

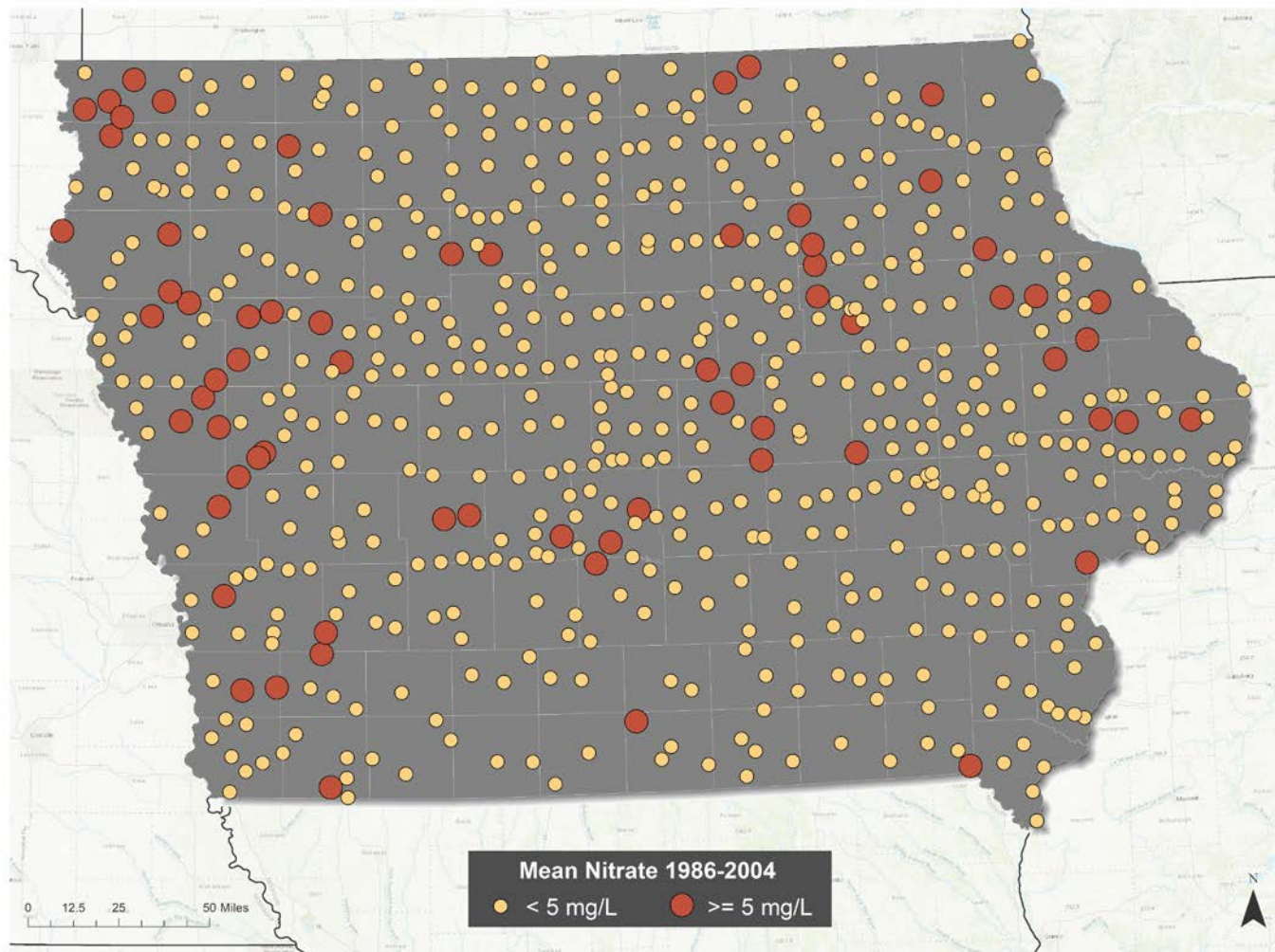
eTable 1. Geocoding status^a and town size^b of enrollment address

| Town size | Well-geocoded address | Poor-geocoded address | No address |
|----------------------|--------------------------|--------------------------|---------------|
| | n (%) | n (%) | n (%) |
| <10,000 | 12272 (38) | 3182 (35) | - |
| 10,000 to <100,000 | 11857 (37) | 565 (6) | - |
| ≥100,000 | 3636 (11) | 31 (0) | - |
| Unincorporated place | 3815 (12) | 5353 (59) | - |
| Missing | 871 (3) | - | 68 |
| Total | 32451 (78) | 9131 (22) | 68 (0) |

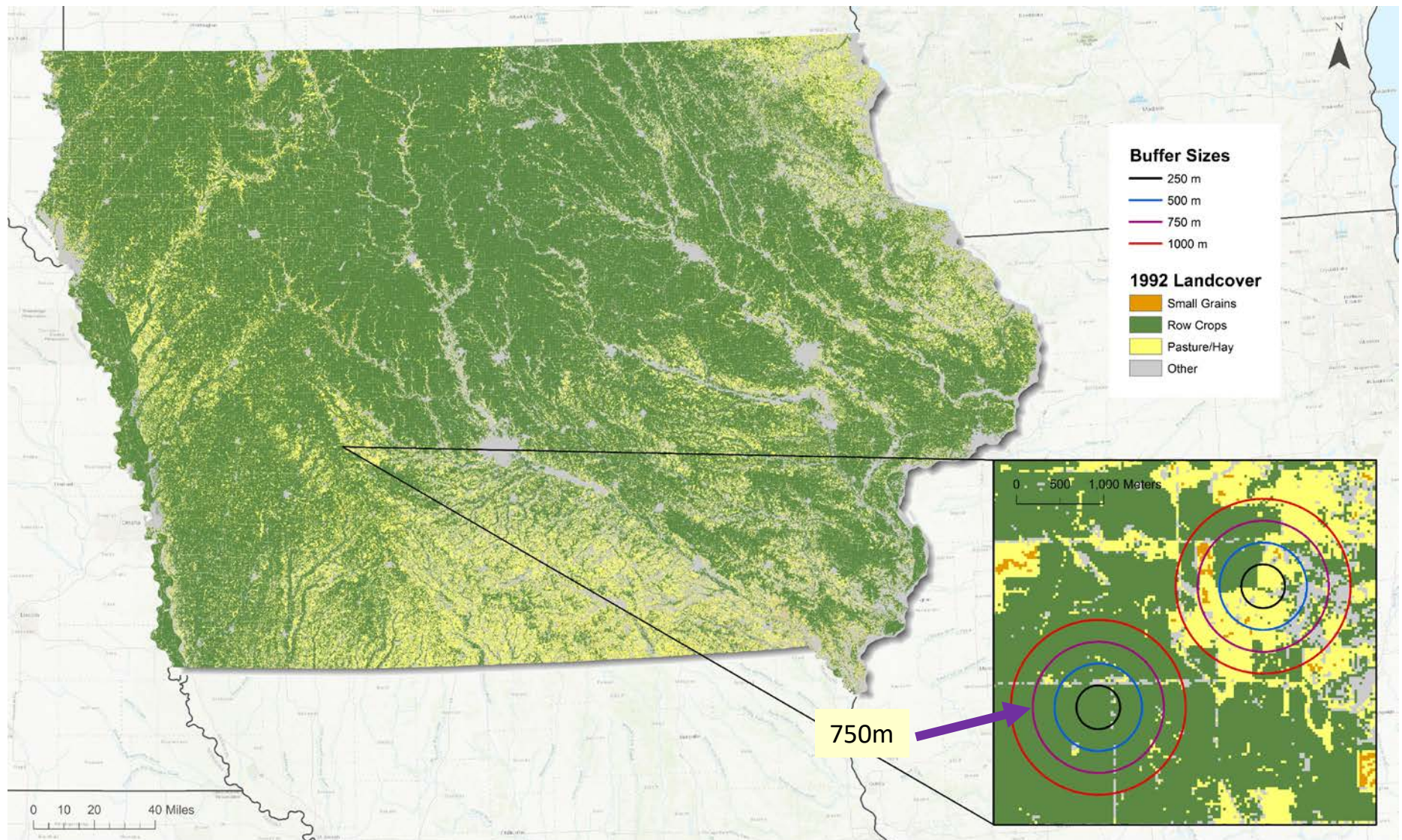
^aWell-geocoded addresses: geocodes placed at the complete street address or nearest intersection. Poor-geocoded addresses: geocodes placed at the zip code centroid.

^bTown size for incorporated place (self-governing city, town, or village defined by Census 2000 Incorporated Places boundaries) otherwise unincorporated place

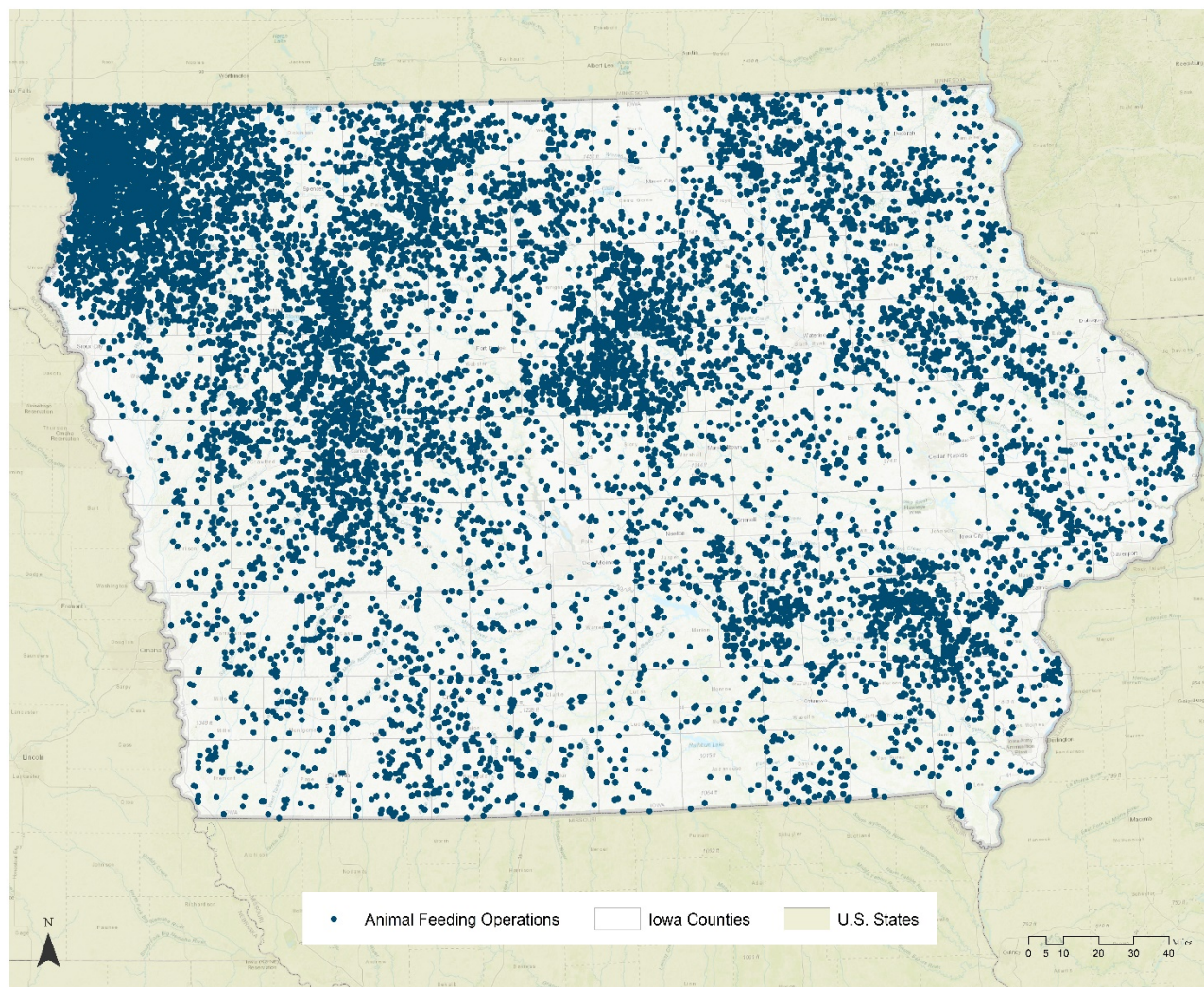
eFigure 1. Geographic distribution of average nitrate-nitrogen ($\text{NO}_3\text{-N}$) concentrations in Iowa public water supplies from 1986-2004. Red dots depict $\text{NO}_3\text{-N}$ levels above one-half the Environmental Protection Agency maximum contaminant level (MCL).



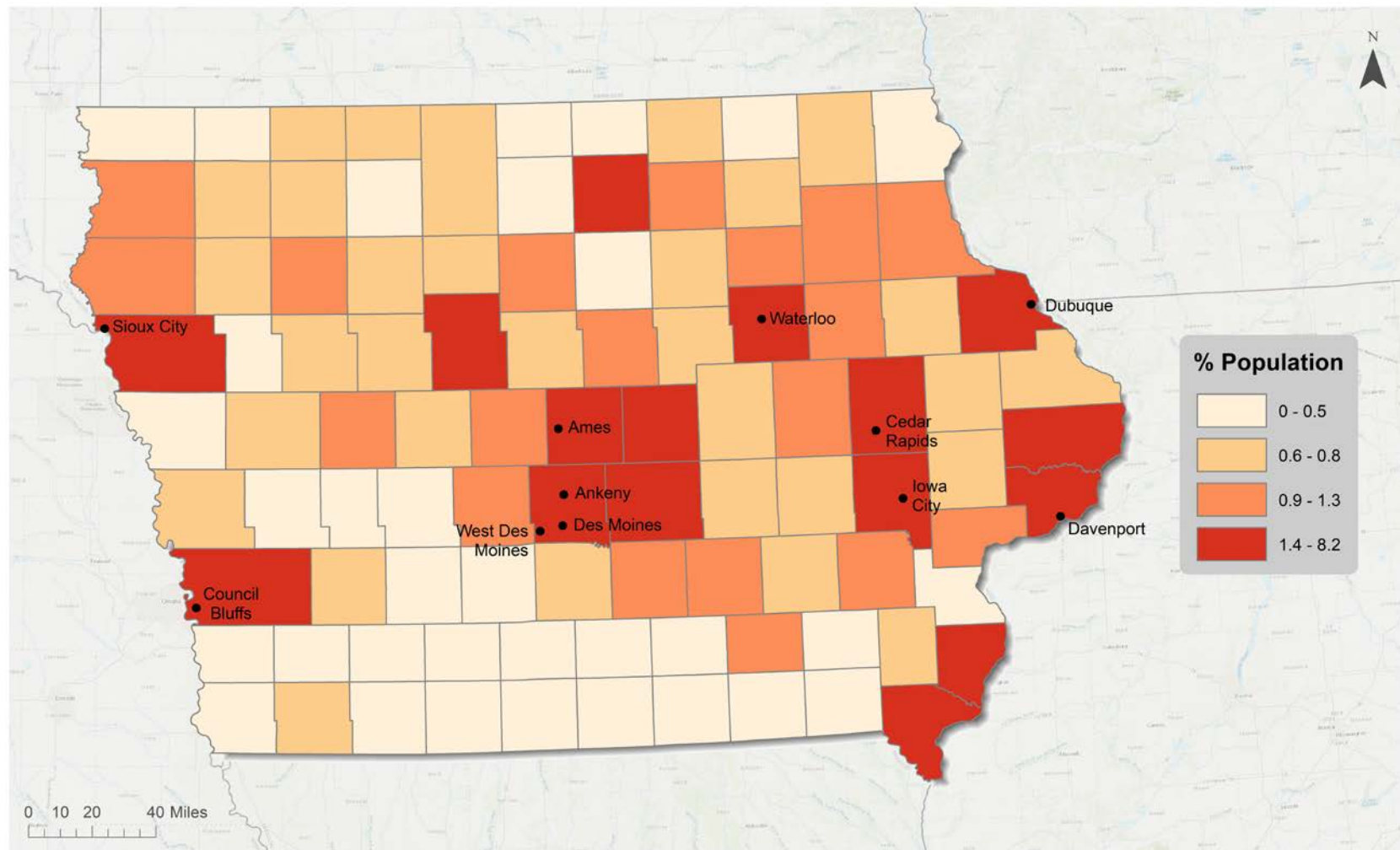
eFigure 2. Geographic distribution of agricultural land by crop type in Iowa (1992)



eFigure 3. Geographic distribution of concentrated animal feeding operations in Iowa (2003-2011)



eFigure 4. Geographic distribution of the percentage of Iowa Women's Health Study participants by county of residence at enrollment



eTable 2. Characteristics of Iowa Women's Health Study participants included and not included in bias analysis (N=41,650)

| | Included bias analysis ^a | Excluded bias analysis |
|--|-------------------------------------|------------------------|
| Total, n (%) | 29226 (70) | 12424 (30) |
| Age, mean (sd) | | |
| Years | 61.7 (4.24) | 61.6 (4.25) |
| Race, n (%) | | |
| White non-Hispanic | 28564 (98) | 12160 (98) |
| Other | 266 (1) | 79 (1) |
| Missing | 396 (1) | 185 (1) |
| Body mass index (BMI), n (%) | | |
| <25 | 11872 (41) | 4610 (37) |
| 25-<30 | 10717 (37) | 4623 (37) |
| 30+ | 6637 (23) | 3191 (26) |
| Smoking status, n (%) | | |
| Never | 18087 (62) | 8664 (70) |
| Current | 4609 (16) | 1562 (13) |
| Former | 6076 (21) | 2001 (16) |
| Missing | 454 (2) | 197 (2) |
| Occupation, n (%) | | |
| Homemaker | 10340 (35) | 5248 (42) |
| Farmer | 810 (3) | 684 (6) |
| Outside Home | 18076 (62) | 6492 (52) |
| Education level, n (%) | | |
| More than High School | 11523 (39) | 4583 (37) |
| High school or less | 17630 (60) | 7801 (63) |
| Missing | 73 (0) | 40 (0) |
| Town size (enrollment), n (%) | | |
| <10,000 | 10443 (36) | 5011 (40) |
| 10,000 to <100,000 | 11136 (38) | 1286 (10) |
| ≥100,000 | 3370 (12) | 297 (2) |
| Unincorporated place | 3451 (12) | 5717 (46) |
| Missing | 826 (3) | 113 (1) |
| Participation in 5th follow-up (2004), n (%) | | |
| No | 6705 (23) | 2952 (24) |
| Yes | 14661 (50) | 6176 (50) |
| Missing/censored ^b | 7860 (27) | 3296 (27) |
| Drinking water source ^c , n (%) | | |

| | | |
|---------------------------------|------------|-----------|
| Public Water Supply | 20784 (71) | 6625 (53) |
| Private Well | 3386 (12) | 3248 (26) |
| Bottled Water | 497 (2) | 269 (2) |
| Other | 320 (1) | 166 (1) |
| Missing/Don't know ^d | 4239 (15) | 2116 (17) |

^aParticipants with well-geocoded addresses were included in bias analysis

^bCensored due to cancer diagnosis or death

^cReported in the 1989 survey

^dValues were missing from a combination of not completing the questionnaire, non-response, or answered 'Don't Know' on the questionnaire inquiring on their main water source

eTable 3. Distribution of Euclidean distances (km) between moves for each follow-up period^a

| Survey periods | Years | N | Mean | Minimum | 25 th percentile | Median | 75 th percentile | Maximum |
|-----------------------------|--------------|------|--------|---------|--------------------------------|--------|--------------------------------|---------|
| Enrollment to 1st Follow-Up | 1986 to 1987 | 1248 | 262.66 | 0.25 | 1.40 | 5.34 | 98.66 | 2630.67 |
| 1st to 2nd Follow-Up | 1987 to 1989 | 1690 | 248.70 | 0.25 | 1.50 | 5.68 | 93.20 | 2645.77 |
| 2nd to 3rd Follow-Up | 1989 to 1992 | 1288 | 243.78 | 0.25 | 1.56 | 5.33 | 69.61 | 6099.02 |
| 3rd to 4th Follow-Up | 1992 to 1997 | 3955 | 226.62 | 0.25 | 1.51 | 5.30 | 45.64 | 6594.05 |
| 4th to 5th Follow-Up | 1997 to 2004 | 5381 | 268.37 | 0.25 | 2.08 | 8.66 | 101.31 | 7522.46 |

^aBetween address pairs that were well-geocoded (geocodes placed at the complete street address or nearest intersection) for subsequent survey periods

eTable 4. Relationship between exposure prevalence and sensitivity and specificity of exposure assignment when using the enrollment address^a and attenuation of a hypothetical odds ratio (OR) of 2.0

| Exposure type | Exposure prevalence | Sensitivity (%) | Specificity (%) | OR _{observed} ^b |
|---|---------------------|-----------------|-----------------|-------------------------------------|
| NO₃-N in drinking water annual average concentration (mg/L) | | | | |
| ≥50 th percentile | 50 | 98.3 | 98.4 | 1.95 |
| ≥75 th percentile | 25 | 93.5 | 98.7 | 1.92 |
| ≥95 th percentile | 5 | 97.5 | 99.7 | 1.95 |
| Agricultural land Percentage within 750m of home | | | | |
| Row crops | | | | |
| ≥50 th percentile | 50 | 94.3 | 94.3 | 1.84 |
| ≥75 th percentile | 25 | 94.7 | 98.2 | 1.91 |
| ≥95 th percentile | 5 | 86.0 | 99.3 | 1.85 |
| Pasture/hay in 750m | | | | |
| ≥50 th percentile | 50 | 94.3 | 94.1 | 1.84 |
| ≥75 th percentile | 25 | 94.1 | 98.0 | 1.90 |
| ≥95 th percentile | 5 | 91.0 | 99.5 | 1.90 |
| CAFOs number within 5km of home | | | | |
| 1+ operation(s) | 40 | 98.9 | 96.9 | 1.94 |
| 2+ operations | 25 | 98.5 | 98.3 | 1.94 |
| 8+ operations | 5 | 98.8 | 99.6 | 1.93 |

^aCompared to exposure estimated across all addresses over 19 years of follow-up (true exposure; gold standard)

^bWhere OR_{true}=2.0