

**Supplemental Figure 1.** Process used to assign drinking water source at enrollment to Iowa (IA) Agricultural Health Study (AHS) participants. Assignments based on responses collected from questionnaires at enrollment (phase (P)1:1993-1997), P2: 1999-2000, and P3: 2005-2010. Order of assignments was based on reliability and accuracy of reporting at each phase. Later phase reporting only used if participant had not moved since enrollment. Participants missing drinking water source were assigned their partner’s source if still living together.



**Supplemental Figure 2.** Process used to assign drinking water source at enrollment to North Carolina (NC) Agricultural Health Study (AHS) participants. Assignments based on responses collected from questionnaires at enrollment (phase (P)1:1993-1997), P2: 1999-2000, and P3: 2005-2010. Order of assignments was based on reliability and accuracy of reporting at each phase. Later phase reporting only used if participant had not moved since enrollment. Participants missing drinking water source were assigned their partner’s source if still living together.

**Supplemental Table 1.** Characteristics of Agricultural Health Study private well users by private well nitrate test status at enrollment for Iowa (IA) and North Carolina (NC) participants who participated in phase 2 and/or phase 3, excluding commercial applicators.

|  |  |  |
| --- | --- | --- |
|  | Iowa (N=24,923) | North Carolina (N=14,804) |
| **Reported NO3-N testing** | No (N=5,144) | Yes (N=19,779) | No (N=8,370) | Yes (N=6,434) |
| **Age, mean(sd)** |  |  |  |  |
| Years  |  47.6 (11.5) | 45.9 (11.2) | 49.8 (12.2) | 50.6 (12.6) |
| **Race & ethnicity, n(%)** |  |  |  |  |
| White, non-Hispanic  | 4,899 (99.0) | 18869 (99.1) | 6,872 (94.6) | 5,269 (94.8) |
| White, Hispanic | 46 (0.9) | 162 (0.9) | 57 (0.8) | 60 (1.1) |
| Black/African American, non-Hispanic | 1 (<0.1) | 4 (<0.1) | 252 (3.5) | 181 (3.3) |
| Black/African American, Hispanic | -- | -- | 2 (<0.1) | 3 (<0.1) |
| Other, non-Hispanic | 3 (<0.1) | 9 (<0.1) | 81 (1.1) | 42 (0.8) |
| Other, Hispanic | -- | -- | 3 (<0.1) | 1 (<0.1) |
| Missing (n) |  195 | 735 | 1,103 | 878 |
| **Sex (n (%))** |  |  |  |  |
| Male  | 3,047 (59.2) | 10,601 (53.6) | 5,214 (62.3) | 3,718 (57.8) |
| Female | 2,097 (40.8) | 9,178 (46.4) | 3,156 (37.7) | 2,716 (42.2) |
| Missing (n) | -- | -- | -- | -- |
| **Education, n(%)** |  |  |  |  |
| <High school | 214 (4.3) | 645 (3.3) | 1,133 (14.5) | 870 (14.6) |
| High school graduate  | 2,447 (48.6) | 8,209 (42.4) | 3,463 (44.4) | 2,531 (42.3) |
| Some college or 1-3 yr vocational education after high school | 1,330 (26.4) | 5,630 (29.1) | 1,649 (21.1) | 1,271 (21.3) |
| College graduate | 685 (13.6) | 3,199 (16.5) | 1,018 (13.0) | 833 (13.9) |
| >1 year of grad or professional school completed | 157 (3.1) | 745 (3.8) | 346 (4.4) | 297 (5.0) |
| Other  | 205 (4.1) | 953 (4.9) | 196 (2.5) | 177 (3.0) |
| Missing (n) |  106 | 398 |  565 | 455 |
| **Smokinga, n(%)** |  |  |  |  |
| Never smokers | 3,348 (66.9) | 13,397 (69.4) | 3,912 (50.9) | 3,062 (51.8) |
| Current smokers  | 495 (9.9) | 1,602 (8.3) | 1,448 (18.8) | 1,147 (19.4) |
| Past smokers | 1,160 (23.2) | 4,307 (22.3) | 2,332 (30.3) | 1,701 (28.8) |
| Missing (n) |  141 | 473 | 678 | 524 |
| **Alcoholb,n(%)** |  |  |  |  |
| Never  | 1,392 (27.8) | 4,846 (25.1) | 4,982 (66.3) | 3,772 (65.4) |
| <1 time a month | 1,195 (23.8) | 4,760 (24.7) | 1,013 (13.5) | 812 (14.1) |
| 1–3 times a month | 965 (19.3) | 4,209 (21.8) | 563 (7.5) | 449 (7.8) |
| 1 time a week | 553 (11.0) | 2,450 (12.7) | 316 (4.2) | 276 (4.8) |
| 2–4 times a week | 652 (13.0) | 2,284 (11.8) | 431 (5.7) | 326 (5.7) |
| Almost every day to every day | 257 (5.1) | 762 (3.9) | 215 (2.9) | 135 (2.3) |
| Missing (n) |  130 | 468 | 850 | 664 |
| **Marital Status, n(%)** |  |  |  |  |
| Married or living as married  | 4,553 (88.5) | 18,657 (94.3) | 7,541 (90.7) | 5,939 (92.7) |
| Divorced or separated  | 133 (2.6) | 264 (1.3) | 253 (3.0) | 152 (2.4) |
| Widowed  | 19 (0.4) | 90 (0.5) | 83 (1.0) | 57 (0.9) |
| Never married | 439 (8.5) | 765 (3.9) | 441 (5.3) | 256 (4.0) |
| **Children** |  |  |  |  |
| No | 584 (19.2) | 1,221 (11.6) | 782 (15.9) | 499 (14.1) |
| Yes | 2,451 (80.8) | 9,309 (88.4) | 4,145 (84.1) | 3,039 (85.9) |
| Missing | 2,109 | 9,249 | 3,443 | 2,896 |
| Missing (n) | 0 | 3 | 52 | 30 |
| **Children <10 years at home, n(%)** |  |  |  |  |
| No | 889 (30.6) | 2,472 (24.4) | 1,851 (41.3) | 1,363 (42.0) |
| Yes | 942 (32.5) | 4,374 (43.2) | 1,635 (36.5) | 1,213 (37.4) |
| No births within last 9 years | 1,071 (36.9) | 3,289 (32.5) | 998 (22.3) | 668 (20.6) |
| Missing (n) | 2,242 | 9,644 | 3,886 | 3,190 |
| **Owned or worked on a farmc, n(%)** |  |  |  |  |
| Yes | 3,061 (99.8) | 10,642 (99.7) | 4,724 (93.4) | 3,416 (93.6) |
| No  | 7 (0.2) | 37 (0.4) | 333 (6.6) | 235 (6.4) |
| Missing (n) | 26 | 86 | 332 | 223 |
| **Applied natural or chemical fertilizer to farmland, n(%)** |  |  |  |  |
| Yes  | 1,898 (51.6) | 6,829 (47.0) | 3,095 (59.7) | 2,301 (56.2) |
| No  | 1,778 (48.4) | 7,717 (53.1) | 2,092 (40.3) | 1,796 (43.8) |
| Missing (n) | 1,468 | 5,233 | 3,183 | 2,337 |
| **Age of home, n(%)** |  |  |  |  |
| <10 years | 136 (4.3) | 842 (6.3) | 559 (13.7) | 452 (14.4) |
| 10-20 years | 321 (10.1) | 1,611 (12.1) | 971 (23.8) | 751 (23.8) |
| 21-40 years | 497 (15.6) | 1,968 (14.8) | 1,617 (39.6) | 1,227 (39.0) |
| 41-99 years | 1,678 (52.6) | 6,523 (49.1) | 787 (19.3) | 585 (18.6) |
| 100+ years | 557 (17.5) | 2,352 (17.7) | 149 (3.7) | 135 (4.3) |
| Missing (n) | 1,955 | 6,483 | 4,287 | 3,284 |
| **Housing foundation type, n(%)** |  |  |  |  |
| slab | 39 (1.2) | 169 (1.3) | 178 (4.4) | 125 (4.0) |
| crawl space | 86 (2.7) | 243 (1.8) | 2,055 (51.2) | 1,575 (50.5) |
| combination crawl space/basement | 760 (23.9) | 2,912 (21.9) | 389 (9.7) | 329 (10.5) |
| full basement | 2,236 (70.3) | 9,737 (73.1) | 1,006 (25.1) | 808 (25.9) |
| other | 54 (1.7) | 229 (1.7) | 230 (5.7) | 189 (6.1) |
| Did not know | 7 (0.2) | 31 (0.2) | 157 (3.9) | 95 (3.0) |
| Missing (n) | 1,962 | 6,458 | 4,355 | 3,313 |
| **Well depthd (P1-P3), n(%)**  |  |  |  |  |
| <50 ft | 806 (21.1) | 2,429 (16.3) | 1,429 (22.1) | 941 (18.6) |
| 50-150 ft  | 1,362 (35.6) | 5,515 (37.0) | 2,343 (36.2) | 1,832 (36.3) |
| >150 ft | 410 (10.7) | 1,524 (10.2) | 841 (13.0) | 758 (15.0) |
| >100 ft (P2) | 1,244 (32.6) | 5,450 (36.5) | 1,861 (28.8) | 1,522 (30.1) |
| Missing | 1,322 | 4,861 | 1,896 | 1,381 |
| **Safe nitrate levels for bottle-fed infants e** **(P2-P3), n(%)** |  |  |  |  |
| Yes (n (%)) | -- | 16,757 (87.7) | -- | 6,053 (99.1) |
| No (n (%)) | -- | 2,346 (12.3) | -- | 53 (0.9) |
| Don’t know/ Missing g | -- | 676 | -- | 328  |
| **Well distance from pesticide mixing sitef (P1-P2)** |  |  |  |  |
| No pesticides mixed on farm  | 524 (10.9) | 2,081 (10.7) | 764 (9.9) | 575 (9.3) |
| <150 ft  | 1,278 (26.5) | 5,227 (26.8) | 1,356 (17.6) | 1,017 (16.4) |
| 150-300 ft  | 861 (17.9) | 3,611 (18.5) | 986 (12.8) | 750 (12.1) |
| >300 ft  | 2,152 (44.7) | 8,605 (44.1) | 4,616 (59.8) | 3,859 (62.2) |
| Missing  | 329 | 255 | 648 | 233 |
| **Well distance from pesticide application siteh (P2)**  |  |  |  |  |
| No Pesticides applied on farm | 55 (1.2) | 186 (1.0) | 611 (8.4) | 504 (8.4) |
| <100 ft | 885 (19.7) | 3,236 (16.8) | 1,008 (13.9) | 799 (13.3) |
| 100 to 200 ft | 917 (20.4) | 3,691 (19.1) | 1,057 (14.5) | 798 (13.2) |
| >200 ft  | 2,632 (58.6) | 12,188 (63.2) | 4,597 (63.2) | 3,927 (65.2) |
| Missing | 655 | 478 | 1,097 | 406 |
| **Predicted NO3-N, Median (IQR)** |  |  |  |  |
| mg/L | 1.45 (0.8-5.2) | 1.52 (0.8-4.8) | 1.84 (1.4-2.5) | 1.88 (1.4-2.5) |
| Missing (n) | 278 | 772 | 844 | 556 |
| **Nitrate level above ½ MCL, n(%)**  |  |  |  |  |
|  | 1,256 (25.8) | 4,617 (24.3) | 66 (0.9) | 69 (1.2) |
| Missing (n) | 278 | 772 | 844 | 556 |
| **Nitrate level above MCL, n(%)**  |  |  |  |  |
|  | 627 (12.9) | 2,148 (11.3) | 0 (0.0) | 1 (<0.1) |
| Missing (n) | 278 | 772 | 844 | 556 |

aCurrent smokers at enrollment; bHow often participants drank any alcoholic beverages in the past year; cTotal= 23,122 , spouses excluded due to no reporting**;**  dInformation on well depth was collected in P1-P3; eInformation on nitrate testing and safety was collected in P2 and P3**,** fIncludes those who responded don’t know and those who skipped the question; gInformation on distance from pesticide application