**Exposure to Neonicotinoid Insecticides in the U.S. General Population: Data from the 2015-2016 National Health and Nutrition Examination Survey**

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**SUPPLEMENTAL INFORMATION**

| **Table S1.  Geometric mean and selected percentiles of clothianidin concentrations in urine (first row in µg/L, shaded row in µg/g creatinine) for the U.S. population ≥3 years of age. Data from the National Health and Nutrition Examination Survey 2015-2016.** | | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Geometric**  **mean** | | **Selected percentile (95% CI)** | | | | | | | | | | | | | **Sample**  **size** | **Weighted** |
|  |  | | | | | | | | | | | | | **detection frequency** |
|  | **(95% CI)** | | **50th** | | | **75th** | | **90th** | | | | | **95th** | | |  |  |
| Total | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .396 | | (.283-.571) | | 3018 | 7.7 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .741 | | (.667-.874) | | 3017 |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| **Age group** |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| 3-5 years | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .463 | | (<LOD-.619) | | 505 | 7.0 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | 1.40 | | (<LOD-1.75) | | 504 |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| 6-11 years | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .396 | | (<LOD-1.25) | | 419 | 8.3 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .944 | | (<LOD-1.27) | | 419 |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| 12-19 years | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .427 | | (<LOD-.579) | | 404 | 7.4 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .605 | | (<LOD-.922) | | 404 |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| 20-59 years | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .473 | | (.318-.691) | | 1144 | 9.1 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .737 | | (.636-.933) | | 1144 |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| 60 years and older | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | < LOD | |  | | 546 | 3.9 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | < LOD | |  | | 546 |  |
| **Gender** |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| Males | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .375 | | (<LOD-.569) | | 1494 | 7.3 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .618 | | (<LOD-.715) | | 1494 |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| Females | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .463 | | (.272-.734) | | 1524 | 8.0 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .875 | | (.700-1.17) | | 1523 |  |
| **Race/ethnicity** |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| All Hispanic | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .549 | | (<LOD-.930) | | 982 | 7.1 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .778 | | (<LOD-1.01) | | 982 |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| Non-Hispanic Blacks | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .573 | | (.270-1.10) | | 710 | 8.9 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .753 | | (.560-.922) | | 709 |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| Non-Hispanic Whites | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .318 | | (<LOD-.473) | | 874 | 6.7 |
|  | **\*** |  | < LOD |  | < LOD | |  | < LOD | |  | | .737 | | (<LOD-.875) | | 874 |  |
|  |  |  |  |  |  | |  |  | |  | |  | |  | |  |  |
| Others | **\*** |  | < LOD |  | < LOD | |  | .336 | (<LOD-.551) | | | .567 | | (.336-.770) | | 452 | 13.1 |
|  | **\*** |  | < LOD |  | < LOD | |  | .560 | (<LOD-.667) | | | .737 | | (.583-1.23) | | 452 |  |
|  |  |  |  |  | |  |  |  | | |  | |  | |  |  |  |
| CI, confidence interval; LOD, limit of detection < LOD means less than the limit of detection of 0.2 µg/L.  The weighted detection frequency represents the detection percentage of the population. \* Not calculated. Proportion of results below the limit of detection was too high to provide a valid result. Sample size may differ because of missing laboratory results. | | | | | | | | | | | | | | | | | |

| **Table S2. Geometric mean and selected percentiles of imidacloprid concentrations in urine (first row in µg/L, shaded row in µg/g creatinine) for the U.S. population ≥3 years of age. Data from the National Health and Nutrition Examination Survey 2015-2016.** | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Geometric**  **mean** | | **Selected percentile (95% CI)** | | | | | | | | **Sample**  **size** | **Weighted**  **detection frequency** | |
|  |  | | | | | | | |
|  | **(95% CI)** | | **50th** | | **75th** | | **90th** | | **95th** | |  |  | |
| Total | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 2995 | 4.34 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 2994 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| **Age group** |  |  |  |  |  |  |  |  |  |  |  |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| 3-5 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | .440 | (<LOD-.497) | 500 | 6.31 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | 2.55 | (<LOD-2.80) | 499 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| 6-11 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 413 | 4.95 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 413 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| 12-19 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | .401 | (<LOD-.570) | 398 | 5.16 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | .778 | (<LOD-1.33) | 398 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| 20-59 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1141 | 4.11 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1141 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| 60 years and older | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 543 | 3.98 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 543 |  | |
| **Gender** |  |  |  |  |  |  |  |  |  |  |  |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| Males | **\*** |  | < LOD |  | < LOD |  | < LOD |  | .410 | (<LOD-.468) | 1481 | 5.03 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | 1.08 | (<LOD-1.22) | 1481 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| Females | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1514 | 3.68 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1513 |  | |
| **Race/ethnicity** |  |  |  |  |  |  |  |  |  |  |  |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| All Hispanic | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 969 | 4.45 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 969 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| Non-Hispanic Blacks | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 708 | 3.85 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 707 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| Non-Hispanic Whites | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 870 | 4.24 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 870 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  | |
| Others | **\*** |  | < LOD |  | < LOD |  | < LOD |  | .410 | (<LOD-.570) | 448 | 5.39 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | 1.17 | (<LOD-1.40) | 448 |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| CI, confidence interval; LOD: limit of detection < LOD means less than the limit of detection of 0.4 µg/L  The weighted detection frequency represents the detection percentage of the population. \* Not calculated. Proportion of results below the limit of detection was too high to provide a valid result. Sample size may differ because of missing laboratory results. | | | | | | | | | | | | |

| **Table S3. Geometric mean and selected percentiles of acetamiprid concentrations in urine (first row in µg/L, shaded row in µg/g creatinine) for the U.S. population ≥3 years of age. Data from the National Health and Nutrition Examination Survey 2015-2016.** | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | |  | | | | | | | |  | |  |
|  | **Geometric**  **mean** | | **Selected percentile (95% CI)** | | | | | | | | **Sample**  **size** | **Weighted** | | |
|  |  | | | | | | | | **detection frequency** | | |
|  | **(95% CI)** | | **50th** | | **75th** | | **90th** | | **95th** | |  | |  | |
| Total | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 3025 | | 0.308 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 3024 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| **Age group** |  |  |  |  |  |  |  |  |  |  |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| 3-5 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 504 | | 0.117 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 503 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| 6-11 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 419 | | 0.275 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 419 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| 12-19 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 405 | | 0.277 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 405 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| 20-59 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1151 | | 0.354 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1151 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| 60 years and older | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 546 | | 0.247 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 546 | |  | |
| **Gender** |  |  |  |  |  |  |  |  |  |  |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| Males | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1496 | | 0.376 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1496 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| Females | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1529 | | 0.243 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1528 | |  | |
| **Race/ethnicity** |  |  |  |  |  |  |  |  |  |  |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| All Hispanic | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 981 | | 0.767 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 981 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| Non-Hispanic Blacks | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 713 | | 0.999 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 712 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| Non-Hispanic Whites | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 879 | | 0.051 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 879 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| Others | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 452 | | 0.241 | |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 452 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| CI, confidence interval; LOD: limit of detection < LOD means less than the limit of detection of 0.3 µg/L  The weighted detection frequency represents the detection percentage of the population. \* Not calculated. Proportion of results below the limit of detection was too high to provide a valid result. Sample size may differ because of missing laboratory results. | | | | | | | | | | | | | |

| **Table S4. Geometric mean and selected percentiles of thiacloprid concentrations in urine (first row in µg/L, shaded row in µg/g creatinine) for the U.S. population ≥3 years of age. Data from the National Health and Nutrition Examination Survey 2015-2016.** | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Geometric**  **mean** | | **Selected percentile (95% CI)** | | | | | | | | **Sample**  **size** | **Weighted** | |
|  |  | | | | | | | | **detection frequency** | |
|  | **(95% CI)** | | **50th** | | **75th** | | **90th** | | **95th** | |  | |  |
| Total | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 2998 | | 0.054 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 2997 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| **Age group** |  |  |  |  |  |  |  |  |  |  |  | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| 3-5 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 504 | | 0 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 503 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| 6-11 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 417 | | 0.139 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 417 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| 12-19 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 399 | | 0.135 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 399 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| 20-59 years | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1139 | | 0.05 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1139 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| 60 years and older | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 539 | | 0 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 539 | |  |
| **Gender** |  |  |  |  |  |  |  |  |  |  |  | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| Males | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1484 | | 0.03 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1484 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| Females | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1514 | | 0.077 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 1513 | |  |
| **Race/ethnicity** |  |  |  |  |  |  |  |  |  |  |  | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| All Hispanic | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 978 | | 0.312 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 978 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| Non-Hispanic Blacks | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 700 | | 0 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 699 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| Non-Hispanic Whites | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 869 | | 0 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 869 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| Others | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 451 | | 0 |
|  | **\*** |  | < LOD |  | < LOD |  | < LOD |  | < LOD |  | 451 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |
| CI, confidence interval; LOD: limit of detection < LOD means less than the limit of detection of 0.03 µg/L  The weighted detection frequency represents the detection percentage of the population.  \* Not calculated. Proportion of results below the limit of detection was too high to provide a valid result. Sample size may differ because of missing laboratory results. | | | | | | | | | | | | | |