Prevalence and Consequences of Fluoroquinolone-Resistant *Campylobacter* Infections: NARMS 1997-2000

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Centers for Disease Control and Prevention

Campylobacter

- In the United States,
  - Approximately 2.4 million infections annually
    - 150,000 physician visits
    - 13,000 hospitalizations
    - 100 deaths
  - Mild, moderate, severe infections
  - Antimicrobials usually not essential, but may be life-saving
  - Chickens and turkeys are primary reservoir

CDC

Fluoroquinolones (FQs)

- Use in humans:
  - Approved in 1986
  - Most commonly used antimicrobials for *Campylobacter* infections
  - Reduce severity and duration of symptoms associated with infection
- Use in animals:
  - Chickens and turkeys
    - Approved in 1995
    - Added to drinking water

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Human FQ-resistant *Campylobacter* infections

- CDC survey:
  - 1990
  - No FQ-resistant *Campylobacter*
- MN study
  - 1996-1998
  - Increase from 0.8% to 3%

What is the current prevalence of FQ-resistant *Campylobacter* in humans in the United States?

NARMS

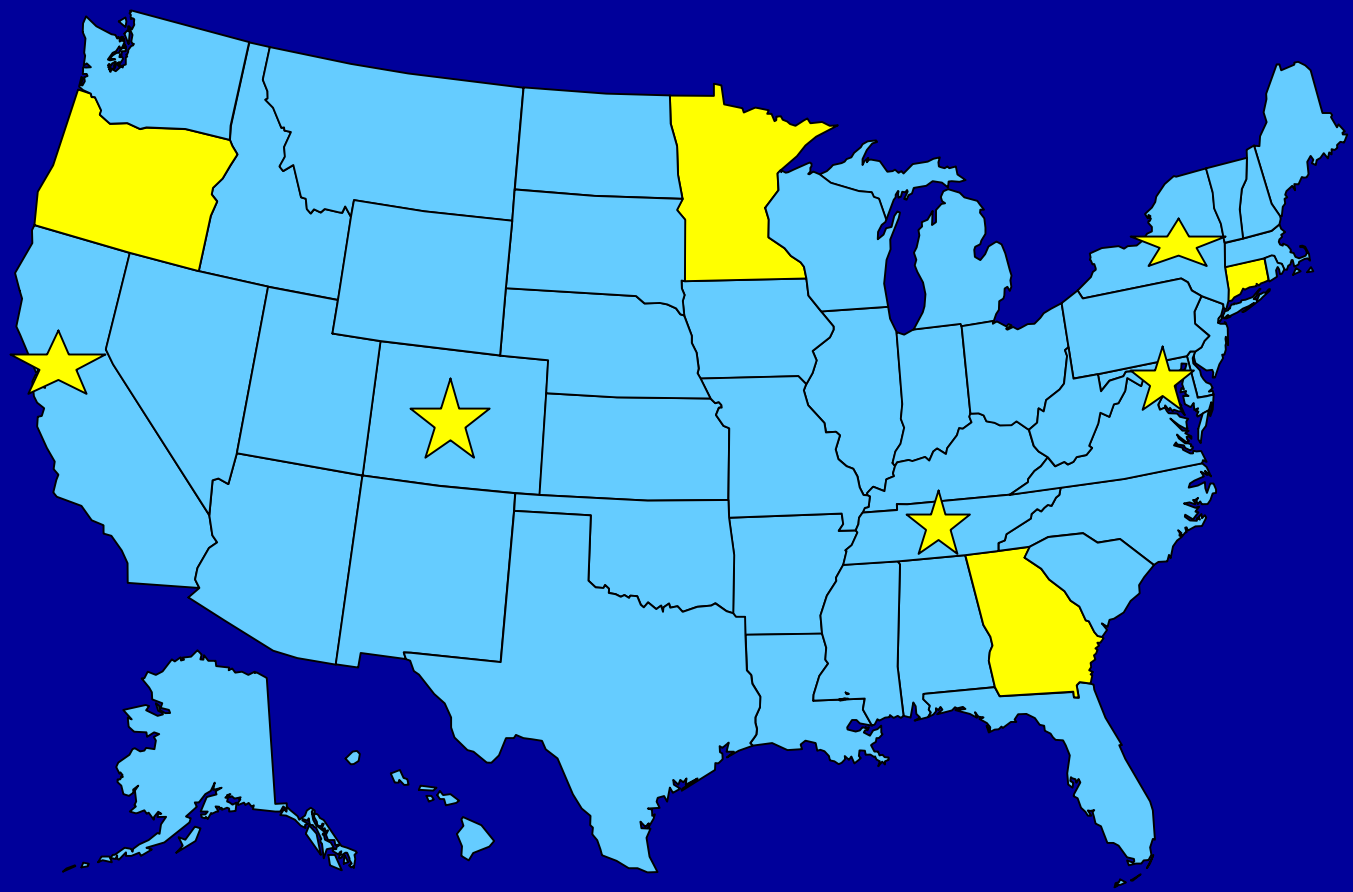
- National Antimicrobial Resistance Monitoring System
  - Receives 1 *Campylobacter* isolate per week from 9 NARMS sites
  - *Campylobacter* isolates speciated and susceptibility tested
    - Ciprofloxacin MIC $\geq$ 4 μg/ml were considered resistant

CDC

NARMS

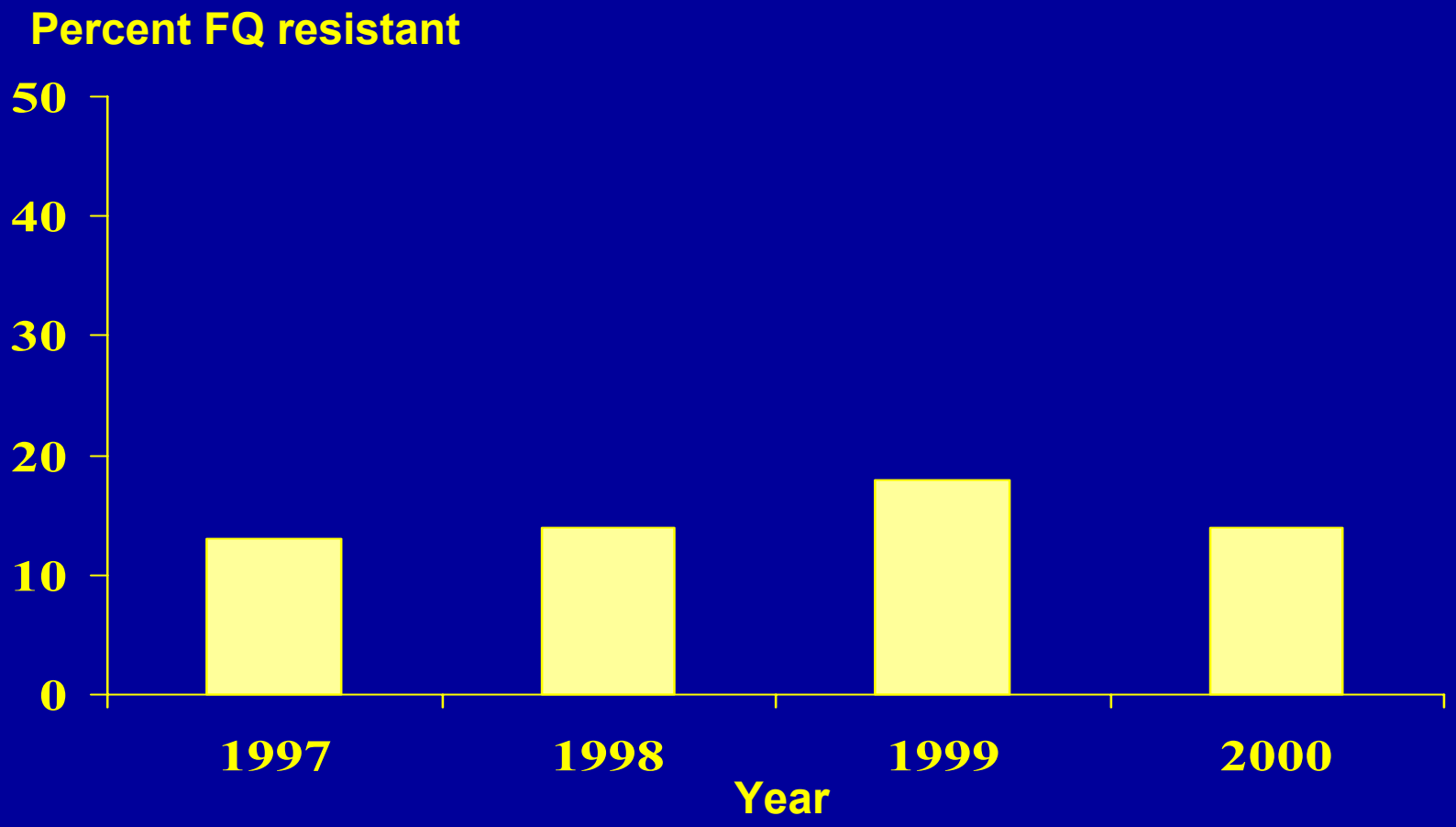
Sites
Connecticut
Georgia
Minnesota
Oregon

California
Colorado
Maryland
New York
Tennessee



CDC

Human *Campylobacter* isolates, 1997-2000 (N=1205)



What are the clinical consequences associated with FQ-resistant *Campylobacter* infections?

Steps

- Step One:
  - How many people took FQs for their illness?
- Step Two:
  - Among FQ users, difference in diarrhea duration between FQ-resistant and FQ-susceptible infections?

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Epidemiological Study

- FoodNet/NARMS (Jan 1998 – Jan 1999)
  - 858 culture-confirmed *Campylobacter* infections
  - Isolates tested at CDC, CT, MN, or NY
- Questionnaire
  - Antimicrobial use (including FQs)
  - Antidiarrheal use
  - Duration of diarrhea

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Medications

- 54% (326/609) of culture-confirmed patients took FQs
  - 39% (128/326) FQ use and no other medications
- Wide use of FQs and high prevalence of FQ-resistant infections
  - Differences in outcome?

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Duration of Diarrhea (N=128)

- Average duration of diarrhea
  - FQ users:
    - FQ-resistant (N=17)
      - 8 days (range: 2-14 days)
    - FQ-susceptible (N=111)
      - 6 days (range: 2-31 days)
- People with FQ-resistant infections, who are treated with FQs, had 2 days longer duration, p=0.08

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Intriguing Finding

- Non–treated patients (N=67)
  - FQ-resistant (N=6):
    - 12 days (range: 8-20 days)
  - FQ-susceptible (N=61):
    - 6 days (range: 2-21 days)
- Among non-treated, FQ-resistance may be associated with longer duration of diarrhea, $p<0.01$

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Multivariate Analysis

- N=858
  - Controlling for factors potentially associated with duration of diarrhea
  - FQ-resistant infections associated with 1 day longer duration of diarrhea, p=0.05

Summary

- FQ-resistance is prevalent
  - 14% in 2000
- Over 50% of culture-confirmed *Campylobacter* infections receive FQs
- FQ-resistance associated with longer duration of diarrhea
- Association was significant, after adjusting for covariates
- FQ-resistant infections have an adverse health consequence
  - A longer duration of diarrhea

CDC

Other Investigations and Actions

- Investigations:
  - Additional FoodNet *Campylobacter* case-control study
    - Eating poultry outside home was a risk factor for domestic acquired FQ-resistant infections
  - FDA quantitative risk assessment
    - FQ use in chickens and turkeys resulted in FQ-resistant *Campylobacter* infections each year in humans
- Actions:
  - Proposed FQ withdrawal
    - Supported by CDC, ASM, and others
    - Opposed by a pharmaceutical company, AVMA, and others

CDC

Acknowledgments

CDC

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NARMS website: www.cdc.gov/narms