
By Zachary Stein

Under the supervision of Daniel Neises, MPH

MPH Field Experience
INTERNSHIP OVERVIEW

• Kansas Department of Health and Environment
  • Bureau of Epidemiology and Public Health Informatics
  • Assessment of foodborne illness in Kansas, the complaint system, and the restaurants that produce the complaints
DEFINITIONS

• KDHE: Kansas Department of Health and Environment
• KDA: Kansas Department of Agriculture
• KFE: Kansas Food Establishment
  • A location holding a food-service license with the KDA
• Investigation: A complaint meeting the investigation criteria as follows:
  • “Two or more individuals from different households who experience a similar illness after eating a common food or different food from a common place.”
INTERNSHIP ACTIVITIES

• Participated in daily updates on Kansas epidemiology and health issues
• Attended CDC phone lectures
• Attended KDHE teleconferences with local health departments
• Assisted with outbreak investigations and phone interviews
• Assisted the CDC in tick collection for testing
INTERNSHIP ACTIVITIES: Tick Hunting
MAIN PROJECT OVERVIEW

• Analysis of KDA’s food establishment complaint system
• Compilation of databases from multiple sources
• Statistical analysis of data
• Provide a multi-disciplinary approach considering the needs of involved agencies
Yearly, approximately 1 in 6 Americans develops a foodborne illness.

- Costing the United States $365 million in medical costs annually.
- 128,000 will be hospitalized.
  - 3,000 cases will be fatal\(^{(1)}\).
- Foodborne disease can be caused by viruses, bacteria, parasites, toxins, or chemical contamination\(^{(10)}\).
<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Estimated number of illnesses &lt;sup&gt;(9)&lt;/sup&gt;</th>
<th>% Food-Related Illness &lt;sup&gt;(9)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norovirus</td>
<td>5,461,731</td>
<td>58</td>
</tr>
<tr>
<td>Salmonella, nontyphoidal</td>
<td>1,027,561</td>
<td>11</td>
</tr>
<tr>
<td><em>Clostridium perfringens</em></td>
<td>965,958</td>
<td>10</td>
</tr>
<tr>
<td><em>Campylobacter spp.</em></td>
<td>845,024</td>
<td>9</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>241,148</td>
<td>3</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>91</td>
</tr>
</tbody>
</table>
Most pathogen contamination occurs during food preparation\(^3\)

Over half of the reported foodborne disease outbreaks cannot be traced to an etiological agent

Most foodborne infections go undiagnosed and unreported

Either the ill person does not see a doctor or there is no specific diagnosis
Foodborne illness outbreaks are usually detected in one of three ways:

- Pathogen-Specific surveillance of reportable diseases
- Reports of illness by healthcare providers or institutions
- Consumer complaints of suspected foodborne illness
  - Organized by the KDA
BACKGROUND cont.

• Complaint systems have many benefits
  • Do not require a diagnosis or lab results
  • All diseases are reported
  • Put constituents in direct contact with appropriate departments
  • Allows investigations to proceed much more rapidly
BACKGROUND cont.

Methods of Reporting

Report a Complaint

You may make a complaint about a Kansas Food Establishment, Food Processor, or Lodging Facility by using our one of our online complaint forms below, sending an email to fsl@kda.ks.gov; or by calling us at (785) 564-6767.

File a Food Safety or Lodging Complaint

File a Food Safety Complaint involving Illness

Please note that, if you provide it, your name and contact information is subject to the Kansas Open Records Act. All complaints are processed according to program policy. Any information provided on the complaint form will be subject to release even if you request to remain anonymous.

Occasionally we have questions about the complaints we investigate, and if we are unable to contact you, it could slow or stop our investigation.

To file a confidential Food Safety Complaint involving illness, please call the Kansas Department of Health and Environment Infectious Disease Epidemiology and Response at (877) 427-7317 or email EpiHotline@kdheks.gov.

We work cooperatively with the Kansas Department of Health and Environment Infectious Disease Epidemiology and Response investigating foodborne illness outbreaks. They provide expertise and technical support to local health departments, the private health care community and the general public. You may contact them at (877) 427-7317 or at EpiHotline@kdheks.gov.
• Current State Complaint System
  1. A Kansan suspects illness originating from a Kansas food establishment
  2. Complainant submits a formal complaint to KDA either through email, telephone, fax, or in person
  3. KDA forwards a copy of the complaint to KDHE
  4. KDHE assesses the complaint and determines if it meets criteria for an outbreak investigation
  5. Investigation is further assessed by KDHE and KDA
DEFINITIONS cont.

- Complainant: The person or entity submitting the complaint
- Franchise Status: For the purpose of this presentation, a “chain establishment” is defined as 3 or more establishments registered in Kansas.
- Anonymity: Anonymous denotes a complainant’s desire to remain anonymous and not provide identifying information on the complaint form.
- Ready-To-Eat Food: Food product that is prepared at the KFE or prepared by an associated location and delivered to be served or sold
DEFINITIONS cont.

- RAC: A number 1-6 assigned to a KFE denoting the relative risk of foodborne illness with 1 being the lowest risk and 6 being the highest. (9)

<table>
<thead>
<tr>
<th>RAC</th>
<th>Basic Description</th>
<th>Potentially Hazardous Foods (PHF's)</th>
<th>Cold/Hot Holding</th>
<th>Food Preparation</th>
<th>Cooking on Site</th>
<th>Ware Washing</th>
<th>Reheating/Cooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>#6</td>
<td>Advanced Prep</td>
<td>Yes</td>
<td>Cold and/or Hot</td>
<td>Extensive</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>#5</td>
<td>Cook and Serve</td>
<td>Yes</td>
<td>Cold and/or Hot</td>
<td>Simple</td>
<td>Yes</td>
<td>Yes</td>
<td>None</td>
</tr>
<tr>
<td>#4</td>
<td>Deli's, Satellite Food Service</td>
<td>Yes</td>
<td>Cold Only</td>
<td>Limited</td>
<td>None</td>
<td>Yes</td>
<td>None</td>
</tr>
<tr>
<td>#3</td>
<td>PHF's can be served-Satellite</td>
<td>Yes</td>
<td>Cold and/or Hot</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
<td>None</td>
</tr>
<tr>
<td>#2</td>
<td>May have PHF's, but no prep on site</td>
<td>Yes</td>
<td>Cold Only</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>#1</td>
<td>Food in Original container</td>
<td>No</td>
<td>Neither</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
OBJECTIVES

• Merge and clean data sets from KDHE and KDA
• Descriptive analysis of foodborne complaints and foodborne outbreak data.
• Statistical significance tests on KFE and complaint variables
  • Identify relevant variables contributing to complaints, investigations, and foodborne disease outbreaks
METHODS

• KFE license information and Complaint data from 2009-2014 was collected from KDA
• EDSS and EpiTrax investigation data was collected from KDHE
• All data was cleaned and compiled on a single Excel file
  • Complaints not involving ready-to-eat food or illness were excluded
  • KFEs not meeting ready-to-eat criteria were excluded
  • Outbreaks not involving food were excluded
  • Outbreaks not originating from complaints were excluded
METHODS cont.

• Outbreak ID was added to the original complaint data
• Merged outbreaks with complaint files using Outbreak ID
• Complaint data linked to producing KFE using registered license
  • KFEs were classified by Principal Food Type, and Franchise Status
ANALYSIS

- Count data was assessed and compiled using Excel and SAS
- KFE variables were analyzed for contributing factors in complaint submission
- Complaint and KFE factors were analyzed for significant contribution to complaint investigation
- Relevant variables were assessed for contribution to confirmation of an outbreak from an investigation
Results - Franchise Status

A. KFE Count by Franchise Status

Chain (35.4%) - 4806
Not a Chain (64.6%) - 8754

B. Rate of Complaints by Franchise Status

Complaints per 100 KFEs

Chain - 16.4
Not a Chain - 5.1

C. Rate of Investigation of Complaints by Franchise Status

Investigations per 100 Complaints

Chain - 10.3
Not a Chain - 21.0
RESULTS - Risk Assessment Code

A. KFE Count by Risk Assessment Code

- #1 (4.0%) - 544 KFEs
- #2 (5.1%) - 694 KFEs
- #3 (6.8%) - 920 KFEs
- #4 (17.4%) - 2365 KFEs
- #5 (13.3%) - 1801 KFEs
- #6 (53.4%) - 7235 KFEs

Number of KFEs

Risk Assessment Code
RESULTS - RAC cont.

B. Complaints by RAC per 100 KFEs

<table>
<thead>
<tr>
<th>Risk Assessment Code</th>
<th>Complaints per 100 KFEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>0.2</td>
</tr>
<tr>
<td>#2</td>
<td>1.2</td>
</tr>
<tr>
<td>#3</td>
<td>1.4</td>
</tr>
<tr>
<td>#4</td>
<td>3.1</td>
</tr>
<tr>
<td>#5</td>
<td>9.4</td>
</tr>
<tr>
<td>#6</td>
<td>13.4</td>
</tr>
</tbody>
</table>
RESULTS - RAC cont.

C. Investigations of Complaints by RAC per 100 Complaints

<table>
<thead>
<tr>
<th>Risk Assessment Code</th>
<th>Investigations per 100 Complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>0.0</td>
</tr>
<tr>
<td>#2</td>
<td>25.0</td>
</tr>
<tr>
<td>#3</td>
<td>15.4</td>
</tr>
<tr>
<td>#4</td>
<td>11.0</td>
</tr>
<tr>
<td>#5</td>
<td>8.9</td>
</tr>
<tr>
<td>#6</td>
<td>15.2</td>
</tr>
</tbody>
</table>
RESULTS - Principal Food Type

A. KFE Counts per Principal Food Type

- AMERICAN (40.9%): 5540 KFEs
- ASIAN (3.7%): 498 KFEs
- DELI (3.3%): 450 KFEs
- GROCERY (14.4%): 1955 KFEs
- HISPANIC (6.3%): 851 KFEs
- OTHER (31.5%): 4267 KFEs
RESULTS - Principal Food Type cont.

B. Complaints by Principal Food Type per 100 KFEs

- AMERICAN: 13.2 complaints per 100 KFEs
- ASIAN: 25.1 complaints per 100 KFEs
- DELI: 12.2 complaints per 100 KFEs
- GROCERY: 3.3 complaints per 100 KFEs
- HISPANIC: 25.0 complaints per 100 KFEs
- OTHER: 1.2 complaints per 100 KFEs
RESULTS - Principal Food Type cont.

C. Investigations of Complaints by Principal Food Type per 100 Complaints

- AMERICAN: 12.2
- ASIAN: 19.2
- DELI: 14.5
- GROCERY: 10.9
- HISPANIC: 16.0
- OTHER: 26.0
RESULTS - Per County

KANSAS - 2010 Census Results
Total Population by County
RESULTS - Submission Type

A. Complaints per Submission Type

- Telephone (66.3%): 821
- Online (33.7%): 417

B. Investigations of Complaints by Submission Type per 100 Complaints

- Telephone: 14.4
- Online: 13.7
RESULTS - Anonymity

A. Complaints per Complainant Type

- Anonymous (31.3%)
  - Number of Complaints: 387

- Named (68.7%)
  - Number of Complaints: 851

B. Investigations of Complaints by Complainant Type per 100 Complaints

- Anonymous
  - Investigations per 100 Complaints: 5.9

- Named
  - Investigations per 100 Complaints: 17.9
RESULTS - Anonymity by Year

A. Complaint Submission and Complainant Type per Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Named</th>
<th>Anonymous</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>128</td>
<td>21</td>
</tr>
<tr>
<td>2010</td>
<td>145</td>
<td>28</td>
</tr>
<tr>
<td>2011</td>
<td>103</td>
<td>47</td>
</tr>
<tr>
<td>2012</td>
<td>160</td>
<td>58</td>
</tr>
<tr>
<td>2013</td>
<td>174</td>
<td>119</td>
</tr>
<tr>
<td>2014</td>
<td>140</td>
<td>114</td>
</tr>
</tbody>
</table>
RESULTS - Anonymity by Year cont.

B. Percent Complainant Submission Method and Complainant Information per Year

Year | Named Telephone | Named Online | Anonymous Telephone | Anonymous Online
--- | --- | --- | --- | ---
2009 | 69.1% | 16.8% | 10.1% | 4.0%
2010 | 68.2% | 15.6% | 11.6% | 4.6%
2011 | 50.0% | 18.7% | 13.3% | 13.3%
2012 | 45.9% | 27.5% | 13.3% | 13.3%
2013 | 34.8% | 22.2% | 18.4% | 11.4%
2014 | 31.9% | 23.2% | 33.5% | 11.4%
## ANALYSIS: KFE Factors and Complaints

### TABLE 1. KFE FACTORS PRODUCING A COMPLAINT

<table>
<thead>
<tr>
<th>RISK ASSESSMENT CODE</th>
<th>Odds Ratio</th>
<th>95% Confidence Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAC 1 vs. 4</td>
<td>0.058</td>
<td>0.003</td>
</tr>
<tr>
<td>RAC 2 vs. 4</td>
<td>0.366</td>
<td>0.162</td>
</tr>
<tr>
<td>RAC 3 vs. 4</td>
<td>0.450</td>
<td>0.237</td>
</tr>
<tr>
<td>RAC 5 vs. 4</td>
<td>3.251</td>
<td>2.464</td>
</tr>
<tr>
<td>RAC 6 vs. 4</td>
<td>4.884</td>
<td>3.861</td>
</tr>
</tbody>
</table>

### FRANCHISE STATUS

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chain vs. Non-Chain</td>
<td>3.647</td>
<td>3.230</td>
<td>4.122</td>
</tr>
</tbody>
</table>

### PRINCIPAL FOOD TYPE

<table>
<thead>
<tr>
<th></th>
<th>Odd</th>
<th>95% Confidence Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian vs. American</td>
<td>2.205</td>
<td>1.769</td>
</tr>
<tr>
<td>Deli vs. American</td>
<td>0.916</td>
<td>0.677</td>
</tr>
<tr>
<td>Grocery vs. American</td>
<td>0.223</td>
<td>0.170</td>
</tr>
<tr>
<td>Hispanic vs. American</td>
<td>2.196</td>
<td>1.844</td>
</tr>
<tr>
<td>Other vs. American</td>
<td>0.078</td>
<td>0.058</td>
</tr>
</tbody>
</table>
## ANALYSIS: KFE, Complaints, and Outbreak Investigations

### TABLE 2. COMPLAINTS INVESTIGATED FOR OUTBREAKS AND NOT INVESTIGATED BY RESTAURANT VARIABLES, KANSAS, 2009-2014

<table>
<thead>
<tr>
<th>Variables</th>
<th>Not Investigated (n=1063)</th>
<th>Investigated (n=174)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td></td>
</tr>
<tr>
<td><strong>RAC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1 (&lt;1)</td>
<td>0 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6 (1)</td>
<td>2 (1)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>11 (1)</td>
<td>2 (1)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>65 (6)</td>
<td>8 (5)</td>
<td>0.91</td>
</tr>
<tr>
<td>5</td>
<td>154 (14)</td>
<td>15 (9)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>826 (78)</td>
<td>147 (84)</td>
<td></td>
</tr>
<tr>
<td><strong>PRINCIPAL FOOD TYPE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American</td>
<td>642 (60)</td>
<td>88 (51)</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>101 (10)</td>
<td>24 (14)</td>
<td></td>
</tr>
<tr>
<td>Deli</td>
<td>47 (4)</td>
<td>8 (5)</td>
<td>0.31</td>
</tr>
<tr>
<td>Grocery</td>
<td>57 (5)</td>
<td>7 (4)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>179 (17)</td>
<td>34 (20)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>37 (3)</td>
<td>13 (7)</td>
<td></td>
</tr>
<tr>
<td><strong>FRANCHISE STATUS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chain</td>
<td>709 (67)</td>
<td>80 (46)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Non-Chain</td>
<td>354 (33)</td>
<td>94 (54)</td>
<td></td>
</tr>
</tbody>
</table>
# ANALYSIS: KFE, Complaints, and Outbreak Investigations

## TABLE 3. COMPLAINTS INVESTIGATED FOR OUTBREAKS AND NOT INVESTIGATED BY COMPLAINT SUBMISSION VARIABLES, KANSAS, 2009-2014

<table>
<thead>
<tr>
<th>SUBMISSION METHOD</th>
<th>Not Investigated (n=1429)</th>
<th>Investigated (n=224)</th>
<th>Odds Ratio</th>
<th>95% Confidence Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone</td>
<td>948 (66)</td>
<td>152 (68)</td>
<td>0.93</td>
<td>0.69 1.26</td>
</tr>
<tr>
<td>Online</td>
<td>481 (34)</td>
<td>72 (32)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANONYMITY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anonymous</td>
<td>468 (33)</td>
<td>28 (12)</td>
<td>3.41</td>
<td>2.26 5.14</td>
</tr>
<tr>
<td>Named</td>
<td>961 (67)</td>
<td>196 (88)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 4. COMPLAINT ANONYMITY AND KFE FRANCHISE STATUS EFFECT ON COMPLAINT SUBMISSION OUTCOME, KANSAS, 2009-2014

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>95% Confidence Limits</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANONYMITY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Named Complaints</td>
<td>3.44</td>
<td>2.26</td>
<td>5.14</td>
</tr>
<tr>
<td>Vs. Anonymous Complaints</td>
<td></td>
<td></td>
<td>0.03</td>
</tr>
<tr>
<td><strong>FRANCHISE STATUS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Chain</td>
<td>2.35</td>
<td>1.70</td>
<td>3.26</td>
</tr>
<tr>
<td>Vs. Chain</td>
<td></td>
<td></td>
<td>0.02</td>
</tr>
</tbody>
</table>
## ANALYSIS: Submission Method and Anonymity

### TABLE 5.
COMPLAINT METHOD’S EFFECT ON ANONYMITY

<table>
<thead>
<tr>
<th>Method Comparison</th>
<th>Odds Ratio</th>
<th>95% Confidence Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online vs. Telephone</td>
<td>1.430</td>
<td>1.148</td>
</tr>
</tbody>
</table>

### TABLE 6.
ANONYMITY’S EFFECT ON INVESTIGATION NOT LEADING TO AN OUTBREAK

<table>
<thead>
<tr>
<th>Outbreak Status Comparison</th>
<th>Odds Ratio</th>
<th>95% Confidence Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outbreak Determined “Not an Outbreak” vs Confirmed Outbreaks</td>
<td>2.669</td>
<td>1.179</td>
</tr>
</tbody>
</table>
DISCUSSION

- Anonymity and its effects on investigations
  - Online complaints have 1.4 times the odds of being submitted anonymously
    - OR= 1.4
  - Anonymous complaints that meet criteria for investigation are 2.7 times the likelihood to result in being declared “Not an Outbreak”
    - OR= 2.7
DISCUSSION cont.

• KFE Variable effects on Complaints
  • Risk Assessment Code
    • RAC is a good predictor of the odds of a complaint being submitted with RAC 6 standing significantly higher than all lower codes
  • Principal Food Type
    • Delis, groceries, and other types of food demonstrate lower odds of complaint production compared to American KFES with OR= 0.92, 0.22, and 0.08 respectively
    • Compared to American food, our two “Foreign” food establishment categories, Asian and Hispanic, showed an increased odds of producing a complaint of 2.2
DISCUSSION cont.

- KFE Variable Effects on Complaints Cont...
  - Franchise Status
    - OR = 3.7
      - Chain restaurants are 3.7 more likely to produce a complaint compared to non-chain restaurants
DISCUSSION cont.

• KFEs:
  • Excluding Franchise Status, KFE strata do not serve as significant predictors for the odds of investigations or outbreaks
  • However, KFE strata do all serve as a significant predictor for the odds of producing a complaint
DISCUSSION cont.

- Significant Variable effects on Investigation
  - Anonymity
    - OR = 3.4
      - Named complaints increase the odds of an investigation 3.4 fold
  - Franchise Status
    - OR = 2.3
      - Complaints regarding a non-chain restaurant are 2.3 times more likely to result in an investigation compared to their chain franchise counterparts

*No other KFE variables were shown to significantly contribute to the Investigation Status
DISCUSSION cont.

• Anonymity
  • Positively affected by “Other” (Email) complaint methods
  • Negatively affects ability to investigate and confirm outbreaks
  • Seems to be increasing as complainants move towards email complaints

• An increased number of complaints does not necessarily mean to expect an increase in investigations or outbreaks
CONSIDERATIONS

• Well-structured complaint systems are an effective part of foodborne outbreak surveillance (3)

• Complaint systems have the potential for more rapid assessment of a complaint

• Complaint systems remove the barriers between the general population and health departments
CONSIDERATIONS cont.

• KFEs
  • Watch for bias in reporting of complaints
    • “Foreign Food” restaurants are much more likely to produce a complaint, but does not result in an investigation or outbreak
  • High complaint levels do not necessarily mean a greater odds of an outbreak
  • RAC serves as a good predictor for complaints but not for potential outbreaks
CONSIDERATIONS cont.

• Anonymous Complaints:
  • Assess ways to encourage complainants to submit a named complaint
  • Assess anonymity warnings in the complaint process
  • Encourage telephone complaints

• Potential Outcomes:
  • A decrease in “fruitless” investigations
  • An increase in confirmed outbreaks
LIMITATIONS

- Dependence on population to submit complaints
- Missing Information in Complaint Data
- Missing KFE Data
- “Not an Outbreak” could mean many things
- Data lost due to data sets originating from different agencies, departments, and systems
Future Study

• Analysis of other KFE variables (e.g. KFE size, Date of Licensure, etc.)
• Analysis of time between exposure to complaint
• Determine how best to inform Kansans regarding the foodborne illness complaint system
• Determine how best to encourage named complaints
Core Competencies

- **Biostatistics**
  - Analysis of foodborne illness complaints and KFEs
  - Association between investigations and anonymity

- **Environmental Toxicology**
  - Review of foodborne illness from toxin contamination
  - Thorough application of Permethrin when hunting ticks

- **Epidemiology**
  - Analysis of complaints by KFE factors
  - Assistance with disease investigations
  - Daily updates on current projects at KDHE

- **Administration of Health Care Organizations**
  - Daily work in the BEPHI offices
  - Meetings with epidemiologists from varying disciplines

- **Social and Behavioral Basis of Public Health**
  - Barriers between ill persons and complaints
  - Assessment of current state of anonymous complaints
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REFERENCES

Questions?