

National Health and Nutrition Examination Survey

2015-2016 Data Documentation, Codebook, and Frequencies

Neonicotinoids - Urine - Surplus (SSNEON_I)

Data File: SSNEON_I.xpt

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Component Description

Neonicotinoids are a class of insecticides used in growing genetically-modified corn, soybeans, cotton, sunflowers, and canola, as well as various other genetically-modified and non-genetically-modified vegetables and fruits (Cimino et al. 2017). Approximately 90% of the corn and 50% of the soybeans planted in the USA have been treated with neonicotinoids (Douglas 2015).

Neonicotinoid insecticides are also used in lawn treatment and in pet collars (Tomizawa 2005).

The neonicotinoid family includes acetamiprid, clothianidin, imidacloprid, nitenpyram, nithiazine, thiacloprid and thiamethoxam; imidacloprid is the world's single most widely applied insecticide. Neonics have neurotoxic action on the nicotinic acetylcholine receptor; neonicotinoids have received increased scrutiny because they may adversely affect pollinators and are linked to colony collapse disorder in bees (Hladik et al. 2014) and the decline of insectivorous birds (Hallmann, 2014). Additionally, neonicotinoids are persistent in the environment and have been detected in streams and food, among other environmental matrices (Chen et al. 2014, Hladik et al. 2014). For example, multiple neonicotinoids were detected in 72% of fruits and 45% of vegetables procured in 2012 from Boston neighborhood grocery stores, with imidacloprid present in about 70% of fruits and vegetables (Chen et al. 2014).

To better understand exposure to some of the most commonly used neonicotinoids we measured Imidacloprid, 5-Hydroxy imidacloprid, Acetamiprid, N-desmethyl Acetamiprid, Clothianidin and Thiacloprid in one third subsample of participants 3+ years of age from NHANES 2015-2016.

Eligible Sample

All participants aged 3-5 years old and an one-third sample of participants aged 6 and older from NHANES 2015-2016 with stored urine.

Description of Laboratory Methodology

The method uses 0.2 mL urine and is based on enzymatic hydrolysis of urinary conjugates of the target analytes, online solid phase extraction, reversed phase high-performance liquid chromatography separation, and isotope dilution-electrospray ionization tandem mass spectrometry detection (Baker 2018, in preparation).

Laboratory Quality Assurance and Monitoring

The analytical measurements were conducted following strict quality control/quality

assurance CLIA guidelines. Along with the study samples, each analytical run included high- and low-concentration quality control materials (QCs) and reagent blanks to assure the accuracy and reliability of the data. The concentrations of the high-concentration QCs and the low-concentration QCs, averaged to obtain one measurement of high-concentration QC and low-concentration QC for each run, were evaluated using standard statistical probability rules (Caudill et al. 2008).

Data Processing and Editing

Data were received after all analyses were complete. The data were not edited. Data Access: All data are publicly available.

Analytic Notes

Detection Limits

The detection limits were constant for all of the analytes in the data set. Two variables are provided for each analyte. The variable name ending in "L" (ex., SSECBAL) indicates whether the result was below the limit of detection: the value "0" means that the result was at or above the limit of detection, "1" indicates that the result was below the limit of detection. For analytes with analytic results below the limit of detection (ex., SSECBA=1), an imputed fill value was placed in the analyte results field. This value is the limit of detection divided by square root of 2 ($LOD/\sqrt{2}$). The other variable prefixed SS (ex., SSECBA) provides the analytic result for that analyte.

The limit of detection (LOD, in $\mu\text{g/L}$) for IMID, ACET, CLOT, THIA, OHIM, and AND:

Variable Name	SAS Label	LOD
SSIMID	Imidacloprid ($\mu\text{g/L}$)	0.40
SSACET	Acetamiprid ($\mu\text{g/L}$)	0.30
SSCLOT	Clothianidin ($\mu\text{g/L}$)	0.20
SSTHIA	Thiacloprid ($\mu\text{g/L}$)	0.03
SSOHIM	5-Hydroxyimidacloprid ($\mu\text{g/L}$)	0.40
SSAND	N-Desmethyacetamiprid ($\mu\text{g/L}$)	0.20

Interferences:

Blanks in an analyte results field represent missing values in cases when the presence of interferences precluded obtaining a valid numeric result for a given analyte.

References

- Baker SE, Bishop Serafim A, Morales-Agudelo P, Vidal M, Ospina M, and Calafat AM. Quantification of DEET and Neonicotinoid Pesticide Biomarkers in Human Urine by Online Solid Phase Extraction-High Performance Liquid Chromatography-Tandem Mass Spectrometry-Manuscript in Preparation.
- Caudill SP, Schleicher RL, Pirkle JL. 2008. Multi-rule quality control for the age-related eye disease study. *Statist Med* 27: 4094-4106.
- Chen M, Tao L, McLean J. and Lu C. Quantitative Analysis of Neonicotinoid Insecticide Residues in Foods: Implication for Dietary Exposures *J. Agric. Food Chem.* 2014, 62, 6082–6090.
- Cimino AM, Boyles AL, Thayer KA, Perry MJ. 2017. Effects of Neonicotinoid Pesticide Exposure on Human Health: A Systematic Review. *Environ Health Perspect* 125:155-162
- Douglas MR and Tooker JF. (2015) Large-Scale Deployment of Seed Treatments Has Driven Rapid Increase in Use of Neonicotinoid Insecticides and Preemptive Pest Management in U.S. Field Crops. *Environ. Sci. Technol.* 49, 5088–5097.
- Hallmann CA, Foppen RP, van Turnhout CA, de Kroon H, Jongejans E. 2014. Declines in insectivorous birds are associated with high neonicotinoid concentrations. *Nature*, 511, (7509), 341-343.
- Hladik ML, Kolpin DW, Kuivila KM. 2014. Widespread occurrence of neonicotinoid insecticides in streams in a high corn and soybean producing region, USA. *Environ Pollut* 193:189-196.
- Tomizawa, M and Casida JE. 2005. Neonicotinoid Insecticide Toxicology: Mechanisms of Selective Action *Annu. Rev. Pharmacol. Toxicol.* 2005. 45:247–68.

Codebook and Frequencies

SEQN - Respondent sequence number

Variable Name:	SEQN
SAS Label:	Respondent sequence number
English Text:	Respondent sequence number.
Target:	Both males and females 3 YEARS - 150 YEARS

WTSB2YR - Subsample B weights

Variable Name: WTSB2YR
SAS Label: Subsample B weights
English Text: Subsample B weights
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
6552.119284 to 874638.01159	Range of Values	3038	3038	
.	Missing	0	3038	

SSIMID - Imidacloprid (ug/L)

Variable Name: SSIMID**SAS Label:** Imidacloprid (ug/L)**English Text:** Imidacloprid (ug/L)**Target:** Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.28 to 4.94	Range of Values	2995	2995	
.	Missing	43	3038	

SSIMIDLC - Imidacloprid (ug/L) Cmt code

Variable Name: SSIMIDLC
SAS Label: Imidacloprid (ug/L) Cmt code
English Text: Imidacloprid (ug/L) Cmt code
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	146	146	
1	Below lower detection limit	2849	2995	
.	Missing	43	3038	

SSACET - Acetamiprid (ug/L)

Variable Name: SSACET**SAS Label:** Acetamiprid (ug/L)**English Text:** Acetamiprid (ug/L)**Target:** Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.21 to 1.7	Range of Values	3025	3025	
.	Missing	13	3038	

SSACETLC - Acetamiprid (ug/L) Cmt code

Variable Name: SSACETLC
SAS Label: Acetamiprid (ug/L) Cmt code
English Text: Acetamiprid (ug/L) Cmt code
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	14	14	
1	Below lower detection limit	3011	3025	
.	Missing	13	3038	

SSCLOT - Clothianidin (ug/L)

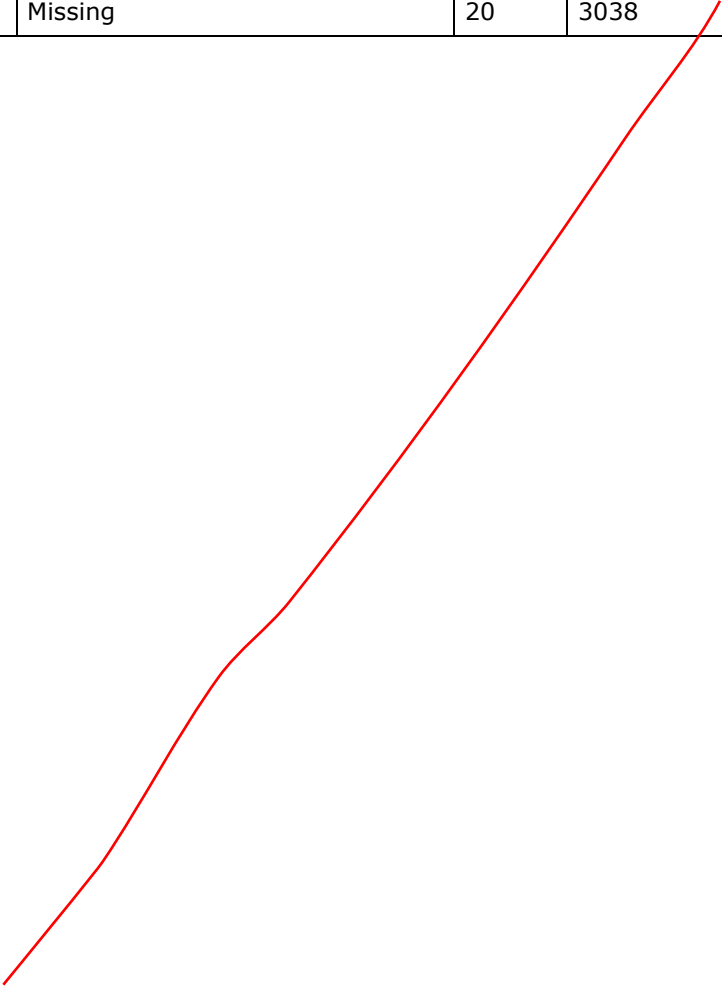
Variable Name: SSCLOT**SAS Label:** Clothianidin (ug/L)**English Text:** Clothianidin (ug/L)**Target:** Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.14 to 31.1	Range of Values	3018	3018	
.	Missing	20	3038	

SSCLOTLC - Clothianidin (ug/L) Cmt code

Variable Name: SSCLOTLC
SAS Label: Clothianidin (ug/L) Cmt code
English Text: Clothianidin (ug/L) Cmt code
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	226	226	
1	Below lower detection limit	2792	3018	
.	Missing	20	3038	



SSTHIA - Thiacloprid (ug/L)

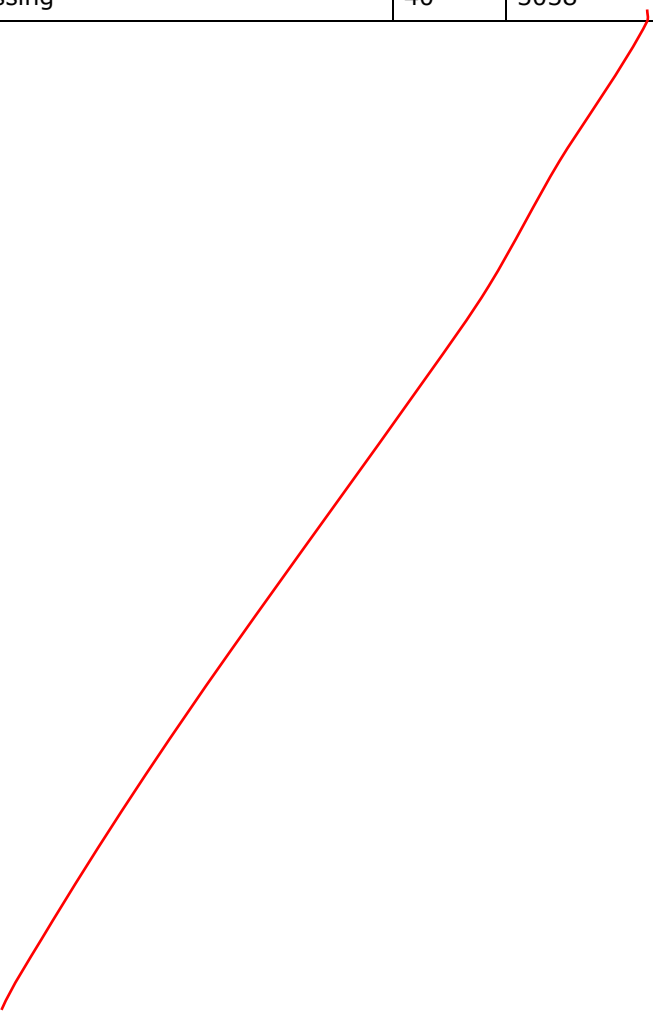
Variable Name: SSTHIA**SAS Label:** Thiacloprid (ug/L)**English Text:** Thiacloprid (ug/L)**Target:** Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.02 to 1.79	Range of Values	2998	2998	
.	Missing	40	3038	

SSTHIALC - Thiacloprid (ug/L) Cmt code

Variable Name: SSTHIALC
SAS Label: Thiacloprid (ug/L) Cmt code
English Text: Thiacloprid (ug/L) Cmt code
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	3	3	
1	Below lower detection limit	2995	2998	
.	Missing	40	3038	



SSOHIM - 5-Hydroxyimidacloprid (ug/L)

Variable Name: SSOHIM
SAS Label: 5-Hydroxyimidacloprid (ug/L)
English Text: 5-Hydroxyimidacloprid (ug/L)
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.28 to 40.4	Range of Values	2878	2878	
.	Missing	160	3038	

SSOHIMLC - 5-Hydroxyimidacloprid (ug/L)Cmt code

Variable Name: SSOHIMLC
SAS Label: 5-Hydroxyimidacloprid (ug/L)Cmt code
English Text: 5-Hydroxyimidacloprid (ug/L)Cmt code
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	542	542	
1	Below lower detection limit	2336	2878	
.	Missing	160	3038	

SSAND - N-Desmethyacetamidrid (ug/L)

Variable Name: SSAND**SAS Label:** N-Desmethyacetamidrid (ug/L)**English Text:** N-Desmethyacetamidrid (ug/L)**Target:** Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0.14 to 34.7	Range of Values	3012	3012	
.	Missing	26	3038	

SSANDLC - N-Desmethyacetamidrid (ug/L) Cmt code

Variable Name: SSANDLC
SAS Label: N-Desmethyacetamidrid (ug/L) Cmt code
English Text: N-Desmethyacetamidrid (ug/L) Cmt code
Target: Both males and females 3 YEARS - 150 YEARS

Code or Value	Value Description	Count	Cumulative	Skip to Item
0	At or above the detection limit	1136	1136	
1	Below lower detection limit	1876	3012	
.	Missing	26	3038	