Enhanced Surveillance of Campylobacteriosis, Arizona, 2010

A collaboration between the Arizona Department of Health Services, Arizona County Health Departments and the University of Arizona SAFER Program.

Kristen Pogreba-Brown, MPH
Campylo-who?

- **Campylobacter**: Gram-Negative spiral bacterium with many different species, most common infection is by *C. jejuni*.

- **Symptoms**: Diarrhea (often bloody), Nausea, Vomiting, Headache, Fatigue, Fever

- **Self-limiting**, usually lasts 5-7 days

- **Complications**: UTIs, Meningitis and Guillain-Barre. (rare)
Epidemiology of Campylobacteriosis

- Transmission is through the fecal-oral route such as consuming contaminated food.

- The incubation period is between 2 and 10 days. Usually 3-5 days.

- Rarely occurs in outbreaks. Usually sporadic cases.

- Common risk factors include: Ingestion of undercooked poultry, consumption of unpasteurized/raw dairy products*, foreign travel and contaminated water.
Burden of Illness

- Campylobacteriosis is the most common cause of gastroenteritis in the United States & all industrialized countries.

- Current incidence rate in the United State is ~13 cases/ 100,000 people.

- Campylobacteriosis is estimated to affect over 2.4 million persons every year, or 0.8% of the population.

- It is not usually fatal but it estimated to cause about 124 deaths each year.
Campylobacteriosis in Arizona

Number of Reported Cases of Campylobacteriosis in the State of Arizona by Year
Reported Cases = Tip of the Iceberg!

Surveillance and Reporting

- Reported to Health Dept/CDC
- Culture-confirmed case
- Active surveillance
- Lab tests for pathogen
- Specimen obtained
- Person seeks medical care
- Person reports illness to health authorities
- Person becomes ill
- Illness in the general population
Previous Studies

- Meta-analysis (38 studies) of case-control studies (most in U.S., Northern EU, UK, Australia & New Zealand)

- Many are matched Case-Control studies: Age, Gender and Geographic Locations

- Findings Consistent: Risk factors include,
  - raw/undercooked poultry, foreign travel, contaminated water, unpasteurized dairy consumption, contact with puppies & farm animals (especially for children), BBQ food (7-13)
Design: Matched Case-Control Study 1:2

- Matched on Age, Gender, Neighborhood
- Age Groups: 1-11 months, 1-9, 10-19, 20-29, 30-59, >60
- Exclusion Criteria: part of a recognized outbreak, non-culture confirmed case, no working phone number, not a resident of a county in Arizona

Controls selected by random digit dialing using Google maps to match to the case’s neighborhood. Then we used the case’s address on whitepages.com and did a neighbor lookup.
The Questionnaires


Results

- Total Cases interviewed: 110
- Total Controls: 61
Cases & Controls

Total Interviews = 171
Cases: 110 / Controls: 61

- Cochise - 18
- Coconino - 7
- La Paz - 1
- Maricopa - 72
- Mohave – 3
- Pima - 18
- Pinal - 15
- Santa Cruz - 7
- Yavapi - 8
- Yuma - 22
Results: Seasonal Variation

Based on interview date
### Results: Demographics

<table>
<thead>
<tr>
<th>Demographic Category</th>
<th>Cases</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>61</td>
</tr>
<tr>
<td>Male</td>
<td>63 (57%)</td>
<td>35 (57%)</td>
</tr>
<tr>
<td>Female</td>
<td>45 (41%)</td>
<td>26 (43%)</td>
</tr>
<tr>
<td>Age (mean &amp; range)</td>
<td>31.9 (9mo-82 yr)</td>
<td>43.8 (3mo-80yr)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>46 (42%)</td>
<td>9 (9.8%)</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>53 (48.2%)</td>
<td>50 (82%)</td>
</tr>
<tr>
<td>Urban</td>
<td>33</td>
<td>14</td>
</tr>
<tr>
<td>Suburban</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>Town</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>Rural/Farm</td>
<td>16</td>
<td>12</td>
</tr>
</tbody>
</table>
Preliminary Results: Matched Analyses
Results: Risk Factors

Odds Ratio of Risk Factors: Outside the Home

- Ate at a Social Gathering
- Ate at a Coffee House
- Ate "Ready to Eat"
- Ate at Gas Station
- Ate Snack Bar
- Ate Concessions
- Street Vendor
- Ate Deli
- Ate Cafeteria
- Ate Fast Food
- Ate At Restaurant
Results: Risk Factors

Odds Ratios of Arizona-Specific Risk Factors

- Ate Cilantro
- Farm Visit
- Ate Queso fresco
- Nibble Raw meat
- Ate Food Bought Outside Country
- Travel Outside Country

* Indicates statistically significant risk factor.
Discussion: Problems Encountered

- Cases – getting people on the phone
- Controls - who wants to complete a 30-45 minute interview without an incentive?
- Possible biased sample with making majority of calls from 9-5 M-F
- Difference between ethnicity of cases and controls
Discussion:

- Recall Bias: Remember correctly?
- Selection Bias: Healthy controls? Severe cases?
- Residual Confounding: Socioeconomic status?
- Over-matched: Matching on gender?
- Representativeness: Lack of ethnic diversity
Public Health Implications

What did this pilot study achieve?

Modification of the *Campylobacter* investigation form

Identified novel risk factors for Arizona

Starting point for further research

Looking glass into dietary habits of Arizona residents
Current Analyses and Studies

- Original analyses done on matched cases & controls only – many cases had to be dropped
  - Additional analyses on full dataset

- Re-enter data into online database
  - Further cleaning
  - Matched variables to current case series

- Case-series of all Maricopa cases from Feb 2011-August 2012 using modified questionnaire
  - Case-Case analyses
Questions?

- Agencies involved
  - ADHS
  - ALL County Health Depts.
  - MEZCOPH/UofA

- Special Thanks
  - Joli Weiss
  - Jennifer Stewart-Ricks
  - Kacey Ernst
  - Robin Harris
  - ADHS Staff & Interns
  - County Health Dept Epi’s and CDI’s
References

Questions?

Is that chicken cooked to 178 degrees? Are you going to eat those sprouts? They're a haven for bacteria!

Why microbiologists hardly ever get a second dinner date.