MULTIRESISTANT ORGANISMS AND ANTIMICROBIAL STEWARDSHIP

Discussion Leader: Lynda Britton, Ph.D., MLS(ASCP)^{CM}

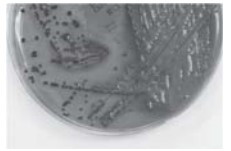
PAN-RESISTANT NEW DELHI METALLO BETA-LACTAMASE-PRODUCING *KLEBSIELLA PNEUMONIAE*

WASHOE COUNTY, NEVADA, 2016

- Carbapenem-resistant *Enterobacteriaceae* (CRE) resistant to all available antimicrobial drugs
- 70-yr-old woman who arrived in the United States in early August 2016 after an extended visit to India
- Developed septic shock and died in early September

MMWR Morb Mortal Wkly Rep 2017;66:33

WOUND CULTURE SUSCEPTIBILITY



- Resistant to 26 antimicrobials:
  - All aminoglycosides, polymyxins
  - I to colistin—lacked *mrc-1* gene
  - Fosfomycin MIC of 16 μg/mL by ETEST
- Sent to CDC for characterization
- Confirmed presence of New Delhi metallo-beta-lactamase

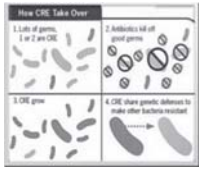
NEW DELHI METALLO-BETA-LACTAMASE

- 2009 in a Swedish patient of Indian origin
- *K. pneumoniae* strain resistant to all antibiotics tested except colistin
- Large plasmids easily transferable to susceptible *E. coli* J53 at a high frequency and other GNRs

Clinical Microbiology and Infection, Volume 16 Number 12, December 2010

CDC'S CRE EMERGING INFECTIONS PROGRAM

- >250 CRE
- 80% remained susceptible to at least one aminoglycoside
- Nearly 90% were susceptible to tigecycline



THE PROBLEM

- Antibiotic misuse and overuse
- Rampant among patients, livestock owners and quacks
- Self medication
- Non-compliance
- Fed to livestock

THE PROBLEM

- Given when they are not needed
- Continued when they are no longer necessary
- Given at the wrong dose
- Broad spectrum agents are used to treat very susceptible bacteria
- The wrong antibiotic is given to treat an infection

WHAT CAN BE DONE?

- Infection control measures
  - Handwashing monitored by radio-frequency-identification-based real-time continuous automated monitoring system
    - 22.6% of HCWs disinfected their hands before entering the patient care zone, Patient isolation
- Consider screening for CRE when patients report recent exposure outside the U.S or in regions of the U.S. known to have a higher incidence of CRE

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ANTIMICROBIAL STEWARDSHIP

- Cochran Review—58% of 23,394 inpatients received treatment within guidelines vs 43% without
  - Reduced use by 2 days and hospital stay by 1 day
- UK-- *C. difficile*--avoiding clindamycin and cephalosporins and minimize use of fluoroquinolone, carbapenem and aminopenicillin
  - Fluoroquinolone use reduced by 50%, while *C. difficile* infections fell by 80%

CDC RECOMMENDATIONS

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

- Evidence-based diagnostic criteria and treatment recommendations
- Delay prescribing or watchful waiting
- Provide communications skills training for clinicians
- Require explicit written justification in medical record for nonrecommended prescribing
- Provide support for clinical decisions
- Use call centers, nurse hotlines, or pharmacist consultations to prevent unnecessary visits

ENABLING MEASURES

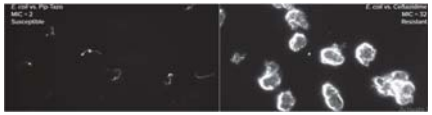
- Improving the quality of prescribing
- Advice and feedback to help physicians make more targeted prescribing decisions
- ↑ appropriate decision making
- Only patients likely to benefit receive them
- Alter physician behavior

RESTRICTIVE INTERVENTIONS

- Selective reporting of laboratory susceptibilities
- Formulary restriction
- Requiring expert authorization for therapeutic substitution
- Automatic stop orders

LABORATORY MEASURES

- Procalcitonin—distinguishing viral from bacterial
- Molecular ID panels
- More rapid identification-MALDI-TOF
  - Reading cultures on multiple shifts
- Faster susceptibility testing with molecular methods & advanced microscopy (Phenotest)



WHAT ELSE?