.9 (22.1 – 27.7)	241 (209 – 291)	2,108
6–11 years	37.8 (31.2 – 45.8)	6.34 (5.11 – 8.41)	34.8 (24.5 – 43.0)	255 (175 – 577)	193
12–19 years	25.8 (22.3 – 29.7)	4.33 (3.67 – 4.93)	19.5 (16.7 – 26.0)	181 (143 – 247)	378
20–39 years	24.8 (21.4 – 28.9)	4.16 (3.52 – 4.76)	21.7 (18.1 – 28.3)	181 (134 – 289)	494
40–59 years	29.0 (25.3 – 33.2)	4.00 (3.18 – 4.90)	23.6 (17.7 – 30.3)	273 (202 – 477)	448
60 years and older	36.0 (32.8 – 39.6)	5.83 (4.85 – 6.54)	30.0 (26.4 – 34.1)	292 (224 – 431)	595
Males					
Total, 6 years and older	26.6 (23.9 – 29.5)	4.40 (3.87 – 4.86)	22.7 (19.4 – 26.2)	204 (169 – 261)	1,035
6–11 years	33.0 (23.9 – 45.6)	5.93† (4.89 – 8.18)	24.8 (17.3 – 40.0)	195† (126 – 945)	99
12–19 years	24.9 (19.3 – 32.3)	4.34 (3.13 – 5.24)	18.9 (14.5 – 31.4)	144 (121 – 311)	191
20–39 years	23.3 (19.3 – 28.2)	3.96 (2.52 – 4.69)	20.7 (15.9 – 28.7)	189 (105 – 339)	217
40–59 years	27.1 (22.5 – 32.5)	3.85 (3.22 – 4.95)	21.3 (16.4 – 27.9)	244 (155 – 623)	229
60 years and older	29.4 (24.5 – 35.4)	5.47 (3.88 – 6.92)	26.2 (20.0 – 33.5)	190 (147 – 263)	299
Females					
Total, 6 years and older	32.3 (29.0 – 35.9)	4.69 (4.14 – 5.40)	27.4 (23.5 – 32.6)	289 (227 – 361)	1,073
6–11 years	44.4 (31.3 – 62.8)	8.19† (2.79 – 11.4)	43.0 (26.0 – 58.2)	266† (164 – 1,300)	94
12–19 years	26.7 (21.7 – 32.8)	4.15 (3.63 – 5.22)	20.5 (15.8 – 26.1)	203 (156 – 342)	187
20–39 years	26.5 (20.8 – 33.7)	4.51 (3.50 – 5.62)	22.3 (18.1 – 33.0)	172 (126 – 300)	277
40–59 years	31.1 (25.1 – 38.6)	3.92 (2.63 – 5.82)	25.6 (17.7 – 34.1)	317 (180 – 675)	219
60 years and older	42.2 (36.1 – 49.3)	6.05 (4.82 – 7.49)	33.7 (27.6 – 42.2)	404 (291 – 567)	296

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.2.b. Urinary genistein (creatinine corrected): Concentrations by survey cycle

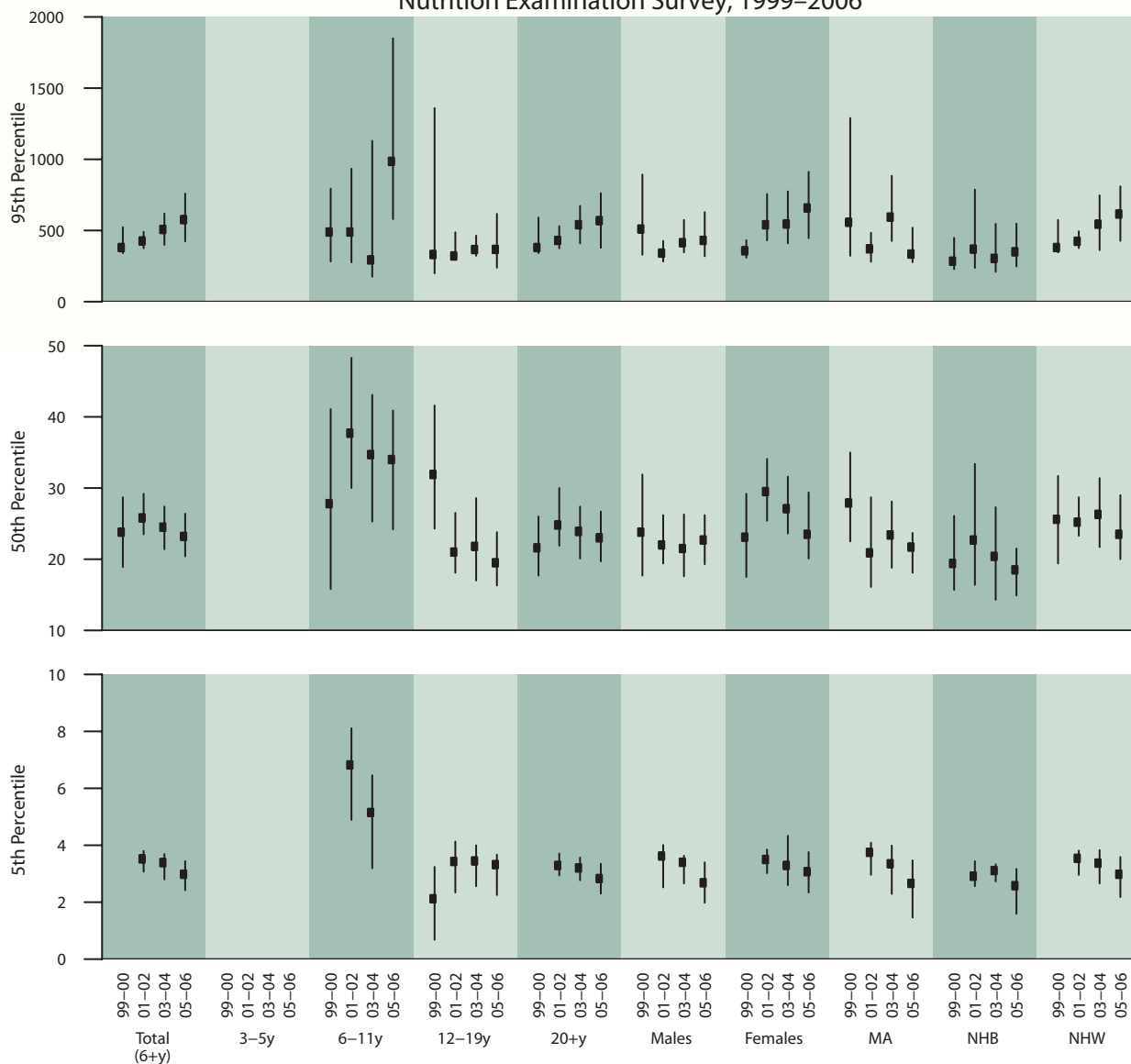
Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	22.3 (17.7 – 28.1)	<LOD	23.8 (18.9 – 28.7)	380 (341 – 523)	2,557
2001–2002	30.9 (28.5 – 33.6)	3.52 (3.07 – 3.80)	25.8 (23.5 – 29.2)	426 (375 – 491)	2,794
2003–2004	29.1 (27.3 – 31.0)	3.39 (2.80 – 3.69)	24.5 (21.4 – 27.4)	507 (399 – 619)	2,594
2005–2006	28.0 (25.3 – 31.0)	2.98 (2.42 – 3.44)	23.2 (20.4 – 26.4)	576 (423 – 759)	2,528
Age group					
6–11 years					
1999–2000	28.3 (21.1 – 37.9)	1.84 (<LOD – 3.04)	27.8 (15.8 – 41.1)	489 (282 – 794)	331
2001–2002	44.5 (37.0 – 53.5)	6.82 (4.89 – 8.11)	37.7 (30.0 – 48.3)	489 (276 – 934)	396
2003–2004	35.8 (29.7 – 43.0)	5.15 (3.19 – 6.46)	34.7 (25.3 – 43.1)	293 (175 – 1,130)	341
2005–2006	42.5 (33.1 – 54.6)	4.86 (<LOD – 6.37)	34.0 (24.2 – 40.9)	985 (580 – 1,850)	351
12–19 years					
1999–2000	29.4 (22.3 – 38.8)	2.12 (.684 – 3.24)	31.9 (24.3 – 41.6)	331 (199 – 1,360)	754
2001–2002	26.3 (21.3 – 32.5)	3.43 (2.34 – 4.13)	21.0 (18.1 – 26.5)	321 (294 – 487)	744
2003–2004	25.9 (21.8 – 30.9)	3.45 (2.56 – 4.00)	21.8 (17.0 – 28.6)	366 (322 – 464)	729
2005–2006	25.3 (22.1 – 29.0)	3.32 (2.25 – 3.67)	19.5 (16.3 – 23.8)	367 (238 – 617)	693
20–39 years					
1999–2000	22.7 (17.3 – 29.9)	<LOD	22.8 (17.0 – 27.2)	417 (355 – 738)	536
2001–2002	27.8 (23.8 – 32.4)	3.29 (2.22 – 3.92)	22.9 (18.7 – 29.8)	379 (329 – 476)	604
2003–2004	24.5 (21.9 – 27.4)	2.97 (2.55 – 3.69)	19.7 (17.3 – 23.4)	320 (271 – 557)	554
2005–2006	24.1 (19.8 – 29.3)	2.55 (1.85 – 3.76)	21.3 (16.5 – 27.5)	447 (288 – 734)	583
40–59 years					
1999–2000	15.7 (10.3 – 24.1)	<LOD	16.3 (12.5 – 26.8)	374 (246 – 894)	420
2001–2002	32.7 (27.8 – 38.6)	3.54 (2.26 – 4.12)	28.7 (24.2 – 32.1)	461 (377 – 1,260)	531
2003–2004	31.1 (26.4 – 36.6)	3.18 (1.96 – 3.75)	24.9 (19.7 – 29.8)	676 (496 – 1,670)	452
2005–2006	26.1 (21.5 – 31.7)	2.46 (1.82 – 2.97)	21.5 (16.8 – 29.2)	578 (326 – 1,220)	449
60 years and older					
1999–2000	26.1 (21.7 – 31.3)	<LOD	27.3 (20.4 – 35.9)	371 (252 – 691)	516
2001–2002	31.6 (25.8 – 38.8)	3.00 (2.36 – 3.76)	25.5 (20.7 – 33.3)	491 (323 – 1,310)	519
2003–2004	33.9 (29.7 – 38.7)	3.39 (2.78 – 4.33)	29.5 (23.8 – 34.6)	539 (444 – 754)	518
2005–2006	35.2 (30.3 – 40.8)	4.13 (3.34 – 5.27)	27.9 (23.0 – 35.0)	589 (402 – 776)	452
Gender					
Males					
1999–2000	23.3 (16.8 – 32.3)	<LOD	23.8 (17.7 – 31.9)	510 (329 – 893)	1,222
2001–2002	26.2 (23.1 – 29.8)	3.62 (2.52 – 4.01)	22.0 (19.4 – 26.2)	341 (282 – 427)	1,375
2003–2004	26.4 (22.8 – 30.5)	3.40 (2.66 – 3.63)	21.5 (17.6 – 26.3)	414 (346 – 574)	1,244
2005–2006	25.8 (23.4 – 28.4)	2.68 (1.98 – 3.40)	22.7 (19.3 – 26.2)	430 (319 – 629)	1,252
Females					
1999–2000	21.3 (17.5 – 26.0)	<LOD	23.1 (17.5 – 29.2)	357 (309 – 432)	1,335
2001–2002	36.2 (32.8 – 39.9)	3.50 (3.02 – 3.85)	29.5 (25.4 – 34.1)	540 (430 – 756)	1,419
2003–2004	31.9 (28.7 – 35.5)	3.29 (2.60 – 4.33)	27.1 (23.6 – 31.6)	545 (410 – 775)	1,350
2005–2006	30.3 (25.8 – 35.5)	3.07 (2.34 – 3.76)	23.5 (20.1 – 29.4)	658 (446 – 912)	1,276
Race/ethnicity					
Mexican Americans					
1999–2000	28.4 (23.3 – 34.7)	1.40 (<LOD – 2.74)	27.9 (22.5 – 35.0)	557 (322 – 1,290)	819
2001–2002	26.6 (21.6 – 32.9)	3.75 (2.96 – 4.09)	20.9 (16.1 – 28.7)	371 (280 – 484)	679
2003–2004	28.0 (24.8 – 31.8)	3.35 (2.29 – 3.99)	23.4 (18.8 – 28.1)	594 (426 – 884)	653
2005–2006	24.9 (22.1 – 28.0)	2.66 (1.46 – 3.47)	21.7 (18.1 – 23.7)	334 (277 – 520)	634
Non-Hispanic Blacks					
1999–2000	17.0 (12.2 – 23.6)	<LOD	19.4 (15.7 – 26.1)	284 (229 – 449)	597
2001–2002	26.4 (19.2 – 36.4)	2.91 (2.56 – 3.44)	22.7 (16.4 – 33.4)	369 (237 – 788)	692
2003–2004	23.0 (18.1 – 29.1)	3.11 (2.73 – 3.33)	20.4 (14.3 – 27.3)	304 (210 – 547)	681
2005–2006	21.7 (18.8 – 25.1)	2.58 (1.59 – 3.17)	18.5 (14.9 – 21.5)	350 (247 – 548)	662
Non-Hispanic Whites					
1999–2000	23.3 (18.5 – 29.3)	<LOD	25.6 (19.4 – 31.7)	380 (346 – 574)	901
2001–2002	30.5 (28.1 – 33.0)	3.54 (2.96 – 3.81)	25.2 (23.3 – 28.7)	424 (376 – 494)	1,211
2003–2004	30.5 (28.1 – 33.1)	3.37 (2.66 – 3.83)	26.3 (21.7 – 31.4)	544 (362 – 747)	1,069
2005–2006	28.2 (25.1 – 31.8)	2.98 (2.18 – 3.59)	23.5 (20.0 – 29.0)	615 (427 – 810)	1,039

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.2.b. Urinary genistein (creatinine corrected): Concentrations by survey cycle

Selected percentiles in $\mu\text{g/g}$ creatinine (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.3.a.1. Urinary daidzein: Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
		2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	66.6 (62.1 – 71.5)	3.31 (2.74 – 3.72)	5.35 (4.25 – 6.22)	60.4 (54.7 – 65.9)	1,170 (1,000 – 1,290)	1,850 (1,590 – 2,200)	5,122
Age group							
6–11 years	89.4 (77.7 – 103)	7.38 (5.07 – 8.35)	10.2 (7.62 – 13.1)	68.4 (59.2 – 86.6)	1,180 (996 – 1,870)	2,250 (1,550 – 6,320)	692
12–19 years	91.6 (80.5 – 104)	5.85 (3.92 – 6.63)	9.07 (6.69 – 9.60)	77.3 (65.0 – 94.5)	1,310 (989 – 1,760)	2,180 (1,710 – 3,350)	1,422
20–39 years	61.6 (53.3 – 71.3)	3.32 (1.80 – 3.99)	4.82 (3.43 – 6.14)	54.3 (47.2 – 65.9)	1,210 (835 – 1,560)	1,860 (1,490 – 2,430)	1,137
40–59 years	60.9 (54.9 – 67.6)	3.04 (1.89 – 3.48)	4.56 (3.42 – 5.90)	56.5 (47.0 – 65.5)	1,120 (893 – 1,340)	1,510 (1,270 – 3,510)	901
60 years and older	60.9 (52.7 – 70.5)	2.24 (1.47 – 3.58)	4.31 (2.73 – 6.34)	60.5 (48.9 – 73.4)	839 (709 – 1,310)	1,600 (1,210 – 2,660)	970
Gender							
Males	73.8 (67.2 – 81.1)	3.63 (2.74 – 4.56)	6.35 (4.53 – 7.62)	66.0 (58.0 – 73.7)	1,200 (1,060 – 1,350)	1,750 (1,520 – 2,220)	2,496
Females	60.4 (55.3 – 66.0)	3.04 (2.39 – 3.41)	4.47 (3.72 – 5.61)	55.5 (49.5 – 61.5)	1,000 (836 – 1,270)	1,910 (1,490 – 2,630)	2,626
Race/ethnicity							
Mexican Americans	59.0 (54.1 – 64.4)	3.07 (2.14 – 3.68)	4.71 (3.62 – 5.66)	48.6 (44.8 – 56.8)	1,350 (1,130 – 1,500)	1,800 (1,560 – 2,450)	1,287
Non-Hispanic Blacks	78.4 (67.6 – 90.9)	4.48 (3.48 – 5.77)	7.05 (5.74 – 7.82)	72.3 (61.3 – 85.2)	1,180 (886 – 1,610)	2,220 (1,500 – 3,390)	1,343
Non-Hispanic Whites	63.9 (58.7 – 69.6)	3.03 (2.26 – 3.41)	4.66 (3.69 – 6.11)	58.5 (52.0 – 65.3)	1,040 (930 – 1,250)	1,600 (1,420 – 2,150)	2,108

Figure 4.3.a. Urinary daidzein: Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

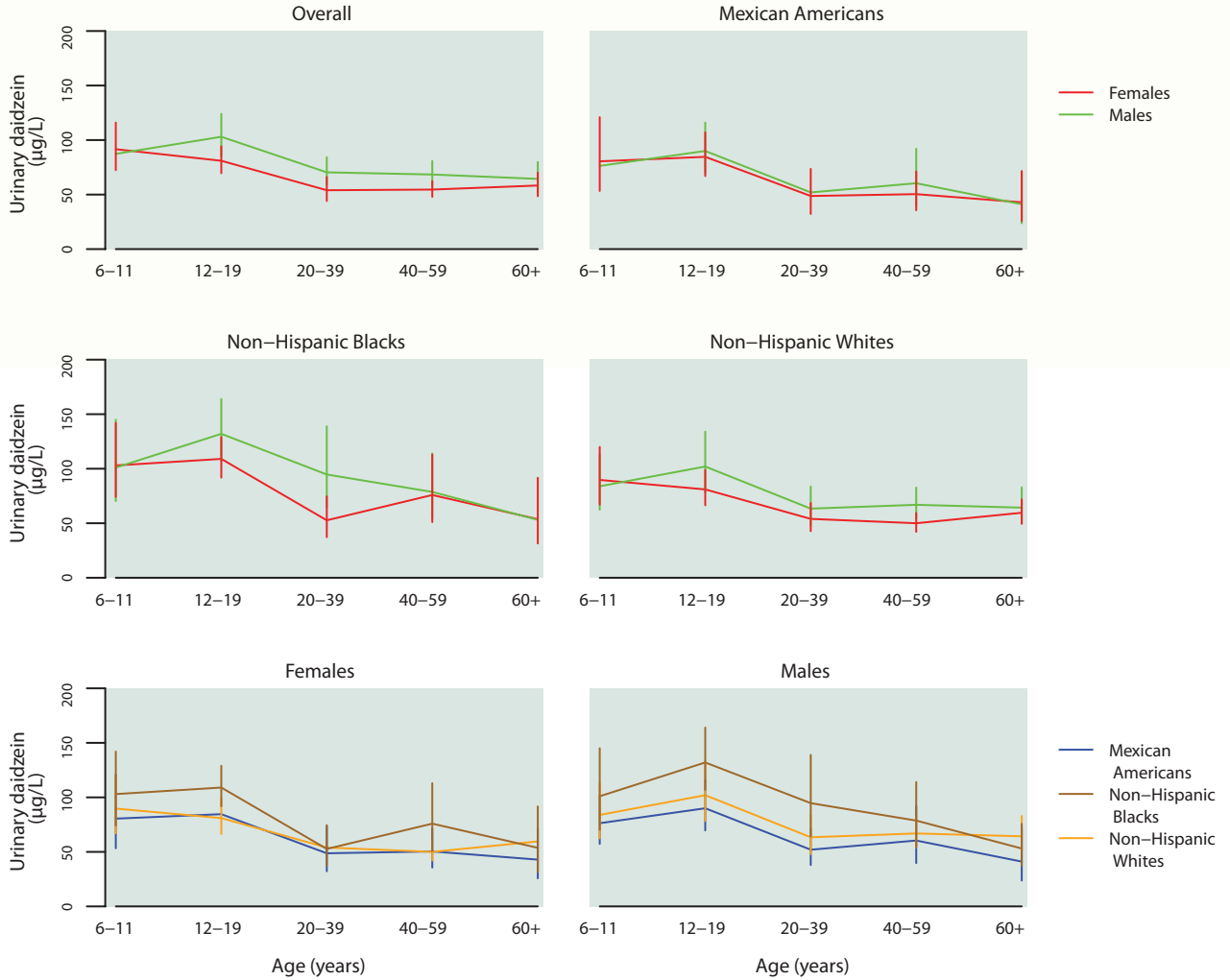


Table 4.3.a.2. Urinary daidzein: Total population

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	66.6 (62.1 – 71.5)	8.65 (7.74 – 9.48)	60.4 (54.7 – 65.9)	613 (525 – 684)	5,122
6–11 years	89.4 (77.7 – 103)	15.7 (12.2 – 18.1)	68.4 (59.2 – 86.6)	653 (619 – 916)	692
12–19 years	91.6 (80.5 – 104)	14.5 (11.8 – 15.8)	77.3 (65.0 – 94.5)	834 (659 – 969)	1,422
20–39 years	61.6 (53.3 – 71.3)	8.20 (6.00 – 10.4)	54.3 (47.2 – 65.9)	571 (422 – 752)	1,137
40–59 years	60.9 (54.9 – 67.6)	7.71 (6.35 – 8.67)	56.5 (47.0 – 65.5)	572 (410 – 807)	901
60 years and older	60.9 (52.7 – 70.5)	7.92 (6.54 – 9.19)	60.5 (48.9 – 73.4)	471 (399 – 618)	970
Males					
Total, 6 years and older	73.8 (67.2 – 81.1)	9.92 (8.68 – 11.9)	66.0 (58.0 – 73.7)	695 (589 – 786)	2,496
6–11 years	87.3 (72.9 – 105)	17.5 (12.2 – 21.0)	64.0 (51.5 – 91.4)	874 (497 – 1,150)	340
12–19 years	103 (85.2 – 124)	17.3 (13.9 – 19.4)	86.6 (64.8 – 107)	863 (526 – 1,320)	728
20–39 years	70.4 (58.8 – 84.2)	9.80 (5.43 – 12.8)	65.3 (51.7 – 75.0)	729 (544 – 968)	499
40–59 years	68.4 (57.9 – 80.8)	8.55 (7.15 – 9.37)	66.2 (47.7 – 84.7)	671 (409 – 930)	451
60 years and older	64.4 (52.0 – 79.9)	9.16 (7.75 – 11.8)	57.7 (43.8 – 78.5)	561 (417 – 749)	478
Females					
Total, 6 years and older	60.4 (55.3 – 66.0)	7.79 (6.41 – 8.76)	55.5 (49.5 – 61.5)	507 (431 – 619)	2,626
6–11 years	91.6 (72.4 – 116)	14.3 (9.67 – 17.9)	78.1 (57.3 – 99.4)	643 (455 – 882)	352
12–19 years	81.0 (69.6 – 94.3)	11.1 (9.30 – 14.5)	71.1 (59.6 – 93.6)	812 (604 – 936)	694
20–39 years	54.0 (44.1 – 66.2)	7.31 (5.72 – 9.03)	47.9 (38.1 – 63.9)	383 (309 – 585)	638
40–59 years	54.6 (47.9 – 62.3)	6.98 (4.64 – 8.60)	48.2 (40.6 – 58.2)	511 (395 – 736)	450
60 years and older	58.3 (48.5 – 70.2)	7.04 (4.21 – 8.11)	60.9 (46.8 – 80.2)	403 (362 – 562)	492

Table 4.3.a.3. Urinary daidzein: Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/L) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	59.0 (54.1 – 64.4)	7.94 (6.47 – 8.95)	48.6 (44.8 – 56.8)	671 (496 – 848)	1,287
6–11 years	78.3 (61.0 – 100)	16.6 (11.6 – 18.1)	64.5 (51.3 – 83.2)	588 (321 – 2,270)	231
12–19 years	87.3 (72.5 – 105)	12.3 (8.90 – 16.5)	74.6 (62.2 – 96.1)	812 (558 – 1,000)	445
20–39 years	50.5 (42.9 – 59.3)	6.19 (4.34 – 8.14)	35.3 (28.1 – 47.1)	821 (468 – 1,160)	282
40–59 years	55.4 (43.6 – 70.3)	7.50 (4.68 – 10.4)	48.2 (38.0 – 62.6)	475 (347 – 1,260)	157
60 years and older	42.1 (31.0 – 57.3)	5.61 (2.89 – 7.89)	40.7 (22.8 – 61.7)	366 (222 – 1,200)	172
Males					
Total, 6 years and older	60.8 (52.2 – 70.9)	8.82 (7.42 – 9.78)	48.2 (40.1 – 56.8)	742 (484 – 1,050)	625
6–11 years	76.3 (57.3 – 102)	17.3 (7.01 – 20.6)	60.0 (41.0 – 109)	481 (312 – 1,370)	112
12–19 years	90.0 (69.7 – 116)	16.0 (9.79 – 17.8)	84.7 (53.8 – 129)	590 (408 – 1,270)	228
20–39 years	52.0 (37.9 – 71.3)	7.67 (3.36 – 10.2)	36.0 (27.9 – 48.7)	846 (468 – 1,330)	117
40–59 years	60.4 (39.7 – 92.0)	8.25† (4.94 – 10.0)	47.8 (21.4 – 81.5)	790† (356 – 4,980)	85
60 years and older	41.1 (23.7 – 71.4)	7.55† (1.89 – 9.13)	40.0 (15.3 – 84.1)	329† (154 – 2,020)	83
Females					
Total, 6 years and older	57.1 (48.9 – 66.7)	6.73 (5.24 – 8.15)	49.8 (42.3 – 64.2)	556 (418 – 871)	662
6–11 years	80.5 (53.3 – 121)	14.4 (5.79 – 22.1)	65.4 (49.0 – 98.4)	735 (283 – 3,410)	119
12–19 years	84.6 (67.0 – 107)	10.4 (8.24 – 13.6)	71.1 (56.2 – 97.1)	867 (623 – 1,380)	217
20–39 years	48.7 (32.2 – 73.6)	5.71 (3.33 – 8.01)	32.3 (23.7 – 67.2)	594 (295 – 1,790)	165
40–59 years	50.4 (35.6 – 71.2)	5.24† (3.72 – 11.2)	48.4 (35.4 – 84.6)	346† (267 – 484)	72
60 years and older	42.9 (25.7 – 71.5)	5.28† (1.79 – 7.45)	40.1 (18.6 – 73.7)	381† (226 – 2,270)	89

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.3.a.4. Urinary daidzein: Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	78.4 (67.6 – 90.9)	9.87 (8.52 – 11.6)	72.3 (61.3 – 85.2)	639 (474 – 766)	1,343
6–11 years	102 (80.6 – 129)	11.5 (8.37 – 16.0)	95.8 (70.0 – 129)	927 (487 – 2,170)	207
12–19 years	120 (104 – 139)	17.5 (13.5 – 20.8)	111 (92.3 – 144)	895 (756 – 1,160)	496
20–39 years	68.4 (53.2 – 88.0)	11.3 (8.37 – 13.1)	50.7 (41.3 – 76.5)	601 (408 – 893)	249
40–59 years	77.2 (59.6 – 99.9)	8.40 (6.24 – 11.2)	75.0 (58.8 – 111)	457 (377 – 839)	231
60 years and older	53.5 (37.7 – 75.8)	7.55 (4.20 – 9.29)	46.9 (28.8 – 78.8)	361 (259 – 823)	160
Males					
Total, 6 years and older	90.2 (75.1 – 108)	12.1 (8.49 – 14.2)	83.6 (64.7 – 110)	724 (584 – 1,050)	661
6–11 years	101 (70.3 – 145)	11.2† (4.75 – 15.9)	103 (42.5 – 215)	1,050† (534 – 2,140)	99
12–19 years	132 (107 – 164)	19.4 (11.4 – 24.1)	120 (95.6 – 152)	1,140 (766 – 1,980)	258
20–39 years	94.7 (64.5 – 139)	13.2 (7.79 – 16.6)	67.3 (41.4 – 151)	851 (564 – 1,400)	116
40–59 years	78.7 (54.4 – 114)	8.53 (6.17 – 13.3)	83.2 (58.0 – 134)	390 (368 – 701)	114
60 years and older	53.1 (37.3 – 75.7)	8.34† (7.92 – 12.2)	40.3 (27.8 – 70.4)	325† (169 – 1,800)	74
Females					
Total, 6 years and older	69.7 (57.7 – 84.2)	9.41 (7.40 – 11.2)	64.7 (54.2 – 77.9)	476 (427 – 675)	682
6–11 years	103 (74.2 – 142)	11.0† (7.50 – 24.0)	85.1 (58.3 – 129)	687† (398 – 7,580)	108
12–19 years	109 (91.8 – 129)	14.3 (9.60 – 22.6)	104 (73.9 – 142)	757 (652 – 1,140)	238
20–39 years	52.7 (37.2 – 74.6)	9.40 (5.61 – 12.1)	43.3 (26.0 – 75.9)	408 (280 – 622)	133
40–59 years	75.9 (51.0 – 113)	7.94 (4.01 – 11.8)	69.9 (47.9 – 109)	462 (369 – 2,070)	117
60 years and older	53.7 (31.4 – 91.7)	6.06† (2.92 – 9.07)	55.3 (22.5 – 106)	368† (257 – 1,170)	86

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.3.a.5. Urinary daidzein: Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	63.9 (58.7 – 69.6)	8.36 (6.60 – 9.38)	58.5 (52.0 – 65.3)	571 (479 – 684)	2,108
6–11 years	86.5 (70.6 – 106)	16.0 (11.4 – 20.6)	66.6 (56.0 – 93.6)	643 (450 – 985)	193
12–19 years	91.5 (77.3 – 108)	15.2 (10.6 – 17.3)	76.3 (59.5 – 100)	824 (606 – 977)	378
20–39 years	58.5 (47.8 – 71.7)	6.75 (4.48 – 10.3)	53.0 (44.8 – 66.9)	484 (343 – 753)	494
40–59 years	57.9 (50.4 – 66.5)	7.22 (5.29 – 8.66)	50.6 (41.9 – 65.3)	575 (407 – 893)	448
60 years and older	61.6 (52.9 – 71.8)	8.03 (6.59 – 9.36)	61.2 (49.1 – 78.5)	469 (396 – 662)	595
Males					
Total, 6 years and older	70.2 (62.0 – 79.4)	9.34 (7.77 – 12.2)	63.8 (54.1 – 72.9)	680 (509 – 779)	1,035
6–11 years	83.9 (62.4 – 113)	18.4† (7.93 – 21.7)	63.1 (49.4 – 94.1)	651† (271 – 1,180)	99
12–19 years	102 (78.3 – 134)	16.6 (12.7 – 23.1)	80.1 (55.1 – 118)	812 (466 – 1,440)	191
20–39 years	63.4 (48.0 – 83.7)	8.03 (3.27 – 14.2)	59.0 (43.8 – 77.0)	575 (341 – 1,010)	217
40–59 years	66.9 (54.2 – 82.7)	8.29 (6.53 – 9.37)	63.4 (42.1 – 83.3)	670 (409 – 970)	229
60 years and older	64.3 (50.0 – 82.9)	9.18 (6.88 – 12.0)	58.7 (42.2 – 88.7)	591 (416 – 762)	299
Females					
Total, 6 years and older	58.3 (52.6 – 64.7)	7.50 (5.79 – 8.68)	53.1 (47.0 – 61.0)	484 (397 – 608)	1,073
6–11 years	89.7 (67.1 – 120)	14.9† (5.43 – 19.0)	89.1 (50.9 – 141)	583† (352 – 7,440)	94
12–19 years	81.0 (66.4 – 98.8)	11.8 (7.34 – 15.8)	73.3 (52.3 – 101)	817 (455 – 970)	187
20–39 years	54.0 (42.7 – 68.5)	6.43 (5.19 – 8.74)	51.1 (38.2 – 64.5)	382 (293 – 683)	277
40–59 years	50.0 (42.1 – 59.4)	5.98 (3.46 – 8.36)	43.5 (32.6 – 53.4)	514 (309 – 843)	219
60 years and older	59.6 (49.4 – 71.8)	7.25 (3.83 – 8.51)	61.4 (49.3 – 83.1)	401 (357 – 656)	296

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.3.b. Urinary daidzein: Concentrations by survey cycle

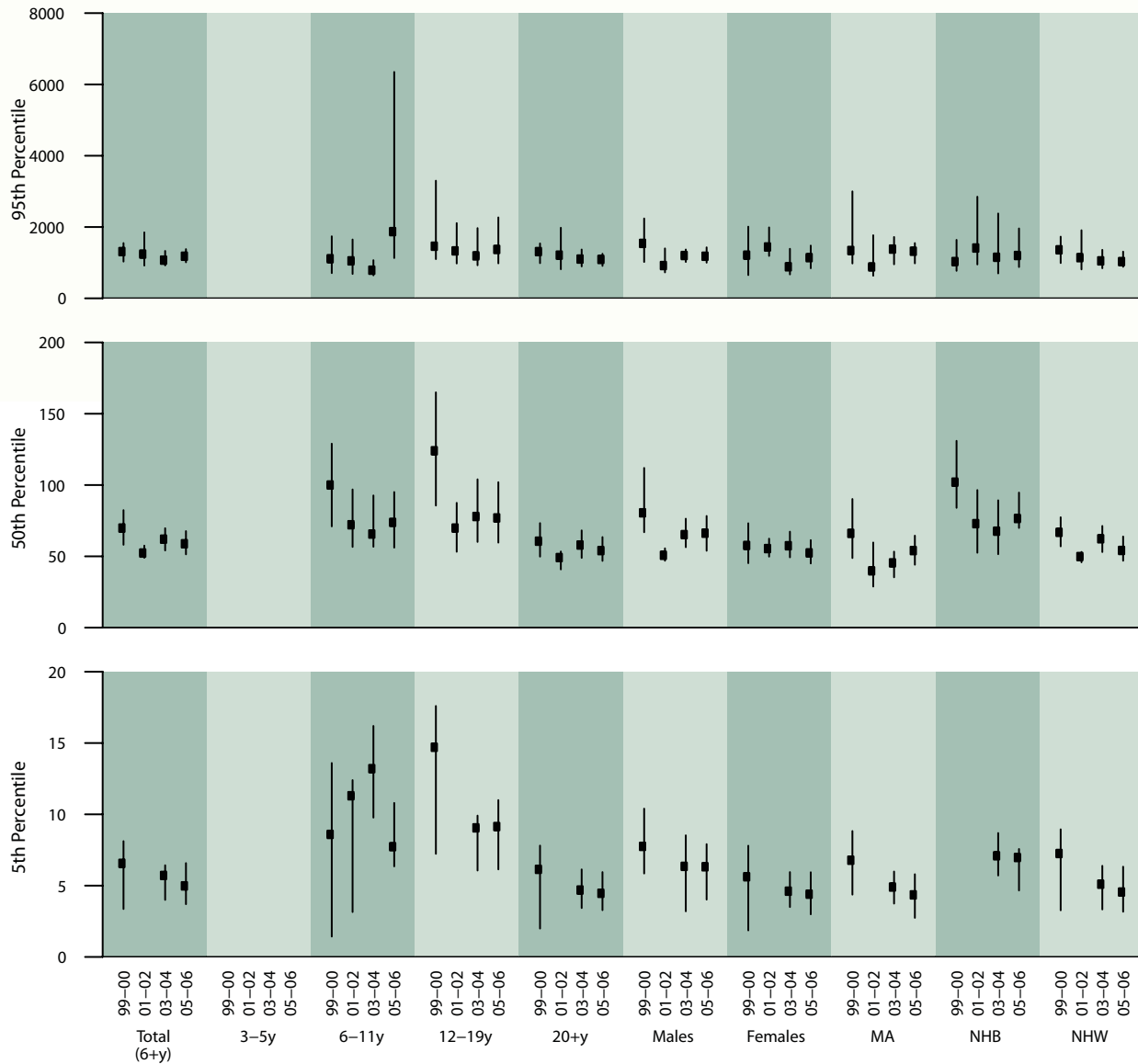
Geometric mean and selected percentiles of urine concentrations (in µg/L) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	75.1 (61.9 – 91.1)	6.56 (3.36 – 8.12)	69.8 (58.1 – 82.4)	1,310 (1,030 – 1,550)	2,553
2001–2002	51.7 (46.6 – 57.5)	< LOD	52.3 (49.0 – 57.5)	1,240 (919 – 1,850)	2,794
2003–2004	66.7 (60.4 – 73.7)	5.71 (4.00 – 6.43)	62.0 (54.1 – 69.7)	1,070 (924 – 1,330)	2,594
2005–2006	66.5 (59.7 – 74.1)	4.98 (3.70 – 6.58)	58.8 (51.4 – 67.7)	1,180 (1,010 – 1,380)	2,528
Age group					
6–11 years					
1999–2000	90.5 (75.1 – 109)	8.59 (1.43 – 13.6)	100 (71.0 – 129)	1,110 (707 – 1,740)	330
2001–2002	84.9 (71.6 – 101)	11.3 (3.15 – 12.4)	72.1 (56.6 – 96.9)	1,050 (684 – 1,650)	396
2003–2004	84.9 (71.6 – 101)	13.2 (9.77 – 16.2)	65.6 (56.7 – 92.7)	788 (644 – 1,070)	341
2005–2006	94.1 (74.3 – 119)	7.73 (6.35 – 10.8)	73.8 (56.1 – 95.1)	1,870 (1,130 – 6,350)	351
12–19 years					
1999–2000	123 (91.4 – 166)	14.7 (7.23 – 17.6)	124 (85.6 – 165)	1,460 (1,100 – 3,300)	753
2001–2002	69.3 (52.6 – 91.3)	2.63 (< LOD – 6.02)	69.8 (53.2 – 87.5)	1,330 (977 – 2,110)	744
2003–2004	89.0 (75.2 – 105)	9.05 (6.06 – 9.91)	77.9 (60.1 – 104)	1,190 (927 – 1,970)	729
2005–2006	94.4 (76.0 – 117)	9.14 (6.14 – 11.0)	76.9 (59.6 – 102)	1,370 (981 – 2,270)	693
20–39 years					
1999–2000	80.6 (64.3 – 101)	7.55 (3.34 – 9.89)	67.1 (55.6 – 82.5)	1,730 (983 – 4,150)	534
2001–2002	51.5 (42.7 – 62.1)	< LOD	50.7 (40.4 – 64.9)	1,200 (763 – 1,930)	604
2003–2004	59.9 (47.6 – 75.3)	4.82 (3.21 – 6.58)	56.1 (44.9 – 69.0)	1,170 (809 – 1,480)	554
2005–2006	63.4 (51.7 – 77.6)	4.81 (2.19 – 6.27)	52.3 (44.7 – 68.5)	1,360 (737 – 2,240)	583
40–59 years					
1999–2000	55.4 (39.0 – 78.6)	2.50 (< LOD – 7.77)	56.7 (40.8 – 70.7)	1,060 (801 – 1,520)	420
2001–2002	50.6 (40.4 – 63.3)	< LOD	53.1 (39.3 – 68.2)	1,760 (859 – 3,030)	531
2003–2004	67.9 (58.3 – 79.2)	5.13 (3.05 – 6.43)	62.2 (46.1 – 78.7)	1,290 (840 – 3,440)	452
2005–2006	54.9 (47.3 – 63.7)	3.79 (2.99 – 5.86)	50.5 (41.4 – 61.9)	983 (665 – 1,300)	449
60 years and older					
1999–2000	64.6 (53.0 – 78.8)	6.47 (5.61 – 9.10)	61.5 (45.9 – 85.0)	665 (556 – 991)	516
2001–2002	32.0 (26.2 – 39.0)	< LOD	33.8 (28.4 – 40.4)	636 (397 – 1,990)	519
2003–2004	55.7 (44.4 – 69.9)	4.07 (2.51 – 5.72)	56.5 (43.8 – 76.3)	780 (585 – 1,660)	518
2005–2006	66.4 (54.6 – 80.8)	4.76 (1.85 – 8.24)	62.5 (43.9 – 89.5)	952 (707 – 1,600)	452
Gender					
Males					
1999–2000	88.9 (71.4 – 111)	7.75 (5.85 – 10.4)	80.5 (66.9 – 112)	1,540 (1,020 – 2,240)	1,220
2001–2002	49.8 (42.8 – 57.9)	< LOD	50.7 (46.9 – 55.6)	918 (727 – 1,400)	1,375
2003–2004	73.8 (63.4 – 85.9)	6.35 (3.20 – 8.53)	65.2 (56.4 – 76.4)	1,200 (1,020 – 1,370)	1,244
2005–2006	73.9 (65.3 – 83.6)	6.32 (4.02 – 7.91)	66.2 (53.9 – 78.3)	1,180 (1,000 – 1,430)	1,252
Females					
1999–2000	64.1 (52.9 – 77.6)	5.62 (1.86 – 7.80)	57.6 (45.2 – 73.2)	1,210 (652 – 2,010)	1,333
2001–2002	53.6 (48.1 – 59.8)	< LOD	55.4 (49.8 – 62.4)	1,440 (1,190 – 1,990)	1,419
2003–2004	60.7 (53.6 – 68.8)	4.61 (3.50 – 5.95)	57.4 (49.3 – 67.3)	884 (670 – 1,390)	1,350
2005–2006	60.1 (52.5 – 68.9)	4.40 (2.99 – 5.94)	52.4 (45.0 – 61.4)	1,140 (843 – 1,480)	1,276
Race/ethnicity					
Mexican Americans					
1999–2000	78.9 (59.8 – 104)	6.78 (4.37 – 8.83)	66.1 (48.8 – 90.2)	1,340 (977 – 3,000)	816
2001–2002	39.2 (28.5 – 54.0)	< LOD	39.8 (28.8 – 59.7)	880 (633 – 1,770)	679
2003–2004	57.4 (50.2 – 65.7)	4.90 (3.74 – 5.99)	45.4 (35.3 – 53.3)	1,380 (954 – 1,720)	653
2005–2006	60.6 (53.3 – 68.9)	4.35 (2.74 – 5.80)	54.0 (44.1 – 64.5)	1,320 (981 – 1,550)	634
Non-Hispanic Blacks					
1999–2000	91.5 (71.1 – 118)	7.48 (< LOD – 11.2)	102 (84.0 – 131)	1,030 (771 – 1,640)	596
2001–2002	66.3 (47.7 – 91.9)	< LOD	72.9 (52.5 – 96.5)	1,410 (950 – 2,850)	692
2003–2004	75.5 (56.5 – 101)	7.09 (5.71 – 8.69)	67.6 (51.5 – 89.3)	1,150 (699 – 2,380)	681
2005–2006	81.3 (71.6 – 92.4)	6.97 (4.66 – 7.57)	76.5 (69.9 – 94.7)	1,200 (878 – 1,960)	662
Non-Hispanic Whites					
1999–2000	74.7 (61.8 – 90.3)	7.25 (3.27 – 8.95)	66.8 (57.0 – 77.4)	1,360 (990 – 1,730)	901
2001–2002	48.6 (43.8 – 53.9)	< LOD	49.8 (45.8 – 53.1)	1,140 (811 – 1,910)	1,211
2003–2004	65.9 (58.7 – 74.0)	5.10 (3.33 – 6.39)	62.3 (53.0 – 71.3)	1,050 (843 – 1,360)	1,069
2005–2006	62.0 (54.4 – 70.7)	4.55 (3.17 – 6.33)	54.1 (46.9 – 63.9)	1,030 (884 – 1,310)	1,039

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.3.b. Urinary daidzein: Concentrations by survey cycle

Selected percentiles in $\mu\text{g/L}$ (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.4.a.1. Urinary daidzein (creatinine corrected): Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
		2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	63.7 (60.0 – 67.5)	4.69 (4.17 – 5.11)	6.83 (6.29 – 7.32)	54.6 (50.2 – 58.5)	1,060 (939 – 1,150)	1,890 (1,520 – 2,820)	5,122
Age group							
6–11 years	96.8 (85.1 – 110)	9.11 (7.67 – 11.1)	12.3 (9.30 – 15.7)	72.6 (63.3 – 87.8)	1,630 (1,000 – 2,990)	3,010 (1,860 – 5,360)	692
12–19 years	68.3 (60.0 – 77.7)	5.75 (4.91 – 6.71)	7.91 (6.76 – 9.36)	56.2 (47.3 – 69.0)	910 (755 – 1,210)	1,330 (1,180 – 2,730)	1,422
20–39 years	52.5 (46.6 – 59.3)	3.98 (2.80 – 4.53)	5.88 (4.34 – 6.73)	44.6 (37.9 – 52.2)	878 (685 – 1,100)	1,360 (1,090 – 2,480)	1,137
40–59 years	61.6 (56.1 – 67.8)	4.02 (2.73 – 4.80)	5.99 (4.72 – 7.17)	51.7 (46.0 – 58.2)	1,140 (895 – 2,180)	2,760 (1,510 – 4,990)	901
60 years and older	71.4 (63.3 – 80.5)	5.84 (4.78 – 7.05)	8.24 (7.26 – 9.16)	63.9 (51.3 – 78.0)	1,010 (828 – 1,180)	1,770 (1,120 – 2,940)	970
Gender							
Males	58.6 (53.5 – 64.1)	4.34 (3.58 – 4.79)	6.32 (5.09 – 7.08)	49.9 (45.5 – 55.2)	924 (812 – 1,100)	1,550 (1,190 – 2,640)	2,496
Females	68.9 (63.4 – 74.9)	5.13 (4.29 – 5.94)	7.44 (6.45 – 8.14)	60.0 (51.0 – 68.9)	1,130 (1,010 – 1,510)	2,100 (1,630 – 3,290)	2,626
Race/ethnicity							
Mexican Americans	53.2 (47.7 – 59.3)	3.88 (2.31 – 4.18)	4.66 (4.10 – 5.41)	47.7 (38.6 – 56.1)	973 (859 – 1,170)	1,750 (1,360 – 2,390)	1,287
Non-Hispanic Blacks	55.0 (48.8 – 62.1)	3.99 (3.43 – 4.57)	5.90 (4.51 – 6.56)	48.0 (39.1 – 59.6)	825 (645 – 1,040)	1,360 (1,020 – 2,320)	1,343
Non-Hispanic Whites	65.1 (60.7 – 69.7)	4.86 (4.30 – 5.83)	7.25 (6.49 – 7.90)	56.0 (50.6 – 60.8)	1,080 (940 – 1,200)	1,890 (1,480 – 3,030)	2,108

Figure 4.4.a. Urinary daidzein (creatinine corrected): Concentrations by age group
 Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

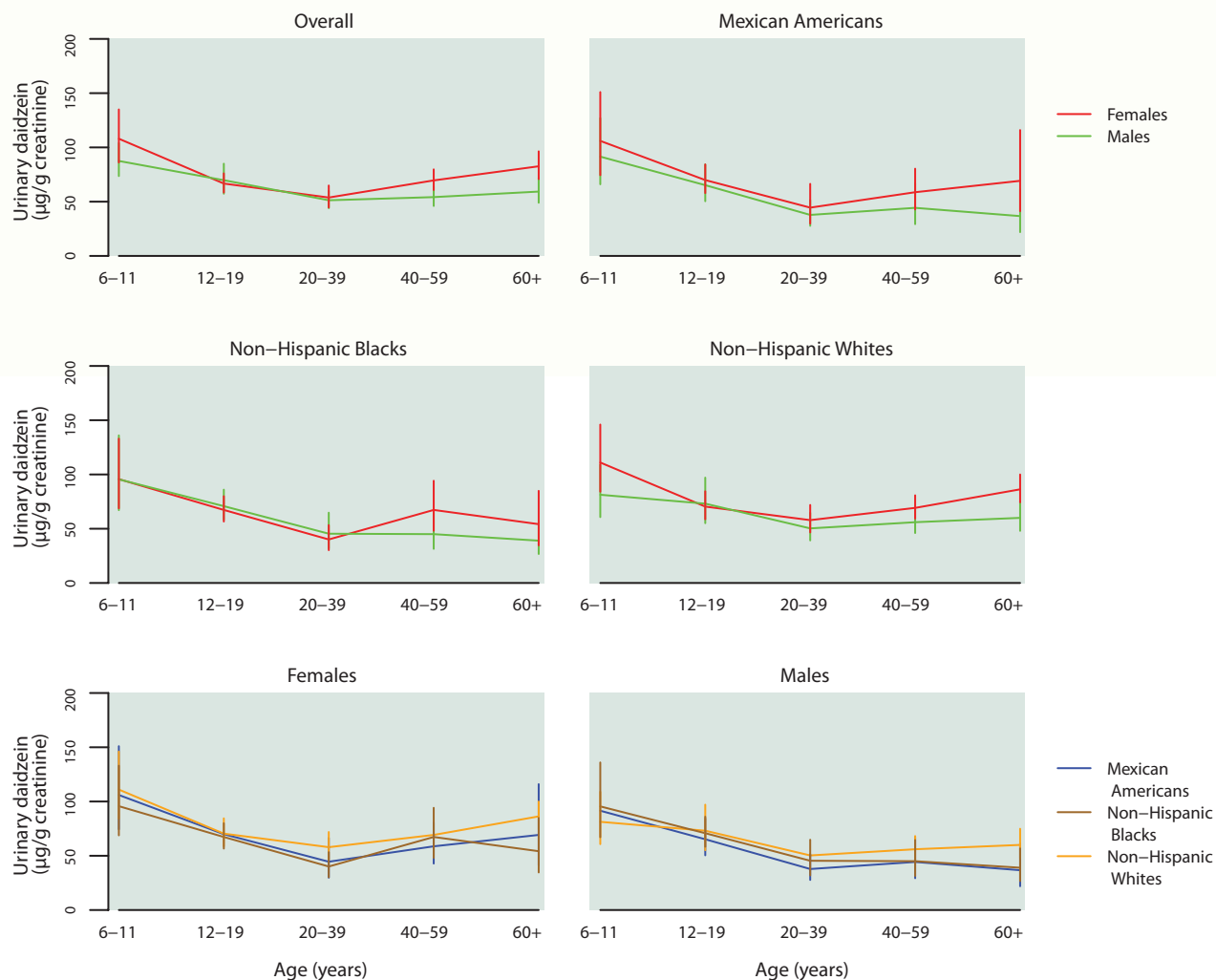


Table 4.4.a.2. Urinary daidzein (creatinine corrected): Total population

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	63.7 (60.0 – 67.5)	9.68 (8.96 – 10.5)	54.6 (50.2 – 58.5)	522 (463 – 593)	5,122
6–11 years	96.8 (85.1 – 110)	19.0 (14.8 – 23.0)	72.6 (63.3 – 87.8)	697 (580 – 924)	692
12–19 years	68.3 (60.0 – 77.7)	11.5 (9.80 – 12.7)	56.2 (47.3 – 69.0)	522 (419 – 738)	1,422
20–39 years	52.5 (46.6 – 59.3)	8.66 (7.41 – 9.62)	44.6 (37.9 – 52.2)	424 (338 – 501)	1,137
40–59 years	61.6 (56.1 – 67.8)	8.59 (7.78 – 9.25)	51.7 (46.0 – 58.2)	570 (410 – 894)	901
60 years and older	71.4 (63.3 – 80.5)	11.3 (10.1 – 12.0)	63.9 (51.3 – 78.0)	565 (462 – 702)	970
Males					
Total, 6 years and older	58.6 (53.5 – 64.1)	8.91 (8.16 – 9.82)	49.9 (45.5 – 55.2)	467 (421 – 543)	2,496
6–11 years	87.5 (73.6 – 104)	15.8 (11.8 – 21.6)	68.2 (54.2 – 82.8)	733 (435 – 1,190)	340
12–19 years	69.8 (57.3 – 85.0)	11.6 (9.54 – 13.5)	53.9 (43.2 – 69.7)	580 (404 – 842)	728
20–39 years	51.3 (44.0 – 59.9)	7.55 (6.03 – 9.50)	43.4 (36.9 – 50.3)	451 (379 – 595)	499
40–59 years	54.2 (46.0 – 63.9)	7.88 (6.08 – 8.73)	47.0 (38.7 – 60.1)	458 (305 – 766)	451
60 years and older	59.3 (49.0 – 71.9)	10.0 (8.24 – 11.5)	51.0 (43.3 – 65.7)	423 (370 – 565)	478
Females					
Total, 6 years and older	68.9 (63.4 – 74.9)	10.7 (9.41 – 12.2)	60.0 (51.0 – 68.9)	582 (493 – 702)	2,626
6–11 years	108 (86.1 – 135)	22.3 (14.6 – 27.7)	84.3 (68.0 – 112)	696 (561 – 1,060)	352
12–19 years	66.7 (58.4 – 76.1)	11.4 (9.31 – 13.0)	58.6 (45.9 – 76.2)	514 (379 – 662)	694
20–39 years	53.8 (44.6 – 64.9)	9.21 (7.51 – 10.7)	46.6 (34.7 – 63.9)	349 (237 – 654)	638
40–59 years	69.6 (60.7 – 79.8)	9.63 (7.84 – 12.3)	57.3 (48.8 – 68.7)	699 (459 – 1,130)	450
60 years and older	82.6 (70.8 – 96.4)	12.7 (10.2 – 14.5)	75.0 (58.7 – 92.5)	686 (537 – 965)	492

Table 4.4.a.3. Urinary daidzein (creatinine corrected): Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	53.2 (47.7 – 59.3)	6.93 (6.05 – 7.61)	47.7 (38.6 – 56.1)	527 (431 – 601)	1,287
6–11 years	98.3 (76.7 – 126)	20.2 (16.6 – 23.2)	80.4 (62.1 – 108)	601 (332 – 1,940)	231
12–19 years	67.5 (56.8 – 80.1)	10.8 (7.46 – 13.3)	57.9 (49.4 – 71.5)	492 (380 – 834)	445
20–39 years	40.7 (33.7 – 49.2)	5.59 (4.19 – 7.06)	30.1 (24.2 – 42.4)	499 (290 – 809)	282
40–59 years	50.7 (39.5 – 65.0)	6.01 (4.56 – 7.76)	45.9 (30.2 – 62.8)	537 (275 – 990)	157
60 years and older	52.0 (36.8 – 73.4)	6.95 (5.30 – 8.24)	49.3 (31.5 – 75.6)	344 (253 – 971)	172
Males					
Total, 6 years and older	48.0 (40.5 – 56.9)	6.05 (5.04 – 7.07)	40.4 (30.2 – 56.1)	469 (355 – 594)	625
6–11 years	91.5 (66.0 – 127)	20.4 (15.5 – 23.2)	74.0 (50.3 – 130)	429 (313 – 1,510)	112
12–19 years	65.2 (50.4 – 84.4)	12.3 (7.04 – 13.8)	55.2 (37.2 – 91.2)	424 (302 – 861)	228
20–39 years	37.8 (27.7 – 51.5)	4.82 (2.22 – 6.78)	27.8 (20.6 – 44.4)	432 (264 – 899)	117
40–59 years	44.3 (29.3 – 67.1)	5.90† (3.67 – 7.61)	29.8 (16.1 – 73.2)	552† (258 – 1,640)	85
60 years and older	36.7 (21.9 – 61.5)	5.57† (4.50 – 6.89)	35.3 (15.0 – 66.2)	309† (110 – 2,740)	83
Females					
Total, 6 years and older	59.6 (50.8 – 69.9)	7.76 (6.39 – 9.44)	53.5 (43.2 – 62.6)	602 (406 – 897)	662
6–11 years	106 (74.4 – 151)	20.1 (13.5 – 27.3)	85.2 (68.2 – 112)	898 (305 – 3,630)	119
12–19 years	69.9 (57.9 – 84.3)	10.1 (6.44 – 13.3)	65.8 (43.1 – 81.9)	736 (477 – 881)	217
20–39 years	44.5 (29.8 – 66.4)	6.66 (4.07 – 8.39)	33.2 (18.7 – 56.2)	569 (207 – 2,670)	165
40–59 years	58.7 (42.8 – 80.4)	6.72† (4.24 – 11.8)	52.7 (40.8 – 75.2)	427† (256 – 924)	72
60 years and older	69.2 (41.2 – 116)	8.25† (3.99 – 13.0)	64.1 (24.7 – 157)	443† (255 – 2,030)	89

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.4.a.4. Urinary daidzein (creatinine corrected): Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	55.0 (48.8 – 62.1)	8.72 (7.34 – 9.46)	48.0 (39.1 – 59.6)	437 (389 – 538)	1,343
6–11 years	95.6 (75.9 – 121)	13.3 (11.1 – 18.8)	81.9 (67.4 – 108)	1,010 (647 – 1,910)	207
12–19 years	69.0 (60.5 – 78.8)	9.54 (8.52 – 11.6)	66.5 (51.3 – 85.0)	496 (424 – 640)	496
20–39 years	42.4 (34.5 – 52.2)	6.72 (5.68 – 9.60)	28.1 (23.4 – 44.7)	368 (211 – 702)	249
40–59 years	56.1 (45.9 – 68.6)	8.30 (5.49 – 10.0)	48.7 (38.5 – 66.9)	422 (290 – 614)	231
60 years and older	47.7 (35.0 – 64.9)	9.05 (6.31 – 10.7)	42.0 (25.3 – 67.0)	295 (223 – 603)	160
Males					
Total, 6 years and older	52.7 (44.7 – 62.0)	7.20 (6.40 – 8.99)	44.4 (32.0 – 63.8)	440 (391 – 532)	661
6–11 years	95.5 (67.1 – 136)	11.2† (8.55 – 13.9)	94.6 (39.1 – 139)	1,210† (646 – 2,090)	99
12–19 years	70.8 (58.3 – 86.0)	9.79 (7.70 – 11.8)	70.0 (53.8 – 88.7)	584 (426 – 910)	258
20–39 years	45.4 (31.9 – 64.8)	6.49 (3.95 – 8.98)	27.2 (20.2 – 77.0)	410 (234 – 1,360)	116
40–59 years	45.0 (31.4 – 64.5)	6.01 (3.03 – 8.96)	42.1 (29.9 – 58.2)	338 (222 – 684)	114
60 years and older	39.0 (26.7 – 56.8)	7.23† (4.44 – 11.3)	25.7 (19.2 – 50.9)	238† (114 – 996)	74
Females					
Total, 6 years and older	57.1 (48.2 – 67.6)	9.36 (7.44 – 11.4)	49.4 (39.9 – 66.3)	419 (330 – 593)	682
6–11 years	95.7 (68.8 – 133)	18.3† (6.78 – 23.1)	77.5 (61.2 – 95.9)	758† (307 – 2,820)	108
12–19 years	67.3 (56.6 – 80.0)	9.35 (7.76 – 13.2)	62.7 (46.6 – 85.6)	458 (328 – 895)	238
20–39 years	40.1 (30.2 – 53.3)	7.29 (4.25 – 11.4)	29.9 (23.8 – 42.2)	310 (153 – 668)	133
40–59 years	67.3 (48.1 – 94.2)	9.31 (6.16 – 12.6)	55.0 (35.4 – 90.6)	552 (299 – 922)	117
60 years and older	54.2 (34.6 – 84.9)	9.07† (4.74 – 11.6)	55.5 (26.1 – 79.8)	312† (185 – 1,040)	86

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.4.a.5. Urinary daidzein (creatinine corrected): Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	65.1 (60.7 – 69.7)	10.0 (8.80 – 11.4)	56.0 (50.6 – 60.8)	519 (451 – 658)	2,108
6–11 years	93.9 (77.9 – 113)	17.1 (11.9 – 25.8)	70.3 (57.7 – 96.8)	577 (423 – 991)	193
12–19 years	71.8 (60.1 – 85.8)	12.3 (10.4 – 13.6)	57.5 (46.0 – 74.4)	563 (415 – 763)	378
20–39 years	54.0 (45.5 – 64.1)	9.24 (7.14 – 10.8)	46.4 (37.6 – 57.0)	403 (315 – 578)	494
40–59 years	62.2 (55.5 – 69.8)	8.59 (7.54 – 10.0)	52.9 (43.2 – 60.5)	582 (397 – 1,030)	448
60 years and older	73.5 (65.4 – 82.6)	11.4 (10.1 – 12.6)	65.9 (55.2 – 80.0)	548 (459 – 714)	595
Males					
Total, 6 years and older	58.7 (52.2 – 65.9)	9.03 (8.12 – 10.5)	49.9 (43.4 – 57.4)	6456 (369 – 638)	1,035
6–11 years	81.3 (60.7 – 109)	15.6† (10.8 – 22.6)	60.2 (45.1 – 95.9)	540† (287 – 2,790)	99
12–19 years	73.1 (55.1 – 97.1)	12.3 (8.32 – 16.7)	54.3 (40.6 – 82.5)	653 (397 – 892)	191
20–39 years	50.3 (39.2 – 64.7)	8.53 (4.63 – 10.7)	41.7 (33.8 – 54.3)	425 (296 – 777)	217
40–59 years	56.0 (46.0 – 68.2)	8.18 (5.53 – 8.99)	46.0 (37.2 – 62.3)	465 (304 – 946)	229
60 years and older	60.0 (48.0 – 74.9)	10.1 (8.07 – 11.6)	54.2 (40.5 – 79.6)	402 (357 – 501)	299
Females					
Total, 6 years and older	71.9 (65.4 – 79.1)	11.6 (9.27 – 13.6)	63.3 (53.8 – 73.5)	589 (484 – 818)	1,073
6–11 years	111 (84.1 – 146)	23.8† (12.9 – 33.2)	94.0 (66.0 – 124)	578† (397 – 1,780)	94
12–19 years	70.4 (58.7 – 84.5)	12.2 (7.26 – 16.3)	66.9 (43.9 – 86.4)	520 (372 – 713)	187
20–39 years	57.9 (46.6 – 71.9)	10.1 (7.66 – 13.0)	47.8 (35.8 – 67.5)	385 (237 – 817)	277
40–59 years	69.2 (59.3 – 80.8)	9.16 (7.25 – 13.0)	57.6 (46.3 – 71.7)	894 (410 – 1,310)	219
60 years and older	86.3 (74.3 – 100)	13.4 (10.1 – 15.6)	78.0 (59.8 – 97.1)	656 (519 – 974)	296

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.4.b. Urinary daidzein (creatinine corrected): Concentrations by survey cycle

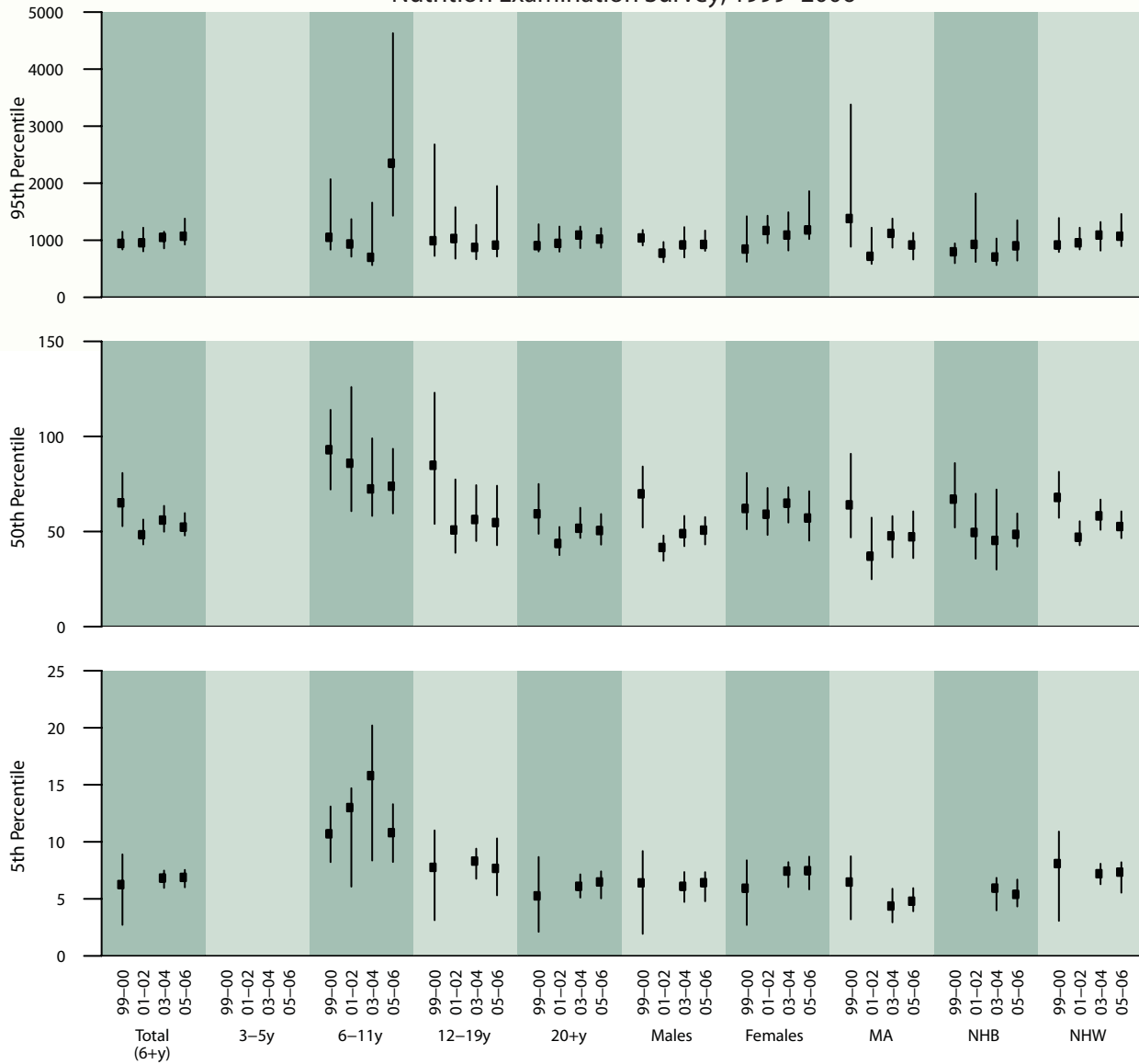
Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	68.5 (55.9 – 83.9)	6.25 (2.72 – 8.90)	65.1 (52.8 – 80.8)	943 (838 – 1,150)	2,553
2001–2002	48.5 (43.7 – 54.0)	<LOD	48.3 (43.2 – 56.3)	955 (805 – 1,220)	2,794
2003–2004	62.5 (58.3 – 67.0)	6.82 (5.96 – 7.48)	56.0 (49.9 – 63.5)	1,050 (858 – 1,150)	2,594
2005–2006	64.8 (58.7 – 71.6)	6.88 (6.01 – 7.54)	52.3 (47.9 – 59.7)	1,070 (924 – 1,380)	2,528
Age group					
6–11 years					
1999–2000	92.6 (76.3 – 112)	10.7 (8.22 – 13.1)	93.0 (72.1 – 114)	1,050 (835 – 2,070)	330
2001–2002	96.4 (79.0 – 118)	13.0 (6.07 – 14.7)	85.9 (60.7 – 126)	934 (712 – 1,370)	396
2003–2004	90.4 (77.2 – 106)	15.8 (8.36 – 20.2)	72.4 (58.2 – 99.0)	700 (563 – 1,660)	341
2005–2006	104 (83.1 – 130)	10.8 (8.23 – 13.3)	73.8 (59.5 – 93.5)	2,350 (1,430 – 4,630)	351
12–19 years					
1999–2000	83.1 (58.4 – 118)	7.76 (3.13 – 11.0)	84.8 (54.0 – 123)	991 (725 – 2,680)	753
2001–2002	53.4 (40.8 – 70.0)	2.77 (<LOD – 4.26)	50.8 (38.8 – 77.4)	1,030 (677 – 1,580)	744
2003–2004	66.6 (55.7 – 79.6)	8.31 (6.76 – 9.40)	56.3 (45.0 – 74.4)	873 (667 – 1,270)	729
2005–2006	70.0 (56.9 – 86.2)	7.67 (5.31 – 10.3)	54.7 (42.8 – 74.1)	914 (714 – 1,950)	693
20–39 years					
1999–2000	63.9 (50.7 – 80.6)	5.10 (2.37 – 8.40)	52.8 (41.0 – 81.7)	1,100 (811 – 1,740)	534
2001–2002	41.6 (35.1 – 49.4)	<LOD	43.0 (30.4 – 54.2)	849 (615 – 1,040)	604
2003–2004	50.5 (43.0 – 59.3)	5.95 (4.11 – 7.11)	42.6 (36.1 – 50.6)	870 (570 – 1,360)	554
2005–2006	54.6 (45.0 – 66.4)	5.60 (3.60 – 7.48)	47.0 (34.2 – 65.2)	875 (645 – 1,200)	583
40–59 years					
1999–2000	56.2 (39.7 – 79.6)	3.39 (<LOD – 8.27)	50.3 (39.1 – 71.2)	827 (624 – 1,360)	420
2001–2002	50.2 (40.3 – 62.7)	<LOD	53.3 (40.4 – 67.5)	1,220 (848 – 2,140)	531
2003–2004	65.1 (56.5 – 75.2)	5.51 (4.02 – 7.94)	58.2 (48.9 – 70.6)	1,220 (713 – 4,260)	452
2005–2006	58.5 (50.8 – 67.4)	6.35 (3.70 – 7.64)	46.1 (40.8 – 56.2)	1,090 (714 – 2,890)	449
60 years and older					
1999–2000	77.6 (63.4 – 94.8)	8.64 (5.52 – 12.0)	82.7 (61.7 – 104)	761 (575 – 996)	516
2001–2002	37.9 (31.0 – 46.3)	<LOD	36.0 (25.9 – 44.2)	726 (502 – 1,780)	519
2003–2004	65.9 (55.1 – 78.9)	8.01 (6.03 – 9.02)	61.8 (48.0 – 78.2)	973 (653 – 1,870)	518
2005–2006	77.1 (65.2 – 91.1)	9.10 (6.42 – 11.4)	64.5 (49.7 – 87.6)	1,020 (827 – 1,610)	452
Gender					
Males					
1999–2000	69.7 (54.7 – 88.8)	6.40 (1.93 – 9.19)	69.8 (52.1 – 84.2)	1,040 (908 – 1,180)	1,220
2001–2002	40.5 (34.8 – 47.1)	<LOD	41.6 (34.6 – 47.9)	773 (615 – 969)	1,375
2003–2004	57.7 (49.4 – 67.3)	6.10 (4.73 – 7.35)	48.9 (42.3 – 58.2)	918 (699 – 1,230)	1,244
2005–2006	59.5 (53.3 – 66.3)	6.42 (4.79 – 7.34)	50.7 (43.2 – 57.6)	926 (814 – 1,170)	1,252
Females					
1999–2000	67.4 (54.8 – 82.9)	5.93 (2.71 – 8.38)	62.1 (51.2 – 80.8)	845 (622 – 1,420)	1,333
2001–2002	57.6 (50.8 – 65.2)	<LOD	59.1 (48.2 – 72.9)	1,170 (949 – 1,430)	1,419
2003–2004	67.4 (60.8 – 74.9)	7.43 (6.03 – 8.22)	64.9 (54.7 – 73.3)	1,090 (820 – 1,490)	1,350
2005–2006	70.4 (61.3 – 80.8)	7.47 (5.83 – 8.70)	57.1 (45.2 – 71.2)	1,180 (1,020 – 1,860)	1,276
Race/ethnicity					
Mexican Americans					
1999–2000	72.4 (59.1 – 88.9)	6.47 (3.20 – 8.73)	64.0 (46.9 – 90.9)	1,380 (886 – 3,380)	816
2001–2002	36.9 (27.8 – 49.0)	<LOD	37.0 (24.9 – 57.3)	718 (584 – 1,220)	679
2003–2004	51.8 (45.0 – 59.6)	4.37 (2.94 – 5.89)	47.7 (36.4 – 58.1)	1,120 (870 – 1,380)	653
2005–2006	54.7 (45.6 – 65.7)	4.79 (3.91 – 5.94)	47.2 (36.0 – 60.6)	917 (662 – 1,130)	634
Non-Hispanic Blacks					
1999–2000	58.7 (46.0 – 74.9)	3.74 (<LOD – 6.58)	67.0 (52.1 – 86.0)	797 (598 – 945)	596
2001–2002	46.2 (33.2 – 64.3)	<LOD	49.5 (35.7 – 69.9)	927 (620 – 1,820)	692
2003–2004	53.2 (42.4 – 66.7)	5.94 (3.99 – 6.84)	45.3 (30.0 – 72.1)	706 (564 – 1,030)	681
2005–2006	57.0 (50.3 – 64.5)	5.39 (4.33 – 6.69)	48.5 (42.1 – 59.5)	902 (643 – 1,350)	662
Non-Hispanic Whites					
1999–2000	73.6 (60.7 – 89.2)	8.09 (3.07 – 10.9)	67.9 (57.2 – 81.4)	917 (794 – 1,390)	901
2001–2002	48.0 (43.5 – 53.0)	<LOD	47.0 (42.8 – 55.4)	954 (838 – 1,220)	1,211
2003–2004	64.9 (59.9 – 70.4)	7.20 (6.28 – 8.08)	58.2 (50.9 – 66.8)	1,090 (818 – 1,320)	1,069
2005–2006	65.2 (57.9 – 73.3)	7.34 (5.54 – 8.21)	52.6 (46.5 – 60.6)	1,070 (896 – 1,460)	1,039

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.4.b. Urinary daidzein (creatinine corrected): Concentrations by survey cycle

Selected percentiles in $\mu\text{g/g}$ creatinine (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.5.a.1. Urinary equol: Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
		2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	8.21 (7.61 – 8.85)	.499 (.468 – .593)	.953 (.754 – 1.08)	8.33 (7.59 – 9.06)	64.8 (56.0 – 80.8)	205 (138 – 329)	5,117
Age group							
6–11 years	12.8 (11.1 – 14.8)	1.10 (.794 – 1.49)	1.95 (1.25 – 2.17)	13.2 (10.8 – 16.0)	84.9 (60.3 – 131)	140 (106 – 311)	692
12–19 years	11.1 (10.0 – 12.2)	.998 (.671 – 1.27)	1.62 (1.28 – 1.88)	10.8 (9.61 – 11.7)	72.2 (53.8 – 114)	148 (114 – 287)	1,422
20–39 years	8.39 (7.41 – 9.50)	.594 (.357 – .766)	.897 (.690 – 1.20)	8.80 (7.71 – 9.78)	71.7 (50.4 – 132)	200 (117 – 563)	1,137
40–59 years	6.85 (6.06 – 7.75)	.385 (< LOD – .491)	.559 (.468 – .964)	6.37 (5.36 – 7.63)	56.2 (43.6 – 146)	314 (117 – 1,220)	897
60 years and older	6.96 (6.06 – 8.00)	.393 (< LOD – .621)	.884 (.591 – 1.02)	7.07 (6.06 – 8.03)	51.4 (38.7 – 86.4)	150 (72.5 – 372)	969
Gender							
Males	8.85 (8.10 – 9.66)	.710 (.496 – .967)	1.18 (.986 – 1.28)	9.07 (8.18 – 10.0)	67.2 (55.6 – 93.0)	147 (117 – 246)	2,492
Females	7.65 (6.95 – 8.42)	.450 (.300 – .502)	.715 (.575 – .892)	7.49 (6.81 – 8.27)	64.4 (51.6 – 89.1)	257 (158 – 541)	2,625
Race/ethnicity							
Mexican Americans	6.06 (5.46 – 6.72)	.489 (< LOD – .602)	.793 (.585 – .992)	5.87 (5.28 – 6.69)	46.2 (38.7 – 73.5)	107 (70.7 – 201)	1,287
Non-Hispanic Blacks	7.13 (6.35 – 8.01)	.570 (.343 – .694)	.846 (.693 – 1.02)	6.82 (6.08 – 8.20)	48.5 (40.2 – 61.3)	78.3 (67.8 – 117)	1,340
Non-Hispanic Whites	8.78 (7.99 – 9.65)	.499 (.471 – .580)	.994 (.725 – 1.20)	9.15 (8.27 – 9.99)	69.8 (56.4 – 96.8)	242 (146 – 504)	2,106

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.5.a. Urinary equol: Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

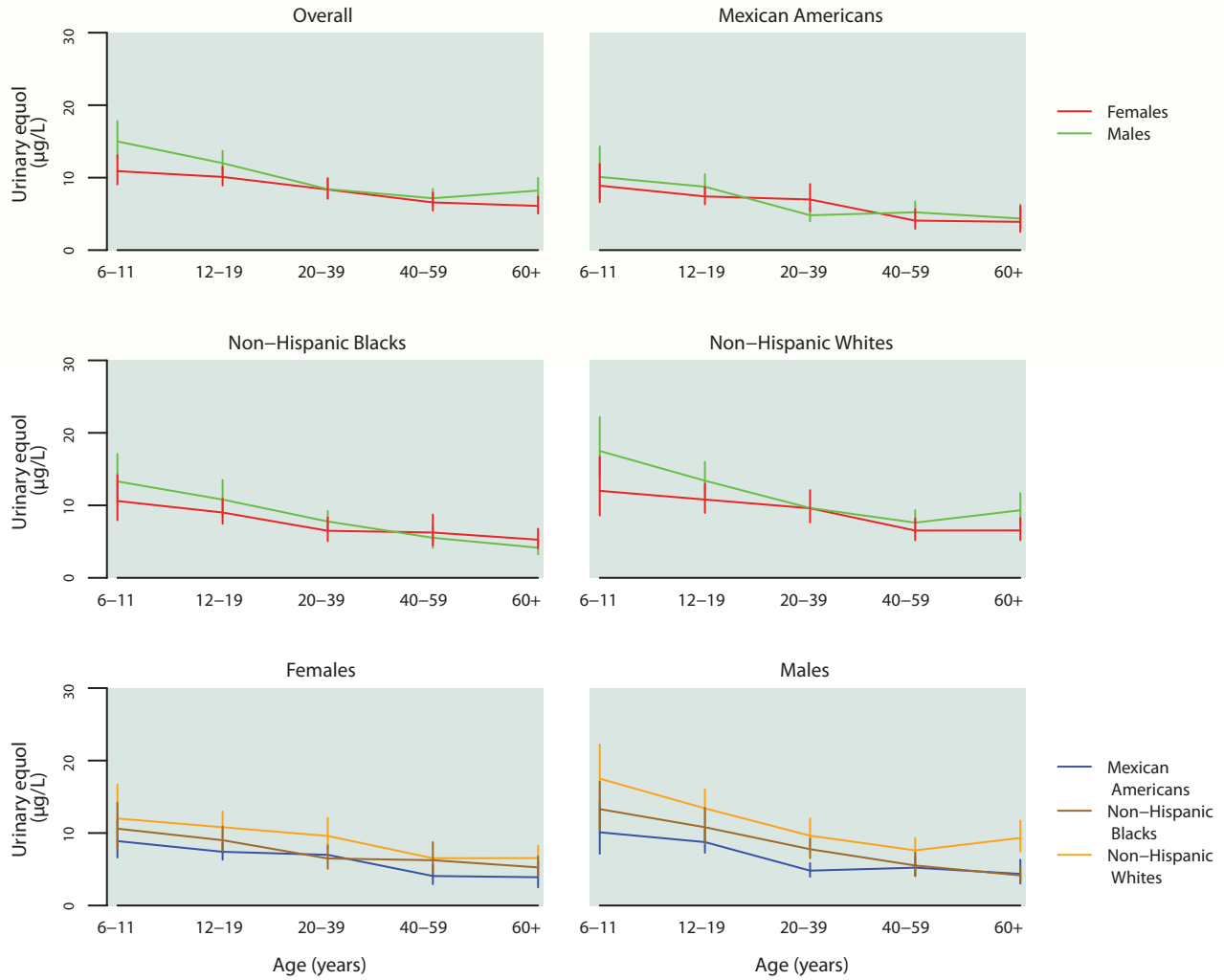


Table 4.5.a.2. Urinary equol: Total population

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	8.21 (7.61 – 8.85)	1.49 (1.30 – 1.60)	8.33 (7.59 – 9.06)	36.7 (33.8 – 39.7)	5,117
6–11 years	12.8 (11.1 – 14.8)	2.75 (2.10 – 3.50)	13.2 (10.8 – 16.0)	45.5 (41.5 – 65.3)	692
12–19 years	11.1 (10.0 – 12.2)	2.61 (2.29 – 2.90)	10.8 (9.61 – 11.7)	42.8 (38.6 – 47.0)	1,422
20–39 years	8.39 (7.41 – 9.50)	1.50 (1.20 – 1.80)	8.80 (7.71 – 9.78)	36.5 (30.8 – 42.8)	1,137
40–59 years	6.85 (6.06 – 7.75)	1.28 (1.07 – 1.41)	6.37 (5.36 – 7.63)	33.3 (29.7 – 37.5)	897
60 years and older	6.96 (6.06 – 8.00)	1.30 (1.09 – 1.51)	7.07 (6.06 – 8.03)	32.0 (24.4 – 39.1)	969
Males					
Total, 6 years and older	8.85 (8.10 – 9.66)	1.60 (1.38 – 1.99)	9.07 (8.18 – 10.0)	38.6 (34.4 – 42.9)	2,492
6–11 years	15.0 (12.6 – 17.8)	3.79 (2.20 – 5.37)	16.4 (13.2 – 19.2)	50.1 (43.4 – 74.2)	340
12–19 years	12.0 (10.5 – 13.7)	2.67 (2.24 – 3.29)	11.7 (10.6 – 12.7)	44.8 (36.9 – 69.0)	728
20–39 years	8.42 (7.10 – 9.99)	1.47 (1.03 – 1.83)	8.70 (7.21 – 10.0)	41.3 (31.1 – 52.6)	499
40–59 years	7.16 (6.07 – 8.44)	1.42 (1.20 – 1.79)	7.44 (5.69 – 8.91)	30.0 (24.3 – 37.4)	447
60 years and older	8.22 (6.78 – 9.98)	1.50 (1.23 – 1.83)	8.44 (7.09 – 10.1)	36.2 (27.5 – 46.9)	478
Females					
Total, 6 years and older	7.65 (6.95 – 8.42)	1.30 (1.19 – 1.50)	7.49 (6.81 – 8.27)	34.8 (32.1 – 38.7)	2,625
6–11 years	10.9 (9.07 – 13.1)	2.43 (1.59 – 2.80)	10.1 (9.16 – 12.5)	43.5 (35.0 – 69.5)	352
12–19 years	10.1 (8.93 – 11.5)	2.49 (1.87 – 2.83)	9.39 (8.03 – 11.4)	40.4 (34.8 – 47.1)	694
20–39 years	8.36 (7.09 – 9.86)	1.50 (1.06 – 1.97)	9.07 (7.09 – 10.6)	32.2 (28.2 – 40.7)	638
40–59 years	6.58 (5.45 – 7.95)	.939 (.529 – 1.29)	5.69 (4.68 – 6.95)	34.5 (30.9 – 45.9)	450
60 years and older	6.10 (5.03 – 7.39)	1.18 (.974 – 1.40)	5.80 (5.20 – 7.32)	26.4 (19.2 – 40.6)	491

Table 4.5.a.3. Urinary equol: Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/L) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	6.06 (5.46 – 6.72)	1.27 (1.01 – 1.49)	5.87 (5.28 – 6.69)	25.8 (20.9 – 35.4)	1,287
6–11 years	9.49 (7.78 – 11.6)	1.60 (1.05 – 2.47)	9.20 (6.88 – 11.7)	45.5 (37.6 – 85.8)	231
12–19 years	8.07 (7.04 – 9.24)	1.60 (1.44 – 2.01)	7.08 (6.25 – 8.19)	35.7 (27.8 – 49.2)	445
20–39 years	5.71 (4.97 – 6.56)	1.27 (.967 – 1.51)	5.59 (4.49 – 6.42)	21.9 (17.9 – 39.2)	282
40–59 years	4.63 (3.73 – 5.75)	1.08 (< LOD – 1.48)	4.99 (3.92 – 5.86)	19.0 (14.0 – 25.0)	157
60 years and older	4.10 (3.21 – 5.23)	.631 (.379 – .946)	4.73 (3.19 – 6.60)	16.6 (10.8 – 27.3)	172
Males					
Total, 6 years and older	5.92 (5.25 – 6.68)	1.29 (1.04 – 1.57)	5.69 (4.89 – 6.81)	24.6 (19.8 – 32.9)	625
6–11 years	10.1 (7.14 – 14.3)	2.17 (.735 – 3.86)	9.71 (6.15 – 14.4)	40.8 (26.9 – 88.4)	112
12–19 years	8.75 (7.28 – 10.5)	1.83 (1.35 – 2.32)	7.71 (6.15 – 9.42)	41.1 (28.6 – 61.8)	228
20–39 years	4.81 (3.96 – 5.86)	1.15 (.685 – 1.41)	4.55 (3.70 – 6.03)	18.0 (12.6 – 40.6)	117
40–59 years	5.22 (4.05 – 6.72)	1.18† (.707 – 1.98)	5.27 (4.28 – 6.94)	19.5† (12.5 – 31.6)	85
60 years and older	4.36 (3.01 – 6.31)	.600† (< LOD – 1.47)	4.99 (3.05 – 6.89)	17.3† (9.44 – 65.3)	83
Females					
Total, 6 years and older	6.21 (5.35 – 7.22)	1.20 (.793 – 1.51)	6.18 (5.15 – 7.09)	28.0 (20.7 – 39.6)	662
6–11 years	8.89 (6.62 – 11.9)	1.47 (.569 – 2.34)	8.44 (5.75 – 11.4)	57.0 (37.3 – 202)	119
12–19 years	7.41 (6.32 – 8.69)	1.50 (.916 – 2.21)	6.81 (5.51 – 8.03)	28.4 (19.3 – 52.0)	217
20–39 years	6.99 (5.35 – 9.13)	1.37 (.689 – 1.85)	6.79 (4.70 – 9.31)	35.2 (19.6 – 66.9)	165
40–59 years	4.07 (2.94 – 5.64)	.861† (< LOD – 1.36)	3.89 (2.93 – 5.72)	18.3† (14.0 – 34.4)	72
60 years and older	3.90 (2.50 – 6.08)	.671† (< LOD – 1.12)	4.41 (2.15 – 7.53)	14.8† (9.40 – 80.2)	89

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.5.a.4. Urinary equol: Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean		Selected percentiles (95% conf. interval)			Sample size			
	(95% conf. interval)		10th	50th	90th				
Males and Females									
Total, 6 years and older	7.13	(6.35 – 8.01)	1.49	(1.28 – 1.70)	6.82	(6.08 – 8.20)	31.3	(27.1 – 36.6)	1,340
6–11 years	11.9	(9.99 – 14.2)	3.00	(2.09 – 3.59)	10.8	(8.53 – 14.0)	54.2	(40.6 – 79.7)	207
12–19 years	9.86	(8.44 – 11.5)	2.40	(1.99 – 2.78)	8.98	(7.83 – 10.3)	42.5	(35.2 – 61.4)	496
20–39 years	7.03	(5.93 – 8.34)	1.50	(1.01 – 2.10)	6.94	(5.91 – 9.58)	24.6	(21.6 – 32.3)	249
40–59 years	5.91	(4.67 – 7.49)	1.19	(.705 – 1.60)	5.49	(4.44 – 7.21)	33.4	(21.8 – 45.8)	228
60 years and older	4.79	(3.89 – 5.91)	.852	(.685 – 1.10)	5.17	(4.14 – 6.24)	21.8	(17.1 – 30.7)	160
Males									
Total, 6 years and older	7.47	(6.72 – 8.30)	1.57	(1.36 – 1.74)	6.78	(5.94 – 8.18)	31.5	(27.0 – 39.4)	658
6–11 years	13.3	(10.4 – 17.1)	3.43†	(1.29 – 4.53)	12.7	(9.66 – 14.9)	71.1†	(35.1 – 125)	99
12–19 years	10.8	(8.60 – 13.5)	2.73	(1.99 – 3.07)	9.98	(7.56 – 12.6)	40.1	(32.6 – 70.0)	258
20–39 years	7.77	(6.53 – 9.24)	1.46	(1.21 – 2.10)	6.65	(5.38 – 9.46)	27.4	(23.1 – 45.5)	116
40–59 years	5.52	(4.14 – 7.35)	1.46†	(1.11 – 1.67)	5.13	(4.01 – 7.66)	24.5†	(13.5 – 51.5)	111
60 years and older	4.15	(3.25 – 5.29)	.758†	(< LOD – 1.27)	4.28	(3.25 – 5.82)	21.7†	(10.8 – 66.2)	74
Females									
Total, 6 years and older	6.87	(5.87 – 8.04)	1.25	(.765 – 1.80)	6.86	(5.92 – 8.46)	30.3	(25.2 – 37.5)	682
6–11 years	10.6	(7.95 – 14.2)	2.52†	(1.45 – 3.58)	9.24	(6.86 – 12.6)	47.6†	(30.5 – 124)	108
12–19 years	9.01	(7.47 – 10.9)	2.08	(1.31 – 2.78)	8.50	(7.01 – 9.53)	43.6	(31.4 – 71.3)	238
20–39 years	6.49	(5.06 – 8.33)	1.50	(.605 – 2.40)	7.06	(4.83 – 10.1)	22.2	(17.7 – 30.1)	133
40–59 years	6.25	(4.47 – 8.74)	.702	(.318 – 1.88)	5.84	(4.69 – 8.20)	37.0	(24.8 – 63.0)	117
60 years and older	5.26	(4.08 – 6.78)	.872†	(.723 – 1.03)	5.43	(3.80 – 8.00)	21.8†	(17.4 – 37.7)	86

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.5.a.5. Urinary equol: Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean		Selected percentiles (95% conf. interval)			Sample size			
	(95% conf. interval)		10th	50th	90th				
Males and Females									
Total, 6 years and older	8.78	(7.99 – 9.65)	1.54	(1.30 – 1.80)	9.15	(8.27 – 9.99)	38.2	(34.4 – 43.0)	2,106
6–11 years	14.7	(11.9 – 18.1)	3.40	(2.09 – 5.41)	16.3	(12.7 – 18.8)	44.9	(38.1 – 78.1)	193
12–19 years	12.1	(10.6 – 13.8)	3.09	(2.50 – 3.61)	11.9	(10.6 – 13.6)	42.0	(36.7 – 46.5)	378
20–39 years	9.62	(8.11 – 11.4)	1.57	(1.13 – 2.04)	10.0	(8.77 – 11.7)	42.8	(32.6 – 57.5)	494
40–59 years	7.04	(6.11 – 8.12)	1.29	(.848 – 1.49)	6.87	(5.37 – 8.81)	33.8	(30.8 – 37.4)	447
60 years and older	7.65	(6.47 – 9.04)	1.46	(1.17 – 1.88)	7.66	(6.29 – 8.72)	33.6	(25.9 – 47.8)	594
Males									
Total, 6 years and older	9.68	(8.71 – 10.8)	1.71	(1.40 – 2.10)	10.0	(8.94 – 11.1)	40.1	(36.0 – 45.2)	1,034
6–11 years	17.5	(13.8 – 22.2)	5.59†	(2.11 – 6.02)	17.5	(13.5 – 24.4)	44.9†	(39.9 – 115)	99
12–19 years	13.4	(11.3 – 16.0)	3.28	(1.89 – 4.54)	12.2	(11.3 – 15.4)	45.0	(36.6 – 79.1)	191
20–39 years	9.63	(7.72 – 12.0)	1.54	(1.00 – 2.07)	10.0	(8.68 – 11.5)	44.3	(32.4 – 82.8)	217
40–59 years	7.61	(6.19 – 9.35)	1.41	(1.08 – 1.91)	7.93	(5.97 – 9.71)	31.4	(26.6 – 42.6)	228
60 years and older	9.32	(7.43 – 11.7)	1.73	(1.27 – 2.50)	9.42	(7.36 – 12.1)	37.6	(30.7 – 55.2)	299
Females									
Total, 6 years and older	7.98	(7.02 – 9.06)	1.45	(1.20 – 1.60)	7.86	(6.93 – 9.16)	35.6	(31.7 – 42.8)	1,072
6–11 years	12.0	(8.61 – 16.7)	2.61†	(.948 – 3.85)	12.3	(9.15 – 17.3)	43.2†	(27.4 – 91.7)	94
12–19 years	10.8	(8.95 – 13.0)	2.76	(1.92 – 3.64)	11.1	(8.16 – 13.8)	39.9	(32.0 – 45.3)	187
20–39 years	9.60	(7.63 – 12.1)	1.66	(.954 – 2.27)	10.3	(7.50 – 12.8)	37.3	(29.2 – 72.9)	277
40–59 years	6.52	(5.18 – 8.20)	.967	(.492 – 1.32)	6.18	(4.63 – 7.52)	33.9	(30.9 – 47.3)	219
60 years and older	6.54	(5.19 – 8.25)	1.27	(.956 – 1.58)	6.08	(5.27 – 8.01)	29.4	(18.6 – 55.9)	295

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.5.b. Urinary equol: Concentrations by survey cycle

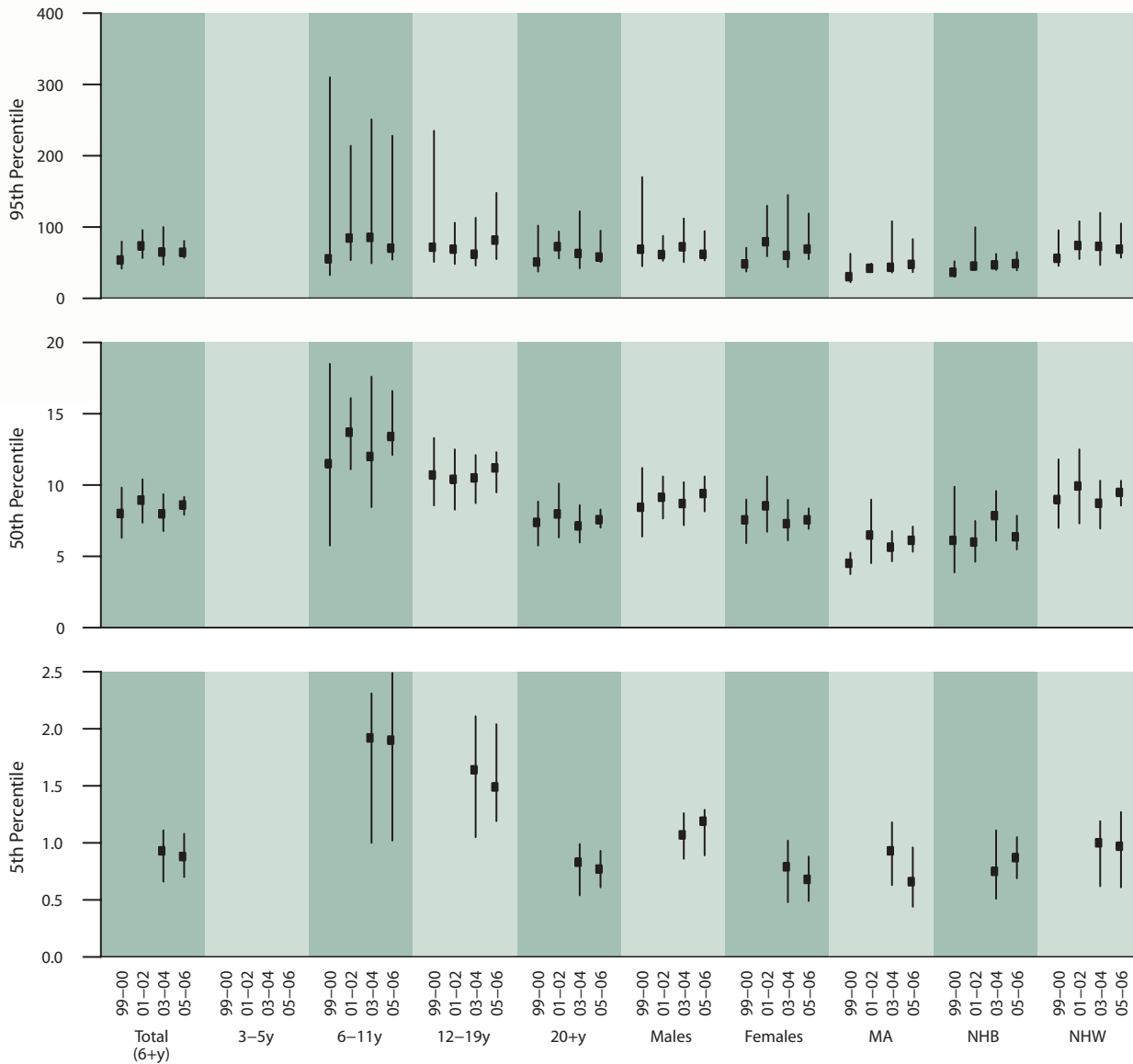
Geometric mean and selected percentiles of urine concentrations (in µg/L) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	8.37 (7.21 – 9.72)	< LOD	8.00 (6.29 – 9.82)	53.7 (41.6 – 79.6)	2,182
2001–2002	9.17 (7.76 – 10.8)	< LOD	8.94 (7.36 – 10.4)	73.5 (56.4 – 95.8)	2,794
2003–2004	8.02 (7.07 – 9.10)	.934 (.655 – 1.11)	7.98 (6.77 – 9.36)	64.8 (47.0 – 100)	2,590
2005–2006	8.40 (7.63 – 9.24)	.878 (.698 – 1.08)	8.60 (7.91 – 9.17)	64.5 (56.9 – 80.5)	2,527
Age group					
6–11 years					
1999–2000	10.4 (7.65 – 14.3)	< LOD	11.5 (5.76 – 18.5)	55.4 (32.5 – 310)	272
2001–2002	12.2 (10.2 – 14.6)	< LOD	13.7 (11.1 – 16.1)	84.5 (53.6 – 214)	396
2003–2004	12.4 (9.71 – 15.8)	1.92 (1.00 – 2.31)	12.0 (8.45 – 17.6)	85.4 (49.1 – 251)	341
2005–2006	13.3 (11.3 – 15.7)	1.90 (1.02 – 2.49)	13.4 (12.1 – 16.6)	70.3 (54.3 – 228)	351
12–19 years					
1999–2000	10.9 (8.64 – 13.8)	< LOD	10.7 (8.57 – 13.3)	71.6 (51.1 – 235)	657
2001–2002	10.2 (8.50 – 12.1)	< LOD	10.4 (8.27 – 12.5)	68.9 (48.1 – 106)	744
2003–2004	10.6 (8.96 – 12.4)	1.64 (1.05 – 2.11)	10.5 (8.73 – 12.1)	61.8 (46.0 – 113)	729
2005–2006	11.6 (10.3 – 13.0)	1.49 (1.19 – 2.04)	11.2 (9.48 – 12.3)	81.6 (54.9 – 148)	693
20–39 years					
1999–2000	7.66 (6.63 – 8.86)	< LOD	7.55 (5.49 – 9.38)	38.1 (35.6 – 69.4)	439
2001–2002	9.35 (7.40 – 11.8)	< LOD	9.25 (6.95 – 11.3)	67.0 (49.7 – 111)	604
2003–2004	8.81 (7.29 – 10.6)	.980 (.509 – 1.31)	9.11 (7.18 – 10.8)	99.6 (44.4 – 221)	554
2005–2006	8.00 (6.71 – 9.54)	.820 (.587 – 1.18)	8.60 (7.42 – 9.73)	57.1 (45.0 – 95.1)	583
40–59 years					
1999–2000	7.80 (6.17 – 9.84)	< LOD	7.28 (4.97 – 9.09)	53.7 (34.0 – 3,160)	378
2001–2002	8.92 (7.27 – 10.9)	< LOD	8.12 (6.43 – 10.1)	102 (44.7 – 312)	531
2003–2004	6.65 (5.61 – 7.87)	.613 (.372 – 1.04)	6.09 (4.66 – 8.60)	51.6 (38.0 – 140)	448
2005–2006	7.05 (5.83 – 8.54)	.542 (.325 – 1.07)	6.76 (5.33 – 8.36)	63.8 (38.6 – 542)	449
60 years and older					
1999–2000	8.04 (6.93 – 9.33)	< LOD	7.33 (5.55 – 9.70)	54.8 (35.9 – 237)	436
2001–2002	7.18 (5.83 – 8.85)	< LOD	5.68 (3.76 – 8.16)	51.0 (41.8 – 113)	519
2003–2004	6.16 (4.93 – 7.68)	.754 (< LOD – 1.02)	5.88 (4.99 – 7.75)	39.6 (32.2 – 176)	518
2005–2006	7.84 (6.60 – 9.31)	.940 (.599 – 1.16)	7.80 (6.29 – 8.95)	55.5 (42.4 – 326)	451
Gender					
Males					
1999–2000	9.15 (7.37 – 11.4)	< LOD	8.44 (6.38 – 11.2)	68.8 (45.0 – 170)	1,042
2001–2002	9.41 (7.99 – 11.1)	< LOD	9.14 (7.65 – 10.6)	61.4 (52.6 – 87.6)	1,375
2003–2004	8.56 (7.54 – 9.72)	1.07 (.861 – 1.26)	8.70 (7.18 – 10.2)	72.3 (50.8 – 112)	1,240
2005–2006	9.13 (7.99 – 10.4)	1.19 (.892 – 1.29)	9.40 (8.15 – 10.6)	61.7 (53.1 – 94.2)	1,252
Females					
1999–2000	7.70 (6.79 – 8.74)	< LOD	7.56 (5.92 – 8.98)	48.2 (37.6 – 70.9)	1,140
2001–2002	8.94 (7.38 – 10.8)	< LOD	8.54 (6.72 – 10.6)	79.3 (58.9 – 130)	1,419
2003–2004	7.55 (6.44 – 8.84)	.792 (.480 – 1.02)	7.29 (6.12 – 8.96)	60.2 (43.8 – 145)	1,350
2005–2006	7.75 (6.85 – 8.78)	.684 (.486 – .877)	7.56 (6.93 – 8.36)	69.0 (54.8 – 119)	1,275
Race/ethnicity					
Mexican Americans					
1999–2000	5.24 (4.77 – 5.75)	< LOD	4.51 (3.75 – 5.25)	30.3 (22.6 – 62.5)	726
2001–2002	7.22 (6.04 – 8.62)	< LOD	6.49 (4.52 – 8.98)	42.1 (40.1 – 48.7)	679
2003–2004	6.08 (5.08 – 7.28)	.927 (.625 – 1.18)	5.64 (4.65 – 6.77)	43.5 (36.2 – 108)	653
2005–2006	6.04 (5.31 – 6.87)	.663 (.440 – .961)	6.12 (5.32 – 7.09)	47.6 (36.7 – 83.0)	634
Non-Hispanic Blacks					
1999–2000	6.67 (5.16 – 8.63)	< LOD	6.12 (3.87 – 9.88)	36.5 (30.0 – 52.0)	504
2001–2002	7.11 (6.01 – 8.42)	< LOD	6.00 (4.62 – 7.48)	45.2 (40.7 – 99.6)	692
2003–2004	7.32 (6.13 – 8.73)	.753 (.505 – 1.11)	7.85 (6.09 – 9.58)	46.9 (39.8 – 62.3)	678
2005–2006	6.96 (5.89 – 8.22)	.868 (.686 – 1.05)	6.37 (5.48 – 7.85)	48.6 (39.2 – 64.9)	662
Non-Hispanic Whites					
1999–2000	9.38 (7.94 – 11.1)	< LOD	8.98 (6.99 – 11.8)	56.1 (45.4 – 95.5)	744
2001–2002	9.89 (7.90 – 12.4)	< LOD	9.93 (7.31 – 12.5)	74.1 (55.1 – 108)	1,211
2003–2004	8.51 (7.22 – 10.0)	.996 (.618 – 1.19)	8.72 (6.95 – 10.3)	72.9 (46.8 – 120)	1,068
2005–2006	9.05 (8.08 – 10.1)	.965 (.606 – 1.27)	9.48 (8.56 – 10.3)	68.9 (56.9 – 105)	1,038

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.5.b. Urinary equol: Concentrations by survey cycle

Selected percentiles in $\mu\text{g/L}$ (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.6.a.1. Urinary equol (creatinine corrected): Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
	2.5th	5th	50th	95th	97.5th		
Total, 6 years and older	7.85 (7.31 – 8.43)	1.05 (.898 – 1.18)	7.64 (7.10 – 8.15)	58.1 (48.3 – 78.3)	219 (129 – 356)	5,117	
Age group							
6–11 years	13.9 (12.4 – 15.6)	1.45 (1.00 – 2.26)	14.4 (12.3 – 16.0)	92.0 (59.9 – 129)	136 (117 – 270)	692	
12–19 years	8.24 (7.40 – 9.19)	.948 (.501 – 1.34)	8.04 (7.17 – 8.69)	48.2 (38.2 – 75.3)	118 (80.6 – 216)	1,422	
20–39 years	7.15 (6.38 – 8.02)	.675 (.540 – .776)	7.06 (6.25 – 7.86)	63.7 (40.1 – 115)	210 (118 – 392)	1,137	
40–59 years	6.95 (6.07 – 7.96)	.538 (< LOD – .693)	6.57 (5.54 – 7.54)	66.0 (35.1 – 245)	421 (110 – 1,130)	897	
60 years and older	8.16 (7.32 – 9.08)	.889 (< LOD – 1.11)	8.13 (7.12 – 8.80)	45.3 (33.8 – 99.4)	140 (63.1 – 436)	969	
Gender							
Males	7.02 (6.46 – 7.64)	.634 (.462 – .769)	6.84 (6.27 – 7.53)	51.8 (44.0 – 67.2)	129 (106 – 237)	2,492	
Females	8.72 (8.02 – 9.49)	.787 (.705 – .890)	8.36 (7.88 – 8.98)	70.0 (48.3 – 104)	356 (169 – 692)	2,625	
Race/ethnicity							
Mexican Americans	5.46 (4.94 – 6.04)	.615 (< LOD – .690)	4.84 (4.34 – 5.48)	37.9 (33.4 – 69.8)	129 (83.3 – 192)	1,287	
Non-Hispanic Blacks	5.02 (4.48 – 5.62)	.533 (.403 – .669)	4.88 (4.40 – 5.59)	30.5 (26.1 – 42.2)	64.8 (42.5 – 96.6)	1,340	
Non-Hispanic Whites	8.94 (8.26 – 9.67)	.792 (.621 – .977)	8.65 (7.95 – 9.50)	69.4 (48.3 – 107)	267 (155 – 502)	2,106	

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.6.a. Urinary equol (creatinine corrected): Concentrations by age group
 Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

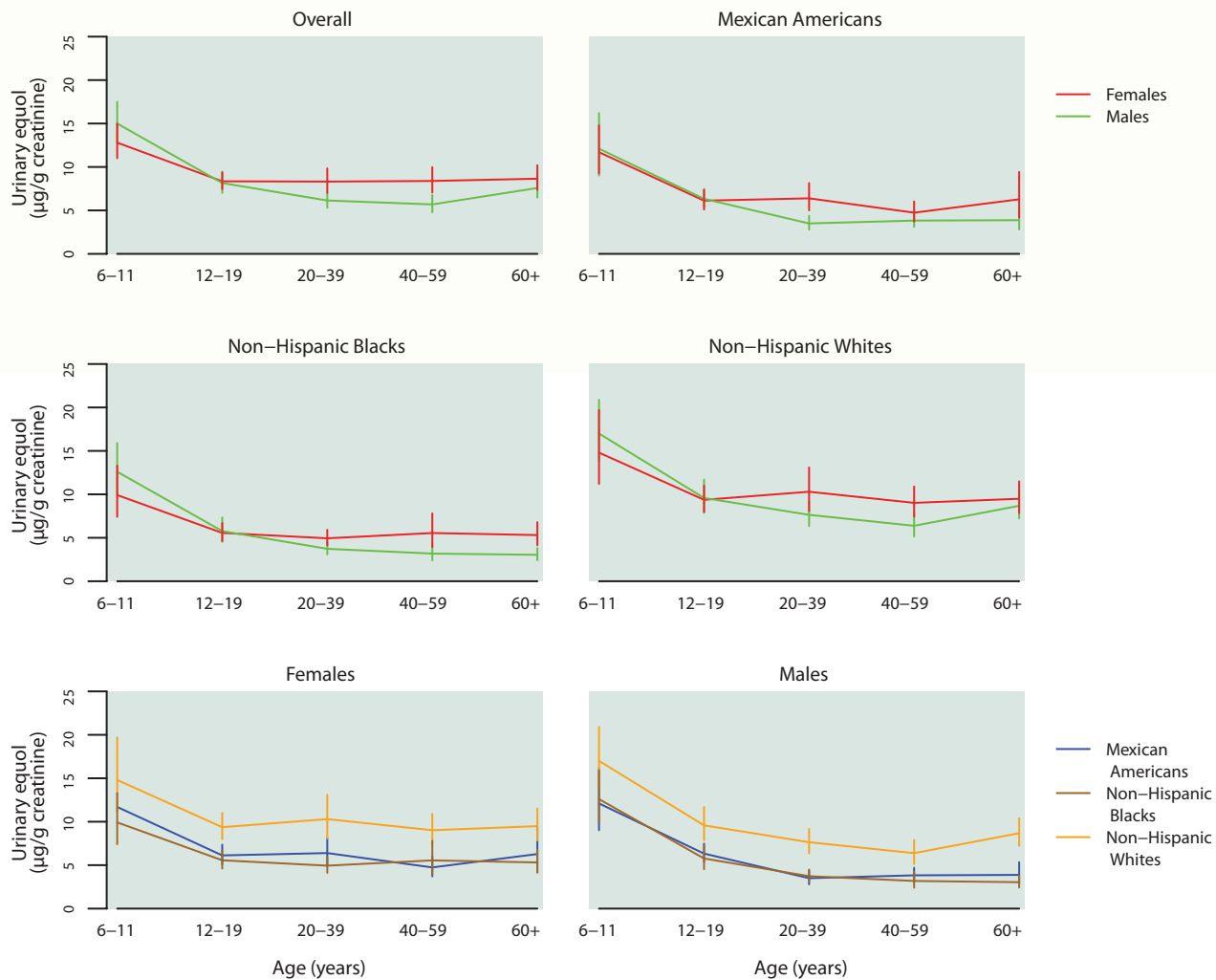


Table 4.6.a.2. Urinary equol (creatinine corrected): Total population

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	7.85 (7.31 – 8.43)	1.72 (1.54 – 1.90)	7.64 (7.10 – 8.15)	30.7 (28.8 – 32.6)	5,117
6–11 years	13.9 (12.4 – 15.6)	3.64 (2.88 – 4.34)	14.4 (12.3 – 16.0)	44.9 (40.5 – 57.6)	692
12–19 years	8.24 (7.40 – 9.19)	2.09 (1.87 – 2.39)	8.04 (7.17 – 8.69)	31.3 (26.0 – 35.0)	1,422
20–39 years	7.15 (6.38 – 8.02)	1.45 (1.17 – 1.73)	7.06 (6.25 – 7.86)	29.5 (23.7 – 34.6)	1,137
40–59 years	6.95 (6.07 – 7.96)	1.40 (1.14 – 1.60)	6.57 (5.54 – 7.54)	25.6 (21.3 – 34.3)	897
60 years and older	8.16 (7.32 – 9.08)	2.14 (1.86 – 2.43)	8.13 (7.12 – 8.80)	27.1 (21.6 – 34.0)	969
Males					
Total, 6 years and older	7.02 (6.46 – 7.64)	1.48 (1.28 – 1.76)	6.84 (6.27 – 7.53)	28.8 (25.7 – 31.7)	2,492
6–11 years	15.0 (12.9 – 17.5)	3.84 (3.12 – 4.90)	16.1 (14.7 – 19.0)	45.4 (37.2 – 90.4)	340
12–19 years	8.15 (7.01 – 9.47)	1.92 (1.72 – 2.25)	8.15 (6.93 – 9.51)	31.3 (25.8 – 47.4)	728
20–39 years	6.14 (5.31 – 7.10)	1.26 (.981 – 1.47)	5.83 (4.99 – 6.67)	25.2 (20.0 – 34.6)	499
40–59 years	5.69 (4.78 – 6.77)	1.18 (.790 – 1.58)	5.53 (4.55 – 6.67)	21.8 (15.9 – 33.7)	447
60 years and older	7.58 (6.47 – 8.88)	1.87 (1.37 – 2.25)	7.28 (6.43 – 8.67)	28.8 (20.8 – 34.1)	478
Females					
Total, 6 years and older	8.72 (8.02 – 9.49)	1.95 (1.67 – 2.16)	8.36 (7.88 – 8.98)	32.3 (30.1 – 34.9)	2,625
6–11 years	12.8 (11.0 – 15.0)	3.24 (2.47 – 4.43)	12.8 (10.1 – 14.7)	44.8 (39.8 – 57.7)	352
12–19 years	8.35 (7.44 – 9.37)	2.33 (1.89 – 2.72)	7.94 (7.03 – 8.71)	30.5 (22.8 – 37.1)	694
20–39 years	8.32 (7.03 – 9.84)	1.87 (1.20 – 2.15)	8.08 (7.13 – 9.13)	32.2 (25.0 – 38.8)	638
40–59 years	8.39 (7.05 – 9.98)	1.51 (1.19 – 1.86)	7.92 (6.51 – 9.40)	31.4 (24.1 – 43.1)	450
60 years and older	8.65 (7.36 – 10.2)	2.41 (2.00 – 2.83)	8.44 (7.65 – 9.39)	26.8 (20.4 – 39.8)	491

Table 4.6.a.3. Urinary equol (creatinine corrected): Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	5.46 (4.94 – 6.04)	1.29 (1.14 – 1.43)	4.84 (4.34 – 5.48)	22.4 (19.7 – 27.6)	1,287
6–11 years	11.9 (10.4 – 13.7)	2.42 (1.84 – 4.06)	10.9 (8.91 – 13.8)	58.9 (30.4 – 121)	231
12–19 years	6.23 (5.49 – 7.07)	1.62 (1.35 – 1.73)	5.57 (4.69 – 6.09)	25.3 (19.7 – 34.5)	445
20–39 years	4.61 (3.91 – 5.42)	1.12 (.736 – 1.37)	4.10 (3.26 – 4.90)	19.6 (15.2 – 31.0)	282
40–59 years	4.24 (3.57 – 5.04)	1.23 (< LOD – 1.43)	4.11 (3.40 – 4.80)	14.0 (11.8 – 27.0)	157
60 years and older	5.06 (4.22 – 6.06)	1.46 (.752 – 1.97)	4.82 (3.84 – 6.04)	19.0 (10.5 – 61.0)	172
Males					
Total, 6 years and older	4.67 (4.08 – 5.35)	1.16 (.883 – 1.34)	4.23 (3.78 – 5.04)	18.9 (16.3 – 21.2)	625
6–11 years	12.1 (9.02 – 16.2)	3.55 (1.73 – 4.93)	10.6 (8.24 – 16.2)	35.9 (27.4 – 108)	112
12–19 years	6.33 (5.37 – 7.48)	1.60 (1.35 – 1.82)	5.58 (4.35 – 6.84)	27.5 (19.6 – 43.7)	228
20–39 years	3.50 (2.79 – 4.38)	.804 (.519 – 1.20)	3.42 (2.99 – 4.15)	11.5 (7.33 – 21.7)	117
40–59 years	3.83 (3.11 – 4.70)	1.27† (.640 – 1.40)	3.78 (3.16 – 4.90)	11.4† (8.79 – 26.7)	85
60 years and older	3.88 (2.81 – 5.35)	1.16† (< LOD – 1.91)	4.17 (3.23 – 5.83)	10.5† (7.12 – 60.1)	83
Females					
Total, 6 years and older	6.48 (5.83 – 7.21)	1.57 (1.37 – 1.84)	5.75 (4.93 – 6.55)	29.0 (24.0 – 34.5)	662
6–11 years	11.7 (9.26 – 14.8)	2.14 (1.07 – 3.77)	10.9 (8.65 – 13.4)	88.9 (28.8 – 177)	119
12–19 years	6.12 (5.10 – 7.36)	1.59 (1.13 – 1.80)	5.50 (4.49 – 6.06)	24.0 (15.6 – 40.4)	217
20–39 years	6.39 (5.00 – 8.15)	1.62 (1.14 – 2.09)	5.39 (4.01 – 7.25)	30.4 (19.7 – 58.3)	165
40–59 years	4.74 (3.71 – 6.04)	.933† (< LOD – 1.67)	4.23 (3.33 – 5.37)	21.0† (13.1 – 31.3)	72
60 years and older	6.28 (4.18 – 9.43)	1.82† (< LOD – 2.38)	5.43 (3.77 – 8.92)	24.4† (11.9 – 201)	89

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.6.a.4. Urinary equol (creatinine corrected): Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	5.02 (4.48 – 5.62)	1.19 (1.02 – 1.41)	4.88 (4.40 – 5.59)	20.8 (18.2 – 23.7)	1,340
6–11 years	11.2 (9.38 – 13.3)	3.12 (2.54 – 3.56)	9.67 (7.96 – 11.3)	47.8 (34.3 – 64.1)	207
12–19 years	5.66 (4.86 – 6.60)	1.45 (1.14 – 1.68)	5.37 (4.61 – 6.33)	21.5 (16.8 – 27.9)	496
20–39 years	4.36 (3.81 – 4.98)	1.02 (.802 – 1.36)	4.87 (4.24 – 5.64)	12.3 (10.8 – 17.6)	249
40–59 years	4.33 (3.36 – 5.58)	1.02 (.520 – 1.41)	4.06 (2.87 – 5.29)	19.7 (16.8 – 25.8)	228
60 years and older	4.28 (3.53 – 5.19)	1.08 (.798 – 1.38)	4.22 (3.62 – 5.09)	16.7 (13.6 – 23.6)	160
Males					
Total, 6 years and older	4.37 (3.86 – 4.95)	1.01 (.775 – 1.18)	4.24 (3.60 – 4.97)	19.1 (15.2 – 23.4)	658
6–11 years	12.6 (9.98 – 15.9)	3.44† (1.39 – 4.49)	11.0 (8.57 – 14.3)	52.6† (28.7 – 99.7)	99
12–19 years	5.77 (4.53 – 7.34)	1.45 (.957 – 1.76)	5.39 (4.19 – 6.65)	21.7 (15.8 – 36.8)	258
20–39 years	3.73 (3.09 – 4.50)	.892 (.630 – 1.05)	3.82 (3.14 – 5.00)	12.1 (10.5 – 15.9)	116
40–59 years	3.18 (2.40 – 4.21)	.865† (.471 – 1.24)	2.92 (2.24 – 4.31)	11.6† (6.28 – 27.1)	111
60 years and older	3.04 (2.42 – 3.82)	.742† (< LOD – .959)	3.22 (2.07 – 4.15)	13.5† (9.29 – 22.1)	74
Females					
Total, 6 years and older	5.63 (4.95 – 6.40)	1.41 (1.18 – 1.59)	5.45 (4.77 – 6.45)	22.1 (18.5 – 25.5)	682
6–11 years	9.92 (7.41 – 13.3)	2.69† (1.59 – 3.38)	8.60 (6.65 – 11.1)	43.5† (30.1 – 68.7)	108
12–19 years	5.56 (4.61 – 6.70)	1.43 (1.03 – 1.81)	5.30 (4.05 – 7.15)	20.9 (16.0 – 28.0)	238
20–39 years	4.94 (4.12 – 5.92)	1.34 (.768 – 1.89)	5.12 (4.53 – 6.44)	12.3 (10.8 – 20.2)	133
40–59 years	5.55 (3.94 – 7.81)	1.12 (.501 – 1.51)	5.32 (3.42 – 7.37)	24.3 (18.4 – 65.6)	117
60 years and older	5.31 (4.14 – 6.80)	1.51† (1.22 – 1.63)	4.81 (3.98 – 6.91)	19.3† (14.1 – 32.3)	86

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.6.a.5. Urinary equol (creatinine corrected): Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	8.94 (8.26 – 9.67)	2.12 (1.87 – 2.32)	8.65 (7.95 – 9.50)	32.4 (30.4 – 34.8)	2,106
6–11 years	16.0 (13.4 – 19.0)	4.07 (2.54 – 5.84)	17.1 (14.2 – 20.0)	44.8 (39.0 – 81.4)	193
12–19 years	9.48 (8.25 – 10.9)	2.75 (1.97 – 3.28)	9.27 (8.04 – 10.9)	32.1 (26.2 – 38.2)	378
20–39 years	8.87 (7.54 – 10.4)	1.95 (1.28 – 2.31)	8.50 (7.25 – 9.93)	33.2 (26.3 – 55.1)	494
40–59 years	7.58 (6.57 – 8.75)	1.51 (1.15 – 2.02)	7.18 (6.03 – 8.73)	26.5 (21.7 – 35.0)	447
60 years and older	9.12 (8.02 – 10.4)	2.55 (2.13 – 2.94)	8.66 (7.89 – 9.39)	29.1 (22.3 – 38.7)	594
Males					
Total, 6 years and older	8.10 (7.34 – 8.94)	1.91 (1.41 – 2.23)	7.87 (6.92 – 8.89)	30.4 (27.1 – 33.9)	1,034
6–11 years	17.0 (13.8 – 20.9)	4.06† (2.35 – 6.86)	18.4 (15.2 – 21.9)	44.2† (34.9 – 132)	99
12–19 years	9.58 (7.86 – 11.7)	2.18 (1.78 – 3.30)	9.53 (7.67 – 11.5)	32.8 (26.7 – 59.8)	191
20–39 years	7.64 (6.35 – 9.19)	1.59 (1.13 – 2.24)	7.09 (6.21 – 9.30)	28.9 (21.8 – 47.5)	217
40–59 years	6.38 (5.14 – 7.92)	1.17 (.741 – 2.01)	6.44 (4.85 – 7.62)	23.5 (17.7 – 53.0)	228
60 years and older	8.68 (7.23 – 10.4)	2.36 (1.85 – 2.71)	8.31 (6.94 – 9.56)	29.0 (21.6 – 39.1)	299
Females					
Total, 6 years and older	9.84 (8.90 – 10.9)	2.32 (2.00 – 2.77)	9.24 (8.62 – 10.3)	34.0 (30.6 – 39.7)	1,072
6–11 years	14.8 (11.2 – 19.7)	4.05† (.890 – 6.10)	14.1 (11.8 – 18.0)	44.8† (36.8 – 90.7)	94
12–19 years	9.37 (7.98 – 11.0)	3.02 (2.28 – 3.55)	8.70 (7.53 – 11.0)	30.7 (21.3 – 37.5)	187
20–39 years	10.3 (8.07 – 13.1)	2.14 (1.19 – 2.98)	9.09 (8.00 – 11.7)	38.3 (29.8 – 75.9)	277
40–59 years	9.02 (7.44 – 10.9)	1.67 (1.22 – 2.59)	8.68 (6.70 – 12.1)	31.7 (21.7 – 44.0)	219
60 years and older	9.49 (7.84 – 11.5)	2.84 (2.12 – 3.20)	8.89 (8.06 – 10.1)	29.4 (21.0 – 49.8)	295

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.6.b. Urinary equol (creatinine corrected): Concentrations by survey cycle

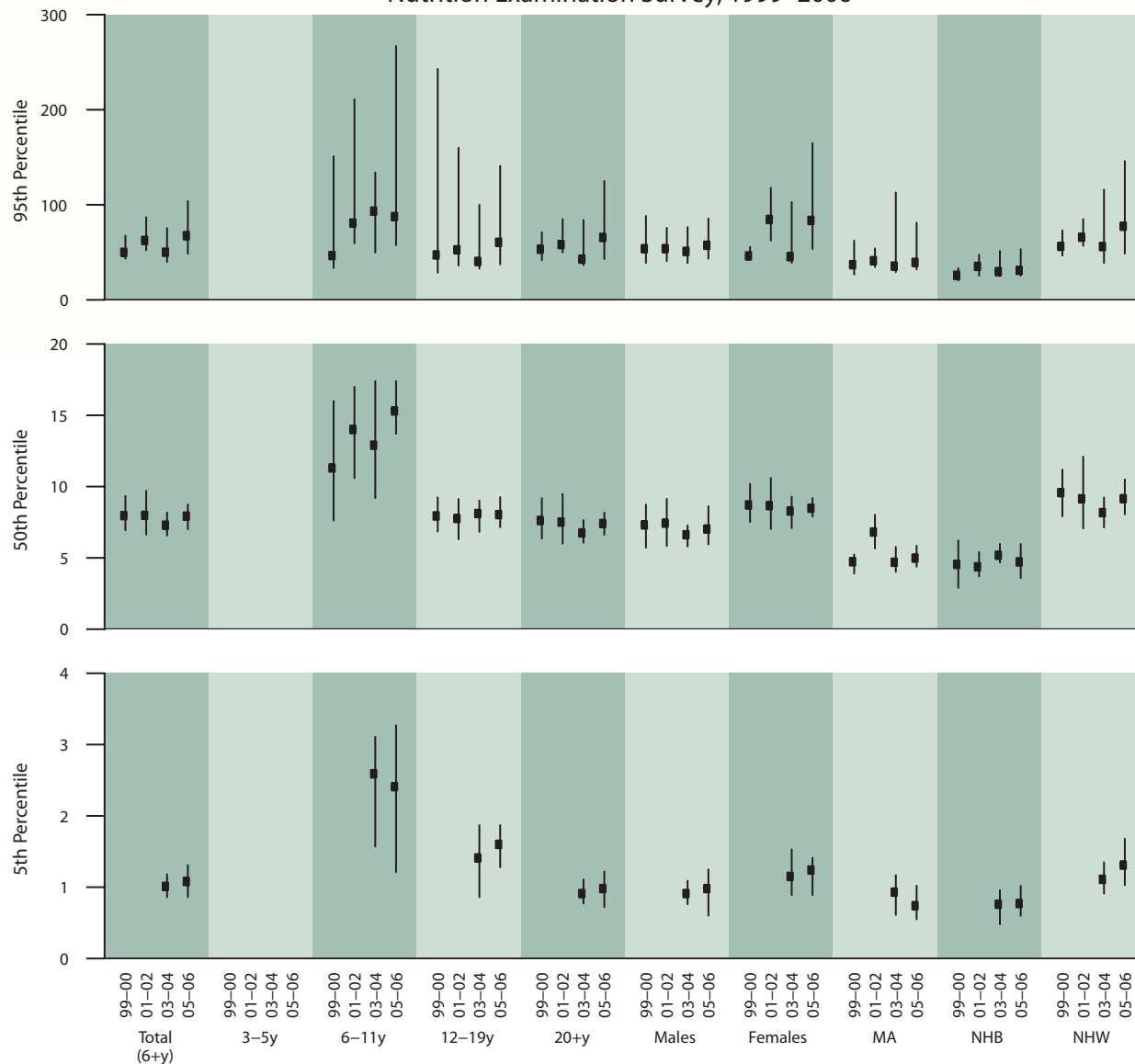
Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)		Selected percentiles (95% conf. interval)			Sample size
			5th	50th	95th	
Total, 6 years and older						
1999–2000	7.70	(6.82 – 8.70)	<LOD	7.96 (6.93 – 9.34)	50.0 (43.2 – 67.5)	2,182
2001–2002	8.60	(7.26 – 10.2)	<LOD	7.98 (6.64 – 9.71)	62.5 (52.1 – 87.0)	2,794
2003–2004	7.52	(6.83 – 8.29)	1.01 (.861 – 1.18)	7.29 (6.56 – 8.18)	50.1 (39.9 – 75.5)	2,590
2005–2006	8.18	(7.33 – 9.14)	1.08 (.861 – 1.31)	7.92 (7.01 – 8.75)	67.5 (48.6 – 104)	2,527
Age group						
6–11 years						
1999–2000	10.3	(7.82 – 13.5)	<LOD	11.3 (7.61 – 16.0)	46.6 (33.5 – 151)	272
2001–2002	13.9	(11.2 – 17.2)	<LOD	14.0 (10.6 – 17.0)	80.8 (59.5 – 211)	396
2003–2004	13.2	(10.9 – 15.9)	2.59 (1.57 – 3.11)	12.9 (9.20 – 17.4)	93.4 (49.7 – 134)	341
2005–2006	14.7	(12.6 – 17.1)	2.41 (1.21 – 3.27)	15.3 (13.7 – 17.4)	87.6 (57.6 – 267)	351
12–19 years						
1999–2000	7.61	(6.17 – 9.39)	<LOD	7.94 (6.84 – 9.24)	47.2 (28.6 – 243)	657
2001–2002	7.83	(6.68 – 9.17)	<LOD	7.76 (6.30 – 9.13)	52.6 (36.0 – 160)	744
2003–2004	7.90	(6.59 – 9.49)	1.41 (.856 – 1.87)	8.11 (6.82 – 9.03)	40.4 (32.8 – 100)	729
2005–2006	8.61	(7.53 – 9.83)	1.60 (1.28 – 1.87)	8.03 (7.15 – 9.27)	60.5 (37.4 – 141)	693
20–39 years						
1999–2000	6.20	(5.22 – 7.38)	<LOD	6.32 (5.37 – 7.59)	34.1 (30.5 – 50.5)	439
2001–2002	7.56	(6.16 – 9.27)	<LOD	6.83 (5.60 – 8.78)	53.5 (39.0 – 126)	604
2003–2004	7.42	(6.36 – 8.66)	.902 (.750 – 1.26)	6.88 (5.90 – 7.89)	104 (37.2 – 238)	554
2005–2006	6.90	(5.76 – 8.27)	.887 (.644 – 1.06)	7.09 (5.80 – 8.37)	47.2 (32.9 – 171)	583
40–59 years						
1999–2000	7.84	(6.30 – 9.76)	<LOD	8.06 (6.05 – 9.76)	69.0 (41.9 – 1,680)	378
2001–2002	8.86	(7.19 – 10.9)	<LOD	7.83 (6.18 – 9.71)	81.9 (55.3 – 138)	531
2003–2004	6.40	(5.47 – 7.49)	.777 (.615 – 1.05)	6.54 (5.03 – 7.69)	38.1 (24.2 – 534)	448
2005–2006	7.51	(6.01 – 9.39)	.895 (.343 – 1.34)	6.61 (5.24 – 8.53)	108 (35.1 – 734)	449
60 years and older						
1999–2000	9.72	(8.33 – 11.3)	<LOD	9.63 (7.42 – 11.3)	80.7 (41.1 – 448)	436
2001–2002	8.50	(7.02 – 10.3)	<LOD	7.78 (6.48 – 10.1)	63.7 (38.1 – 161)	519
2003–2004	7.28	(6.19 – 8.56)	1.27 (<LOD – 1.52)	7.63 (6.22 – 8.79)	33.7 (24.8 – 256)	518
2005–2006	9.09	(7.93 – 10.4)	1.38 (1.09 – 1.82)	8.40 (7.49 – 9.42)	51.1 (34.1 – 291)	451
Gender						
Males						
1999–2000	7.01	(5.93 – 8.29)	<LOD	7.31 (5.71 – 8.74)	53.8 (38.9 – 88.4)	1,042
2001–2002	7.66	(6.39 – 9.18)	<LOD	7.43 (5.83 – 9.14)	53.9 (40.7 – 75.8)	1,375
2003–2004	6.71	(6.02 – 7.47)	.912 (.762 – 1.09)	6.62 (5.80 – 7.28)	51.0 (38.7 – 76.6)	1,240
2005–2006	7.35	(6.40 – 8.43)	.984 (.599 – 1.25)	7.02 (5.94 – 8.63)	57.4 (43.3 – 85.6)	1,252
Females						
1999–2000	8.41	(7.33 – 9.66)	<LOD	8.71 (7.52 – 10.2)	46.2 (43.1 – 55.6)	1,140
2001–2002	9.60	(7.99 – 11.5)	<LOD	8.66 (7.02 – 10.6)	84.6 (62.4 – 118)	1,419
2003–2004	8.38	(7.39 – 9.51)	1.15 (.893 – 1.53)	8.29 (7.08 – 9.29)	45.4 (39.0 – 103)	1,350
2005–2006	9.07	(8.04 – 10.2)	1.24 (.885 – 1.41)	8.48 (7.90 – 9.19)	83.5 (53.4 – 165)	1,275
Race/ethnicity						
Mexican Americans						
1999–2000	4.89	(4.36 – 5.47)	<LOD	4.73 (3.90 – 5.23)	37.0 (26.7 – 62.3)	726
2001–2002	6.79	(5.82 – 7.92)	<LOD	6.81 (5.66 – 8.02)	41.2 (34.5 – 54.2)	679
2003–2004	5.48	(4.60 – 6.54)	.932 (.609 – 1.17)	4.69 (4.02 – 5.77)	35.5 (29.2 – 113)	653
2005–2006	5.45	(4.84 – 6.14)	.738 (.548 – 1.02)	4.98 (4.38 – 5.85)	39.4 (31.9 – 81.2)	634
Non-Hispanic Blacks						
1999–2000	4.31	(3.36 – 5.52)	<LOD	4.54 (2.90 – 6.22)	25.8 (20.3 – 33.3)	504
2001–2002	4.96	(4.19 – 5.86)	<LOD	4.37 (3.70 – 5.41)	35.2 (25.4 – 47.4)	692
2003–2004	5.17	(4.38 – 6.10)	.759 (.484 – .958)	5.18 (4.67 – 5.97)	29.7 (24.9 – 51.5)	678
2005–2006	4.88	(4.11 – 5.78)	.769 (.595 – 1.02)	4.72 (3.58 – 5.98)	31.0 (25.4 – 53.3)	662
Non-Hispanic Whites						
1999–2000	9.31	(8.01 – 10.8)	<LOD	9.57 (7.91 – 11.2)	56.2 (46.6 – 73.0)	744
2001–2002	9.77	(7.86 – 12.1)	<LOD	9.14 (7.06 – 12.1)	65.9 (56.8 – 85.0)	1,211
2003–2004	8.39	(7.46 – 9.43)	1.11 (.914 – 1.35)	8.17 (7.13 – 9.23)	56.0 (38.7 – 116)	1,068
2005–2006	9.51	(8.48 – 10.7)	1.31 (1.03 – 1.68)	9.15 (8.06 – 10.5)	77.4 (48.6 – 146)	1,038

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.6.b. Urinary equol (creatinine corrected): Concentrations by survey cycle

Selected percentiles in $\mu\text{g/g}$ creatinine (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.7.a.1. Urinary O-desmethylangolensin: Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
		2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	4.80 (4.42 – 5.22)	< LOD	< LOD	4.09 (3.67 – 4.53)	251 (216 – 322)	524 (462 – 612)	5,109
Age group							
6–11 years	6.74 (5.30 – 8.59)	< LOD	.233 (< LOD – .372)	6.17 (4.56 – 8.88)	231 (164 – 371)	445 (361 – 547)	692
12–19 years	7.35 (6.18 – 8.74)	< LOD	< LOD	6.38 (5.25 – 8.33)	285 (229 – 451)	607 (406 – 1,010)	1,422
20–39 years	4.13 (3.52 – 4.86)	< LOD	< LOD	3.32 (2.79 – 3.90)	242 (165 – 400)	485 (402 – 651)	1,129
40–59 years	4.42 (3.81 – 5.13)	< LOD	< LOD	3.88 (2.93 – 5.02)	261 (203 – 481)	657 (385 – 1,150)	899
60 years and older	4.42 (3.69 – 5.30)	< LOD	< LOD	3.71 (2.97 – 4.90)	191 (128 – 404)	455 (341 – 928)	967
Gender							
Males	4.92 (4.29 – 5.63)	< LOD	< LOD	4.21 (3.60 – 5.20)	223 (190 – 299)	476 (383 – 563)	2,492
Females	4.70 (4.26 – 5.18)	< LOD	< LOD	3.92 (3.35 – 4.56)	283 (209 – 406)	649 (455 – 938)	2,617
Race/ethnicity							
Mexican Americans	2.79 (2.29 – 3.39)	< LOD	< LOD	1.93 (1.34 – 2.62)	147 (108 – 226)	304 (227 – 422)	1,286
Non-Hispanic Blacks	5.69 (4.70 – 6.90)	< LOD	< LOD	4.56 (3.88 – 5.72)	279 (208 – 378)	531 (384 – 877)	1,342
Non-Hispanic Whites	4.99 (4.55 – 5.46)	< LOD	< LOD	4.35 (3.90 – 5.12)	245 (201 – 339)	525 (433 – 696)	2,100

<LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.7.a. Urinary O–desmethylangolensin: Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

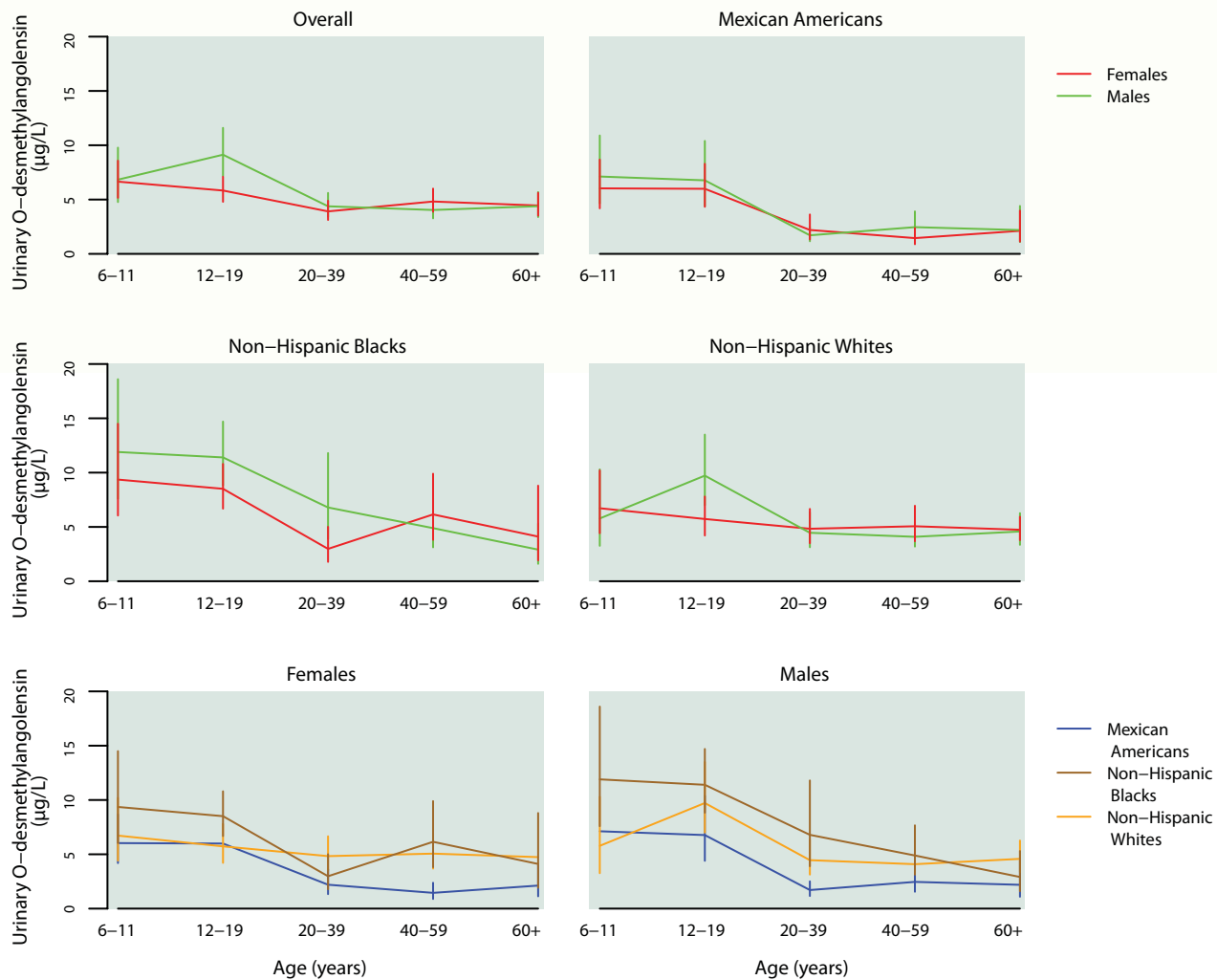


Table 4.7.a.2. Urinary O-desmethylangolensin: Total population

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	4.80 (4.42 – 5.22)	.243 (.210 – .276)	4.09 (3.67 – 4.53)	97.6 (88.0 – 115)	5,109
6–11 years	6.74 (5.30 – 8.59)	.472 (.297 – .655)	6.17 (4.56 – 8.88)	107 (74.1 – 159)	692
12–19 years	7.35 (6.18 – 8.74)	.397 (.300 – .479)	6.38 (5.25 – 8.33)	108 (89.5 – 171)	1,422
20–39 years	4.13 (3.52 – 4.86)	.228 (< LOD – .276)	3.32 (2.79 – 3.90)	86.5 (65.6 – 136)	1,129
40–59 years	4.42 (3.81 – 5.13)	< LOD	3.88 (2.93 – 5.02)	114 (71.0 – 181)	899
60 years and older	4.42 (3.69 – 5.30)	.237 (< LOD – .293)	3.71 (2.97 – 4.90)	84.9 (60.5 – 116)	967
Males					
Total, 6 years and older	4.92 (4.29 – 5.63)	.280 (.231 – .328)	4.21 (3.60 – 5.20)	91.2 (73.4 – 117)	2,492
6–11 years	6.83 (4.77 – 9.78)	.501 (.234 – .705)	5.60 (3.59 – 9.19)	117 (69.6 – 238)	340
12–19 years	9.13 (7.17 – 11.6)	.433 (.341 – .546)	8.73 (6.49 – 11.5)	127 (102 – 253)	728
20–39 years	4.38 (3.41 – 5.61)	.213 (< LOD – .299)	3.63 (3.06 – 4.49)	89.8 (63.3 – 175)	498
40–59 years	4.04 (3.27 – 4.99)	.278 (.207 – .339)	3.34 (2.48 – 4.96)	69.6 (52.0 – 138)	451
60 years and older	4.39 (3.39 – 5.69)	.261 (< LOD – .363)	4.05 (3.01 – 5.43)	75.8 (54.6 – 103)	475
Females					
Total, 6 years and older	4.70 (4.26 – 5.18)	.213 (< LOD – .258)	3.92 (3.35 – 4.56)	105 (80.6 – 151)	2,617
6–11 years	6.65 (5.16 – 8.58)	.392 (.252 – .653)	6.91 (4.76 – 9.15)	100 (60.7 – 158)	352
12–19 years	5.83 (4.79 – 7.10)	.324 (.220 – .480)	4.28 (3.15 – 5.79)	92.9 (71.4 – 104)	694
20–39 years	3.91 (3.12 – 4.89)	.244 (< LOD – .300)	2.83 (2.02 – 3.94)	80.6 (58.4 – 155)	631
40–59 years	4.82 (3.87 – 6.01)	< LOD	4.46 (3.00 – 6.43)	181 (99.3 – 275)	448
60 years and older	4.45 (3.52 – 5.62)	.224 (< LOD – .279)	3.45 (2.71 – 5.36)	88.7 (59.8 – 153)	492

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Table 4.7.a.3. Urinary O-desmethylangolensin: Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/L) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	2.79 (2.29 – 3.39)	< LOD	1.93 (1.34 – 2.62)	62.4 (50.0 – 89.5)	1,286
6–11 years	6.57 (4.75 – 9.07)	.446 (.306 – .603)	6.92 (3.88 – 11.0)	103 (58.3 – 189)	231
12–19 years	6.38 (4.66 – 8.73)	.324 (.213 – .396)	5.77 (4.16 – 8.32)	134 (87.6 – 271)	445
20–39 years	1.92 (1.45 – 2.53)	< LOD	1.06 (.693 – 1.53)	58.2 (24.5 – 110)	281
40–59 years	1.91 (1.41 – 2.59)	< LOD	1.21 (.806 – 2.20)	31.7 (21.3 – 70.6)	157
60 years and older	2.15 (1.43 – 3.23)	< LOD	1.47 (.853 – 2.99)	27.9 (17.2 – 50.3)	172
Males					
Total, 6 years and older	2.83 (2.20 – 3.65)	< LOD	1.92 (1.23 – 2.79)	61.5 (47.3 – 89.9)	625
6–11 years	7.12 (4.64 – 10.9)	.506 (.307 – .700)	7.04 (2.90 – 15.9)	115 (61.2 – 275)	112
12–19 years	6.77 (4.40 – 10.4)	.365 (.241 – .462)	6.56 (3.54 – 11.1)	122 (55.4 – 286)	228
20–39 years	1.71 (1.16 – 2.51)	< LOD	.783 (.607 – 1.47)	39.2 (18.1 – 121)	117
40–59 years	2.46 (1.55 – 3.91)	< LOD†	1.80 (.755 – 3.23)	48.1† (21.9 – 342)	85
60 years and older	2.19 (1.09 – 4.41)	< LOD†	1.39 (.695 – 5.52)	21.6† (14.0 – 607)	83
Females					
Total, 6 years and older	2.74 (2.17 – 3.45)	< LOD	1.97 (1.27 – 2.85)	64.9 (39.2 – 111)	661
6–11 years	6.03 (4.19 – 8.68)	.378 (.290 – .531)	6.65 (3.89 – 10.5)	81.9 (32.7 – 296)	119
12–19 years	5.99 (4.33 – 8.29)	.302 (< LOD – .381)	4.71 (3.81 – 7.61)	176 (93.4 – 325)	217
20–39 years	2.20 (1.33 – 3.63)	< LOD	1.31 (.772 – 2.43)	63.7 (19.3 – 235)	164
40–59 years	1.45 (.886 – 2.38)	< LOD†	1.06 (.513 – 1.97)	20.7† (10.1 – 73.1)	72
60 years and older	2.12 (1.13 – 3.98)	< LOD†	1.45 (.808 – 4.19)	38.7† (11.3 – 1,390)	89

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.7.a.4. Urinary O-desmethylangolensin: Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	5.69 (4.70 – 6.90)	.267 (.210 – .342)	4.56 (3.88 – 5.72)	113 (89.0 – 157)	1,342
6–11 years	10.6 (7.76 – 14.4)	.639 (.244 – 1.24)	11.1 (7.91 – 16.4)	164 (106 – 338)	207
12–19 years	9.85 (8.13 – 11.9)	.565 (.391 – .896)	10.2 (7.23 – 15.0)	121 (100 – 172)	496
20–39 years	4.31 (3.05 – 6.07)	< LOD	3.25 (2.16 – 4.64)	90.8 (51.6 – 170)	249
40–59 years	5.54 (4.02 – 7.64)	.265 (< LOD – .380)	4.61 (2.91 – 7.10)	124 (80.1 – 220)	231
60 years and older	3.60 (2.02 – 6.39)	.215 (< LOD – .279)	2.57 (1.49 – 4.67)	82.6 (47.3 – 341)	159
Males					
Total, 6 years and older	6.62 (5.17 – 8.47)	.297 (.206 – .458)	5.48 (4.13 – 8.91)	114 (90.2 – 168)	660
6–11 years	11.9 (7.59 – 18.6)	.854† (.360 – 1.53)	10.8 (5.47 – 20.0)	182† (106 – 764)	99
12–19 years	11.4 (8.83 – 14.7)	.580 (.376 – .969)	12.7 (7.98 – 17.0)	145 (111 – 241)	258
20–39 years	6.79 (3.90 – 11.8)	.226 (< LOD – .614)	4.57 (2.91 – 12.9)	122 (82.3 – 400)	116
40–59 years	4.89 (3.12 – 7.67)	.244 (< LOD – .474)	4.83 (2.15 – 9.22)	69.3 (46.5 – 216)	114
60 years and older	2.91 (1.60 – 5.30)	.212† (< LOD – .298)	2.70 (1.05 – 4.21)	48.7† (20.0 – 868)	73
Females					
Total, 6 years and older	5.01 (3.87 – 6.50)	.246 (< LOD – .334)	4.09 (2.94 – 5.38)	112 (82.0 – 160)	682
6–11 years	9.36 (6.05 – 14.5)	.364† (< LOD – 1.11)	11.9 (7.46 – 16.4)	121† (56.0 – 502)	108
12–19 years	8.51 (6.68 – 10.8)	.551 (.259 – .963)	7.87 (5.52 – 14.0)	98.0 (77.3 – 143)	238
20–39 years	2.98 (1.78 – 5.01)	< LOD	2.17 (1.14 – 4.46)	49.2 (27.2 – 160)	133
40–59 years	6.15 (3.81 – 9.90)	.280 (.207 – .388)	4.44 (2.60 – 8.52)	203 (106 – 486)	117
60 years and older	4.11 (1.92 – 8.80)	.217† (< LOD – .363)	2.45 (1.37 – 8.03)	91.7† (67.0 – 322)	86

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.7.a.5. Urinary O-desmethylangolensin: Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	4.99 (4.55 – 5.46)	.247 (.201 – .293)	4.35 (3.90 – 5.12)	97.9 (86.2 – 123)	2,100
6–11 years	6.20 (4.18 – 9.18)	.443 (< LOD – .679)	5.49 (3.39 – 9.17)	95.4 (60.4 – 203)	193
12–19 years	7.55 (5.92 – 9.63)	.401 (.259 – .571)	6.85 (5.13 – 9.64)	103 (85.0 – 205)	378
20–39 years	4.64 (3.67 – 5.85)	.264 (< LOD – .331)	3.71 (2.94 – 5.33)	104 (65.2 – 161)	488
40–59 years	4.54 (3.75 – 5.51)	< LOD	4.14 (2.91 – 5.62)	121 (67.5 – 185)	447
60 years and older	4.67 (3.89 – 5.60)	.248 (< LOD – .320)	4.09 (3.25 – 5.34)	84.4 (57.6 – 117)	594
Males					
Total, 6 years and older	4.88 (4.11 – 5.80)	.290 (.217 – .350)	4.21 (3.40 – 5.41)	88.8 (67.8 – 120)	1,034
6–11 years	5.78 (3.26 – 10.3)	.445† (< LOD – .719)	4.99 (1.97 – 10.4)	88.6† (40.8 – 580)	99
12–19 years	9.72 (7.00 – 13.5)	.429 (.295 – .611)	9.13 (6.14 – 13.6)	125 (88.5 – 365)	191
20–39 years	4.46 (3.13 – 6.36)	.236 (< LOD – .365)	3.56 (2.79 – 5.63)	78.4 (48.1 – 189)	217
40–59 years	4.09 (3.19 – 5.24)	.294 (.201 – .354)	3.02 (2.28 – 5.24)	70.4 (51.0 – 170)	229
60 years and older	4.58 (3.35 – 6.27)	.266 (< LOD – .384)	4.17 (3.21 – 6.29)	72.6 (50.6 – 103)	298
Females					
Total, 6 years and older	5.09 (4.45 – 5.82)	.209 (< LOD – .277)	4.53 (3.79 – 5.58)	112 (74.9 – 175)	1,066
6–11 years	6.72 (4.42 – 10.2)	.438† (< LOD – .745)	6.05 (3.68 – 12.2)	105† (48.1 – 310)	94
12–19 years	5.73 (4.21 – 7.80)	.299 (< LOD – .615)	3.99 (2.90 – 8.09)	88.8 (61.2 – 170)	187
20–39 years	4.83 (3.50 – 6.66)	.295 (.221 – .349)	3.90 (2.73 – 6.07)	114 (58.4 – 303)	271
40–59 years	5.06 (3.68 – 6.95)	< LOD	5.51 (2.99 – 7.16)	181 (67.3 – 333)	218
60 years and older	4.74 (3.78 – 5.94)	.237 (< LOD – .311)	3.90 (2.86 – 6.17)	85.9 (53.0 – 168)	296

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.7.b. Urinary O-desmethylangolensin: Concentrations by survey cycle

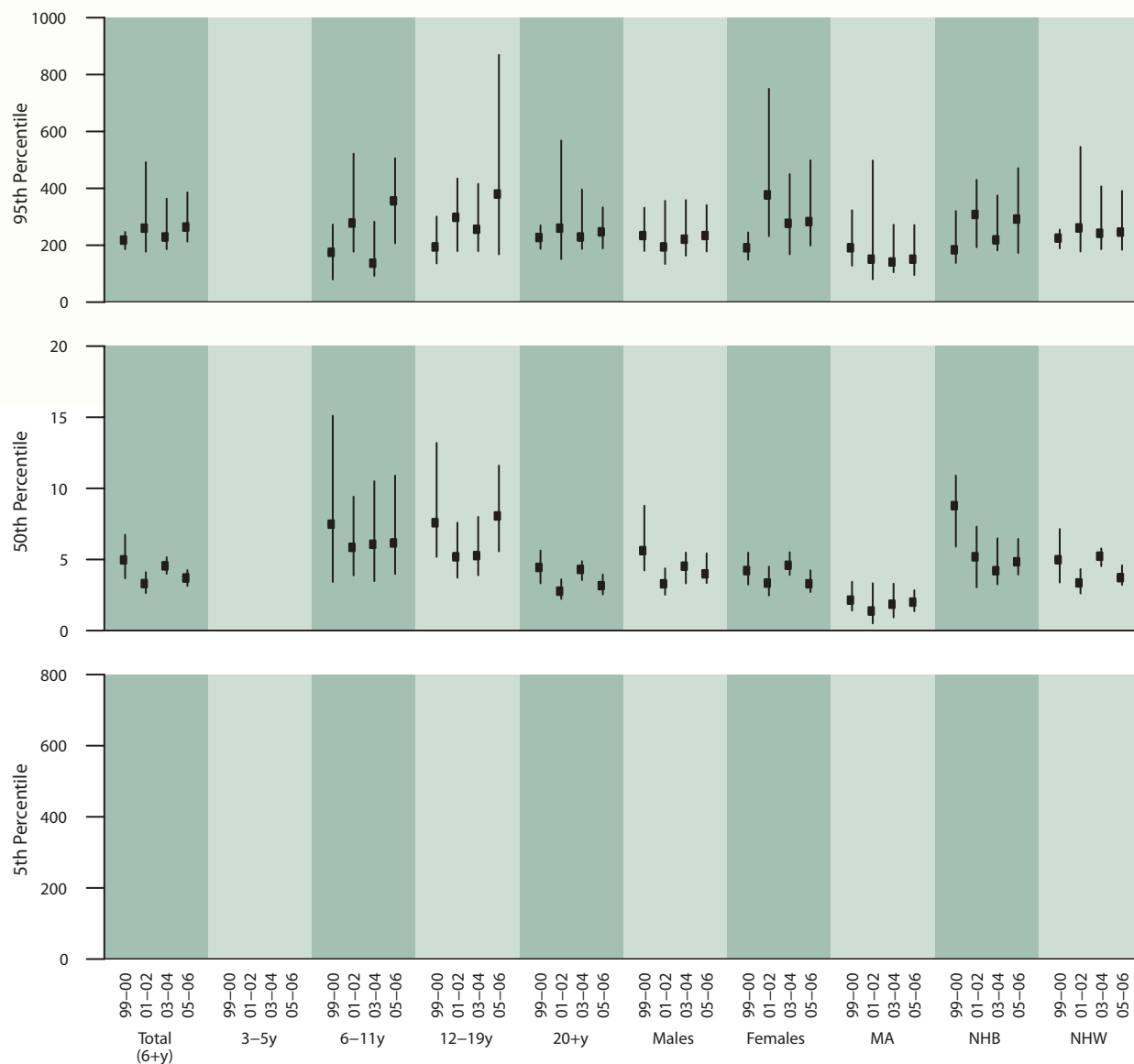
Geometric mean and selected percentiles of urine concentrations (in µg/L) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	4.39 (3.37 – 5.73)	< LOD	4.97 (3.67 – 6.74)	218 (186 – 247)	2,271
2001–2002	4.08 (3.53 – 4.73)	< LOD	3.30 (2.64 – 4.11)	260 (177 – 492)	2,794
2003–2004	4.91 (4.34 – 5.55)	< LOD	4.55 (3.99 – 5.16)	229 (186 – 364)	2,581
2005–2006	4.70 (4.17 – 5.31)	< LOD	3.70 (3.14 – 4.25)	264 (213 – 386)	2,528
Age group					
6–11 years					
1999–2000	5.60 (3.85 – 8.15)	< LOD	7.48 (3.42 – 15.1)	175 (79.4 – 273)	287
2001–2002	6.19 (4.51 – 8.49)	< LOD	5.85 (3.88 – 9.42)	278 (177 – 522)	396
2003–2004	6.32 (4.30 – 9.30)	.319 (< LOD – .590)	6.07 (3.48 – 10.5)	137 (92.3 – 283)	341
2005–2006	7.20 (5.20 – 9.96)	< LOD	6.16 (3.98 – 10.9)	356 (207 – 506)	351
12–19 years					
1999–2000	6.04 (3.76 – 9.70)	< LOD	7.58 (5.18 – 13.2)	194 (136 – 301)	667
2001–2002	5.92 (4.46 – 7.86)	< LOD	5.19 (3.72 – 7.59)	298 (179 – 435)	744
2003–2004	6.36 (4.95 – 8.18)	< LOD	5.27 (3.89 – 8.00)	256 (179 – 416)	729
2005–2006	8.50 (6.48 – 11.2)	.244 (< LOD – .337)	8.06 (5.57 – 11.6)	380 (168 – 869)	693
20–39 years					
1999–2000	4.00 (2.73 – 5.86)	< LOD	4.44 (2.77 – 5.87)	306 (252 – 462)	481
2001–2002	3.36 (2.61 – 4.34)	< LOD	2.48 (1.80 – 3.00)	248 (128 – 680)	604
2003–2004	4.25 (3.24 – 5.58)	< LOD	3.65 (2.74 – 4.89)	317 (154 – 483)	546
2005–2006	4.03 (3.29 – 4.93)	< LOD	3.00 (2.17 – 3.78)	235 (154 – 336)	583
40–59 years					
1999–2000	4.20 (3.13 – 5.62)	< LOD	4.24 (2.78 – 6.11)	171 (119 – 304)	365
2001–2002	5.07 (3.45 – 7.46)	< LOD	4.39 (2.61 – 7.20)	381 (206 – 1,000)	531
2003–2004	5.13 (4.34 – 6.07)	< LOD	5.13 (3.52 – 6.44)	222 (180 – 753)	450
2005–2006	3.84 (2.97 – 4.97)	< LOD	2.92 (1.72 – 4.29)	274 (214 – 587)	449
60 years and older					
1999–2000	3.93 (2.75 – 5.62)	< LOD	4.80 (3.04 – 8.37)	111 (74.5 – 185)	471
2001–2002	2.32 (1.83 – 2.94)	< LOD	1.73 (1.16 – 2.30)	98.3 (70.6 – 464)	519
2003–2004	4.17 (3.09 – 5.63)	< LOD	3.69 (2.71 – 5.88)	203 (129 – 394)	515
2005–2006	4.68 (3.70 – 5.91)	< LOD	3.76 (2.74 – 5.45)	171 (92.6 – 486)	452
Gender					
Males					
1999–2000	4.97 (3.71 – 6.66)	< LOD	5.62 (4.23 – 8.78)	234 (180 – 332)	1,087
2001–2002	3.81 (3.08 – 4.71)	< LOD	3.29 (2.52 – 4.38)	194 (134 – 356)	1,375
2003–2004	4.90 (3.93 – 6.12)	< LOD	4.53 (3.32 – 5.49)	221 (163 – 359)	1,240
2005–2006	4.93 (4.13 – 5.89)	< LOD	3.99 (3.34 – 5.43)	234 (178 – 341)	1,252
Females					
1999–2000	3.92 (2.97 – 5.16)	< LOD	4.22 (3.24 – 5.48)	191 (149 – 245)	1,184
2001–2002	4.36 (3.64 – 5.23)	< LOD	3.34 (2.47 – 4.50)	377 (232 – 750)	1,419
2003–2004	4.91 (4.26 – 5.66)	< LOD	4.59 (3.91 – 5.51)	277 (168 – 450)	1,341
2005–2006	4.50 (3.90 – 5.20)	< LOD	3.29 (2.71 – 4.24)	283 (199 – 499)	1,276
Race/ethnicity					
Mexican Americans					
1999–2000	2.40 (1.55 – 3.73)	< LOD	2.14 (1.40 – 3.43)	191 (128 – 323)	721
2001–2002	2.44 (1.51 – 3.94)	< LOD	1.38 (.501 – 3.33)	151 (80.1 – 498)	679
2003–2004	2.54 (1.86 – 3.48)	< LOD	1.85 (.928 – 3.30)	141 (105 – 272)	652
2005–2006	3.04 (2.29 – 4.05)	< LOD	2.00 (1.36 – 2.84)	151 (95.3 – 271)	634
Non-Hispanic Blacks					
1999–2000	5.75 (4.60 – 7.20)	< LOD	8.78 (5.90 – 10.9)	184 (138 – 320)	527
2001–2002	5.38 (4.01 – 7.21)	< LOD	5.19 (3.04 – 7.31)	308 (193 – 430)	692
2003–2004	5.55 (4.07 – 7.57)	< LOD	4.21 (3.25 – 6.49)	219 (182 – 375)	680
2005–2006	5.83 (4.49 – 7.58)	< LOD	4.84 (3.94 – 6.45)	292 (173 – 471)	662
Non-Hispanic Whites					
1999–2000	4.53 (3.23 – 6.37)	< LOD	4.98 (3.38 – 7.14)	225 (189 – 255)	810
2001–2002	4.13 (3.44 – 4.96)	< LOD	3.35 (2.61 – 4.32)	261 (178 – 546)	1,211
2003–2004	5.28 (4.65 – 5.99)	< LOD	5.23 (4.53 – 5.78)	242 (186 – 407)	1,061
2005–2006	4.72 (4.09 – 5.45)	< LOD	3.72 (3.21 – 4.59)	246 (184 – 391)	1,039

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.7.b. Urinary O-desmethylangolensin: Concentrations by survey cycle

Selected percentiles in µg/L (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.8.a.1. Urinary O-desmethylangolensin (creatinine corrected): Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean	Selected percentiles (95% conf. interval)					Sample size
	(95% conf. interval)	2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	4.58 (4.25 – 4.94)	< LOD	< LOD	3.89 (3.51 – 4.33)	204 (193 – 260)	530 (376 – 725)	5,109
Age group							
6–11 years	7.31 (5.72 – 9.33)	< LOD	.349 (< LOD – .470)	6.11 (4.49 – 8.22)	243 (175 – 349)	362 (317 – 611)	692
12–19 years	5.47 (4.64 – 6.46)	< LOD	< LOD	4.67 (3.74 – 6.52)	201 (136 – 375)	456 (270 – 713)	1,422
20–39 years	3.51 (3.05 – 4.04)	< LOD	< LOD	3.10 (2.38 – 3.74)	181 (144 – 260)	425 (241 – 646)	1,129
40–59 years	4.48 (3.89 – 5.16)	< LOD	< LOD	3.51 (2.96 – 4.33)	243 (194 – 532)	795 (343 – 1,270)	899
60 years and older	5.18 (4.38 – 6.13)	< LOD	< LOD	4.37 (3.42 – 5.80)	239 (140 – 389)	480 (317 – 1,730)	967
Gender							
Males	3.90 (3.42 – 4.44)	< LOD	< LOD	3.41 (2.81 – 4.09)	179 (144 – 227)	325 (256 – 482)	2,492
Females	5.35 (4.85 – 5.91)	< LOD	< LOD	4.40 (3.76 – 5.25)	271 (202 – 396)	738 (548 – 1,020)	2,617
Race/ethnicity							
Mexican Americans	2.51 (2.01 – 3.14)	< LOD	< LOD	1.68 (1.09 – 2.45)	130 (93.0 – 158)	243 (164 – 423)	1,286
Non-Hispanic Blacks	4.00 (3.35 – 4.77)	< LOD	< LOD	3.47 (2.48 – 4.61)	180 (136 – 313)	512 (292 – 876)	1,342
Non-Hispanic Whites	5.07 (4.68 – 5.49)	< LOD	< LOD	4.30 (3.85 – 4.69)	227 (194 – 274)	557 (338 – 824)	2,100

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.8.a. Urinary O–desmethylangolensin (creatinine corrected): Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

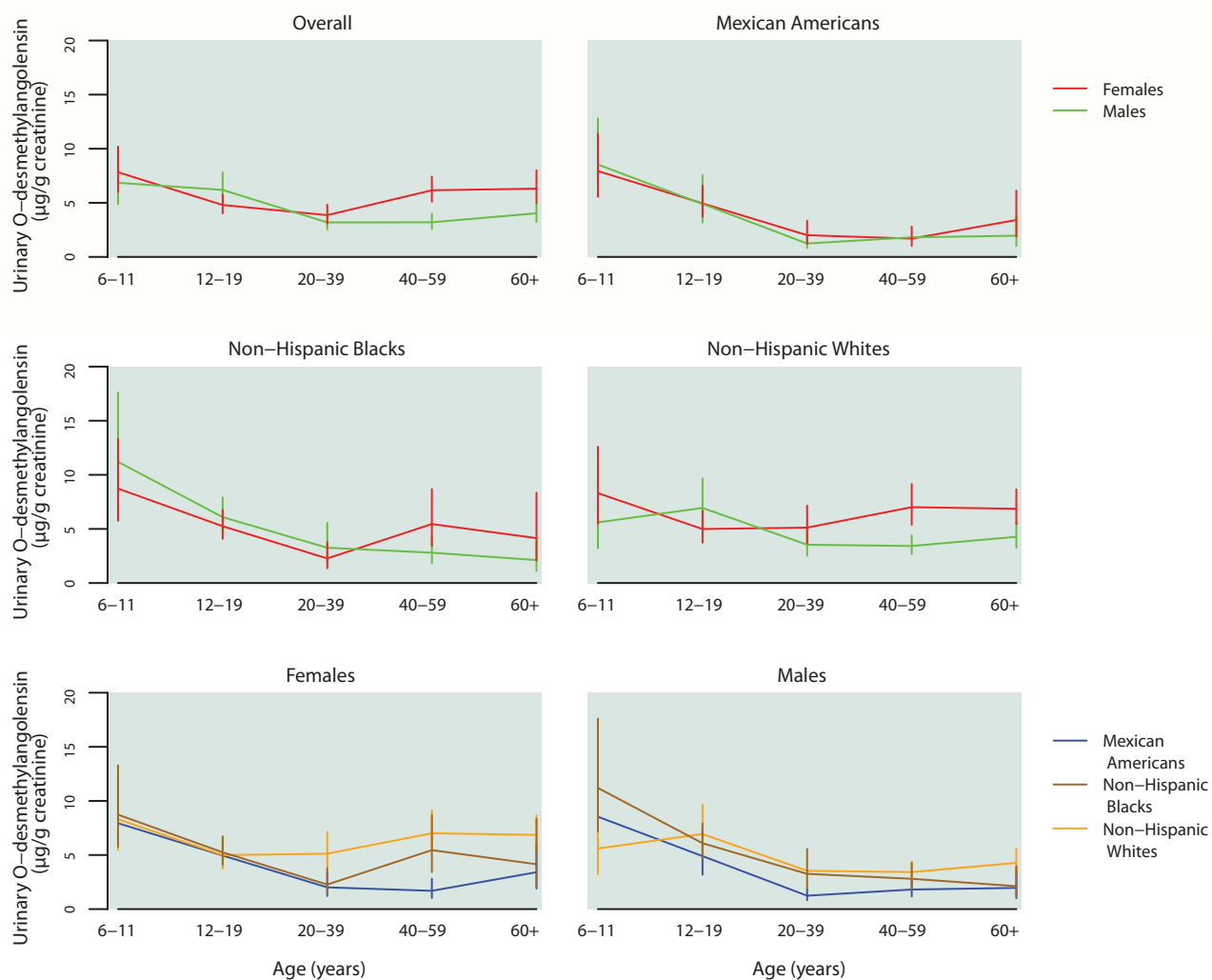


Table 4.8.a.2. Urinary O-desmethylangolensin (creatinine corrected): Total population

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	4.58 (4.25 – 4.94)	.312 (.289 – .338)	3.89 (3.51 – 4.33)	93.2 (81.6 – 109)	5,109
6–11 years	7.31 (5.72 – 9.33)	.587 (.389 – .800)	6.11 (4.49 – 8.22)	109 (84.7 – 165)	692
12–19 years	5.47 (4.64 – 6.46)	.320 (.289 – .402)	4.67 (3.74 – 6.52)	86.1 (61.4 – 129)	1,422
20–39 years	3.51 (3.05 – 4.04)	.248 (< LOD – .299)	3.10 (2.38 – 3.74)	78.0 (63.1 – 97.3)	1,129
40–59 years	4.48 (3.89 – 5.16)	< LOD	3.51 (2.96 – 4.33)	138 (76.1 – 190)	899
60 years and older	5.18 (4.38 – 6.13)	.384 (< LOD – .472)	4.37 (3.42 – 5.80)	79.2 (65.8 – 119)	967
Males					
Total, 6 years and older	3.90 (3.42 – 4.44)	.281 (.233 – .323)	3.41 (2.81 – 4.09)	73.1 (58.7 – 85.3)	2,492
6–11 years	6.85 (4.87 – 9.63)	.496 (.308 – .801)	5.45 (3.39 – 8.21)	126 (81.4 – 215)	340
12–19 years	6.19 (4.90 – 7.82)	.315 (.219 – .487)	6.40 (4.16 – 8.62)	94.4 (61.8 – 169)	728
20–39 years	3.19 (2.53 – 4.03)	.196 (< LOD – .283)	2.68 (2.00 – 4.15)	67.3 (46.0 – 93.6)	498
40–59 years	3.20 (2.57 – 3.99)	.251 (.200 – .312)	2.76 (2.03 – 3.84)	51.5 (37.2 – 94.2)	451
60 years and older	4.03 (3.22 – 5.05)	.341 (< LOD – .424)	3.75 (2.54 – 5.01)	64.8 (40.6 – 107)	475
Females					
Total, 6 years and older	5.35 (4.85 – 5.91)	.342 (< LOD – .385)	4.40 (3.76 – 5.25)	131 (95.9 – 158)	2,617
6–11 years	7.83 (6.01 – 10.2)	.682 (.379 – .857)	7.16 (5.34 – 9.21)	100 (77.5 – 164)	352
12–19 years	4.80 (4.03 – 5.72)	.321 (.278 – .392)	4.02 (3.17 – 4.75)	74.9 (54.2 – 120)	694
20–39 years	3.86 (3.08 – 4.83)	.301 (< LOD – .337)	3.44 (2.23 – 4.59)	86.8 (63.3 – 139)	631
40–59 years	6.16 (5.10 – 7.43)	< LOD	5.00 (3.20 – 6.49)	192 (152 – 316)	448
60 years and older	6.31 (4.96 – 8.01)	.426 (< LOD – .643)	5.49 (3.84 – 7.18)	102 (74.4 – 155)	492

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Table 4.8.a.3. Urinary O-desmethylangolensin (creatinine corrected): Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	2.51 (2.01 – 3.14)	< LOD	1.68 (1.09 – 2.45)	52.7 (39.7 – 74.3)	1,286
6–11 years	8.24 (6.07 – 11.2)	.539 (.345 – .845)	7.19 (4.88 – 12.9)	102 (73.3 – 160)	231
12–19 years	4.93 (3.63 – 6.69)	.295 (.240 – .365)	4.46 (3.00 – 6.97)	103 (59.6 – 155)	445
20–39 years	1.55 (1.12 – 2.14)	< LOD	.843 (.692 – 1.16)	33.8 (17.5 – 80.4)	281
40–59 years	1.75 (1.28 – 2.40)	< LOD	1.01 (.818 – 2.03)	27.3 (22.5 – 52.6)	157
60 years and older	2.66 (1.82 – 3.88)	< LOD	1.95 (1.08 – 3.72)	35.9 (25.1 – 63.6)	172
Males					
Total, 6 years and older	2.24 (1.69 – 2.96)	< LOD	1.33 (.935 – 2.07)	45.9 (34.6 – 74.9)	625
6–11 years	8.54 (5.71 – 12.8)	.532 (.307 – 1.03)	7.44 (4.18 – 16.7)	110 (72.7 – 274)	112
12–19 years	4.90 (3.18 – 7.55)	.292 (.208 – .428)	4.55 (2.36 – 10.5)	103 (43.8 – 146)	228
20–39 years	1.24 (.818 – 1.88)	< LOD	.732 (.591 – .930)	28.8 (13.4 – 95.5)	117
40–59 years	1.81 (1.17 – 2.79)	< LOD†	.997 (.601 – 3.02)	36.6† (16.9 – 156)	85
60 years and older	1.96 (1.00 – 3.82)	< LOD†	1.44 (.646 – 3.16)	20.4† (12.1 – 159)	83
Females					
Total, 6 years and older	2.86 (2.22 – 3.68)	< LOD	2.16 (1.36 – 3.15)	59.6 (41.4 – 96.0)	661
6–11 years	7.94 (5.56 – 11.4)	.527 (.268 – .811)	6.00 (4.39 – 12.1)	93.0 (62.8 – 156)	119
12–19 years	4.95 (3.71 – 6.60)	.295 (< LOD – .342)	4.20 (2.93 – 6.89)	100 (72.2 – 243)	217
20–39 years	2.01 (1.21 – 3.35)	< LOD	1.01 (.703 – 2.25)	40.5 (13.8 – 203)	164
40–59 years	1.69 (1.02 – 2.80)	< LOD†	1.01 (.870 – 2.39)	27.1† (16.3 – 66.5)	72
60 years and older	3.41 (1.90 – 6.13)	< LOD†	2.79 (1.08 – 7.40)	45.9† (23.0 – 803)	89

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.8.a.4. Urinary O-desmethylangolensin (creatinine corrected): Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	4.00 (3.35 – 4.77)	.249 (.208 – .295)	3.47 (2.48 – 4.61)	75.6 (60.8 – 97.4)	1,342
6–11 years	9.91 (7.22 – 13.6)	.701 (.469 – .983)	10.1 (7.06 – 15.0)	160 (85.0 – 249)	207
12–19 years	5.66 (4.68 – 6.84)	.336 (.262 – .519)	6.00 (4.57 – 8.05)	72.7 (53.8 – 100)	496
20–39 years	2.67 (1.93 – 3.69)	< LOD	1.99 (1.21 – 3.33)	45.7 (34.3 – 82.1)	249
40–59 years	4.03 (3.01 – 5.39)	.241 (< LOD – .319)	3.60 (1.85 – 6.21)	77.7 (58.0 – 133)	231
60 years and older	3.20 (1.86 – 5.51)	.194 (< LOD – .342)	2.34 (1.45 – 4.24)	73.0 (30.4 – 296)	159
Males					
Total, 6 years and older	3.86 (3.06 – 4.88)	.233 (.157 – .322)	3.81 (2.31 – 4.93)	69.7 (52.6 – 92.1)	660
6–11 years	11.2 (7.16 – 17.6)	.797† (.574 – 1.50)	10.7 (5.44 – 15.8)	173† (85.5 – 476)	99
12–19 years	6.09 (4.69 – 7.91)	.324 (.199 – .529)	6.53 (4.50 – 9.81)	81.0 (52.5 – 137)	258
20–39 years	3.26 (1.91 – 5.56)	.157 (< LOD – .342)	2.38 (1.20 – 6.28)	62.5 (41.0 – 133)	116
40–59 years	2.80 (1.83 – 4.28)	.194 (< LOD – .310)	2.10 (1.14 – 5.38)	46.0 (20.8 – 121)	114
60 years and older	2.12 (1.13 – 3.98)	.146† (< LOD – .217)	1.87 (.716 – 3.04)	28.2† (12.9 – 664)	73
Females					
Total, 6 years and older	4.11 (3.19 – 5.30)	.265 (< LOD – .330)	3.28 (2.29 – 5.29)	78.9 (62.4 – 126)	682
6–11 years	8.73 (5.75 – 13.3)	.509† (< LOD – 1.10)	9.53 (5.79 – 15.3)	145† (55.0 – 522)	108
12–19 years	5.25 (4.09 – 6.74)	.338 (.222 – .575)	5.33 (3.56 – 8.34)	56.7 (46.9 – 78.1)	238
20–39 years	2.27 (1.36 – 3.79)	< LOD	1.83 (.829 – 4.09)	34.9 (21.9 – 122)	133
40–59 years	5.45 (3.42 – 8.68)	.276 (.197 – .411)	4.28 (1.91 – 7.76)	148 (74.5 – 835)	117
60 years and older	4.15 (2.06 – 8.34)	.334† (< LOD – .461)	2.59 (1.22 – 6.75)	88.1† (36.1 – 366)	86

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.8.a.5. Urinary O-desmethylangolensin (creatinine corrected): Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	5.07 (4.68 – 5.49)	.347 (.312 – .382)	4.30 (3.85 – 4.69)	100 (86.1 – 136)	2,100
6–11 years	6.72 (4.52 – 9.99)	.515 (< LOD – .823)	5.35 (3.55 – 8.26)	126 (75.5 – 219)	193
12–19 years	5.92 (4.64 – 7.57)	.342 (.259 – .492)	4.83 (3.42 – 8.22)	91.6 (59.4 – 149)	378
20–39 years	4.25 (3.40 – 5.30)	.321 (< LOD – .376)	3.90 (3.10 – 4.89)	86.6 (67.4 – 129)	488
40–59 years	4.89 (4.13 – 5.79)	< LOD	3.75 (3.03 – 4.81)	160 (88.4 – 194)	447
60 years and older	5.57 (4.72 – 6.57)	.417 (< LOD – .498)	4.76 (3.87 – 6.27)	78.8 (65.6 – 120)	594
Males					
Total, 6 years and older	4.08 (3.45 – 4.83)	.304 (.237 – .370)	3.57 (2.90 – 4.35)	73.4 (58.4 – 88.8)	1,034
6–11 years	5.60 (3.23 – 9.71)	.403† (< LOD – .810)	4.09 (2.17 – 8.47)	109† (43.9 – 358)	99
12–19 years	6.94 (4.98 – 9.67)	.311 (.186 – .652)	6.78 (3.52 – 13.0)	103 (58.5 – 260)	191
20–39 years	3.54 (2.51 – 5.00)	.257 (< LOD – .350)	3.16 (2.22 – 4.91)	69.1 (48.0 – 95.7)	217
40–59 years	3.42 (2.66 – 4.40)	.278 (.191 – .389)	2.96 (2.16 – 3.95)	55.5 (36.3 – 150)	229
60 years and older	4.27 (3.25 – 5.62)	.354 (< LOD – .493)	3.86 (2.76 – 5.25)	60.7 (37.5 – 117)	298
Females					
Total, 6 years and older	6.27 (5.53 – 7.11)	.400 (< LOD – .428)	5.31 (4.37 – 6.35)	141 (108 – 183)	1,066
6–11 years	8.31 (5.47 – 12.6)	.803† (< LOD – 1.05)	6.95 (4.34 – 11.5)	132† (75.9 – 259)	94
12–19 years	4.99 (3.73 – 6.67)	.347 (< LOD – .484)	4.27 (3.11 – 5.86)	74.7 (47.4 – 131)	187
20–39 years	5.12 (3.67 – 7.15)	.359 (.304 – .418)	4.61 (3.37 – 6.48)	103 (66.8 – 197)	271
40–59 years	7.01 (5.37 – 9.15)	< LOD	5.48 (3.20 – 7.60)	194 (157 – 323)	218
60 years and older	6.86 (5.44 – 8.66)	.484 (< LOD – .719)	5.96 (4.28 – 7.84)	104 (73.9 – 167)	296

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.8.b. Urinary O-desmethylangolensin (creatinine corrected): Concentrations by survey cycle

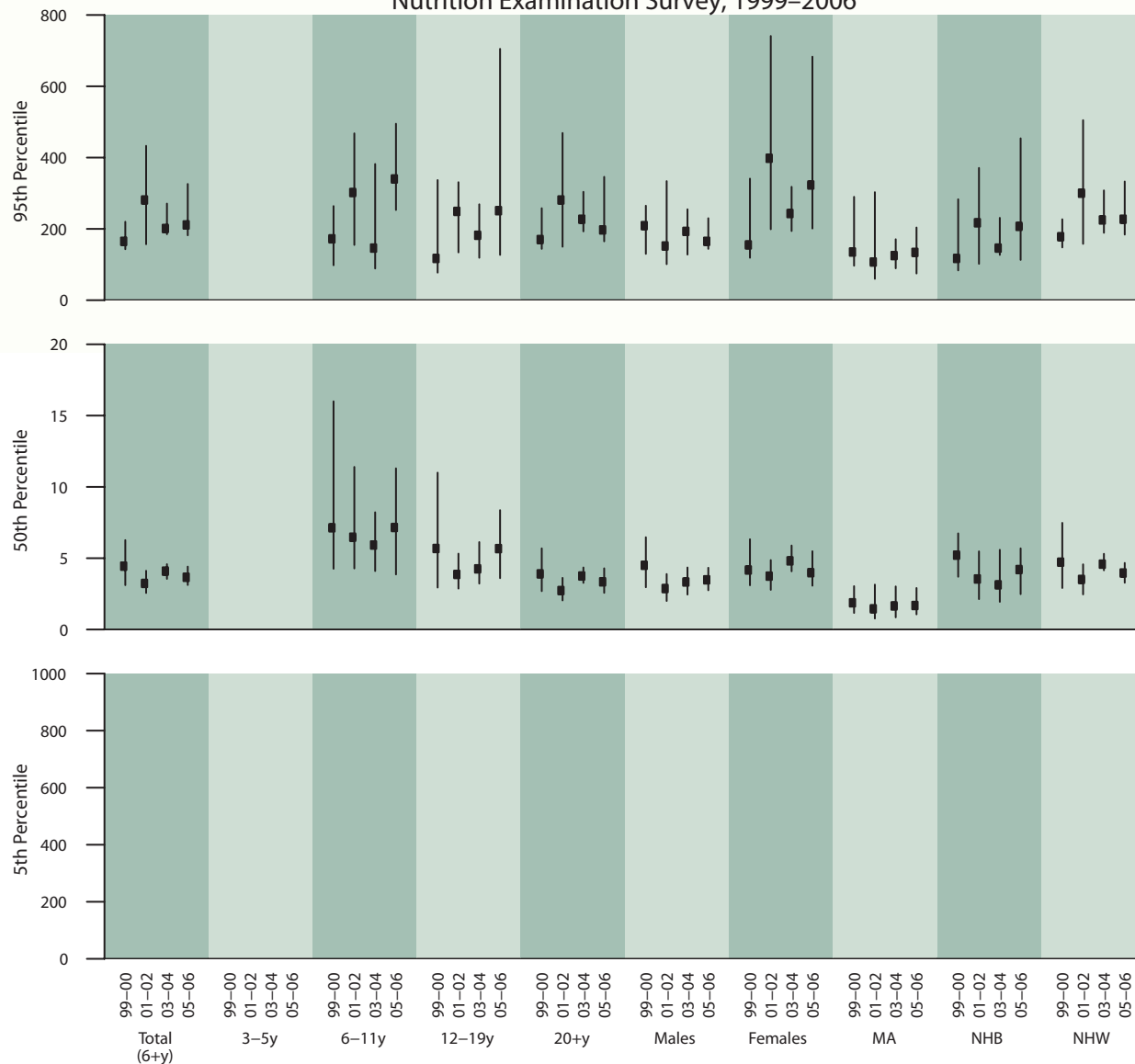
Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	4.03 (2.97 – 5.45)	<LOD	4.44 (3.11 – 6.27)	165 (143 – 220)	2,271
2001–2002	3.83 (3.32 – 4.42)	<LOD	3.23 (2.56 – 4.12)	281 (157 – 433)	2,794
2003–2004	4.58 (4.19 – 5.01)	<LOD	4.09 (3.55 – 4.58)	201 (185 – 271)	2,581
2005–2006	4.59 (4.04 – 5.21)	<LOD	3.66 (3.12 – 4.41)	211 (182 – 326)	2,528
Age group					
6–11 years					
1999–2000	6.00 (4.04 – 8.91)	<LOD	7.13 (4.26 – 16.0)	172 (98.0 – 264)	287
2001–2002	7.03 (5.05 – 9.77)	<LOD	6.47 (4.28 – 11.4)	302 (155 – 468)	396
2003–2004	6.73 (4.55 – 9.97)	.389 (<LOD – .743)	5.92 (4.10 – 8.22)	146 (88.9 – 382)	341
2005–2006	7.93 (5.73 – 11.0)	<LOD	7.15 (3.86 – 11.3)	340 (253 – 495)	351
12–19 years					
1999–2000	4.13 (2.33 – 7.35)	<LOD	5.68 (2.94 – 11.0)	117 (77.3 – 337)	667
2001–2002	4.57 (3.44 – 6.07)	<LOD	3.86 (2.87 – 5.32)	249 (134 – 331)	744
2003–2004	4.76 (3.71 – 6.11)	<LOD	4.25 (3.22 – 6.13)	182 (119 – 269)	729
2005–2006	6.30 (4.89 – 8.13)	.274 (<LOD – .304)	5.67 (3.60 – 8.37)	251 (127 – 705)	693
20–39 years					
1999–2000	3.18 (2.13 – 4.76)	<LOD	3.53 (2.09 – 5.26)	226 (165 – 272)	481
2001–2002	2.72 (2.10 – 3.51)	<LOD	2.06 (1.55 – 2.97)	152 (99.5 – 442)	604
2003–2004	3.55 (2.86 – 4.40)	<LOD	2.98 (2.24 – 3.75)	214 (114 – 434)	546
2005–2006	3.47 (2.84 – 4.25)	<LOD	3.22 (2.11 – 4.37)	166 (136 – 207)	583
40–59 years					
1999–2000	4.26 (3.27 – 5.56)	<LOD	3.57 (2.42 – 6.26)	156 (133 – 261)	365
2001–2002	5.04 (3.50 – 7.26)	<LOD	4.39 (2.65 – 7.23)	473 (212 – 885)	531
2003–2004	4.93 (4.19 – 5.80)	<LOD	4.29 (3.06 – 6.30)	227 (190 – 612)	450
2005–2006	4.09 (3.19 – 5.24)	<LOD	3.01 (2.16 – 4.19)	259 (189 – 800)	449
60 years and older					
1999–2000	4.66 (3.13 – 6.94)	<LOD	6.37 (3.15 – 11.3)	104 (81.6 – 172)	471
2001–2002	2.75 (2.14 – 3.52)	<LOD	1.86 (1.30 – 2.79)	150 (78.7 – 449)	519
2003–2004	4.93 (3.88 – 6.28)	<LOD	4.37 (3.20 – 6.17)	239 (136 – 418)	515
2005–2006	5.42 (4.19 – 7.02)	<LOD	4.31 (2.90 – 7.08)	244 (111 – 754)	452
Gender					
Males					
1999–2000	3.95 (2.79 – 5.58)	<LOD	4.50 (2.96 – 6.47)	209 (130 – 265)	1,087
2001–2002	3.10 (2.48 – 3.86)	<LOD	2.87 (2.00 – 3.89)	152 (101 – 334)	1,375
2003–2004	3.83 (3.10 – 4.73)	<LOD	3.33 (2.45 – 4.35)	193 (128 – 255)	1,240
2005–2006	3.97 (3.33 – 4.72)	<LOD	3.48 (2.75 – 4.33)	165 (144 – 230)	1,252
Females					
1999–2000	4.10 (3.00 – 5.60)	<LOD	4.17 (3.10 – 6.33)	155 (119 – 341)	1,184
2001–2002	4.68 (3.87 – 5.68)	<LOD	3.74 (2.78 – 4.87)	398 (199 – 741)	1,419
2003–2004	5.45 (4.71 – 6.30)	<LOD	4.81 (4.08 – 5.89)	243 (194 – 318)	1,341
2005–2006	5.27 (4.56 – 6.09)	<LOD	3.98 (3.07 – 5.49)	323 (201 – 683)	1,276
Race/ethnicity					
Mexican Americans					
1999–2000	2.19 (1.49 – 3.24)	<LOD	1.87 (1.16 – 3.04)	135 (96.7 – 290)	721
2001–2002	2.30 (1.48 – 3.57)	<LOD	1.45 (.769 – 3.15)	107 (59.9 – 303)	679
2003–2004	2.30 (1.68 – 3.15)	<LOD	1.65 (.847 – 3.02)	125 (89.4 – 171)	652
2005–2006	2.75 (1.92 – 3.93)	<LOD	1.68 (1.06 – 2.91)	134 (74.9 – 204)	634
Non-Hispanic Blacks					
1999–2000	3.65 (2.92 – 4.57)	<LOD	5.21 (3.70 – 6.74)	117 (83.6 – 283)	527
2001–2002	3.75 (2.75 – 5.11)	<LOD	3.54 (2.13 – 5.48)	217 (102 – 371)	692
2003–2004	3.90 (3.02 – 5.04)	<LOD	3.13 (1.94 – 5.59)	146 (127 – 231)	680
2005–2006	4.09 (3.13 – 5.34)	<LOD	4.20 (2.48 – 5.69)	207 (113 – 454)	662
Non-Hispanic Whites					
1999–2000	4.48 (3.11 – 6.47)	<LOD	4.72 (2.91 – 7.48)	178 (148 – 227)	810
2001–2002	4.08 (3.41 – 4.88)	<LOD	3.51 (2.46 – 4.57)	300 (158 – 505)	1,211
2003–2004	5.18 (4.71 – 5.70)	<LOD	4.58 (4.15 – 5.31)	225 (189 – 308)	1,061
2005–2006	4.96 (4.33 – 5.69)	<LOD	3.96 (3.28 – 4.67)	227 (184 – 333)	1,039

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.8.b. Urinary O-desmethylangolensin (creatinine corrected): Concentrations by survey cycle

Selected percentiles in $\mu\text{g/g}$ creatinine (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.9.a.1. Urinary enterodiol: Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
		2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	38.6 (35.8 – 41.6)	.745 (.399 – 1.29)	2.48 (1.79 – 3.01)	43.9 (41.1 – 47.2)	377 (335 – 414)	579 (496 – 683)	5,122
Age group							
6–11 years	37.4 (32.2 – 43.3)	2.24 (.856 – 4.39)	5.43 (2.74 – 6.96)	40.2 (35.8 – 45.4)	265 (199 – 357)	387 (335 – 558)	692
12–19 years	42.0 (38.3 – 46.1)	2.23 (.927 – 3.06)	5.16 (2.97 – 6.05)	44.2 (39.5 – 50.3)	295 (267 – 354)	462 (374 – 656)	1,422
20–39 years	39.2 (34.7 – 44.2)	.763 (.392 – 1.50)	2.70 (1.49 – 3.87)	43.7 (39.7 – 49.9)	365 (314 – 494)	651 (493 – 1,350)	1,137
40–59 years	37.2 (31.3 – 44.1)	< LOD	1.72 (.528 – 2.44)	44.8 (37.6 – 51.6)	423 (330 – 512)	658 (462 – 1,250)	901
60 years and older	38.5 (34.3 – 43.2)	.478 (< LOD – 1.61)	2.42 (1.28 – 3.37)	44.9 (38.9 – 52.6)	362 (301 – 475)	620 (442 – 1,140)	970
Gender							
Males	40.1 (35.9 – 44.7)	.697 (< LOD – 1.29)	2.49 (1.47 – 3.72)	45.9 (41.2 – 49.2)	382 (308 – 453)	585 (457 – 1,080)	2,496
Females	37.2 (33.7 – 41.1)	.813 (< LOD – 1.60)	2.44 (1.59 – 3.02)	42.3 (39.6 – 45.9)	356 (307 – 446)	561 (464 – 712)	2,626
Race/ethnicity							
Mexican Americans	35.6 (31.2 – 40.5)	.899 (< LOD – 1.78)	2.41 (1.70 – 2.94)	39.9 (35.5 – 44.6)	359 (287 – 434)	457 (392 – 890)	1,287
Non-Hispanic Blacks	37.4 (33.8 – 41.3)	1.02 (< LOD – 1.65)	2.90 (2.15 – 3.51)	43.1 (38.4 – 47.4)	275 (249 – 348)	438 (372 – 517)	1,343
Non-Hispanic Whites	38.7 (34.9 – 42.8)	.640 (< LOD – 1.36)	2.44 (1.49 – 3.41)	44.2 (40.2 – 49.6)	367 (310 – 423)	575 (480 – 701)	2,108

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.9.a. Urinary enterodiol: Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

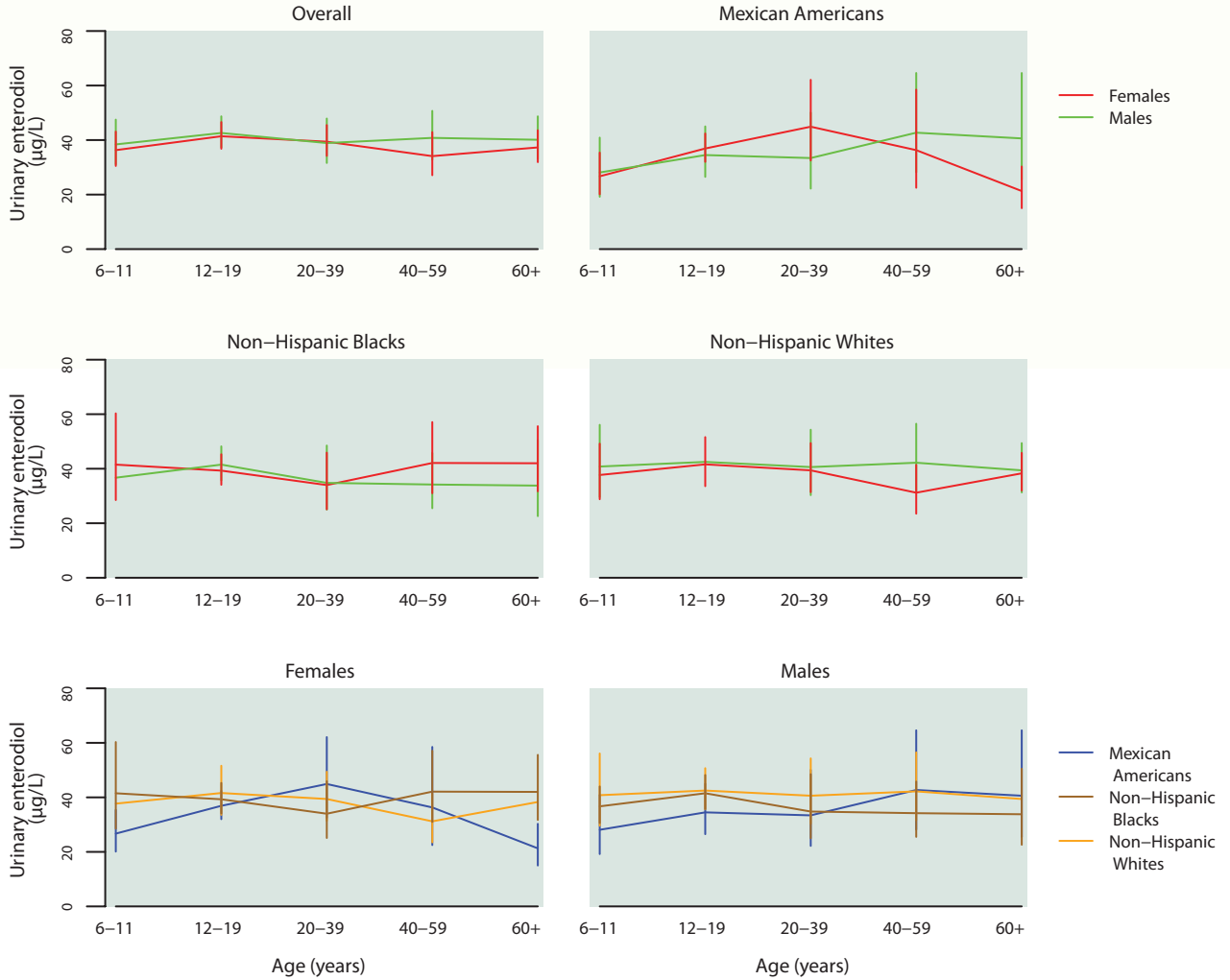


Table 4.9.a.2. Urinary enterodiol: Total population

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	38.6 (35.8 – 41.6)	5.86 (4.78 – 6.69)	43.9 (41.1 – 47.2)	243 (231 – 260)	5,122
6–11 years	37.4 (32.2 – 43.3)	8.10 (6.48 – 9.64)	40.2 (35.8 – 45.4)	150 (126 – 204)	692
12–19 years	42.0 (38.3 – 46.1)	8.12 (6.76 – 9.75)	44.2 (39.5 – 50.3)	192 (168 – 229)	1,422
20–39 years	39.2 (34.7 – 44.2)	5.37 (4.41 – 6.89)	43.7 (39.7 – 49.9)	237 (216 – 267)	1,137
40–59 years	37.2 (31.3 – 44.1)	3.96 (2.46 – 6.11)	44.8 (37.6 – 51.6)	266 (250 – 284)	901
60 years and older	38.5 (34.3 – 43.2)	5.80 (3.81 – 6.96)	44.9 (38.9 – 52.6)	256 (219 – 280)	970
Males					
Total, 6 years and older	40.1 (35.9 – 44.7)	6.59 (5.15 – 7.44)	45.9 (41.2 – 49.2)	255 (228 – 269)	2,496
6–11 years	38.4 (31.1 – 47.5)	8.71 (5.91 – 13.1)	39.7 (34.8 – 47.9)	144 (119 – 267)	340
12–19 years	42.6 (37.3 – 48.7)	8.25 (6.58 – 10.2)	48.4 (38.5 – 56.4)	196 (170 – 250)	728
20–39 years	38.9 (31.6 – 47.9)	5.61 (3.56 – 7.73)	43.8 (36.7 – 50.8)	236 (202 – 293)	499
40–59 years	40.8 (32.8 – 50.7)	5.03 (2.54 – 8.69)	47.7 (38.3 – 54.0)	279 (261 – 332)	451
60 years and older	40.1 (33.1 – 48.7)	6.13 (4.41 – 7.48)	50.2 (41.1 – 56.3)	256 (210 – 307)	478
Females					
Total, 6 years and older	37.2 (33.7 – 41.1)	5.09 (4.12 – 6.40)	42.3 (39.6 – 45.9)	237 (211 – 262)	2,626
6–11 years	36.3 (30.5 – 43.1)	7.66 (5.98 – 9.58)	40.7 (32.9 – 49.6)	157 (120 – 220)	352
12–19 years	41.4 (36.8 – 46.6)	8.00 (5.89 – 10.0)	41.9 (37.7 – 46.4)	181 (155 – 221)	694
20–39 years	39.4 (34.2 – 45.5)	4.90 (4.25 – 6.75)	43.7 (39.8 – 53.3)	243 (209 – 301)	638
40–59 years	34.1 (27.1 – 42.9)	3.31 (1.49 – 5.80)	41.6 (34.4 – 51.5)	244 (205 – 278)	450
60 years and older	37.3 (31.9 – 43.6)	4.59 (2.99 – 6.98)	42.3 (33.7 – 51.7)	255 (204 – 302)	492

Table 4.9.a.3. Urinary enterodiol: Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/L) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	35.6 (31.2 – 40.5)	4.89 (4.22 – 5.85)	39.9 (35.5 – 44.6)	227 (182 – 294)	1,287
6–11 years	27.4 (21.8 – 34.5)	2.79 (1.96 – 5.28)	33.0 (24.6 – 40.2)	166 (130 – 245)	231
12–19 years	35.6 (30.9 – 41.1)	5.80 (3.99 – 8.54)	42.0 (34.8 – 48.2)	178 (141 – 203)	445
20–39 years	38.2 (29.5 – 49.6)	5.52 (3.85 – 7.09)	41.8 (31.6 – 52.4)	245 (183 – 438)	282
40–59 years	39.5 (28.6 – 54.5)	5.19 (1.73 – 11.5)	41.1 (31.9 – 53.6)	272 (192 – 385)	157
60 years and older	28.4 (22.0 – 36.8)	3.31 (1.54 – 5.74)	35.1 (22.0 – 49.2)	165 (111 – 340)	172
Males					
Total, 6 years and older	34.9 (28.8 – 42.2)	4.34 (3.14 – 6.04)	43.3 (35.6 – 49.9)	206 (165 – 288)	625
6–11 years	28.1 (19.2 – 40.9)	2.97 (.785 – 7.94)	34.7 (22.8 – 48.2)	135 (92.4 – 185)	112
12–19 years	34.5 (26.5 – 45.0)	4.74 (2.34 – 9.50)	41.5 (30.3 – 52.8)	189 (126 – 266)	228
20–39 years	33.4 (22.2 – 50.1)	4.48 (.741 – 7.36)	42.6 (24.6 – 55.0)	204 (135 – 414)	117
40–59 years	42.7 (28.2 – 64.6)	4.04† (< LOD – 14.4)	51.2 (32.8 – 64.8)	256† (170 – 404)	85
60 years and older	40.6 (25.5 – 64.6)	4.67† (2.24 – 6.33)	42.7 (19.6 – 89.1)	222† (160 – 2,850)	83
Females					
Total, 6 years and older	36.3 (32.0 – 41.2)	5.48 (4.68 – 6.52)	37.1 (31.4 – 42.1)	238 (185 – 325)	662
6–11 years	26.7 (20.1 – 35.4)	2.49 (1.71 – 4.92)	30.5 (20.3 – 43.1)	196 (136 – 335)	119
12–19 years	36.9 (32.0 – 42.4)	7.51 (5.16 – 9.36)	42.2 (35.0 – 53.7)	162 (118 – 195)	217
20–39 years	44.9 (32.5 – 62.1)	6.26 (3.86 – 9.31)	41.4 (27.8 – 61.5)	306 (193 – 937)	165
40–59 years	36.3 (22.5 – 58.5)	5.97† (< LOD – 11.6)	31.7 (19.0 – 59.2)	274† (189 – 476)	72
60 years and older	21.3 (15.0 – 30.3)	2.49† (.826 – 4.86)	28.1 (16.1 – 45.6)	115† (67.5 – 254)	89

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.9.a.4. Urinary enterodiol: Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	37.4 (33.8 – 41.3)	6.94 (5.78 – 8.13)	43.1 (38.4 – 47.4)	202 (164 – 241)	1,343
6–11 years	39.0 (32.6 – 46.6)	8.75 (7.57 – 10.9)	38.5 (32.6 – 47.4)	144 (113 – 222)	207
12–19 years	40.4 (35.8 – 45.5)	7.82 (6.32 – 10.2)	45.9 (40.2 – 53.4)	203 (158 – 252)	496
20–39 years	34.4 (28.9 – 40.8)	4.70 (2.73 – 9.26)	43.1 (30.9 – 49.3)	182 (138 – 247)	249
40–59 years	38.3 (31.0 – 47.3)	6.45 (3.55 – 9.50)	42.9 (34.8 – 56.0)	229 (159 – 306)	231
60 years and older	38.6 (29.7 – 50.2)	5.01 (2.37 – 11.3)	41.5 (33.1 – 54.2)	213 (143 – 308)	160
Males					
Total, 6 years and older	35.8 (31.0 – 41.4)	7.23 (5.38 – 9.93)	41.2 (37.1 – 44.8)	199 (145 – 256)	661
6–11 years	36.7 (30.6 – 44.0)	8.71† (5.22 – 12.3)	37.6 (32.5 – 45.6)	130† (93.9 – 271)	99
12–19 years	41.5 (35.7 – 48.2)	8.60 (6.42 – 10.6)	46.0 (36.3 – 56.7)	220 (161 – 274)	258
20–39 years	34.8 (25.0 – 48.5)	9.49 (1.28 – 12.7)	42.3 (28.4 – 49.0)	194 (117 – 649)	116
40–59 years	34.2 (25.5 – 45.8)	6.41 (4.24 – 11.2)	40.1 (31.0 – 51.0)	181 (103 – 339)	114
60 years and older	33.8 (22.6 – 50.5)	3.16† (< LOD – 9.91)	38.8 (22.4 – 60.4)	235† (178 – 506)	74
Females					
Total, 6 years and older	38.8 (33.8 – 44.5)	6.71 (4.70 – 8.09)	45.3 (36.5 – 52.9)	209 (159 – 246)	682
6–11 years	41.5 (28.5 – 60.3)	8.80† (5.57 – 12.1)	38.5 (25.1 – 63.3)	162† (105 – 734)	108
12–19 years	39.3 (34.1 – 45.3)	7.36 (4.62 – 10.8)	45.8 (38.4 – 54.9)	181 (148 – 227)	238
20–39 years	34.0 (25.1 – 45.9)	4.44 (1.93 – 7.72)	43.6 (29.2 – 57.8)	163 (129 – 250)	133
40–59 years	42.1 (31.0 – 57.1)	6.38 (3.20 – 9.27)	47.1 (30.4 – 65.8)	241 (167 – 440)	117
60 years and older	42.0 (31.7 – 55.6)	8.15† (2.80 – 14.6)	44.5 (31.8 – 61.6)	173† (120 – 404)	86

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.9.a.5. Urinary enterodiol: Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	38.7 (34.9 – 42.8)	5.87 (4.61 – 6.90)	44.2 (40.2 – 49.6)	244 (228 – 264)	2,108
6–11 years	39.3 (30.9 – 50.1)	8.74 (6.52 – 13.2)	40.4 (34.8 – 48.0)	139 (115 – 232)	193
12–19 years	42.1 (36.3 – 48.8)	8.80 (6.91 – 10.6)	42.8 (36.5 – 54.4)	176 (154 – 230)	378
20–39 years	40.0 (33.4 – 47.9)	5.42 (4.12 – 7.14)	43.8 (36.4 – 55.7)	238 (207 – 296)	494
40–59 years	36.3 (29.2 – 45.1)	3.71 (2.29 – 6.10)	45.2 (35.6 – 54.8)	264 (243 – 281)	448
60 years and older	38.8 (34.2 – 43.9)	5.91 (3.70 – 7.29)	46.0 (38.9 – 56.1)	258 (213 – 280)	595
Males					
Total, 6 years and older	41.1 (35.5 – 47.6)	6.75 (5.23 – 8.72)	46.4 (40.6 – 52.7)	259 (222 – 275)	1,035
6–11 years	40.8 (29.6 – 56.1)	9.08† (4.58 – 17.3)	39.9 (32.8 – 49.3)	129† (109 – 356)	99
12–19 years	42.5 (35.6 – 50.7)	9.11 (6.18 – 11.8)	48.2 (36.1 – 57.6)	176 (148 – 252)	191
20–39 years	40.6 (30.3 – 54.3)	5.50 (3.34 – 9.65)	43.8 (33.6 – 59.1)	238 (184 – 394)	217
40–59 years	42.2 (31.6 – 56.5)	5.30 (2.37 – 10.1)	48.1 (36.7 – 58.2)	280 (259 – 415)	229
60 years and older	39.4 (31.3 – 49.4)	6.58 (4.37 – 8.47)	50.3 (40.5 – 56.9)	246 (182 – 286)	299
Females					
Total, 6 years and older	36.4 (31.6 – 41.9)	4.79 (3.03 – 6.57)	42.3 (38.0 – 49.9)	240 (201 – 273)	1,073
6–11 years	37.7 (28.8 – 49.2)	7.98† (2.17 – 11.7)	41.0 (29.3 – 54.4)	155† (94.9 – 369)	94
12–19 years	41.6 (33.6 – 51.6)	8.15 (5.01 – 13.4)	40.1 (34.9 – 51.0)	174 (131 – 278)	187
20–39 years	39.4 (31.4 – 49.4)	4.87 (3.72 – 7.60)	46.0 (34.2 – 56.9)	236 (183 – 332)	277
40–59 years	31.2 (23.5 – 41.4)	2.52 (.780 – 5.15)	40.5 (31.0 – 55.4)	242 (189 – 276)	219
60 years and older	38.3 (32.0 – 45.8)	4.66 (2.91 – 7.14)	44.6 (33.4 – 58.2)	263 (207 – 309)	296

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.9.b. Urinary enterodiol: Concentrations by survey cycle

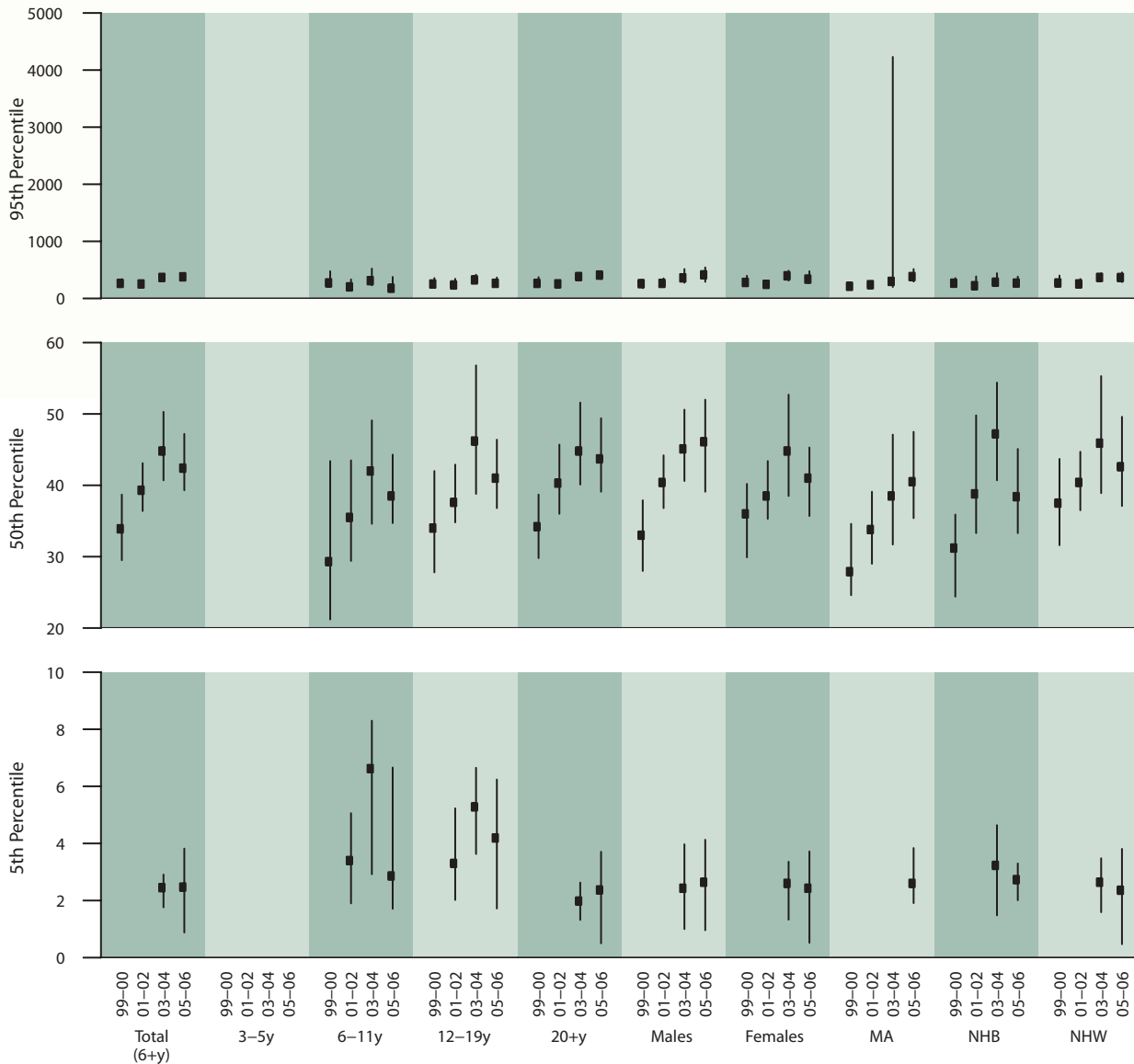
Geometric mean and selected percentiles of urine concentrations (in µg/L) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	26.6 (21.9 – 32.3)	< LOD	33.9 (29.5 – 38.7)	263 (219 – 338)	2,527
2001–2002	35.7 (32.5 – 39.3)	2.10 (< LOD – 3.07)	39.3 (36.4 – 43.1)	253 (225 – 307)	2,794
2003–2004	39.5 (36.1 – 43.3)	2.45 (1.76 – 2.91)	44.8 (40.7 – 50.3)	367 (318 – 424)	2,594
2005–2006	37.7 (33.2 – 42.9)	2.47 (.884 – 3.82)	42.4 (39.3 – 47.2)	378 (316 – 447)	2,528
Age group					
6–11 years					
1999–2000	26.5 (17.1 – 41.0)	< LOD	29.3 (21.2 – 43.4)	272 (203 – 477)	327
2001–2002	33.6 (29.8 – 37.8)	3.40 (1.90 – 5.06)	35.5 (29.4 – 43.5)	202 (170 – 333)	396
2003–2004	42.0 (34.5 – 51.1)	6.62 (2.92 – 8.30)	42.0 (34.6 – 49.1)	311 (230 – 523)	341
2005–2006	33.2 (26.1 – 42.3)	2.86 (1.71 – 6.66)	38.5 (34.7 – 44.3)	178 (136 – 377)	351
12–19 years					
1999–2000	29.8 (23.8 – 37.2)	< LOD	34.0 (27.8 – 42.0)	252 (193 – 357)	744
2001–2002	35.3 (30.5 – 40.9)	3.30 (2.02 – 5.23)	37.6 (34.8 – 42.9)	235 (172 – 344)	744
2003–2004	45.1 (39.4 – 51.6)	5.28 (3.63 – 6.65)	46.2 (38.8 – 56.8)	324 (276 – 416)	729
2005–2006	39.1 (34.0 – 45.0)	4.19 (1.72 – 6.24)	41.0 (36.8 – 46.4)	264 (232 – 367)	693
20–39 years					
1999–2000	27.4 (22.1 – 34.1)	< LOD	36.0 (29.9 – 41.3)	230 (177 – 401)	535
2001–2002	35.3 (29.5 – 42.3)	< LOD	42.5 (36.6 – 47.6)	244 (213 – 371)	604
2003–2004	39.7 (33.2 – 47.5)	2.69 (1.32 – 3.59)	44.5 (37.7 – 53.9)	372 (308 – 654)	554
2005–2006	38.6 (32.3 – 46.2)	3.01 (1.16 – 4.28)	43.5 (34.5 – 53.8)	352 (289 – 519)	583
40–59 years					
1999–2000	26.1 (21.4 – 31.8)	< LOD	34.6 (28.9 – 41.2)	280 (249 – 406)	414
2001–2002	37.3 (29.2 – 47.7)	< LOD	40.5 (34.5 – 50.9)	289 (232 – 488)	531
2003–2004	35.3 (28.6 – 43.6)	1.36 (< LOD – 2.16)	42.6 (36.3 – 50.6)	418 (283 – 712)	452
2005–2006	39.0 (29.4 – 51.8)	2.30 (< LOD – 4.32)	45.9 (34.1 – 59.0)	445 (287 – 651)	449
60 years and older					
1999–2000	23.7 (18.8 – 30.0)	< LOD	29.7 (21.9 – 37.4)	264 (167 – 479)	507
2001–2002	35.4 (30.0 – 41.8)	2.87 (1.55 – 4.49)	36.5 (30.2 – 46.0)	224 (195 – 364)	519
2003–2004	41.7 (36.7 – 47.4)	2.84 (1.82 – 4.35)	50.8 (43.2 – 58.3)	309 (265 – 615)	518
2005–2006	35.6 (29.0 – 43.8)	1.66 (< LOD – 3.05)	39.9 (31.1 – 51.8)	415 (322 – 614)	452
Gender					
Males					
1999–2000	25.3 (19.5 – 32.7)	< LOD	33.0 (28.0 – 37.9)	258 (179 – 324)	1,206
2001–2002	35.2 (31.8 – 39.1)	< LOD	40.4 (36.8 – 44.2)	263 (225 – 351)	1,375
2003–2004	39.7 (36.2 – 43.6)	2.43 (.998 – 3.97)	45.1 (40.6 – 50.6)	360 (275 – 515)	1,244
2005–2006	40.4 (32.8 – 49.8)	2.64 (.957 – 4.13)	46.1 (39.1 – 52.0)	413 (291 – 544)	1,252
Females					
1999–2000	27.9 (23.4 – 33.3)	< LOD	36.0 (29.9 – 40.2)	280 (228 – 397)	1,321
2001–2002	36.2 (32.2 – 40.7)	3.20 (< LOD – 4.75)	38.5 (35.3 – 43.4)	246 (222 – 286)	1,419
2003–2004	39.3 (33.8 – 45.5)	2.60 (1.33 – 3.36)	44.8 (38.5 – 52.7)	396 (313 – 485)	1,350
2005–2006	35.4 (30.3 – 41.2)	2.43 (.524 – 3.72)	41.0 (35.7 – 45.3)	338 (272 – 477)	1,276
Race/ethnicity					
Mexican Americans					
1999–2000	21.7 (19.5 – 24.1)	< LOD	27.9 (24.6 – 34.6)	212 (171 – 258)	791
2001–2002	30.5 (25.7 – 36.3)	1.62 (< LOD – 2.79)	33.8 (29.0 – 39.1)	240 (198 – 304)	679
2003–2004	33.1 (26.4 – 41.6)	1.90 (< LOD – 3.68)	38.5 (31.7 – 47.1)	298 (201 – 4,230)	653
2005–2006	38.1 (32.2 – 45.1)	2.60 (1.91 – 3.84)	40.5 (35.4 – 47.5)	382 (295 – 514)	634
Non-Hispanic Blacks					
1999–2000	25.7 (21.5 – 30.6)	< LOD	31.2 (24.4 – 35.9)	266 (219 – 356)	597
2001–2002	35.1 (28.8 – 42.8)	2.08 (< LOD – 3.42)	38.8 (33.3 – 49.8)	222 (178 – 386)	692
2003–2004	40.3 (34.7 – 46.8)	3.23 (1.48 – 4.64)	47.2 (40.7 – 54.4)	284 (244 – 442)	681
2005–2006	34.7 (30.1 – 40.1)	2.73 (2.01 – 3.30)	38.4 (33.3 – 45.1)	268 (248 – 382)	662
Non-Hispanic Whites					
1999–2000	29.1 (24.2 – 35.1)	< LOD	37.5 (31.6 – 43.7)	271 (219 – 401)	899
2001–2002	35.6 (31.8 – 40.0)	1.82 (< LOD – 3.21)	40.4 (36.5 – 44.7)	254 (219 – 341)	1,211
2003–2004	40.1 (35.6 – 45.1)	2.64 (1.59 – 3.48)	45.9 (38.9 – 55.3)	368 (305 – 441)	1,069
2005–2006	37.3 (31.2 – 44.6)	2.36 (.472 – 3.81)	42.6 (37.1 – 49.6)	366 (286 – 456)	1,039

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.9.b. Urinary enterodiol: Concentrations by survey cycle

Selected percentiles in $\mu\text{g/L}$ (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.10.a.1. Urinary enterodiol (creatinine corrected): Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
		2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	36.9 (34.3 – 39.7)	.909 (.427 – 1.35)	2.69 (1.93 – 3.70)	41.1 (38.2 – 44.1)	309 (283 – 360)	501 (440 – 716)	5,122
Age group							
6–11 years	40.5 (35.1 – 46.7)	3.41 (1.25 – 4.93)	6.16 (3.95 – 7.30)	43.6 (38.1 – 48.1)	216 (198 – 311)	367 (267 – 589)	692
12–19 years	31.3 (28.7 – 34.1)	1.87 (.883 – 2.78)	3.58 (2.79 – 4.68)	33.6 (31.9 – 36.1)	186 (163 – 232)	278 (220 – 542)	1,422
20–39 years	33.4 (29.3 – 38.1)	.793 (.250 – 1.49)	2.29 (1.52 – 2.99)	34.9 (31.6 – 43.0)	301 (244 – 400)	492 (366 – 808)	1,137
40–59 years	37.6 (31.8 – 44.5)	< LOD	1.75 (.889 – 3.41)	42.7 (36.6 – 50.2)	376 (286 – 491)	686 (438 – 1,530)	901
60 years and older	45.1 (39.9 – 50.9)	.610 (< LOD – 1.82)	4.15 (1.05 – 5.93)	51.0 (47.1 – 55.6)	386 (290 – 539)	556 (469 – 1,500)	970
Gender							
Males	31.8 (28.5 – 35.5)	.588 (< LOD – 1.30)	2.25 (1.31 – 3.67)	34.6 (32.0 – 38.0)	280 (233 – 338)	445 (331 – 789)	2,496
Females	42.5 (38.9 – 46.4)	.975 (< LOD – 1.86)	2.95 (2.22 – 4.19)	48.4 (45.0 – 54.6)	375 (296 – 432)	563 (445 – 852)	2,626
Race/ethnicity							
Mexican Americans	32.1 (27.9 – 36.9)	1.20 (< LOD – 1.87)	2.67 (1.62 – 3.47)	35.1 (30.5 – 39.3)	305 (239 – 375)	431 (337 – 876)	1,287
Non-Hispanic Blacks	26.3 (23.5 – 29.3)	.859 (< LOD – 1.10)	2.60 (1.56 – 3.18)	27.8 (24.9 – 31.4)	196 (165 – 218)	276 (224 – 353)	1,343
Non-Hispanic Whites	39.4 (35.5 – 43.6)	.849 (< LOD – 1.40)	2.87 (1.86 – 4.12)	45.4 (40.8 – 49.6)	315 (287 – 375)	508 (438 – 736)	2,108

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.10.a. Urinary enterodiol (creatinine corrected): Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

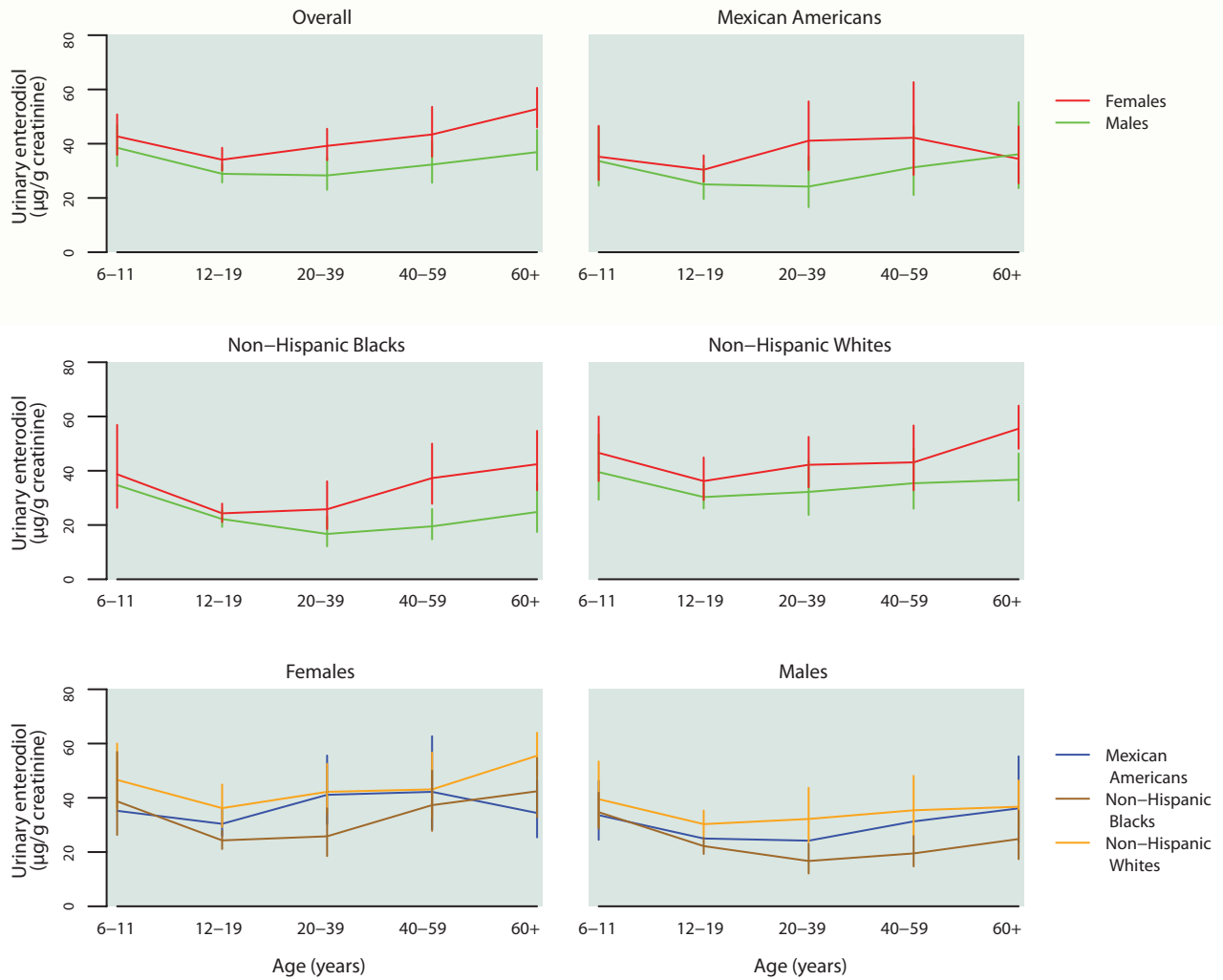


Table 4.10.a.2. Urinary enterodiol (creatinine corrected): Total population

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	36.9 (34.3 – 39.7)	6.26 (5.53 – 7.25)	41.1 (38.2 – 44.1)	202 (185 – 213)	5,122
6–11 years	40.5 (35.1 – 46.7)	8.85 (6.90 – 12.2)	43.6 (38.1 – 48.1)	166 (134 – 201)	692
12–19 years	31.3 (28.7 – 34.1)	6.90 (5.55 – 8.00)	33.6 (31.9 – 36.1)	130 (117 – 154)	1,422
20–39 years	33.4 (29.3 – 38.1)	5.04 (4.01 – 6.33)	34.9 (31.6 – 43.0)	185 (156 – 230)	1,137
40–59 years	37.6 (31.8 – 44.5)	5.64 (3.76 – 7.61)	42.7 (36.6 – 50.2)	217 (201 – 275)	901
60 years and older	45.1 (39.9 – 50.9)	7.91 (6.45 – 9.98)	51.0 (47.1 – 55.6)	228 (198 – 290)	970
Males					
Total, 6 years and older	31.8 (28.5 – 35.5)	5.68 (4.73 – 6.43)	34.6 (32.0 – 38.0)	176 (150 – 210)	2,496
6–11 years	38.5 (31.7 – 46.9)	8.54 (6.17 – 13.0)	38.3 (33.3 – 46.1)	144 (117 – 205)	340
12–19 years	28.9 (25.7 – 32.5)	5.59 (5.19 – 7.40)	32.6 (28.5 – 34.9)	123 (113 – 134)	728
20–39 years	28.3 (23.0 – 34.9)	4.69 (3.28 – 5.94)	29.9 (25.6 – 35.5)	152 (128 – 253)	499
40–59 years	32.3 (25.6 – 40.8)	5.53 (3.19 – 7.12)	33.7 (28.4 – 43.1)	207 (158 – 305)	451
60 years and older	36.9 (30.3 – 45.1)	6.29 (4.32 – 8.00)	43.8 (38.4 – 51.5)	204 (169 – 240)	478
Females					
Total, 6 years and older	42.5 (38.9 – 46.4)	7.53 (5.73 – 8.57)	48.4 (45.0 – 54.6)	210 (198 – 234)	2,626
6–11 years	42.7 (35.9 – 50.8)	9.12 (6.71 – 12.6)	48.1 (40.3 – 57.8)	177 (140 – 218)	352
12–19 years	34.1 (30.1 – 38.5)	8.29 (4.44 – 9.54)	36.0 (32.2 – 39.7)	144 (119 – 165)	694
20–39 years	39.2 (33.9 – 45.5)	5.48 (3.87 – 7.78)	46.3 (35.7 – 57.4)	203 (165 – 243)	638
40–59 years	43.4 (35.2 – 53.6)	5.72 (2.41 – 9.51)	52.6 (42.7 – 63.1)	231 (207 – 301)	450
60 years and older	52.8 (46.0 – 60.6)	9.89 (7.70 – 11.6)	57.4 (50.4 – 65.3)	249 (201 – 407)	492

Table 4.10.a.3. Urinary enterodiol (creatinine corrected): Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	32.1 (27.9 – 36.9)	4.54 (3.80 – 6.35)	35.1 (30.5 – 39.3)	185 (145 – 226)	1,287
6–11 years	34.4 (27.9 – 42.4)	5.18 (3.71 – 6.71)	37.2 (33.9 – 44.9)	178 (135 – 226)	231
12–19 years	27.5 (23.8 – 31.9)	4.55 (3.18 – 7.34)	33.6 (28.0 – 37.6)	123 (96.1 – 147)	445
20–39 years	30.9 (23.4 – 40.7)	4.02 (2.24 – 6.39)	31.1 (27.4 – 39.6)	203 (126 – 343)	282
40–59 years	36.1 (27.6 – 47.3)	5.14 (2.37 – 11.4)	35.2 (27.5 – 43.1)	234 (172 – 328)	157
60 years and older	35.1 (29.0 – 42.6)	5.53 (5.00 – 7.33)	40.9 (32.0 – 50.3)	171 (127 – 206)	172
Males					
Total, 6 years and older	27.6 (22.7 – 33.4)	3.88 (2.69 – 5.22)	33.1 (27.7 – 39.2)	145 (125 – 188)	625
6–11 years	33.6 (24.5 – 46.3)	5.54 (1.57 – 10.7)	39.3 (30.6 – 49.5)	136 (109 – 223)	112
12–19 years	25.0 (19.6 – 31.9)	3.94 (1.46 – 7.15)	31.8 (22.5 – 38.9)	128 (88.0 – 179)	228
20–39 years	24.2 (16.6 – 35.3)	3.11 (.554 – 5.48)	27.9 (20.7 – 38.8)	126 (93.7 – 316)	117
40–59 years	31.3 (21.1 – 46.5)	4.37† (< LOD – 9.03)	36.9 (24.4 – 56.4)	151† (125 – 326)	85
60 years and older	36.1 (23.6 – 55.3)	5.32† (1.31 – 7.57)	42.1 (24.2 – 74.3)	180† (111 – 3,470)	83
Females					
Total, 6 years and older	37.9 (33.8 – 42.5)	6.60 (4.51 – 9.67)	35.9 (33.1 – 40.5)	214 (182 – 310)	662
6–11 years	35.2 (26.6 – 46.6)	5.04 (3.18 – 6.59)	36.4 (28.5 – 45.9)	189 (140 – 434)	119
12–19 years	30.4 (26.0 – 35.7)	6.37 (3.16 – 9.37)	36.5 (29.2 – 40.5)	111 (87.0 – 153)	217
20–39 years	41.1 (30.3 – 55.6)	6.65 (2.66 – 10.7)	34.6 (28.4 – 43.7)	225 (156 – 1,900)	165
40–59 years	42.2 (28.5 – 62.7)	10.9† (< LOD – 15.6)	34.7 (24.5 – 42.5)	322† (224 – 401)	72
60 years and older	34.4 (25.4 – 46.4)	7.20† (1.42 – 12.2)	39.5 (30.7 – 49.7)	134† (114 – 219)	89

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.10.a.4. Urinary enterodiol (creatinine corrected): Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	26.3 (23.5 – 29.3)	5.31 (4.24 – 6.34)	27.8 (24.9 – 31.4)	125 (110 – 152)	1,343
6–11 years	36.6 (30.6 – 43.8)	9.75 (7.92 – 11.3)	34.5 (25.8 – 45.8)	136 (108 – 215)	207
12–19 years	23.2 (20.8 – 25.8)	4.63 (3.25 – 5.70)	26.0 (23.5 – 29.3)	97.7 (86.3 – 107)	496
20–39 years	21.3 (17.7 – 25.7)	3.72 (2.11 – 6.01)	23.0 (17.8 – 28.7)	114 (101 – 145)	249
40–59 years	27.8 (22.9 – 33.9)	4.81 (3.72 – 6.10)	31.2 (25.2 – 42.5)	138 (98.2 – 207)	231
60 years and older	34.4 (27.2 – 43.5)	6.11 (3.63 – 7.83)	40.0 (25.1 – 53.3)	158 (126 – 211)	160
Males					
Total, 6 years and older	20.9 (17.8 – 24.6)	4.17 (3.10 – 5.70)	23.1 (21.0 – 25.9)	103 (84.9 – 141)	661
6–11 years	34.7 (28.7 – 41.9)	9.17† (6.49 – 13.8)	27.8 (23.6 – 42.1)	133† (87.7 – 254)	99
12–19 years	22.2 (19.3 – 25.5)	3.94 (2.80 – 5.30)	25.8 (22.0 – 30.4)	98.2 (78.0 – 114)	258
20–39 years	16.7 (12.1 – 23.1)	3.28 (1.958 – 7.92)	15.6 (13.4 – 23.1)	98.0 (48.0 – 228)	116
40–59 years	19.5 (14.7 – 25.9)	3.83 (1.303 – 5.78)	24.4 (19.1 – 30.5)	88.7 (62.6 – 143)	114
60 years and older	24.8 (17.4 – 35.3)	2.85† (< LOD – 5.98)	29.4 (16.7 – 46.4)	154† (105 – 375)	74
Females					
Total, 6 years and older	31.8 (27.2 – 37.1)	6.96 (4.95 – 7.88)	34.8 (28.3 – 44.5)	145 (124 – 183)	682
6–11 years	38.7 (26.3 – 56.9)	9.48† (5.62 – 11.4)	36.2 (23.8 – 63.6)	138† (104 – 671)	108
12–19 years	24.3 (21.1 – 27.9)	5.67 (2.69 – 8.07)	26.0 (22.5 – 31.5)	97.2 (83.9 – 118)	238
20–39 years	25.8 (18.5 – 36.1)	4.01 (1.38 – 6.49)	28.5 (21.8 – 40.2)	122 (104 – 202)	133
40–59 years	37.3 (27.8 – 50.0)	7.65 (4.05 – 10.2)	45.8 (26.5 – 61.7)	186 (131 – 262)	117
60 years and older	42.4 (32.8 – 54.7)	7.78† (3.31 – 15.1)	42.5 (29.1 – 68.6)	157† (127 – 219)	86

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.10.a.5. Urinary enterodiol (creatinine corrected): Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	39.4 (35.5 – 43.6)	6.60 (5.58 – 8.19)	45.4 (40.8 – 49.6)	205 (186 – 224)	2,108
6–11 years	42.6 (34.0 – 53.4)	11.1 (5.34 – 16.8)	46.1 (37.0 – 52.0)	151 (121 – 226)	193
12–19 years	33.0 (28.8 – 37.8)	7.53 (5.66 – 9.35)	34.6 (31.7 – 40.5)	132 (117 – 163)	378
20–39 years	36.9 (30.1 – 45.0)	5.49 (3.01 – 7.72)	42.6 (32.9 – 54.0)	187 (154 – 248)	494
40–59 years	39.0 (31.5 – 48.3)	5.69 (3.16 – 8.27)	46.7 (37.1 – 56.0)	217 (195 – 290)	448
60 years and older	46.2 (40.4 – 52.9)	8.98 (6.44 – 11.1)	52.2 (47.7 – 56.5)	234 (199 – 291)	595
Males					
Total, 6 years and older	34.4 (29.6 – 40.0)	6.14 (4.80 – 7.62)	37.5 (32.7 – 42.5)	186 (150 – 238)	1,035
6–11 years	39.5 (29.3 – 53.4)	12.2† (1.42 – 18.9)	38.4 (31.5 – 49.8)	127† (93.3 – 328)	99
12–19 years	30.3 (26.1 – 35.3)	6.16 (5.29 – 8.96)	33.2 (27.5 – 40.5)	123 (111 – 139)	191
20–39 years	32.2 (23.7 – 43.7)	5.54 (2.27 – 8.17)	32.5 (23.0 – 47.3)	185 (128 – 338)	217
40–59 years	35.4 (26.0 – 48.1)	5.70 (2.28 – 9.38)	37.4 (28.6 – 50.0)	213 (158 – 341)	229
60 years and older	36.7 (29.0 – 46.4)	6.56 (2.03 – 10.7)	44.0 (38.4 – 52.2)	195 (164 – 241)	299
Females					
Total, 6 years and older	44.9 (39.5 – 51.0)	7.63 (5.36 – 9.36)	55.6 (47.8 – 60.8)	216 (199 – 251)	1,073
6–11 years	46.6 (36.2 – 60.0)	10.2† (4.05 – 15.4)	53.8 (41.4 – 64.6)	171† (131 – 302)	94
12–19 years	36.2 (29.2 – 44.9)	8.91 (4.19 – 10.9)	39.1 (31.4 – 46.2)	151 (117 – 216)	187
20–39 years	42.2 (33.9 – 52.5)	4.89 (2.69 – 8.91)	56.3 (40.0 – 66.8)	203 (159 – 275)	277
40–59 years	43.1 (32.8 – 56.7)	5.49 (1.59 – 9.39)	58.2 (42.5 – 71.1)	217 (204 – 305)	219
60 years and older	55.5 (48.1 – 64.0)	10.2 (7.90 – 12.2)	60.5 (51.3 – 67.3)	291 (203 – 469)	296

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.10.b. Urinary enterodiol (creatinine corrected): Concentrations by survey cycle

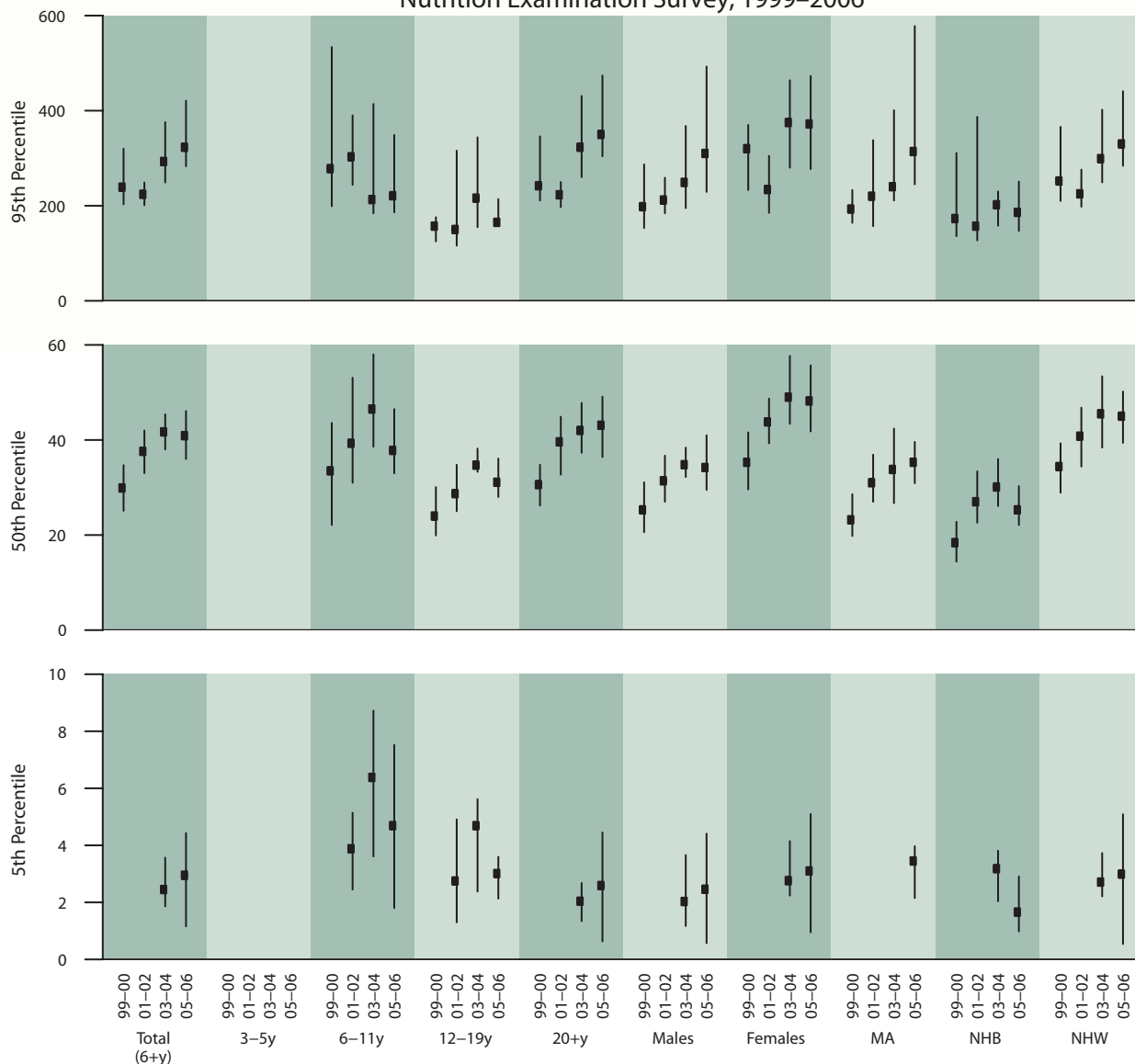
Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	24.2 (20.3 – 28.9)	<LOD	29.9 (25.1 – 34.7)	239 (203 – 320)	2,527
2001–2002	33.5 (30.7 – 36.7)	2.54 (<LOD – 2.96)	37.6 (33.0 – 42.0)	224 (201 – 249)	2,794
2003–2004	37.0 (33.6 – 40.7)	2.45 (1.86 – 3.57)	41.7 (38.0 – 45.4)	293 (249 – 376)	2,594
2005–2006	36.8 (32.7 – 41.4)	2.95 (1.16 – 4.43)	40.9 (36.0 – 46.1)	323 (283 – 421)	2,528
Age group					
6–11 years					
1999–2000	27.0 (18.6 – 39.3)	<LOD	33.5 (22.1 – 43.6)	278 (199 – 534)	327
2001–2002	38.1 (32.5 – 44.7)	3.88 (2.45 – 5.14)	39.3 (31.0 – 53.1)	303 (244 – 390)	396
2003–2004	44.7 (37.4 – 53.5)	6.38 (3.61 – 8.72)	46.5 (38.6 – 58.0)	213 (184 – 414)	341
2005–2006	36.6 (28.9 – 46.4)	4.69 (1.80 – 7.52)	37.8 (33.0 – 46.5)	221 (186 – 349)	351
12–19 years					
1999–2000	20.1 (16.7 – 24.2)	<LOD	24.0 (19.9 – 30.1)	157 (125 – 176)	744
2001–2002	27.2 (23.3 – 31.8)	2.75 (1.30 – 4.91)	28.7 (25.0 – 34.8)	150 (116 – 316)	744
2003–2004	33.8 (30.3 – 37.7)	4.69 (2.38 – 5.62)	34.7 (33.3 – 38.2)	216 (155 – 344)	729
2005–2006	29.0 (25.2 – 33.3)	3.01 (2.13 – 3.60)	31.1 (28.0 – 36.1)	165 (160 – 214)	693
20–39 years					
1999–2000	21.7 (17.1 – 27.6)	<LOD	26.4 (21.4 – 32.4)	232 (149 – 371)	535
2001–2002	28.5 (23.7 – 34.3)	<LOD	30.2 (25.2 – 39.4)	187 (156 – 277)	604
2003–2004	33.5 (27.4 – 40.9)	2.26 (1.63 – 2.71)	33.8 (27.9 – 46.2)	299 (245 – 425)	554
2005–2006	33.3 (27.5 – 40.3)	2.39 (1.618 – 4.04)	36.2 (30.4 – 47.2)	318 (207 – 523)	583
40–59 years					
1999–2000	26.4 (21.9 – 31.9)	<LOD	31.8 (27.4 – 38.7)	293 (217 – 358)	414
2001–2002	37.1 (30.0 – 45.7)	<LOD	44.2 (37.7 – 51.2)	246 (180 – 305)	531
2003–2004	33.8 (27.6 – 41.5)	1.16 (<LOD – 2.44)	40.8 (33.6 – 47.8)	369 (241 – 719)	452
2005–2006	41.6 (31.7 – 54.5)	2.95 (<LOD – 5.29)	46.6 (34.2 – 61.6)	375 (276 – 802)	449
60 years and older					
1999–2000	28.6 (23.0 – 35.6)	<LOD	33.5 (29.2 – 43.9)	258 (186 – 430)	507
2001–2002	41.9 (35.8 – 49.2)	3.67 (2.14 – 6.71)	46.3 (41.8 – 50.8)	238 (220 – 360)	519
2003–2004	49.4 (42.8 – 57.0)	5.75 (1.73 – 6.45)	57.1 (51.9 – 63.1)	309 (230 – 697)	518
2005–2006	41.3 (33.4 – 51.1)	2.15 (<LOD – 5.47)	45.4 (38.7 – 52.1)	418 (290 – 798)	452
Gender					
Males					
1999–2000	19.8 (15.4 – 25.4)	<LOD	25.3 (20.6 – 31.1)	198 (153 – 287)	1,206
2001–2002	28.7 (26.0 – 31.7)	<LOD	31.4 (27.0 – 36.7)	212 (184 – 259)	1,375
2003–2004	31.1 (27.5 – 35.0)	2.03 (1.17 – 3.66)	34.8 (32.2 – 38.4)	249 (195 – 368)	1,244
2005–2006	32.5 (26.7 – 39.5)	2.46 (1.565 – 4.41)	34.2 (29.5 – 41.0)	310 (229 – 493)	1,252
Females					
1999–2000	29.3 (25.0 – 34.4)	<LOD	35.3 (29.6 – 41.6)	320 (233 – 370)	1,321
2001–2002	38.9 (34.9 – 43.3)	3.35 (<LOD – 4.62)	43.8 (39.3 – 48.7)	234 (185 – 305)	1,419
2003–2004	43.6 (38.3 – 49.7)	2.76 (2.24 – 4.15)	49.0 (43.4 – 57.7)	375 (280 – 464)	1,350
2005–2006	41.4 (36.1 – 47.4)	3.10 (1.952 – 5.10)	48.2 (41.8 – 55.7)	372 (277 – 473)	1,276
Race/ethnicity					
Mexican Americans					
1999–2000	19.6 (17.3 – 22.2)	<LOD	23.2 (19.8 – 28.6)	193 (164 – 233)	791
2001–2002	28.7 (24.5 – 33.7)	2.60 (<LOD – 3.88)	31.0 (27.0 – 36.9)	220 (157 – 338)	679
2003–2004	29.9 (23.8 – 37.4)	1.88 (<LOD – 2.68)	33.8 (26.7 – 42.4)	240 (211 – 401)	653
2005–2006	34.4 (28.3 – 41.8)	3.45 (2.15 – 3.97)	35.3 (30.9 – 39.6)	314 (245 – 578)	634
Non-Hispanic Blacks					
1999–2000	16.5 (13.9 – 19.5)	<LOD	18.4 (14.4 – 22.8)	173 (136 – 311)	597
2001–2002	24.5 (19.4 – 30.8)	1.76 (<LOD – 3.48)	27.0 (22.6 – 33.4)	157 (127 – 387)	692
2003–2004	28.4 (24.2 – 33.3)	3.18 (2.04 – 3.81)	30.1 (26.1 – 36.0)	202 (158 – 230)	681
2005–2006	24.3 (20.5 – 28.9)	1.66 (1.980 – 2.91)	25.3 (22.1 – 30.3)	186 (147 – 251)	662
Non-Hispanic Whites					
1999–2000	28.7 (24.5 – 33.6)	<LOD	34.4 (28.9 – 39.3)	252 (210 – 366)	899
2001–2002	35.2 (31.5 – 39.4)	2.50 (<LOD – 2.90)	40.8 (34.4 – 46.8)	225 (198 – 276)	1,211
2003–2004	39.5 (34.5 – 45.3)	2.71 (2.21 – 3.73)	45.5 (38.4 – 53.4)	299 (249 – 402)	1,069
2005–2006	39.2 (33.3 – 46.1)	2.99 (1.537 – 5.09)	45.0 (39.4 – 50.2)	330 (284 – 441)	1,039

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.10.b. Urinary enterodiol (creatinine corrected): Concentrations by survey cycle

Selected percentiles in $\mu\text{g/g}$ creatinine (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.11 a.1. Urinary enterolactone: Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)					Sample size
		2.5th	5th	50th	95th	97.5th	
Total, 6 years and older	290 (266 – 317)	5.51 (3.93 – 6.69)	10.9 (9.27 – 14.5)	390 (350 – 435)	2,740 (2,560 – 2,980)	3,800 (3,390 – 4,340)	5,122
Age group							
6–11 years	340 (287 – 403)	11.4 (3.72 – 23.1)	25.6 (13.5 – 35.2)	413 (334 – 503)	2,150 (1,770 – 2,590)	2,670 (2,250 – 4,230)	692
12–19 years	303 (270 – 339)	5.99 (4.82 – 9.04)	14.0 (8.09 – 18.1)	394 (363 – 445)	2,560 (2,020 – 2,900)	3,290 (2,860 – 4,900)	1,422
20–39 years	272 (236 – 314)	6.15 (2.81 – 9.09)	10.8 (7.26 – 17.6)	349 (307 – 413)	2,810 (2,460 – 3,380)	3,930 (3,330 – 6,420)	1,137
40–59 years	271 (231 – 317)	3.90 (2.39 – 5.55)	7.59 (4.89 – 12.1)	389 (310 – 461)	3,050 (2,470 – 3,640)	4,130 (3,220 – 5,180)	901
60 years and older	327 (288 – 371)	5.82 (1.91 – 9.57)	14.1 (8.96 – 17.7)	476 (396 – 559)	2,690 (2,360 – 3,330)	3,460 (2,960 – 5,610)	970
Gender							
Males	307 (275 – 343)	5.60 (3.53 – 8.21)	12.5 (9.00 – 15.7)	424 (378 – 468)	2,850 (2,600 – 3,150)	3,790 (3,210 – 4,530)	2,496
Females	275 (242 – 313)	5.15 (3.46 – 6.73)	10.3 (8.69 – 14.3)	364 (321 – 422)	2,630 (2,360 – 3,070)	3,780 (3,190 – 5,400)	2,626
Race/ethnicity							
Mexican Americans	315 (282 – 352)	6.62 (5.35 – 9.21)	16.7 (8.05 – 25.3)	402 (364 – 435)	2,410 (2,040 – 2,940)	3,300 (2,670 – 4,760)	1,287
Non-Hispanic Blacks	299 (270 – 331)	5.73 (2.54 – 6.66)	11.0 (6.72 – 15.2)	421 (365 – 469)	2,300 (2,210 – 2,670)	3,140 (2,820 – 3,770)	1,343
Non-Hispanic Whites	287 (256 – 322)	5.56 (3.56 – 7.65)	11.0 (8.84 – 16.5)	387 (336 – 447)	2,740 (2,510 – 3,130)	3,850 (3,350 – 4,520)	2,108

Figure 4.11.a. Urinary enterolactone: Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

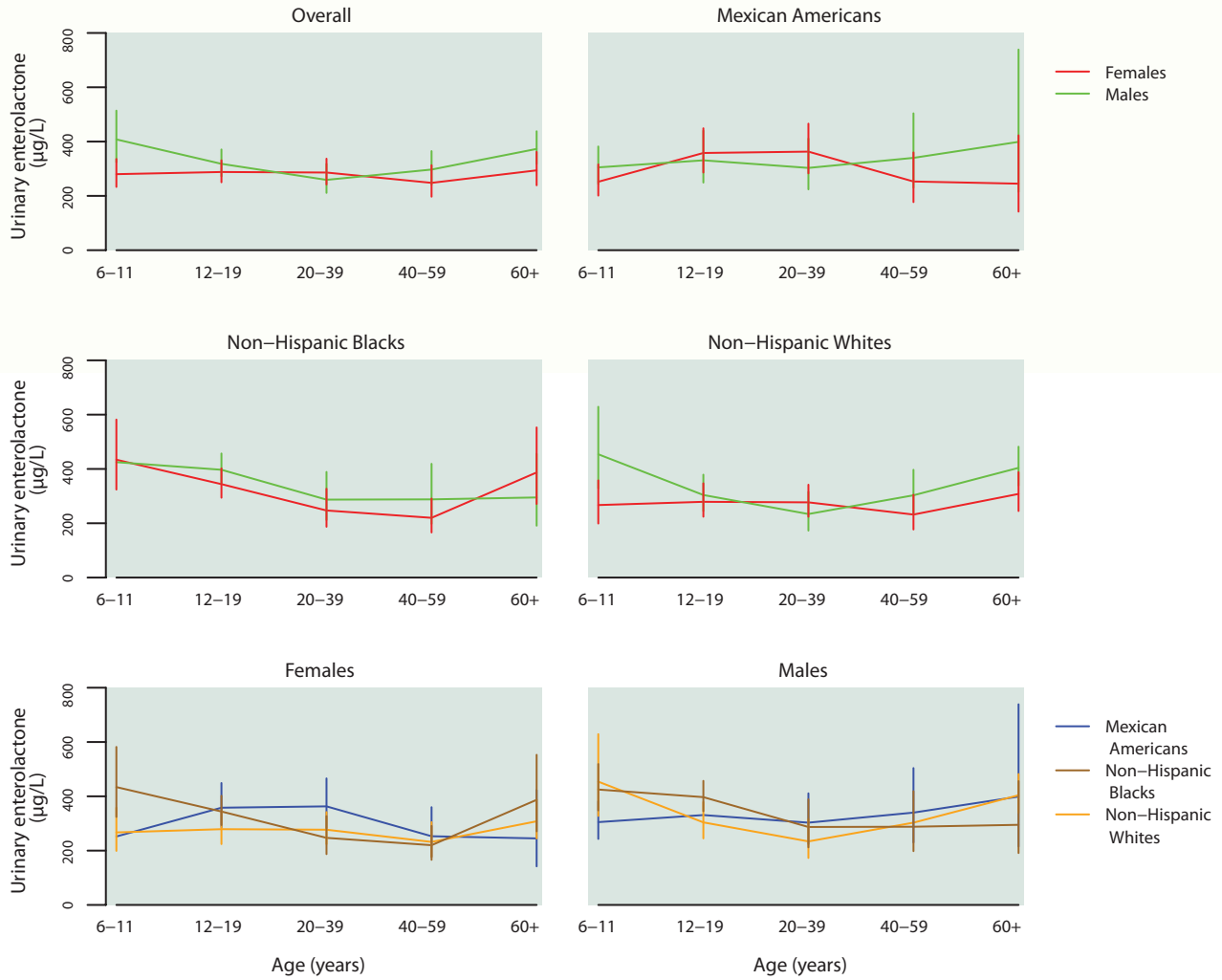


Table 4.11.a.2. Urinary enterolactone: Total population

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	290 (266 – 317)	26.5 (23.0 – 30.9)	390 (350 – 435)	1,810 (1,700 – 1,970)	5,122
6–11 years	340 (287 – 403)	56.2 (32.4 – 76.6)	413 (334 – 503)	1,490 (1,200 – 1,880)	692
12–19 years	303 (270 – 339)	27.3 (19.2 – 44.1)	394 (363 – 445)	1,680 (1,490 – 1,910)	1,422
20–39 years	272 (236 – 314)	26.5 (20.2 – 35.4)	349 (307 – 413)	1,780 (1,540 – 2,060)	1,137
40–59 years	271 (231 – 317)	19.8 (14.2 – 26.7)	389 (310 – 461)	1,950 (1,560 – 2,430)	901
60 years and older	327 (288 – 371)	30.1 (18.9 – 42.3)	476 (396 – 559)	2,020 (1,790 – 2,300)	970
Males					
Total, 6 years and older	307 (275 – 343)	28.8 (23.3 – 36.5)	424 (378 – 468)	1,910 (1,730 – 2,060)	2,496
6–11 years	408 (324 – 514)	79.9 (45.3 – 126)	481 (381 – 582)	1,520 (1,140 – 2,130)	340
12–19 years	318 (272 – 371)	28.6 (20.1 – 51.1)	418 (369 – 495)	1,800 (1,530 – 2,240)	728
20–39 years	259 (211 – 318)	26.2 (16.7 – 37.4)	334 (244 – 427)	1,790 (1,530 – 2,320)	499
40–59 years	297 (241 – 365)	21.7 (12.8 – 32.5)	427 (309 – 537)	2,050 (1,530 – 2,950)	451
60 years and older	373 (318 – 438)	38.9 (20.7 – 59.7)	551 (441 – 651)	2,040 (1,690 – 2,720)	478
Females					
Total, 6 years and older	275 (242 – 313)	24.6 (19.9 – 28.9)	364 (321 – 422)	1,770 (1,540 – 2,000)	2,626
6–11 years	280 (233 – 336)	32.3 (24.1 – 57.3)	346 (260 – 445)	1,420 (1,080 – 2,230)	352
12–19 years	288 (250 – 331)	23.3 (16.5 – 47.6)	372 (320 – 421)	1,520 (1,370 – 1,730)	694
20–39 years	286 (242 – 337)	27.3 (20.2 – 38.7)	354 (311 – 443)	1,760 (1,360 – 2,500)	638
40–59 years	248 (197 – 313)	19.3 (10.8 – 26.6)	349 (271 – 421)	1,840 (1,450 – 2,330)	450
60 years and older	294 (239 – 362)	26.8 (16.3 – 41.8)	424 (323 – 541)	2,010 (1,700 – 2,280)	492

Table 4.11.a.3. Urinary enterolactone: Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in µg/L) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	315 (282 – 352)	39.4 (28.0 – 48.8)	402 (364 – 435)	1,630 (1,460 – 1,930)	1,287
6–11 years	278 (238 – 325)	53.7 (36.8 – 70.2)	348 (265 – 403)	1,100 (898 – 1,510)	231
12–19 years	344 (288 – 411)	54.9 (36.7 – 77.6)	447 (386 – 526)	1,590 (1,280 – 2,050)	445
20–39 years	329 (276 – 393)	38.9 (21.1 – 56.1)	389 (334 – 471)	1,900 (1,470 – 2,650)	282
40–59 years	295 (220 – 396)	28.5 (12.0 – 43.9)	411 (286 – 578)	1,510 (1,260 – 2,150)	157
60 years and older	305 (192 – 484)	29.7 (6.75 – 60.8)	438 (204 – 673)	1,800 (1,270 – 5,730)	172
Males					
Total, 6 years and older	320 (276 – 372)	38.3 (25.0 – 51.0)	423 (362 – 501)	1,700 (1,490 – 2,030)	625
6–11 years	305 (243 – 382)	55.3 (34.8 – 94.5)	367 (243 – 433)	1,210 (862 – 1,960)	112
12–19 years	331 (249 – 440)	46.6 (31.6 – 67.2)	441 (325 – 562)	1,660 (1,180 – 2,480)	228
20–39 years	303 (224 – 411)	25.1 (6.52 – 63.5)	390 (276 – 518)	1,890 (1,350 – 2,780)	117
40–59 years	340 (230 – 504)	28.6† (12.2 – 44.6)	540 (286 – 673)	1,500† (1,250 – 3,450)	85
60 years and older	399 (215 – 739)	38.2† (4.50 – 106)	521 (205 – 1,080)	2,030† (1,350 – 6,680)	83
Females					
Total, 6 years and older	309 (268 – 356)	43.0 (21.6 – 57.0)	366 (317 – 436)	1,560 (1,280 – 1,960)	662
6–11 years	252 (201 – 316)	46.3 (32.3 – 56.2)	319 (243 – 407)	1,010 (776 – 1,740)	119
12–19 years	358 (286 – 449)	65.0 (31.6 – 94.3)	446 (356 – 567)	1,460 (1,160 – 2,040)	217
20–39 years	363 (283 – 466)	45.0 (14.8 – 74.7)	383 (310 – 566)	1,900 (1,260 – 3,510)	165
40–59 years	253 (177 – 360)	21.0† (5.66 – 44.2)	317 (192 – 525)	1,440† (920 – 3,070)	72
60 years and older	245 (142 – 423)	18.4† (5.17 – 52.4)	267 (149 – 676)	1,690† (994 – 3,320)	89

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.11.a.4. Urinary enterolactone: Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	299 (270 – 331)	26.0 (21.3 – 43.2)	421 (365 – 469)	1,580 (1,450 – 1,790)	1,343
6–11 years	429 (362 – 509)	117 (55.9 – 164)	419 (348 – 565)	1,560 (1,350 – 2,070)	207
12–19 years	370 (335 – 408)	46.6 (30.1 – 64.8)	523 (472 – 569)	1,640 (1,460 – 1,970)	496
20–39 years	264 (215 – 326)	23.0 (10.3 – 45.2)	437 (305 – 538)	1,410 (1,210 – 2,230)	249
40–59 years	248 (195 – 316)	19.8 (7.86 – 31.8)	326 (239 – 423)	1,630 (1,390 – 2,210)	231
60 years and older	349 (267 – 455)	39.2 (14.7 – 66.3)	551 (368 – 611)	1,760 (1,270 – 2,330)	160
Males					
Total, 6 years and older	320 (272 – 375)	30.8 (17.1 – 56.8)	439 (339 – 549)	1,740 (1,480 – 2,210)	661
6–11 years	425 (348 – 519)	123† (89.3 – 164)	363 (303 – 558)	1,460† (1,320 – 2,160)	99
12–19 years	397 (345 – 457)	58.9 (34.1 – 79.3)	502 (412 – 605)	1,770 (1,420 – 2,810)	258
20–39 years	287 (212 – 389)	24.9 (6.85 – 46.6)	444 (248 – 595)	1,860 (1,430 – 3,290)	116
40–59 years	288 (198 – 419)	16.4 (2.90 – 78.2)	344 (236 – 698)	1,880 (1,380 – 2,860)	114
60 years and older	295 (191 – 456)	17.8† (4.36 – 60.4)	520 (287 – 646)	1,290† (1,080 – 2,200)	74
Females					
Total, 6 years and older	282 (253 – 315)	23.9 (18.9 – 43.7)	418 (356 – 464)	1,470 (1,310 – 1,750)	682
6–11 years	434 (324 – 582)	94.1† (22.9 – 174)	531 (364 – 624)	1,590† (1,140 – 2,390)	108
12–19 years	344 (294 – 402)	33.9 (15.3 – 59.8)	530 (439 – 596)	1,590 (1,350 – 1,910)	238
20–39 years	247 (187 – 327)	18.0 (8.47 – 45.5)	421 (246 – 540)	1,180 (934 – 1,760)	133
40–59 years	220 (166 – 291)	21.5 (6.67 – 39.7)	303 (178 – 410)	1,530 (1,140 – 2,250)	117
60 years and older	387 (271 – 553)	44.3† (10.3 – 109)	575 (365 – 666)	1,770† (1,430 – 2,340)	86

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.11.a.5. Urinary enterolactone: Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/L) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	287 (256 – 322)	26.3 (22.3 – 31.2)	387 (336 – 447)	1,810 (1,650 – 2,010)	2,108
6–11 years	355 (279 – 452)	56.3 (25.8 – 99.3)	456 (279 – 562)	1,480 (1,100 – 2,250)	193
12–19 years	292 (248 – 344)	27.1 (17.2 – 54.8)	369 (325 – 424)	1,660 (1,390 – 1,950)	378
20–39 years	254 (207 – 312)	26.3 (18.2 – 35.4)	313 (235 – 389)	1,640 (1,410 – 2,290)	494
40–59 years	266 (219 – 323)	19.1 (12.2 – 26.9)	393 (300 – 480)	1,850 (1,510 – 2,440)	448
60 years and older	347 (301 – 401)	33.4 (20.6 – 45.2)	495 (427 – 588)	2,060 (1,800 – 2,400)	595
Males					
Total, 6 years and older	308 (265 – 358)	29.4 (22.9 – 38.0)	434 (374 – 489)	1,900 (1,660 – 2,160)	1,035
6–11 years	454 (328 – 629)	97.2† (29.3 – 181)	528 (338 – 805)	1,560† (1,070 – 2,670)	99
12–19 years	304 (245 – 379)	27.8 (10.6 – 56.7)	391 (337 – 493)	1,760 (1,360 – 2,340)	191
20–39 years	234 (173 – 316)	25.4 (9.45 – 38.0)	269 (194 – 400)	1,570 (1,300 – 2,460)	217
40–59 years	303 (232 – 397)	22.0 (9.47 – 38.6)	437 (304 – 578)	2,130 (1,580 – 2,880)	229
60 years and older	404 (339 – 482)	40.6 (21.8 – 72.4)	596 (454 – 697)	2,080 (1,700 – 2,780)	299
Females					
Total, 6 years and older	268 (227 – 316)	24.6 (19.0 – 29.0)	350 (294 – 415)	1,760 (1,450 – 2,090)	1,073
6–11 years	267 (199 – 358)	26.4† (12.5 – 71.6)	278 (207 – 488)	1,390† (1,040 – 3,010)	94
12–19 years	279 (224 – 347)	21.0 (14.5 – 64.0)	336 (257 – 404)	1,540 (1,020 – 1,990)	187
20–39 years	277 (224 – 342)	26.9 (19.5 – 35.1)	335 (264 – 408)	1,770 (1,230 – 2,790)	277
40–59 years	232 (177 – 305)	17.1 (8.39 – 26.9)	348 (220 – 423)	1,730 (1,250 – 2,200)	219
60 years and older	308 (245 – 388)	29.2 (17.2 – 42.6)	434 (323 – 570)	2,040 (1,690 – 2,360)	296

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.11.b. Urinary enterolactone: Concentrations by survey cycle

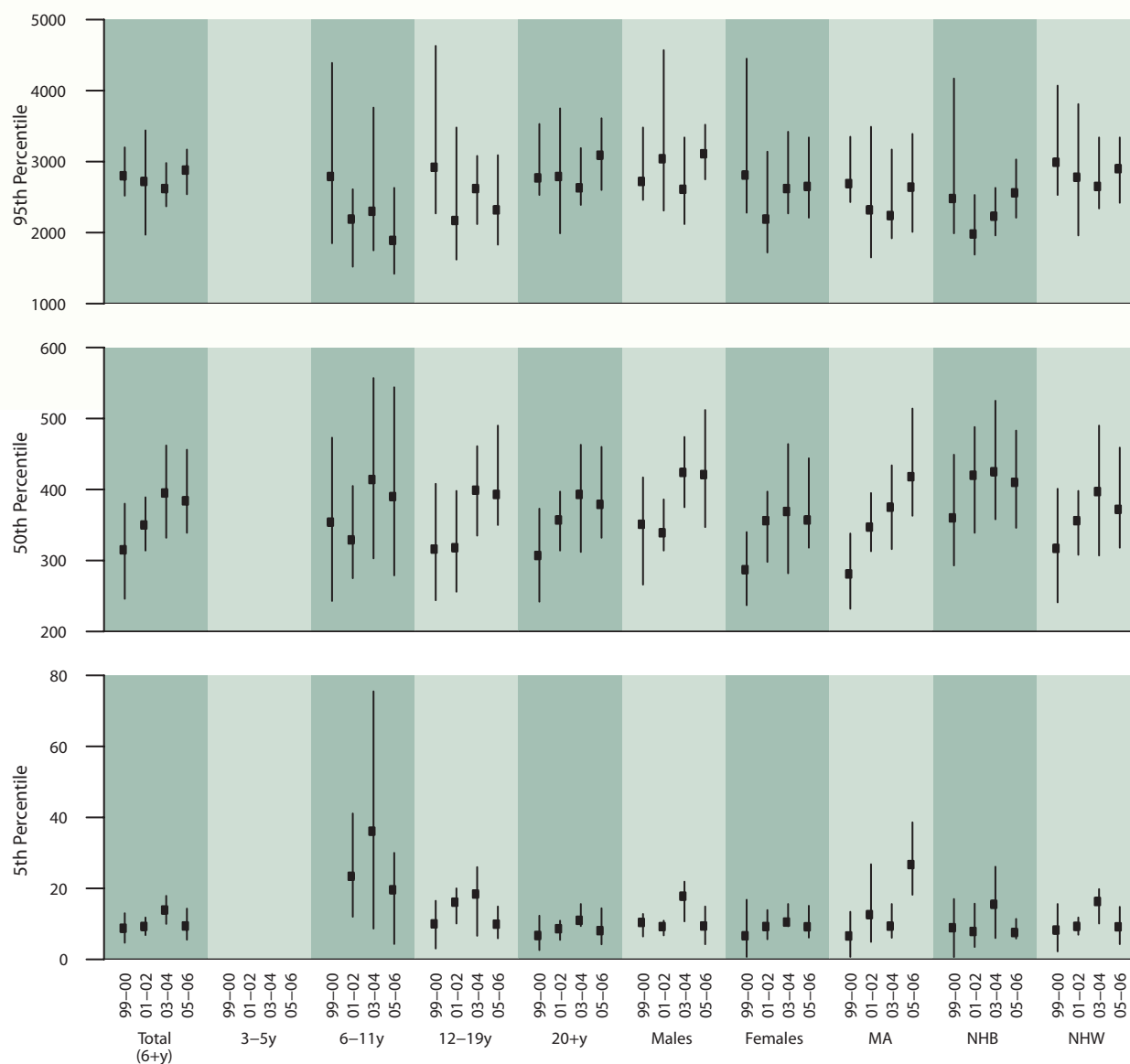
Geometric mean and selected percentiles of urine concentrations (in µg/L) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		5th	50th	95th	
Total, 6 years and older					
1999–2000	239 (200 – 286)	8.77 (4.68 – 13.0)	315 (246 – 380)	2,800 (2,520 – 3,200)	2,548
2001–2002	259 (233 – 287)	9.27 (6.84 – 11.8)	350 (314 – 389)	2,720 (1,970 – 3,440)	2,794
2003–2004	298 (265 – 334)	13.9 (10.0 – 17.9)	395 (332 – 462)	2,620 (2,370 – 2,980)	2,594
2005–2006	283 (245 – 327)	9.40 (5.54 – 14.3)	384 (339 – 456)	2,880 (2,540 – 3,170)	2,528
Age group					
6–11 years					
1999–2000	308 (219 – 432)	34.7 (< LOD – 45.9)	354 (243 – 473)	2,790 (1,850 – 4,390)	331
2001–2002	288 (245 – 339)	23.4 (12.0 – 41.1)	329 (275 – 405)	2,190 (1,520 – 2,610)	396
2003–2004	384 (287 – 513)	36.1 (8.67 – 75.5)	414 (303 – 557)	2,300 (1,750 – 3,760)	341
2005–2006	300 (242 – 373)	19.6 (4.34 – 30.0)	390 (279 – 544)	1,890 (1,420 – 2,630)	351
12–19 years					
1999–2000	250 (191 – 327)	10.0 (3.06 – 16.5)	316 (244 – 408)	2,920 (2,270 – 4,630)	746
2001–2002	267 (231 – 308)	16.1 (10.1 – 20.0)	318 (256 – 398)	2,170 (1,620 – 3,480)	744
2003–2004	314 (267 – 369)	18.4 (6.64 – 26.0)	399 (335 – 461)	2,620 (2,120 – 3,080)	729
2005–2006	292 (245 – 348)	9.91 (5.93 – 14.9)	393 (350 – 490)	2,320 (1,830 – 3,090)	693
20–39 years					
1999–2000	231 (182 – 293)	8.06 (1.33 – 17.0)	303 (228 – 380)	2,660 (2,310 – 4,310)	535
2001–2002	242 (196 – 301)	8.89 (6.56 – 10.9)	335 (263 – 419)	2,890 (1,870 – 4,740)	604
2003–2004	279 (224 – 349)	14.1 (6.47 – 23.0)	372 (289 – 474)	2,500 (1,830 – 3,330)	554
2005–2006	265 (218 – 322)	9.63 (4.72 – 19.0)	337 (276 – 381)	3,130 (2,410 – 7,470)	583
40–59 years					
1999–2000	211 (161 – 278)	2.50 (.690 – 7.44)	297 (229 – 401)	2,970 (2,250 – 5,070)	420
2001–2002	250 (187 – 333)	7.35 (3.98 – 11.5)	369 (278 – 429)	2,880 (1,870 – 4,820)	531
2003–2004	271 (231 – 319)	10.2 (7.40 – 12.5)	372 (281 – 429)	2,720 (2,350 – 4,400)	452
2005–2006	270 (203 – 360)	5.04 (2.73 – 13.3)	397 (299 – 539)	3,060 (2,260 – 4,030)	449
60 years and older					
1999–2000	261 (205 – 331)	10.3 (4.10 – 18.7)	315 (238 – 417)	2,680 (2,240 – 4,580)	516
2001–2002	288 (247 – 334)	8.74 (3.09 – 17.8)	386 (311 – 451)	2,450 (1,710 – 3,460)	519
2003–2004	327 (287 – 372)	17.3 (9.92 – 21.1)	457 (367 – 547)	2,690 (2,360 – 3,170)	518
2005–2006	327 (260 – 410)	11.9 (6.63 – 17.1)	507 (374 – 632)	2,680 (2,070 – 4,400)	452
Gender					
Males					
1999–2000	254 (212 – 304)	10.4 (6.45 – 12.8)	351 (266 – 417)	2,720 (2,460 – 3,480)	1,219
2001–2002	262 (233 – 295)	9.23 (6.76 – 10.9)	339 (314 – 386)	3,040 (2,310 – 4,570)	1,375
2003–2004	314 (280 – 351)	17.8 (10.7 – 21.9)	424 (375 – 474)	2,610 (2,120 – 3,340)	1,244
2005–2006	301 (247 – 368)	9.40 (4.26 – 14.9)	421 (347 – 512)	3,110 (2,750 – 3,520)	1,252
Females					
1999–2000	226 (180 – 284)	6.64 (.711 – 16.8)	287 (237 – 340)	2,810 (2,280 – 4,450)	1,329
2001–2002	255 (226 – 288)	9.25 (5.66 – 13.9)	356 (298 – 397)	2,190 (1,720 – 3,140)	1,419
2003–2004	283 (233 – 343)	10.5 (9.33 – 15.6)	369 (282 – 464)	2,620 (2,270 – 3,420)	1,350
2005–2006	267 (220 – 324)	9.18 (6.13 – 15.1)	357 (318 – 444)	2,650 (2,210 – 3,340)	1,276
Race/ethnicity					
Mexican Americans					
1999–2000	212 (169 – 265)	6.58 (.710 – 13.4)	281 (232 – 338)	2,690 (2,430 – 3,350)	813
2001–2002	275 (221 – 342)	12.6 (4.92 – 26.8)	347 (313 – 395)	2,320 (1,650 – 3,490)	679
2003–2004	275 (239 – 316)	9.35 (6.08 – 15.6)	375 (316 – 434)	2,240 (1,920 – 3,170)	653
2005–2006	359 (311 – 415)	26.7 (18.2 – 38.6)	418 (363 – 514)	2,640 (2,010 – 3,390)	634
Non-Hispanic Blacks					
1999–2000	262 (194 – 352)	8.91 (.671 – 17.0)	360 (293 – 449)	2,480 (1,990 – 4,170)	594
2001–2002	279 (224 – 347)	7.85 (3.49 – 15.7)	420 (339 – 488)	1,980 (1,690 – 2,530)	692
2003–2004	324 (282 – 372)	15.5 (6.01 – 26.1)	425 (358 – 525)	2,230 (1,960 – 2,630)	681
2005–2006	276 (237 – 322)	7.55 (5.86 – 11.4)	410 (346 – 483)	2,560 (2,210 – 3,030)	662
Non-Hispanic Whites					
1999–2000	247 (196 – 312)	8.26 (2.25 – 15.6)	317 (241 – 401)	2,990 (2,530 – 4,070)	901
2001–2002	268 (236 – 305)	9.30 (6.94 – 11.8)	356 (308 – 398)	2,780 (1,960 – 3,810)	1,211
2003–2004	301 (256 – 355)	16.3 (10.1 – 19.8)	397 (307 – 490)	2,650 (2,340 – 3,340)	1,069
2005–2006	274 (228 – 329)	9.17 (4.29 – 14.8)	372 (318 – 459)	2,900 (2,420 – 3,340)	1,039

< LOD means less than the limit of detection, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.11.b. Urinary enterolactone: Concentrations by survey cycle

Selected percentiles in $\mu\text{g/L}$ (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

Table 4.12.a.1. Urinary enterolactone (creatinine corrected): Concentrations

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)		Selected percentiles (95% conf. interval)					Sample size
	2.5th	5th	50th	95th	97.5th			
Total, 6 years and older	5.55 (4.13 – 6.95)	11.2 (9.15 – 13.5)	375 (341 – 418)	2,500 (2,250 – 2,890)	3,780 (3,380 – 4,390)	5,122		
Age group								
6–11 years	368 (312 – 434)	14.6 (7.65 – 30.5)	33.6 (21.0 – 47.1)	463 (382 – 535)	2,120 (1,770 – 2,530)	2,630 (2,300 – 3,430)	692	
12–19 years	225 (203 – 250)	6.79 (4.71 – 8.45)	11.3 (7.51 – 14.7)	290 (271 – 307)	1,470 (1,330 – 1,790)	2,180 (1,580 – 3,540)	1,422	
20–39 years	232 (200 – 269)	4.10 (2.40 – 8.49)	9.56 (6.42 – 13.7)	314 (273 – 363)	2,440 (1,860 – 3,750)	3,780 (2,880 – 5,890)	1,137	
40–59 years	274 (231 – 326)	4.59 (2.61 – 6.17)	8.62 (5.64 – 13.1)	366 (323 – 468)	2,870 (2,260 – 4,000)	4,880 (3,470 – 6,600)	901	
60 years and older	383 (334 – 438)	6.04 (2.51 – 9.36)	13.5 (8.69 – 18.9)	582 (502 – 671)	2,780 (2,480 – 3,620)	4,110 (3,400 – 5,060)	970	
Gender								
Males	244 (216 – 275)	4.80 (2.78 – 6.36)	10.7 (6.43 – 13.5)	336 (298 – 371)	2,110 (1,930 – 2,310)	2,930 (2,440 – 3,460)	2,496	
Females	313 (275 – 357)	6.82 (4.83 – 8.44)	11.3 (9.39 – 15.4)	418 (360 – 481)	2,890 (2,560 – 3,740)	4,590 (3,880 – 5,900)	2,626	
Race/ethnicity								
Mexican Americans	284 (251 – 322)	5.88 (3.39 – 8.31)	14.6 (9.01 – 21.8)	366 (331 – 417)	1,920 (1,670 – 2,260)	2,350 (2,110 – 3,390)	1,287	
Non-Hispanic Blacks	210 (189 – 233)	4.37 (2.46 – 5.15)	7.91 (5.58 – 10.8)	294 (274 – 325)	1,480 (1,340 – 1,670)	2,020 (1,690 – 2,300)	1,343	
Non-Hispanic Whites	292 (258 – 331)	5.97 (3.88 – 8.66)	12.6 (9.39 – 14.6)	406 (350 – 469)	2,730 (2,330 – 3,370)	4,180 (3,430 – 5,250)	2,108	

Figure 4.12.a. Urinary enterolactone (creatinine corrected): Concentrations by age group

Geometric mean (95% confidence interval), National Health and Nutrition Examination Survey, 2003–2006

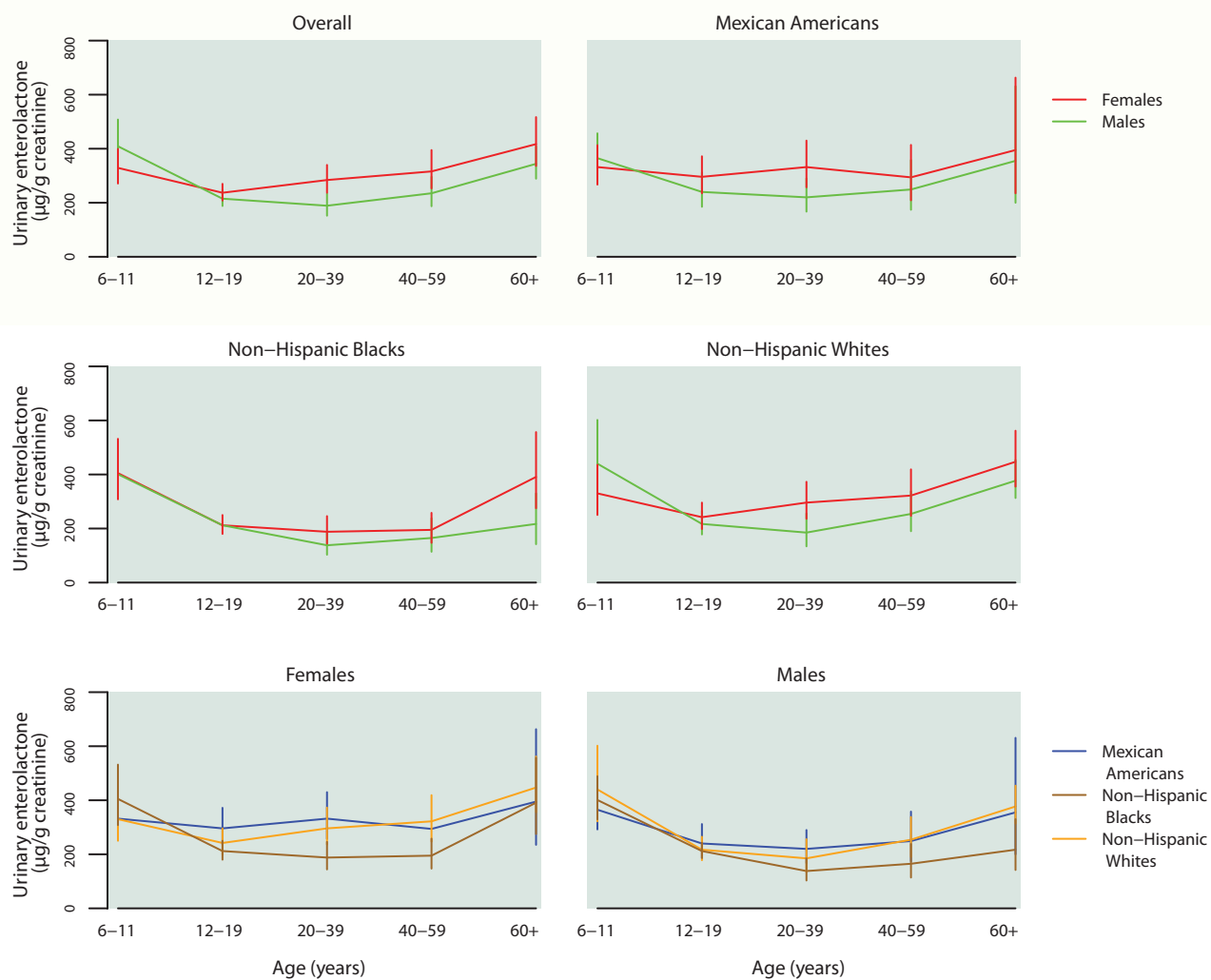


Table 4.12.a.2. Urinary enterolactone (creatinine corrected): Total population

Geometric mean and selected percentiles of urine concentrations (in $\mu\text{g/g}$ creatinine) for the total U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	277 (252 – 305)	26.1 (20.3 – 31.3)	375 (341 – 418)	1,620 (1,480 – 1,800)	5,122
6–11 years	368 (312 – 434)	79.9 (44.5 – 104)	463 (382 – 535)	1,480 (1,200 – 1,900)	692
12–19 years	225 (203 – 250)	22.6 (18.0 – 36.1)	290 (271 – 307)	1,140 (996 – 1,220)	1,422
20–39 years	232 (200 – 269)	20.0 (15.1 – 28.5)	314 (273 – 363)	1,460 (1,250 – 1,720)	1,137
40–59 years	274 (231 – 326)	21.1 (15.4 – 28.7)	366 (323 – 468)	1,720 (1,510 – 2,100)	901
60 years and older	383 (334 – 438)	33.8 (22.8 – 46.9)	582 (502 – 671)	2,130 (1,840 – 2,310)	970
Males					
Total, 6 years and older	244 (216 – 275)	21.0 (16.3 – 28.5)	336 (298 – 371)	1,400 (1,290 – 1,580)	2,496
6–11 years	409 (329 – 508)	91.0 (45.7 – 127)	471 (395 – 622)	1,380 (1,190 – 2,000)	340
12–19 years	215 (188 – 247)	20.9 (13.6 – 34.9)	292 (258 – 312)	1,150 (924 – 1,390)	728
20–39 years	189 (152 – 234)	16.8 (11.7 – 21.7)	257 (209 – 315)	1,290 (1,050 – 1,610)	499
40–59 years	235 (187 – 296)	18.5 (12.7 – 30.6)	328 (267 – 417)	1,450 (1,230 – 1,930)	451
60 years and older	344 (289 – 409)	35.8 (16.2 – 57.6)	522 (452 – 576)	1,720 (1,490 – 2,210)	478
Females					
Total, 6 years and older	313 (275 – 357)	30.0 (22.8 – 35.5)	418 (360 – 481)	1,840 (1,640 – 2,210)	2,626
6–11 years	329 (271 – 399)	56.3 (31.6 – 89.2)	431 (324 – 515)	1,660 (1,080 – 2,310)	352
12–19 years	237 (208 – 270)	25.5 (14.5 – 43.8)	285 (251 – 320)	1,080 (918 – 1,230)	694
20–39 years	284 (237 – 340)	30.8 (15.9 – 42.8)	377 (315 – 431)	1,640 (1,360 – 2,360)	638
40–59 years	316 (253 – 395)	23.7 (15.5 – 32.1)	424 (334 – 585)	2,130 (1,580 – 2,940)	450
60 years and older	417 (336 – 517)	28.3 (19.4 – 53.4)	636 (511 – 784)	2,290 (2,020 – 2,730)	492

Table 4.12.a.3. Urinary enterolactone (creatinine corrected): Mexican Americans

Geometric mean and selected percentiles of urine concentrations (in $\mu\text{g/g}$ creatinine) for Mexican Americans in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	284 (251 – 322)	37.6 (27.2 – 48.7)	366 (331 – 417)	1,410 (1,240 – 1,620)	1,287
6–11 years	349 (304 – 400)	79.6 (57.9 – 113)	404 (338 – 472)	1,330 (1,020 – 1,670)	231
12–19 years	266 (225 – 315)	40.1 (26.8 – 56.0)	343 (286 – 397)	1,160 (986 – 1,320)	445
20–39 years	266 (218 – 324)	29.6 (14.6 – 47.7)	328 (257 – 408)	1,480 (1,210 – 1,940)	282
40–59 years	270 (203 – 358)	25.4 (10.6 – 46.6)	400 (291 – 589)	1,190 (898 – 1,770)	157
60 years and older	376 (246 – 576)	29.4 (8.02 – 89.3)	487 (332 – 761)	1,800 (1,550 – 2,210)	172
Males					
Total, 6 years and older	253 (219 – 291)	31.0 (22.9 – 44.1)	334 (287 – 401)	1,210 (1,020 – 1,480)	625
6–11 years	365 (292 – 457)	88.4 (58.8 – 127)	403 (290 – 494)	1,390 (956 – 1,970)	112
12–19 years	240 (185 – 312)	31.2 (18.5 – 42.9)	289 (241 – 375)	1,170 (928 – 1,530)	228
20–39 years	220 (167 – 290)	27.2 (3.66 – 48.2)	257 (222 – 396)	1,270 (930 – 1,900)	117
40–59 years	249 (174 – 358)	23.3† (6.34 – 49.2)	399 (235 – 603)	898† (841 – 1,530)	85
60 years and older	355 (200 – 631)	37.2† (3.60 – 128)	503 (322 – 714)	1,540† (1,100 – 6,820)	83
Females					
Total, 6 years and older	322 (275 – 378)	40.7 (28.9 – 66.8)	382 (331 – 484)	1,600 (1,330 – 1,870)	662
6–11 years	332 (267 – 413)	64.3 (34.7 – 110)	401 (311 – 538)	1,130 (861 – 1,830)	119
12–19 years	296 (235 – 372)	57.9 (30.5 – 99.0)	378 (316 – 443)	1,100 (860 – 1,350)	217
20–39 years	332 (257 – 430)	39.7 (17.2 – 71.6)	361 (292 – 548)	1,630 (1,300 – 3,210)	165
40–59 years	294 (209 – 414)	28.5† (3.25 – 64.6)	374 (215 – 655)	1,390† (1,090 – 2,590)	72
60 years and older	395 (235 – 663)	25.8† (5.58 – 112)	487 (197 – 1,220)	1,880† (1,590 – 4,100)	89

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.12.a.4. Urinary enterolactone (creatinine corrected): Non-Hispanic blacks

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic blacks in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	210 (189 – 233)	20.2 (13.8 – 30.9)	294 (274 – 325)	1,080 (995 – 1,210)	1,343
6–11 years	403 (342 – 476)	126 (82.0 – 147)	469 (378 – 550)	1,300 (1,080 – 1,660)	207
12–19 years	212 (194 – 232)	30.8 (19.9 – 38.3)	282 (251 – 313)	843 (755 – 1,010)	496
20–39 years	164 (133 – 201)	15.8 (10.5 – 22.2)	263 (194 – 306)	914 (741 – 1,040)	249
40–59 years	180 (143 – 228)	11.8 (5.52 – 24.1)	264 (207 – 321)	1,080 (933 – 1,390)	231
60 years and older	311 (242 – 399)	25.1 (12.7 – 61.0)	489 (325 – 693)	1,430 (1,210 – 1,770)	160
Males					
Total, 6 years and older	187 (157 – 222)	20.0 (11.2 – 31.3)	267 (223 – 305)	1,050 (940 – 1,200)	661
6–11 years	401 (329 – 489)	122† (69.6 – 153)	417 (332 – 523)	1,220† (1,020 – 1,730)	99
12–19 years	212 (186 – 243)	31.8 (19.4 – 44.2)	264 (222 – 301)	923 (767 – 1,320)	258
20–39 years	138 (103 – 185)	12.2 (2.62 – 27.1)	192 (113 – 291)	969 (657 – 1,180)	116
40–59 years	165 (114 – 238)	10.2 (3.65 – 35.8)	233 (167 – 305)	1,040 (711 – 1,440)	114
60 years and older	217 (142 – 330)	14.8† (3.29 – 51.0)	329 (249 – 440)	1,090† (842 – 3,370)	74
Females					
Total, 6 years and older	231 (207 – 259)	20.3 (13.3 – 35.8)	317 (286 – 349)	1,150 (974 – 1,410)	682
6–11 years	405 (308 – 532)	127† (20.6 – 163)	512 (386 – 585)	1,360† (898 – 2,610)	108
12–19 years	212 (180 – 250)	26.0 (11.1 – 39.8)	299 (249 – 360)	814 (727 – 927)	238
20–39 years	188 (144 – 246)	16.1 (7.55 – 32.9)	276 (197 – 347)	820 (619 – 1,360)	133
40–59 years	195 (147 – 258)	11.4 (5.89 – 33.6)	289 (205 – 392)	1,170 (928 – 1,600)	117
60 years and older	391 (275 – 557)	40.6† (9.12 – 96.7)	707 (327 – 822)	1,620† (1,380 – 2,090)	86

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.12.a.5. Urinary enterolactone (creatinine corrected): Non-Hispanic whites

Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for non-Hispanic whites in the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 2003–2006.

	Geometric mean (95% conf. interval)	Selected percentiles (95% conf. interval)			Sample size
		10th	50th	90th	
Males and Females					
Total, 6 years and older	292 (258 – 331)	26.3 (20.0 – 31.5)	406 (350 – 469)	1,680 (1,510 – 2,020)	2,108
6–11 years	385 (305 – 486)	80.8 (35.3 – 113)	467 (367 – 615)	1,380 (1,170 – 2,000)	193
12–19 years	229 (196 – 267)	22.7 (14.2 – 39.5)	277 (247 – 318)	1,150 (959 – 1,320)	378
20–39 years	234 (188 – 292)	18.7 (12.5 – 29.1)	319 (258 – 417)	1,550 (1,200 – 2,350)	494
40–59 years	286 (232 – 352)	22.5 (14.8 – 30.7)	379 (323 – 500)	1,810 (1,500 – 2,210)	448
60 years and older	415 (358 – 480)	38.5 (23.7 – 57.9)	611 (529 – 717)	2,210 (1,850 – 2,610)	595
Males					
Total, 6 years and older	258 (219 – 304)	20.6 (16.0 – 30.1)	360 (309 – 418)	1,490 (1,320 – 1,680)	1,035
6–11 years	440 (322 – 602)	111† (32.6 – 149)	478 (380 – 740)	1,330† (1,150 – 2,850)	99
12–19 years	217 (178 – 265)	20.8 (13.2 – 36.5)	295 (230 – 345)	1,150 (843 – 1,400)	191
20–39 years	185 (134 – 256)	16.1 (5.82 – 20.9)	263 (176 – 362)	1,330 (1,010 – 2,350)	217
40–59 years	254 (190 – 338)	18.8 (12.8 – 34.3)	338 (267 – 497)	1,570 (1,270 – 2,040)	229
60 years and older	377 (313 – 454)	38.1 (18.3 – 61.4)	551 (467 – 666)	1,820 (1,480 – 2,430)	299
Females					
Total, 6 years and older	330 (280 – 389)	31.3 (23.1 – 39.4)	447 (375 – 526)	1,990 (1,660 – 2,530)	1,073
6–11 years	330 (250 – 436)	57.0† (24.7 – 98.5)	427 (257 – 554)	1,690† (1,010 – 2,420)	94
12–19 years	242 (198 – 296)	28.8 (12.4 – 75.4)	264 (238 – 320)	1,180 (909 – 1,350)	187
20–39 years	296 (236 – 373)	30.0 (13.3 – 48.8)	417 (312 – 470)	1,690 (1,250 – 3,260)	277
40–59 years	322 (247 – 419)	25.9 (15.8 – 32.6)	445 (323 – 614)	2,130 (1,500 – 3,470)	219
60 years and older	447 (355 – 562)	35.6 (21.3 – 69.1)	662 (529 – 845)	2,400 (2,090 – 3,040)	296

† Estimate is subject to greater uncertainty due to small cell size.

Table 4.12.b. Urinary enterolactone (creatinine corrected): Concentrations by survey cycle

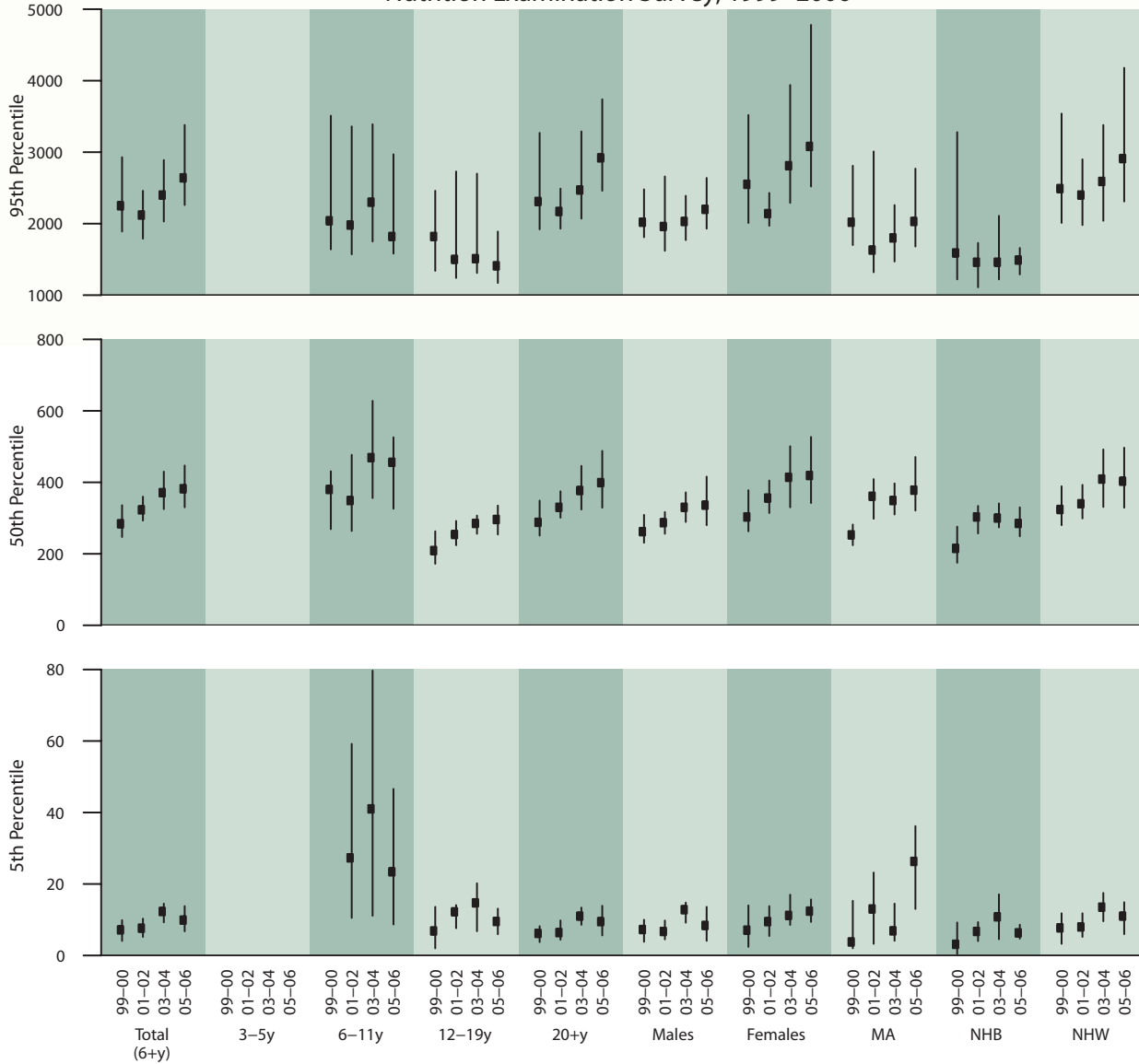
Geometric mean and selected percentiles of urine concentrations (in µg/g creatinine) for the U.S. population, National Health and Nutrition Examination Survey, 1999–2006.

	Geometric mean (95% conf. interval)		Selected percentiles (95% conf. interval)			Sample size			
			5th	50th	95th				
Total, 6 years and older									
1999–2000	218	(184 – 260)	7.15	(4.06 – 9.89)	284	(247 – 336)	2,250	(1,890 – 2,930)	2,548
2001–2002	243	(220 – 268)	7.63	(5.19 – 10.3)	323	(293 – 360)	2,120	(1,790 – 2,460)	2,794
2003–2004	279	(245 – 317)	12.3	(9.27 – 14.5)	371	(325 – 430)	2,400	(2,030 – 2,890)	2,594
2005–2006	276	(237 – 321)	9.89	(6.76 – 13.8)	382	(330 – 447)	2,640	(2,260 – 3,380)	2,528
Age group									
6–11 years									
1999–2000	315	(238 – 416)	38.6	(<LOD – 66.8)	380	(269 – 431)	2,040	(1,640 – 3,510)	331
2001–2002	327	(274 – 391)	27.3	(10.5 – 59.2)	349	(264 – 477)	1,980	(1,570 – 3,360)	396
2003–2004	409	(310 – 540)	41.0	(11.1 – 79.7)	469	(356 – 628)	2,300	(1,750 – 3,390)	341
2005–2006	331	(268 – 408)	23.4	(8.67 – 46.6)	456	(326 – 526)	1,820	(1,580 – 2,970)	351
12–19 years									
1999–2000	169	(133 – 214)	6.86	(2.00 – 13.6)	209	(172 – 263)	1,820	(1,340 – 2,460)	746
2001–2002	206	(178 – 239)	12.2	(7.63 – 14.1)	254	(224 – 292)	1,500	(1,240 – 2,730)	744
2003–2004	235	(202 – 273)	14.7	(6.78 – 20.2)	285	(256 – 307)	1,510	(1,310 – 2,700)	729
2005–2006	216	(184 – 254)	9.50	(5.93 – 13.1)	296	(254 – 335)	1,410	(1,170 – 1,890)	693
20–39 years									
1999–2000	183	(143 – 235)	5.46	(.836 – 8.94)	248	(199 – 291)	1,900	(1,480 – 3,890)	535
2001–2002	196	(160 – 240)	4.83	(2.86 – 9.88)	298	(251 – 334)	1,670	(1,430 – 2,450)	604
2003–2004	235	(186 – 299)	10.0	(4.07 – 14.8)	324	(250 – 422)	2,140	(1,640 – 3,890)	554
2005–2006	229	(187 – 279)	9.40	(4.07 – 16.0)	299	(256 – 348)	2,630	(1,680 – 6,020)	583
40–59 years									
1999–2000	215	(165 – 279)	4.14	(1.49 – 8.85)	282	(244 – 375)	2,520	(2,030 – 4,780)	420
2001–2002	248	(191 – 321)	5.90	(3.49 – 10.7)	335	(266 – 435)	2,450	(1,600 – 4,940)	531
2003–2004	260	(218 – 310)	8.64	(6.33 – 13.5)	354	(300 – 444)	2,450	(2,010 – 4,240)	452
2005–2006	288	(213 – 389)	8.45	(3.84 – 13.9)	394	(306 – 602)	3,380	(2,280 – 4,890)	449
60 years and older									
1999–2000	313	(227 – 432)	14.0	(3.73 – 20.9)	431	(312 – 611)	2,530	(1,940 – 4,500)	516
2001–2002	341	(296 – 392)	9.15	(4.22 – 17.6)	432	(383 – 476)	2,550	(2,130 – 3,030)	519
2003–2004	387	(330 – 453)	18.4	(10.5 – 21.5)	547	(439 – 682)	2,690	(2,340 – 3,340)	518
2005–2006	379	(300 – 478)	11.9	(6.12 – 17.7)	597	(495 – 730)	3,030	(2,250 – 4,480)	452
Gender									
Males									
1999–2000	199	(170 – 234)	7.25	(3.82 – 9.99)	262	(231 – 309)	2,020	(1,810 – 2,480)	1,219
2001–2002	213	(191 – 238)	6.70	(4.49 – 9.78)	287	(256 – 317)	1,960	(1,620 – 2,660)	1,375
2003–2004	245	(215 – 280)	12.8	(9.17 – 14.8)	330	(289 – 372)	2,030	(1,770 – 2,390)	1,244
2005–2006	243	(196 – 300)	8.40	(4.08 – 13.6)	336	(280 – 416)	2,200	(1,930 – 2,640)	1,252
Females									
1999–2000	238	(191 – 297)	7.08	(2.40 – 14.0)	303	(263 – 378)	2,550	(2,010 – 3,520)	1,329
2001–2002	274	(241 – 312)	9.46	(5.43 – 13.8)	356	(314 – 405)	2,140	(1,970 – 2,430)	1,419
2003–2004	314	(257 – 385)	11.2	(8.54 – 17.0)	414	(330 – 501)	2,810	(2,290 – 3,940)	1,350
2005–2006	313	(261 – 375)	12.4	(9.39 – 15.7)	419	(342 – 527)	3,080	(2,520 – 4,780)	1,276
Race/ethnicity									
Mexican Americans									
1999–2000	194	(165 – 228)	3.78	(2.01 – 15.3)	253	(224 – 282)	2,020	(1,700 – 2,810)	813
2001–2002	259	(213 – 314)	13.0	(3.24 – 23.2)	361	(298 – 409)	1,630	(1,320 – 3,010)	679
2003–2004	248	(217 – 282)	6.88	(4.10 – 14.5)	349	(310 – 397)	1,800	(1,470 – 2,260)	653
2005–2006	324	(267 – 393)	26.3	(13.0 – 36.2)	378	(321 – 471)	2,030	(1,680 – 2,770)	634
Non-Hispanic Blacks									
1999–2000	168	(124 – 226)	3.12	(.422 – 9.24)	215	(175 – 276)	1,590	(1,220 – 3,280)	594
2001–2002	195	(153 – 248)	6.71	(4.02 – 9.33)	303	(257 – 334)	1,460	(1,110 – 1,730)	692
2003–2004	228	(194 – 268)	10.8	(4.54 – 17.1)	300	(274 – 341)	1,460	(1,220 – 2,110)	681
2005–2006	193	(167 – 223)	6.32	(4.70 – 8.61)	285	(249 – 330)	1,490	(1,290 – 1,660)	662
Non-Hispanic Whites									
1999–2000	243	(194 – 304)	7.71	(3.26 – 11.8)	324	(280 – 389)	2,490	(2,010 – 3,540)	901
2001–2002	265	(232 – 302)	7.97	(5.19 – 11.8)	340	(299 – 393)	2,400	(1,980 – 2,900)	1,211
2003–2004	297	(248 – 356)	13.5	(9.57 – 17.5)	409	(331 – 492)	2,590	(2,040 – 3,380)	1,069
2005–2006	288	(238 – 347)	11.0	(5.96 – 14.9)	403	(329 – 497)	2,910	(2,310 – 4,180)	1,039

< LOD means less than the limit of detection for the uncorrected urine values, which may vary for some compounds by year. See Appendix D for LOD.

Figure 4.12.b. Urinary enterolactone (creatinine corrected): Concentrations by survey cycle

Selected percentiles in $\mu\text{g/g}$ creatinine (95% confidence intervals), National Health and Nutrition Examination Survey, 1999–2006



Values in the graph are suppressed if either the point estimate or the lower 95% confidence limit is noted as "< LOD" in the accompanying table.

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