

# Prevention of *Campylobacter* exposure in the retail food environment

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# Outline

- EHS-Net Cooperative Agreement
- *Campylobacter* & Campylobacteriosis
- Communicable Disease Investigations
- Risk & Knowledge Assessments
- Restaurant Intervention Study
- Preliminary Findings
- Outlook to the Future

# Cooperative Agreement

- CDC's National Center for Environmental Health
- EHS-Net
- 5 year grant cycle (2010-2015)
- \$149,000/year
- Practice project
- CDC technical advisors



# Goals & Objectives

## GOALS

- Build capacity of EH to implement system-wide interventions to reduce incidence of reported *Campylobacter* cases
- Change perception of EH from regulatory agency to pro-actively inform, educate & empower businesses & residents

## OBJECTIVES

- Reduce incidence of *Campylobacter* infection in SMC
- Decrease food facility risk factors associated with raw chicken handling
- Increase food handler knowledge of *Campylobacter* risk & safe chicken handling
- Increase public's knowledge & awareness of EH

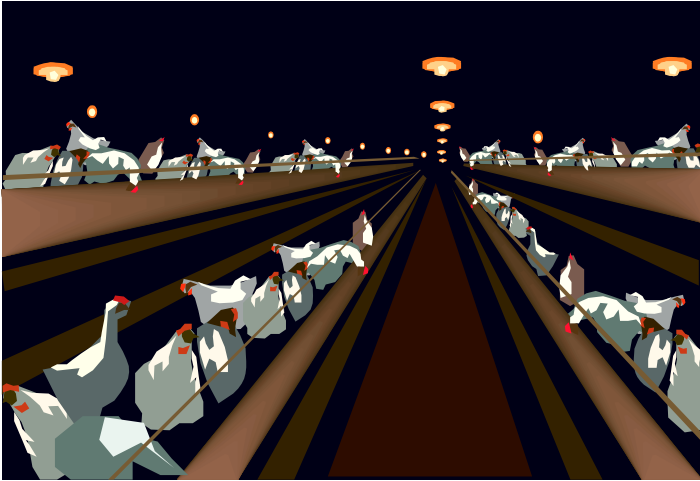
# Activities

- Communicable Disease Investigations
- Case-control study
- CDI Notifications to EHS
- Risk & Knowledge Assessments in restaurants that prepare raw chicken
- Intervention

# *Campylobacter* & Campylobacteriosis



# What is Campylobacter?



- Bacteria endemic in flocks of chickens
- In 2008, FDA's NARMS found 65% of chicken breast tested at retail in CA was infected
- Spread through common water source or contact with infected fecal matter
- At slaughter, infected intestinal organisms can contaminate meat
- Other non-chicken sources

# What is Campylobacteriosis?

- Incubation period:
  - 2-5 days average
  - 1-10 days range
- Infectious dose:
  - 500 organisms
- Symptoms:
  - Diarrhea, cramping, abdominal pain, fever, vomiting
- Treatment:
  - Wait it out or antibiotics
- Most common acute gastroenteritis in USA





# Campylobacter vs. Salmonella

	Campylobacter / Campylobacteriosis	Salmonella / Salmonellosis
Transmission	Raw chicken, unpasteurized milk, recreational water, international travel	Contaminated food, water, or contact with infected animals
% chickens infected (2008)	65% in CA 48.8% nationwide	15.8% in CA 12.1% nationwide
Incubation period	2-5 days average (range 1-10 days)	12 to 72 hours
Symptoms	Diarrhea, cramping, abdominal pain, fever	Diarrhea, fever, abdominal cramps
Duration	1 week	4 to 7 days
Infectious dose	500 organisms	$10^3$ to $10^6$
Cases	Isolated, sporadic events	Outbreaks

# Campylobacteriosis in SMC

## SAN MATEO COUNTY

- 2000-2009, avg 218 cases/year of culture-confirmed *Campylobacter* infections
- Annual incidence rate:
  - In SMC, 30.8 per 100,000 persons
  - In USA, 13.6 per 100,000 persons
- Multiplier of 34 = projected true burden of *Campylobacter* infections in 2009 was 7,786 or > 1,000 cases per 100,000

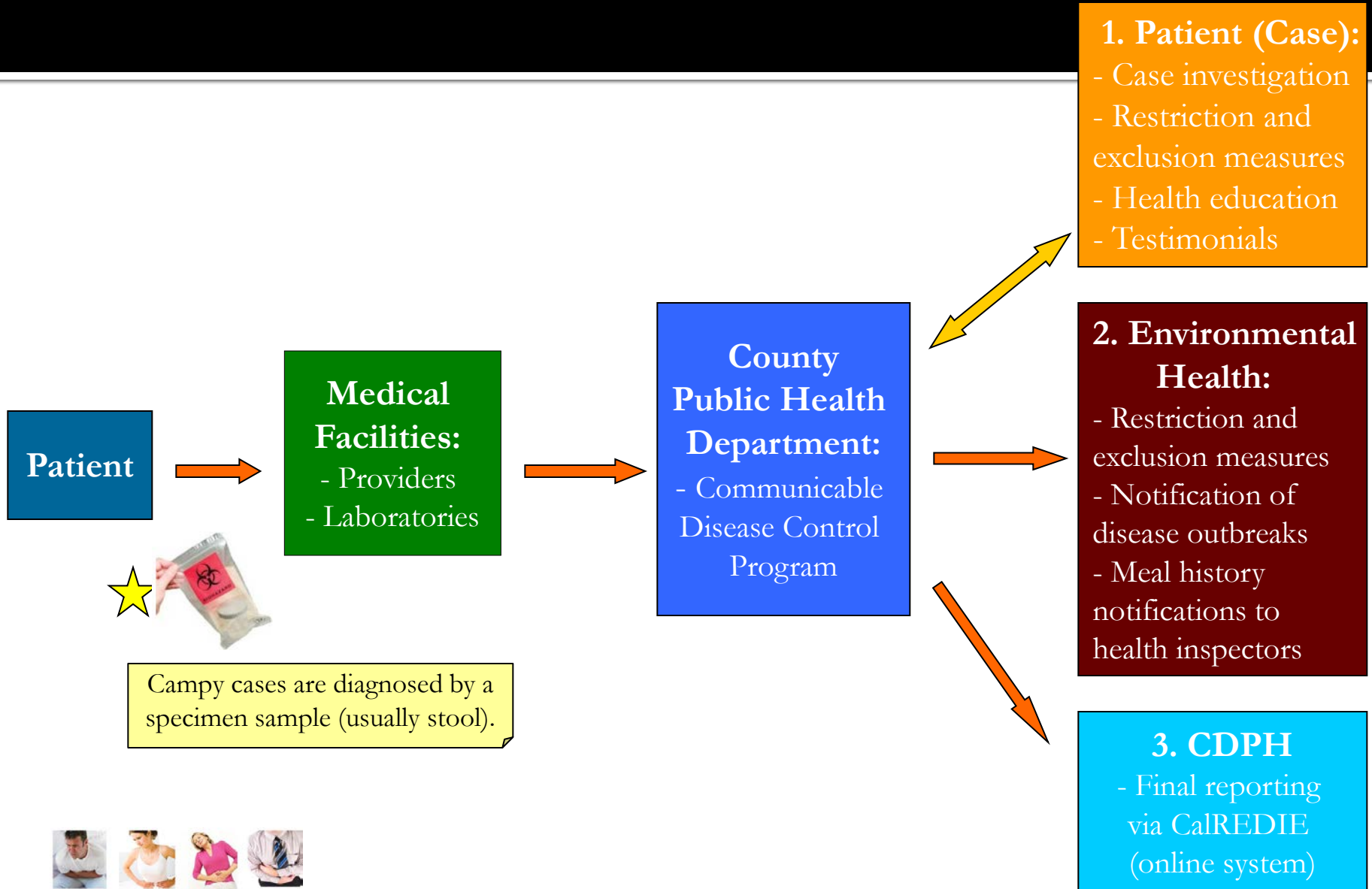
## HEALTHY PEOPLE GOALS

- Health People 2010 target was 12.3 cases per 100,000 persons
- Healthy People 2020 target is 8.5 infections per 100,000 persons

# Communicable Disease Investigations

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# Campylobacter Disease Reporting

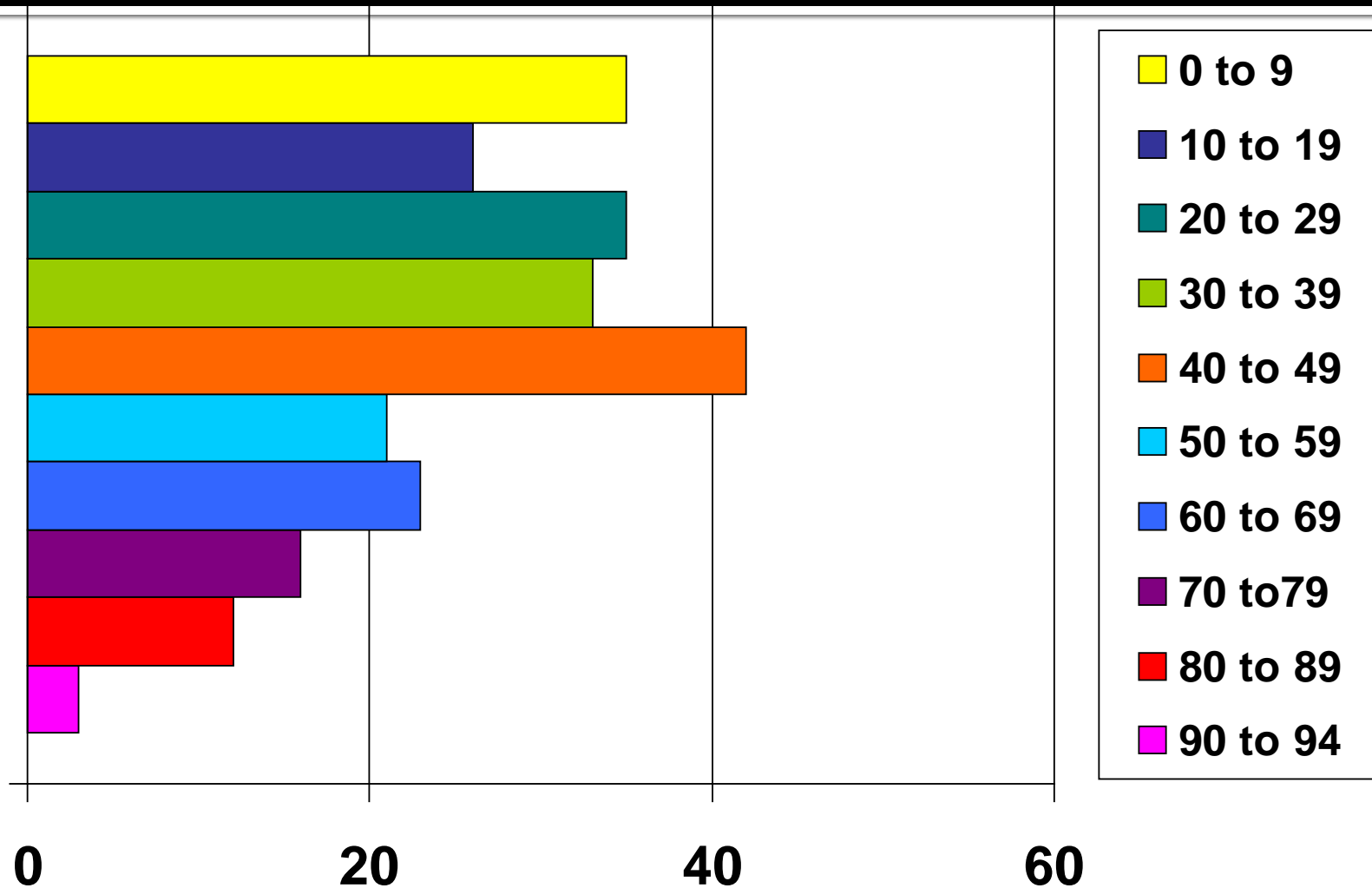


# 2011 Cases

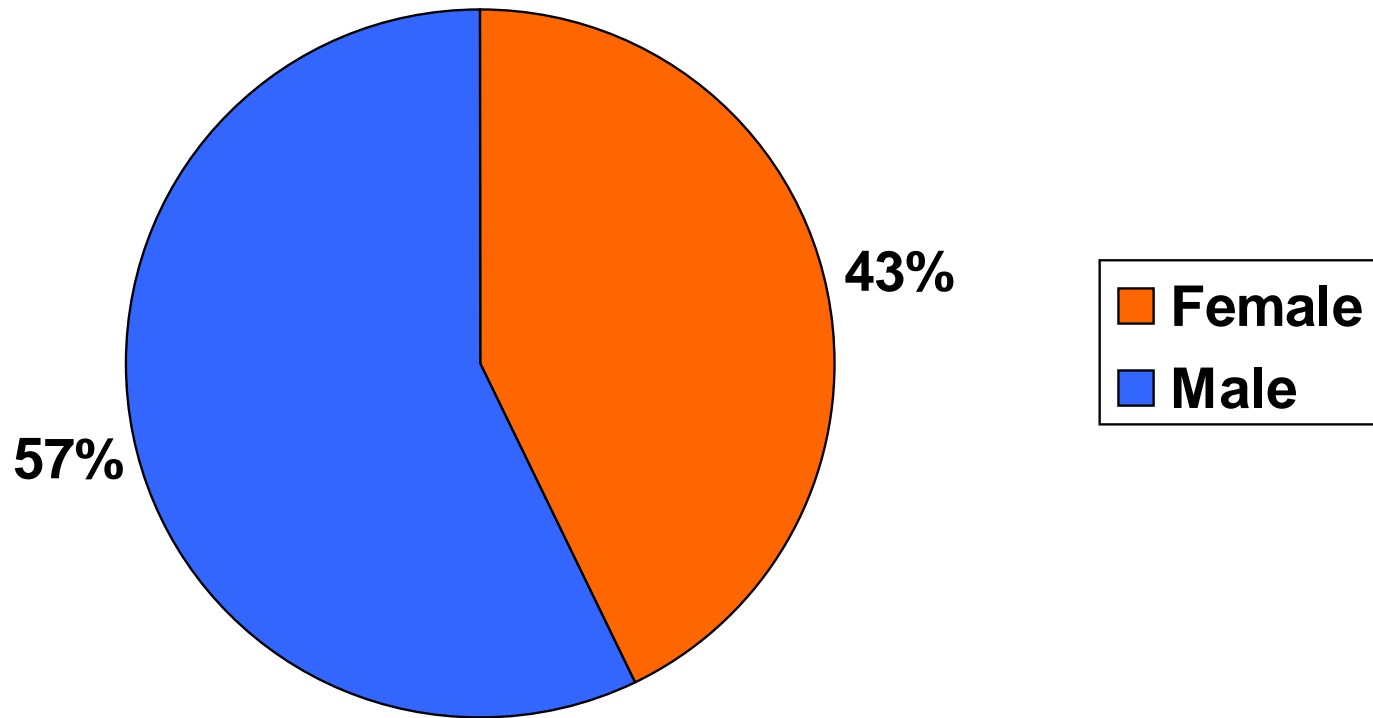
Quarter	n
1 <sup>st</sup>	53
2 <sup>nd</sup>	56
3 <sup>rd</sup>	70
4 <sup>th</sup>	67

**246**  
total  
cases

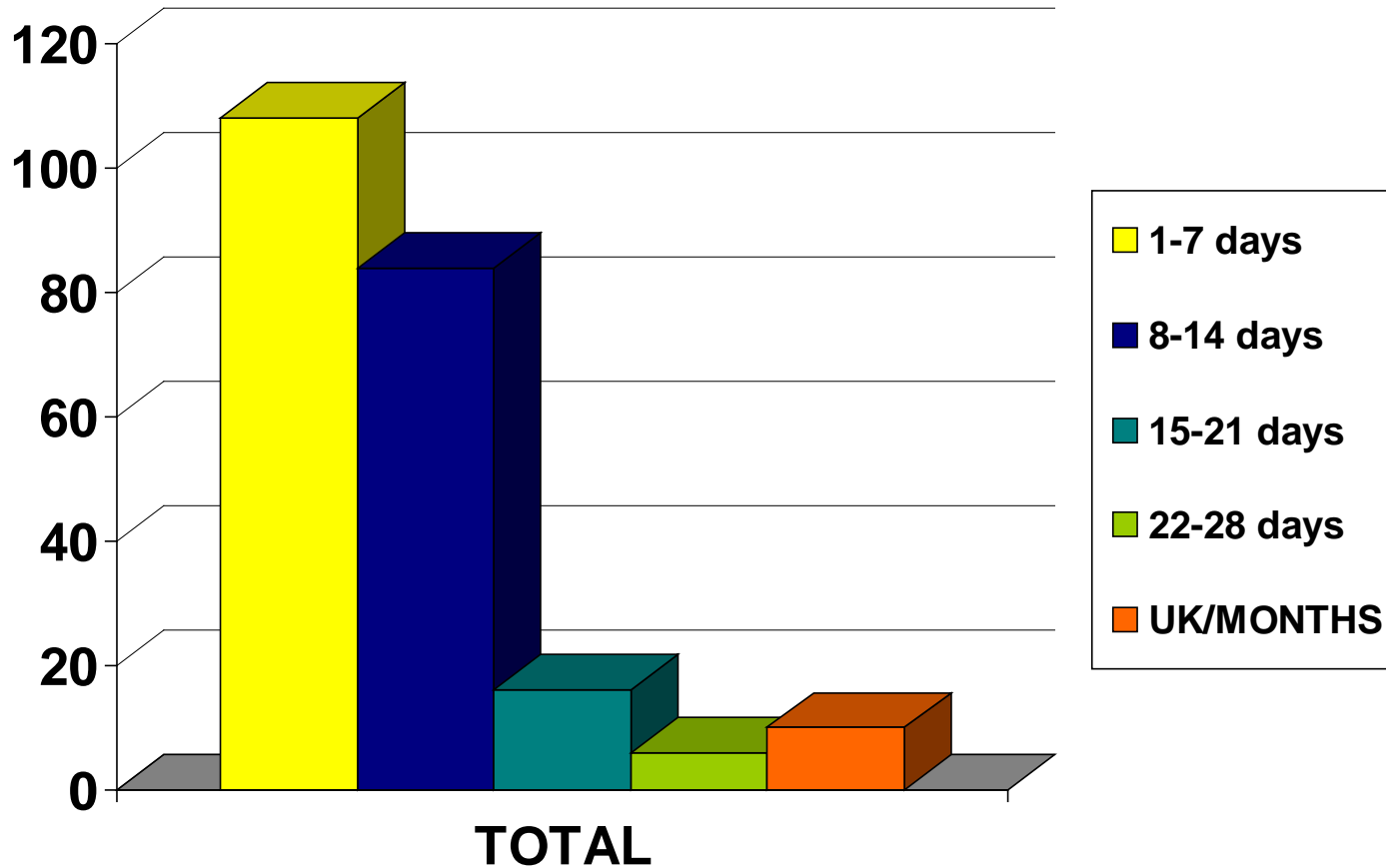
# Year 2011 Cases – By Age, 10 year (n=246)



# 2011 Cases – By Gender (n=246)

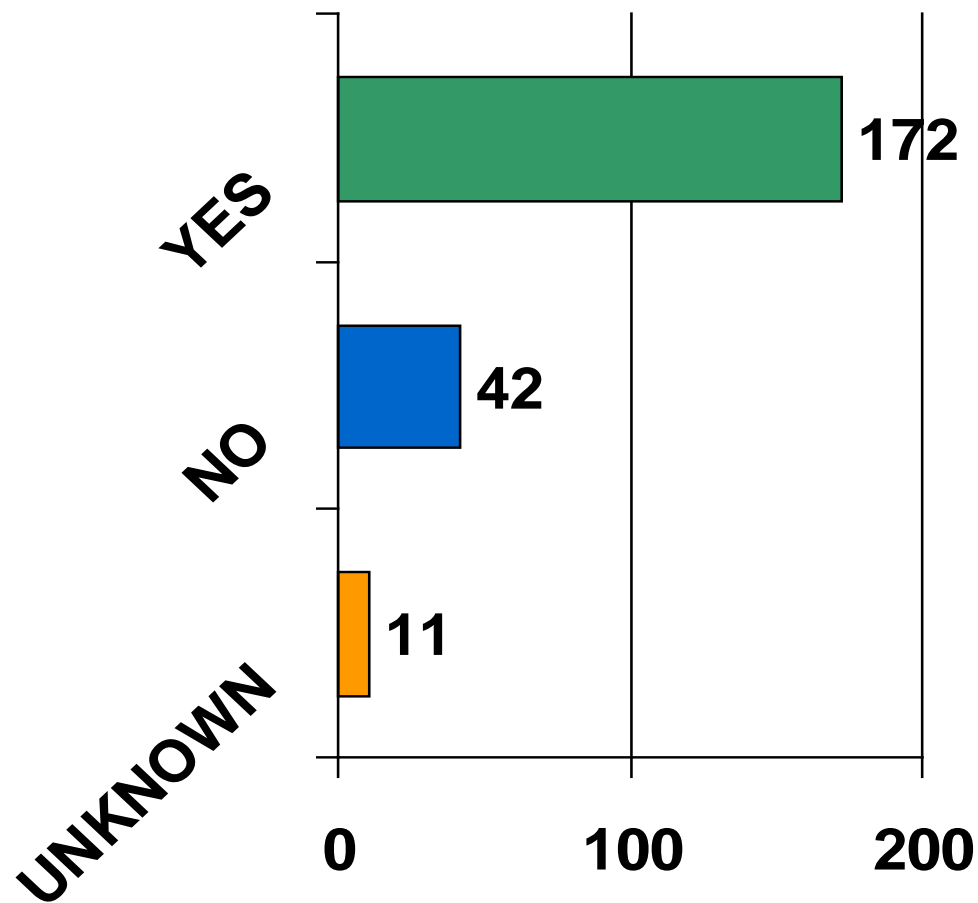


# Duration of Symptoms (n=224)

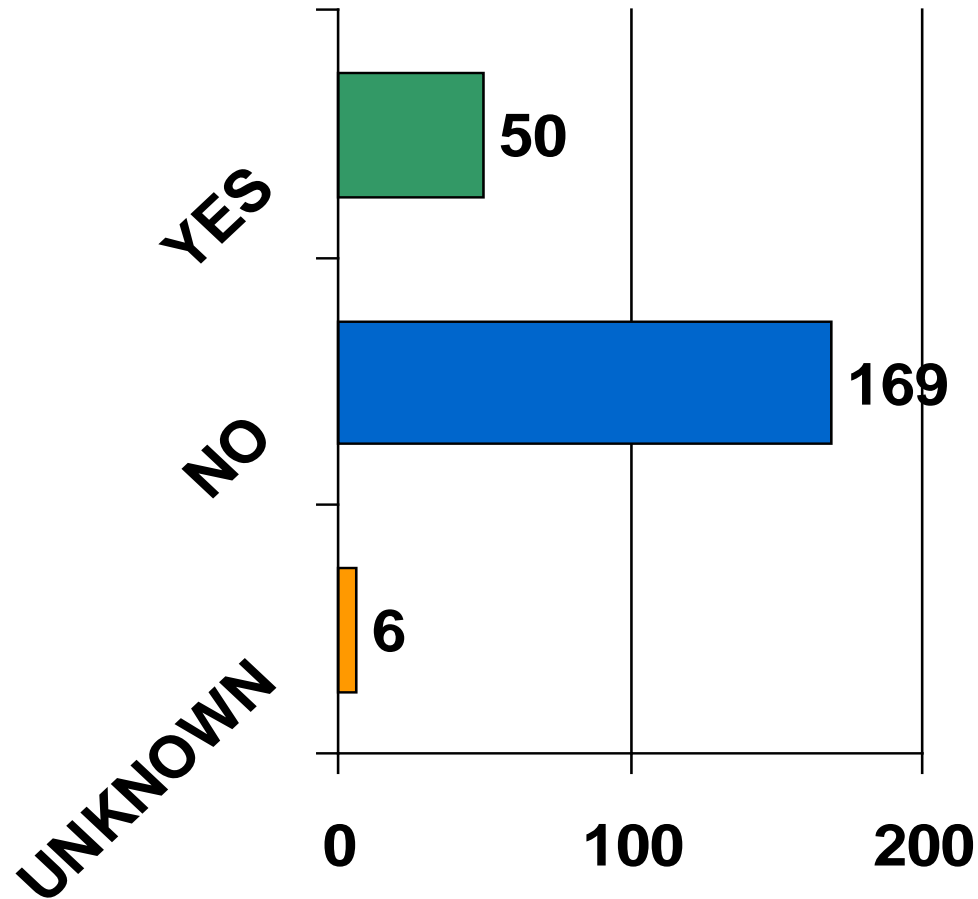




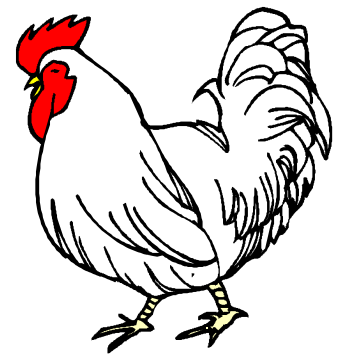
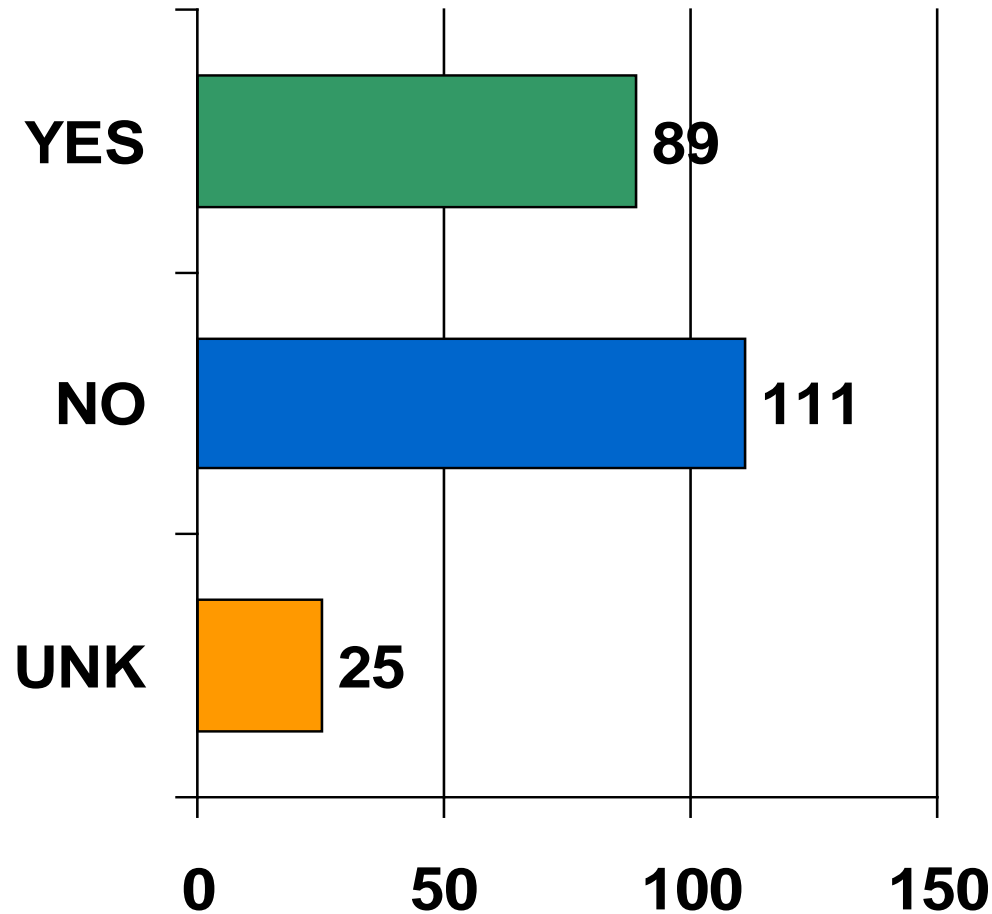
# Food Consumption from Retail Facilities (n=224)



# Food Consumption at Parties & Events (n=224)



# Home Preparation of Chicken (n=224)



# Summary of Risk Factors

Percentages of “Yes” responses of N = 225  
(excludes LTFU cases)

Food consumption from retail facilities	<b>76.4%</b>
Food consumption at parties or events	<b>22.2%</b>
Raw milk product consumption	9.8%
Raw chicken consumption	9.3%
Home preparation of chicken	<b>39.6%</b>

International travel	20.4%
Contact w/ natural water sources	12.9%
Contact w/ sewage overflow or garbage	8.4%
Contact w/ farm animals or sick pets	11.1%
Oral-anal sex (of >18 y/o respondents)	2.2%

# Restaurants named in Case Histories

- Confirmed cases of Campylobacteriosis
- Within the incubation period
- Look at inspection & violation history
- CDI Notifications to EHS
  - Routine within 5 days
  - Routine w/ food prep review within 5 days
  - Inspector's discretion based on food facility inspection history & other risky behaviors of case

# Case Control Study

- Comparing restaurants named in food histories with violations at last two routine inspections
- To examine the strength of association between retail food facilities recalled in case food history reports & violations identified during routine inspections
- Violations:
  - contamination of food & food contact surfaces,
  - improper cooking time/temperature,
  - poor food handler hygiene & hand washing

# Risk & Knowledge Assessments

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# Assessments

## FACILITY RISK

- Storage,
- Preparation, &
- Cooking of raw chicken

## FOOD HANDLER KNOWLEDGE

- Campylobacter & food borne illness
- Safe chicken handling practices





# Assessments: Round 1

TYPE OF ASSESSMENT	TOTAL
Risk (026)	1,627
Knowledge (027)	2,337
<b>TOTAL</b>	<b>3,964</b>

- Lessons learned:
  - Number of facilities that handle raw chicken
  - Multiple visits to see preparation & cooking
  - Chicken prep during off-hours
  - Certain days of the week

# Limitations & Lessons Learned



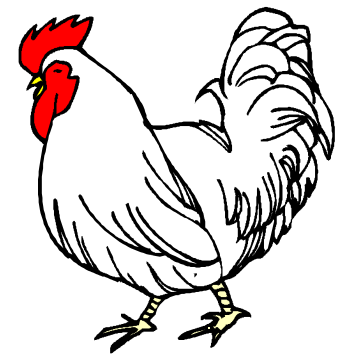
- Pilot test assessment forms & intervention before implementing county-wide
- Conduct standardization training for all EHS conducting assessments & intervention

# Restaurant interventions

- ❑ Goals
- ❑ Strategy
- ❑ Evaluation

# Goals

- To decrease food facility risk factors associated with raw chicken handling by 50%
  - Measured by: facility risk assessments
  - Cross-contamination of other foods or cooked chicken during storage, preparation & cooking
- To increase food handler knowledge of *Campylobacter* risk & safe food handling of raw chicken by 50%
  - Measured by: food handler knowledge assessments
  - Infective dose
  - Incubation period
  - Percent of infected chicken at retail



# Audience



# Theory



- Barriers:
  - Lack of accountability
  - Lack of involvement of managers & coworkers
  - Systems & policies
  - Time pressure
  - Inadequate facilities & supplies
- Engage restaurant owners/managers to influence food workers

“Food safety interventions in foodservice environment are more likely to be effective if organizational context is taken into consideration.”

# Strategy

- Training kit directed at owners/managers to give tools to train employees
  - Training manual
  - Facts about Campylobacter
  - Storage: WIC label for chicken shelf
  - Preparation: glow germ, cross-contamination messages
  - Cooking: thermometers
  - Train-the-Trainer Video



# Graphic Design

- Contract with a graphic design company to design restaurant training kit
- Focus groups to evaluate designs with food handlers & community
- Translated into Spanish, Chinese, Tagalog





**FACT:** EIGHT OUT OF TEN CHICKENS ARE  
INFECTED WITH CAMPYLOBACTER,  
THE LEADING CAUSE OF FOOD POISONING.



**CAUTION! BACTERIA WARNING**

One drop of raw chicken juice can make you sick.

Learn how to protect you and your family.

[www.campylobacter.us](http://www.campylobacter.us) | 1 (800) 123-1234



**Even though it's inspected.**



**It could still be infected.**

**Campylobacter** (kam-pi-lō-bak-tər)  
is the leading cause of food poisoning and  
found in 8 out of 10 chickens.

Just a drop can make you sick, so handle and  
prepare your chicken with care.

[www.campylobacter.us](http://www.campylobacter.us) 1 (800) 123-1234



# KILLER CHICKEN

8 out of 10  
chickens carry  
campylobacter  
bacteria

Only  
1 drop of  
campylobacter  
can cause  
illness in  
2-5 days

Symptoms  
include: nausea,  
fever, cramps,  
vomiting,  
bloody diarrhea,  
paralysis, even  
death...



**A DROP  
CAN MAKE  
YOU SICK**

**Learn how to handle and prepare  
your chicken safely.**

Call 1 (800) 123-1234  
Visit [www.campylobacter.us](http://www.campylobacter.us)



# Intervention Project

- Study Design
  - Wait-listed Control
  - Simple Intervention Group: hand-delivered kit
  - Comprehensive Intervention Group: hand-delivered kit + in-person training with EHS
- Delivery
  - Random sample of approximately 600 restaurants
  - Best intervention implemented at facilities in control group
- Incentives
  - Report
  - Recognition ceremonies at Chambers of Commerce



# Evaluation

- Measure with risk & knowledge assessments
- Control vs. Intervention groups
- Delivery method of intervention



# Timeline: Intervention

- March-August 2012: Intervention development
- Sept-Oct 2012: Intervention implementation
- Jan-April 2013: Round 2 assessments to measure effectiveness of intervention
- Sept-Dec 2013: Round 3 assessments to measure long-term retention rates
- April-May 2014: Intervention @ control group
- Aug 2014-Jan 2015: Data analysis & reports
- Feb-June 2015: Dissemination of results

"Education must begin with the solution of the teacher-student contradiction, by reconciling the poles of the contradiction so that both are simultaneously teachers *and* students." --Paulo Freire

## Questions?

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