Lab Hot Topics Update

Detection of S-TEC: New Guidelines for Clinical and Public Health Labs

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Barriers to Full Recovery

- Acute disease not easily defined
  - ~25% in a MI study NOT bloody
  - WBC's may/may not be present
  - Generally not associated with fever
  - Seasonality not predictable with changing 'menu' of implicated foods

Barriers, cont'd

- Physicians don't think of STEC in patient w/out classic 'bloody diarrhea'
- Physicians don't know what testing clinical labs perform (may send to multiple labs)

Barriers, cont'd

- Clinical laboratories typically test for STEC:
  - Upon request of physician, or hx of bloody diarrhea
  - Only in summer/fall, if at all
  - If specimen bloody (stools come in transport which is red!)

Barriers, cont'd

- Clinical labs typically test for STEC by culture, which can only detect *E.coli* O157
  - Other serotypes also produce disease
  - Culture and prelim identification requires 24-48 hours
  - Media and serotyping reagents expensive and may outdate if testing rarely ordered, so many labs may 'send-out' this testing to commercial labs, resulting in additional delay of 1-2 days

Barriers, cont'd

- EIA detects all serotypes, but
  - Clinical labs unsure if they can do both culture and EIA and get reimbursed
  - Confusion about appropriate billing for EIA
  - Some PHLabs will not accept broths
  - Subculture of broth to solid media may result in delayed result

Barriers, cont'd

- Once a likely STEC is isolated, it must be shipped to a PHLab for further characterization, including PFGE and uploading to PulseNet.
  - STEC is a Category A agent, which requires special handling and extra expense.
  - Labor, materials, and shipping costs for public health purposes not reimbursable

Barriers, cont'd

- Specimens sent to commercial laboratories may not be sent to the PHLab in the state of the patient residence

New MMWR ~ Summer to Fall 2009

- Authored by 15 leading microbiologists from clinical, commercial and public health labs, as well as ID physicians – a consensus document
- Presents evidence to support culture and toxin testing of ALL stools submitted for routine culture.
- Details implementation of guidelines
- Describes the performance characteristics of commercially available assays, and acceptable specimens

- Will establish a standard against which microbiology practices might be compared
- Will establish an expectation for reimbursement for culture AND toxin testing

- Companion Public Health Laboratory Guidelines, expected Fall 2009
  - Authored by 17 public health microbiologists (state and federal)
  - Details *Best Practices* for PHLabs to support the clinical labs in their jurisdictions to assure rapid and comprehensive recognition of STEC

Antimicrobial Resistance:

Is it a Public Health Problem?

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Diseases Connected to Antimicrobial Resistance Issues

- Tuberculosis (MDR and XDR TB)
- Influenza virus
- Head Lice
- Malaria
- MRSA
- SPNE
- Gonorrhea
- Typhoid Fever
- VISA/GISA/VRSA
- VRE
- Arthropod vectors becoming resistant to insecticides
- C difficile
- HIV

•http://www.cdc.gov/drugresistance/diseases.htm

National Issues

- HHS 5-yr Action Plan to prevent Healthcare-Associated Infections (HAI) - 2008
  - Central Line-associated Bloodstream Infections (CLABSI)
  - *Clostridium difficile* Infections (CDI)
  - Catheter-associated Urinary Tract Infections (CAUTI)
  - Methicillin-resistant *Staphylococcus aureus* (MRSA) Infections
  - Surgical Site Infections (SSI)
  - Ventilator-associated Pneumonia (VAP)

National Issues (cont'd)

- **MMWR March 20, 2009 – CRE**
  - Guidance for Control of Infections with Carbapenem-Resistant or Carbapenemase-Producing *Enterobacteriaceae* in Acute Care Facilities
  - Based on 2006 HICPAC guidelines
  - "…worrisome public health developments"
  - "…immediate need for aggressive detection and control strategies"
- **Concern re: other MDROs and pan-resistant organisms (e.g., *Acinetobacter*)**

CRE = Carbapenem-Resistant Enterobacteriaceae

Susceptibility Testing Proficiency: 48 Clinical Microbiology Laboratories

Test Organism	Accuracy
Methicillin-resistant *S. aureus*	100%
Vancomycin-resistant *E. faecium*	100%
Fluoroquinolone-resistant *P. aueruginosa*	100%
Erythromycin-resistant *S. pneumoniae*	97%
Carbapenem-resistant *S. marcescens*	75%
ESBL* *K. pneumoniae*	42%

*Extended spectrum β–lactamase

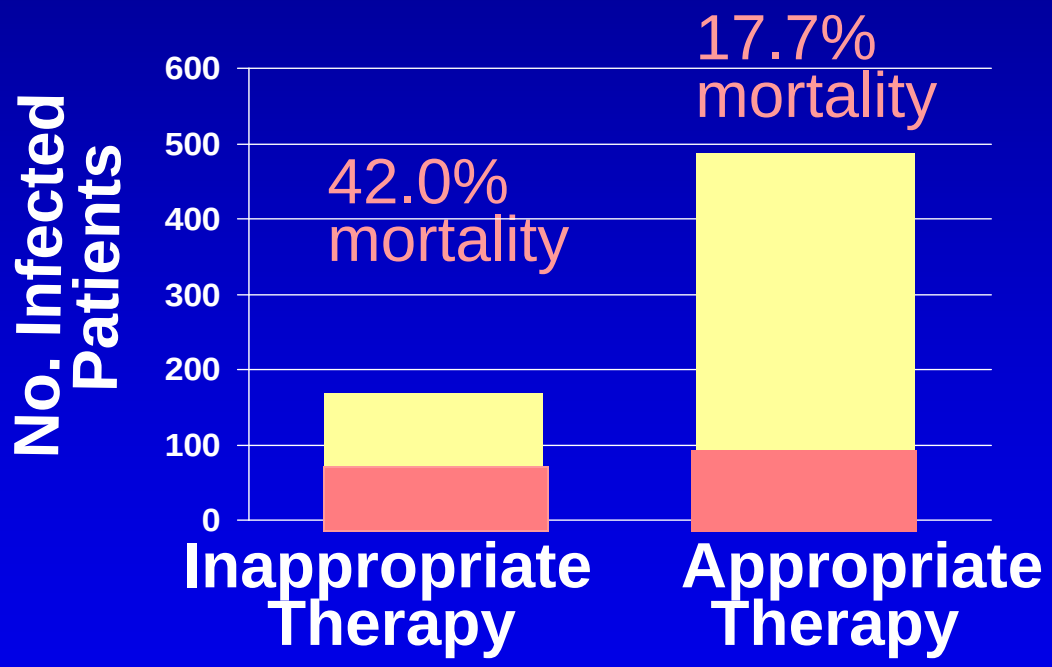
Source: Steward CD, et al: Diagn Microbiol Infect Dis. 2000;38:59-67

Lab Proficiency Data

- American Proficiency Institute 2003 data:
  - 48% of laboratories using disk diffusion method reported one or more drugs not approved by CLSI* for testing against *S. pneumoniae* (3% of labs doing MICs)
- CAP 2001 - 2003 Data
  - 36% of laboratories using disk diffusion results reported one or more drugs not approved by CLSI for testing against *S. pneumoniae*
  - (10.1% of labs doing MICs)

*CLSI = Clinical Laboratory Standards Institute
CAP = College of American Pathologists

Inappropriate Antimicrobial Therapy: Impact on Mortality



Relative Risk = 2.37
(95% C.I. 1.83-3.08; p < .001)

Survivors

Deaths

Source: Kollef M,et al: Chest 1999;115:462-74

Hospitalization and Antimicrobial Resistance in Salmonella Outbreaks, 1984-2002

- **Patients with *Salmonella* resistant to one or more drugs were hospitalized at a rate 2.5 X greater than patients with pan-susceptible strains in 31 outbreaks (26% vs. 7.5%)**

Varma et al, Emerging Infectious Diseases vol. 11 no. 6 (June 2005)

State Issues

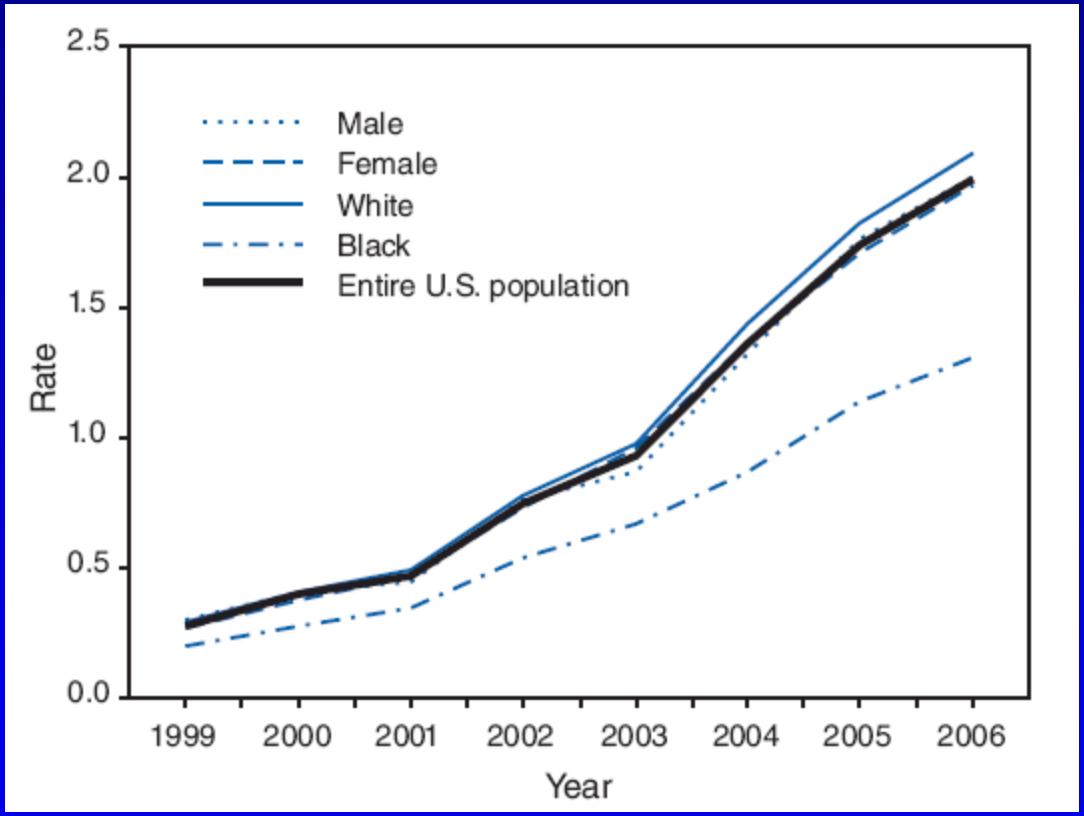
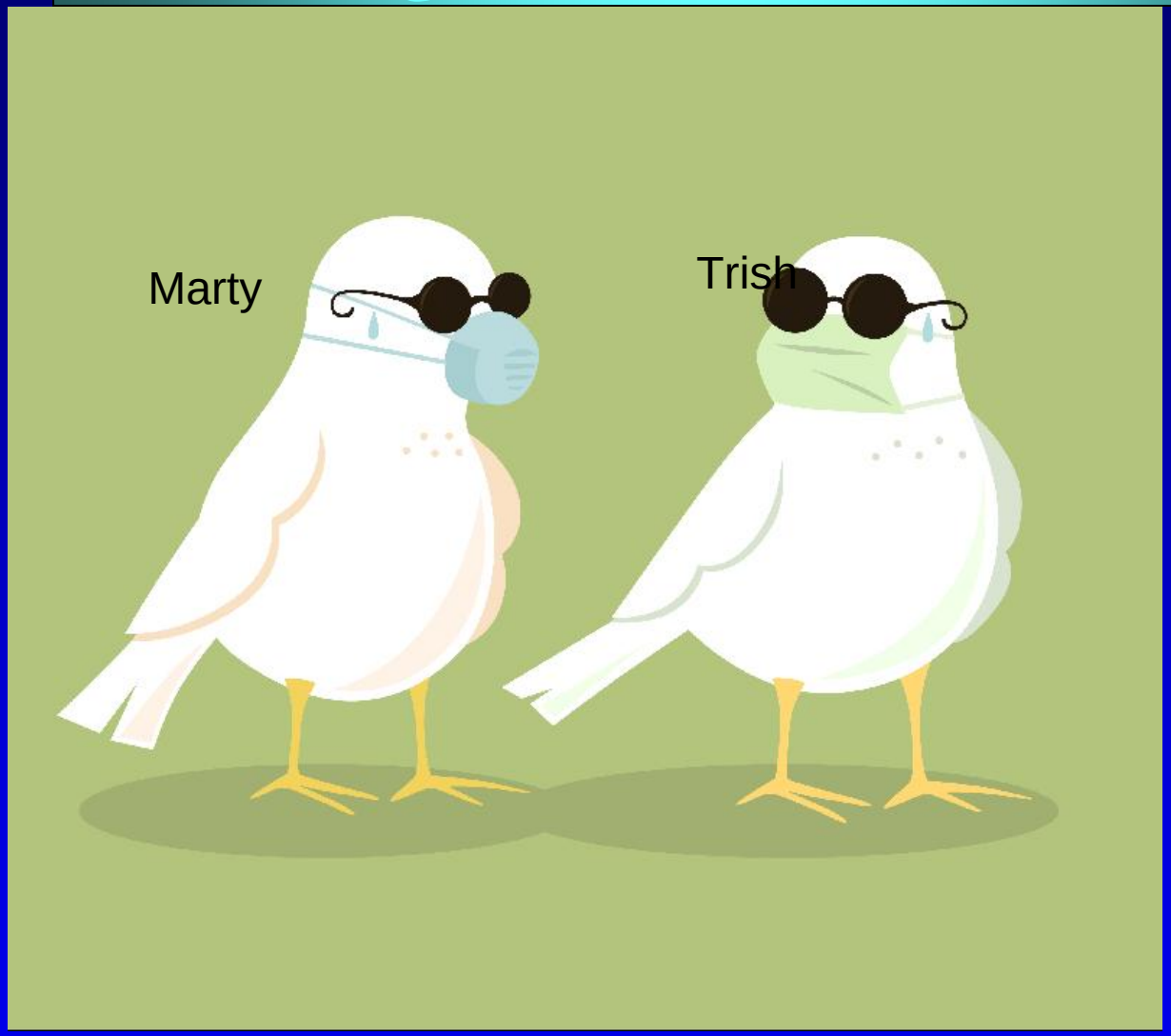
- HB 4010 proposed Jan 22, 2009
  - Requires hospitals to report yearly number of HAI per hospital unit or department
  - Defines HAI as
    - "A nosocomial infection that is a localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent or its toxin and that was not present or incubating at the time a patient was admitted to the hospital for medical treatment"

MDCH Future Activities

- Two state-funded positions (lab, epi)
- Determine surveillance needed
- Use available data (from clinical labs)
- Expand lab testing at Bureau of Labs:
  - Adding methods to confirm unusual resistance
  - May add molecular methods (i.e., to detect resistance genes)

QuickStats

Age-Adjusted Death Rate* for Enterocolitis Due to *Clostridium difficile*, by Race and Sex --- United States, 1999-2006



Questions?