**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/LThe 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/LThe 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. |