Public Health Field Experience

Kansas State University

Mindi Russell, MS, MPH

Overview

- MPH/EID Fellowship
- FDA Experience

Investigation of Intestinal Parasitism Among Hispanic Migrant and Seasonal Farm Workers in Eastern North Carolina

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APHL/CDC Emerging Infectious Diseases Training Fellowship
MPH Field Experience

EID Mentor: Dr. Julie Ann Kase
Major Professor: Dr. Daniel Y.C. Fung

North Carolina State Laboratory of Public Health, Raleigh, NC 27601
Kansas State University, Manhattan, KS 66506

Background

- DHHS – OMH:
  - U.S. 4.2 million
  - N.C. 108,900 (CDC, 2007)
- Farm workers
  - Majority foreign-born
- Intestinal Parasites
  - Endemic in many developing countries
- 1992 study in NC:
  - 20-80% parasitic burden (Ciesielski , 1992)

Research Objectives

Conduct an epidemiological survey of the prevalence of intestinal parasites among:

- Adult Hispanic populations
- Migrant and seasonal farm workers
- Eastern North Carolina
- 2007 planting and harvesting season

Materials and Methods

Collaborators

- NCSLPH – Dr. Julie Ann Kase
- NCSU – Dr. Maria Correa
- NC Community Health Centers (3)

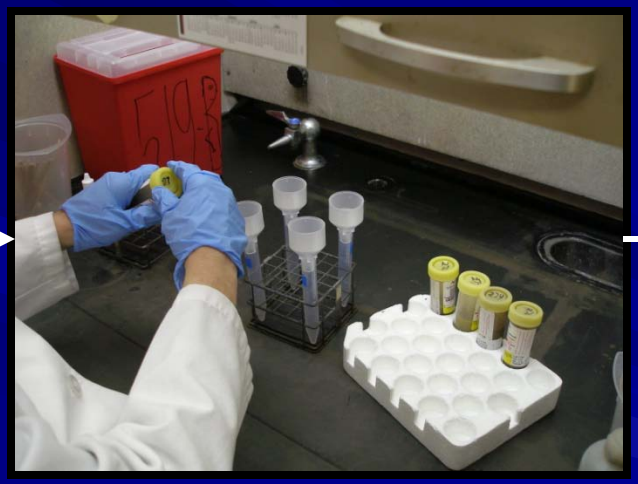
Questionnaires

- Administered
  - Verbally
  - Spanish and English
- Information
  - Demographics
  - Medical history
  - Working conditions
  - Living conditions
  - Lifestyle / hygiene

Stool Specimen

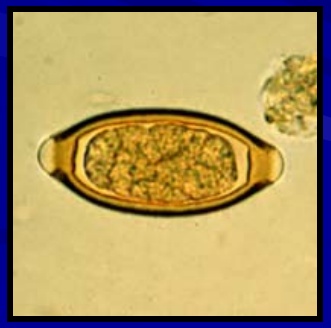
- Complete questionnaire
- Explanation of stool collection procedure
- Submission of stool specimen
- Parasitic Screening
- Reporting

Ova & Parasite Examinations



Parasites

- *Cryptosporidium*
- *Cyclospora*
- *Giardiasis*
- *Taenia*
- *Entamoeba histolytica*
- *Ascaria lumbricoides*
- *Blastocystis hominis*
- *Ancyclostoma duodenale*



Results and Discussion

Demographics

- Of the 71 participants:
  - 100% born in Mexico
  - 86% male
  - 81% between 20-40 years
  - Occupations:
    - Tobacco (73%)
    - Fruits / Vegetables (51%)

Medical History: Parasitism

- Mexico
  - Childhood prevalence: 38%
- US
  - Adult prevalence: 3%
- Self-medication
  - Previous: 69%
  - Current: 7%
  - Most common medication: Vormex

Bathroom Facility Availability

- At home:
  - 78% private toilet
  - 7% latrine
  - 7% portable
- At work:
  - 29% private toilet
  - 12% latrine
  - 44% portable

Living Conditions and Hygiene

- Quarters:
  - 4-6 people
- Hand-washing frequency after bathroom use:
  - 96% at home
  - 78% at work
  - 92% before cooking
- Food Service:
  - 1% jobs in food service industry while in US

O & P Examinations

- Of 16 stool specimens submitted
  - Two Positive
    - *Giardia spp.* (1)
    - *Entamoeba coli* (1)
  - H2A workers
  - Risk of transmission of foodborne parasites

Significance of Research

- Documents prevalence of intestinal parasitism among target population
- Addresses emerging public health concern and threat to food-to-fork continuum: food safety
- Gain better understanding of health and hygiene of farm workers to assess safety and risk of transmission of foodborne parasites from ag commodities to consumers

Detection of *Salmonella* in Foods: Methods Development and Validation

Mindi Russell
Microbiologist

Office of Regulatory Science
Division of Microbiology
Microbial Methods Development Branch

Salmonella

- Up to 1.4 million cases per year.
- Infectious dose can be less than 10 cfu.
- Symptoms range from diarrhea to death, with a case fatality rate of 0.6%.
- Up to 2% of culture confirmed cases can develop reactive arthritis (formerly known as Reiter's syndrome).

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Transmission

- Transmitted in foods and through person-to-person contact.
- Meat and eggs are most commonly implicated.
- Outbreaks have been associated with fruit and fruit juices.
- Orange juice, cantaloupes, mangoes, mamey, and tomatoes have all been implicated in *Salmonella* outbreaks.

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The Organism

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Salmonella enterica

	Number of Serovars
S. enterica subsp. *enterica* (I)	1,531
S. enterica subsp. *salamae* (II)	505
S. enterica subsp. *arizonae* (IIIa)	99
S. enterica subsp. *diarizonae* (IIIb)	336
S. enterica subsp. *houtenae* (IV)	73
S. enterica subsp. *indica* (VI)	13
Total (2007)	**2557**

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BAM Culture Method

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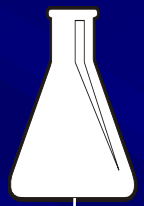
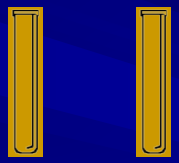
Salmonella Culture Method

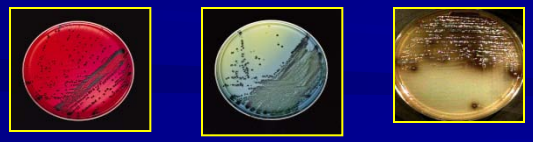
Homogenize Food



Preenrichment — 24 h, 35°C



Selective enrichment — 24 h, 35°C, and 42°C



Selective plating — 24 h, 35°C

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Tomatoes

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Impact

- 13 Tomato-related outbreaks from 1997-2008
- Thousands of people sickened
- Implicated in 2008 Outbreak
  - may have had involvement early on

Culture Methods

- Found that a soak method was significantly more productive than a rinse method
- ORA was not finding positive tomatoes even with a better method
- Studies to address issue

Inoculation by Injection

- Tomatoes Injected into the Stem Scar
- Tomatoes Injected into the Side
- Two different Serotypes

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Inoculation by Immersion

- Tomatoes warmed to ca. 42°C
- Immersed in an inoculum bath at ca. 21°C
- Stirred intermittently for 15 min
- Air dried
- Washed in ethanol
- Stored for 4 days
- Washed in ethanol a second time immediately before analysis

Inoculated Tomatoes

Ethanol Wash

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Analysis & Plating

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Conclusion

- Additional experiments needed using *S*. Saintpaul and *S*. Weltevreden
- Use fluorescent *S*. Typhimurium to determine the distribution of the pathogen after inoculation

Future

- Continue working in applied microbiology
- Improvement in food safety

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