Pesticide Monitoring on Soccer Fields
Via Wipe and Urine Samples

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### Background
- Pesticides linked to serious health outcomes
- Neurologic, reproductive and endocrine, immunologic, developmental impairment, and certain types of cancers.
- Negative health outcomes occur from childhood to adulthood and beyond
- Prior research demonstrated that pesticides are applied to children's athletic fields, question remains: does application of pesticides to the fields lead to pesticide exposure of children who use the fields?

### Purpose
- Pilot study: assessed exposure of children to pesticides applied to playing fields.
- Shoe wipes and urine samples before and after soccer field use.
- Children were the focus of sampling:
  - still developing nervous and immune systems;
  - cover more of the total field than coaches and referees;
  - exposed on a regular basis for many years.
- The chemical of concern: Horsepower, made up of MCPA, triclopyr, dicamba. May cause Non-Hodgkin’s lymphoma, hypothyroidism and birth defects.

### Limitations
- Sample size
- Non-detect due to monitoring in an untreated area (herbicide spot treatment only)

### Funding
University of MD Biology and Behavior Across the Lifespan Research Center
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### Results

#### Subjects
- 25 volunteers total (4 different practice nights)
- Sample: Monday night (n=6)
- 3 subjects from field 3
- 3 subjects from field 4

#### Wipes
- Preuse sample n = 12
- Postuse sample n = 12
- Field blank n = 2

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Preuse</th>
<th>Postuse</th>
<th>LOEL/NOEL\textsuperscript{*}</th>
<th>LOQ</th>
<th>Based on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wipes (herbicides)</td>
<td>&lt;0.06+ 216 μg/sample</td>
<td>15.2 mg/h</td>
<td>Triclopyr chr CA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine (dicamba)</td>
<td>&lt;1+0.36 μg/mL</td>
<td>19.0 mg/h</td>
<td>Dicamba chr CA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine (triclopyr)</td>
<td>&lt;0.02+0.072 μg/mL</td>
<td>15.2 mg/h</td>
<td>Triclopyr chr CA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Urine
- Preuse sample n = 6
- Postuse sample n = 6

### Methods
- N=6 (based on statistical considerations)
- Sampling date: September 15, 2014 following Horsepower application.
- 3 subjects per fields had cleats cleaned, dried, and wiped.
- Start and stop time of field use was noted, and shoes were wiped again.
- Urine samples: collected pre-use; post-use next morning with first void

### Data Analysis

#### Wipes
- Lab facility: ALS Environmental in Salt Lake City, UT.
- Analyzed with modified form of NIOSH Method 5601, Organonitrogen Pesticides via high performance liquid chromatography with an ultraviolet detector (HPLC UV).
- LOD= 0.6 μg/sample - 4.8 μg/sample, precision: 0.055-0.079.

#### Urine
- Lab facility: NMS Labs in Willow Grove, PA.
- LOD: dicamba - 0.1 μg/mL, triclopyr - 0.02 μg/mL.
- Creatinine measured to allow creatinine clearance calculation.

### Conclusions and Further Research
- Validated recruitment process
- Validated sample collection process: shoe wipes and urine
- Can translate to other settings and populations
- Values were below level of detection, possibly due to spot application of the herbicide, need to repeat when can observe application process, to determine true negative.

### Acknowledgements
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