Antimicrobial Stewardship and Infection Prevention
Objectives

• Illustrate the link between antimicrobial stewardship and infection prevention

• Review core elements of antimicrobial stewardship, and opportunities for coordination with infection prevention

• Review roles of nursing staff in antimicrobial stewardship programs
Antimicrobial Stewardship and Infection Prevention are Linked

Antimicrobial Use

Infection

Antimicrobial Resistance, *Clostridium difficile*

Transmission
**Clostridium difficile Pathogenesis**

- **Ingest C. difficile spores** transmitted to patients via the hands of healthcare personnel and environment.
- **Changes in lower intestinal flora due to antimicrobial use** allows proliferation of C. difficile in colon.
- **Toxin A & B production** leads to colon damage.

Two Preventable Events in CDI

The following events may occur separately and in any order, but both are required for infection to occur:

1. The *C. difficile* bacterium or spore is ingested
2. The normal intestinal flora is compromised allowing for *C. difficile* to establish itself and proliferate
Focus Interventions on Preventable Events

1. The *C. difficile* bacterium or spore is ingested
   - Hand hygiene
   - Environmental cleaning and disinfection

2. The normal intestinal flora is compromised allowing for *C. difficile* to establish itself and proliferate
Focus Interventions on Preventable Events - continued

1. The *C. difficile* bacterium or spore is ingested

2. The normal **intestinal flora is compromised** allowing for *
*C. difficile* to establish itself and proliferate

→ Antimicrobial stewardship
Increased Risk of CDI With Cumulative Antimicrobial Exposure

Antimicrobial Stewardship

- Promote and measure appropriate antimicrobial use by optimizing antimicrobial selection, dosing, route, and duration of therapy
  - Improved patient care, increased cure rates, reduced treatment failures
  - Reductions in hospital rates of CDI and antimicrobial resistance
  - Decreased or controlled costs

Howell et al. Arch Intern Med 2010;170:784–90
Evans and Johnson. Clin Infect Dis. 2015;60(S2):S122-8
Regulatory Mandates

Requirements highlight key roles of infection prevention programs in advancing successful antimicrobial stewardship interventions across the continuum care.
Elements of Antimicrobial Stewardship Programs (ASP)

- **Leadership Commitment:** Dedicate necessary resources
- **Accountability:** Appoint a leader responsible for program outcomes
- **Drug Expertise:** Appoint pharmacist leader responsible for working to improve antimicrobial use
- **Action:** Implement at least one recommended action
- **Diagnosis:** Promote accurate and timely testing, and ensure appropriate indications
- **Tracking:** Monitor antibiotic prescribing and resistance patterns
- **Reporting:** Regularly report information on antibiotic use and resistance to doctors, nurses, and relevant staff
- **Education:** Educate clinicians about resistance and optimal prescribing

**What are the Roles and Alignment with Infection Prevention and Nursing?**
Leadership Commitment and Accountability:
Antimicrobial Stewardship/Infection Prevention Alignment

• Both infection prevention and antimicrobial stewardship programs require
  – Leadership commitment
  – Accountability
  – Multidisciplinary engagement among physician, pharmacist, and nursing champions

• Infection prevention and antimicrobial stewardship are both critical patient safety programs
  – Align strategies to promote, disseminate, measure and sustain best practices
Drug Expertise: Contributions from Nursing Staff

- Nursing staff can obtain and document a detailed allergy history
  - Include details of timing and nature of reaction
- Nursing staff can educate patients and families
  - What constitutes an accurate antibiotic allergy history
**Example**

**Penicillin (Beta-Lactam) Allergy Assessments and CDI Prevention**

- Patients with reported penicillin (beta-lactam) allergies frequently receive alternative antimicrobials and are at increased risk of CDI
- Penicillin (beta-lactam) allergy assessments and skin testing for patients with reported allergy
  - Improve use of preferred penicillin (beta-lactam) therapy
  - Reduce use of alternative agents with greater CDI risk

ASP Action: Roles of Nursing Staff

- Inform decisions to start antimicrobials promptly upon early signs of likely bacterial infections, including sepsis
- Prompt and participate in discussions about changes in antimicrobial use by evaluating and communicating patients’ clinical status and medical history
  - 48-72 hour antibiotic “timeout” -> stop or narrow therapy
  - Readiness for transition from intravenous to oral therapy
  - History of CDI or other antibiotic complication
- Perform medication reconciliations during patient transitions of care
Example
Avoid Unnecessary Antimicrobial Therapy in Patients with CDI

• Optimal CDI treatment includes stopping or avoiding non-CDI antimicrobial use wherever possible
  – “Flag” patients with risk factors or recent CDI and alert prescriber to avoid antibiotics or to use lower-risk agents
  – Target patients with CDI diagnoses for medication review to identify and discontinue unnecessary antibiotics
Diagnosis: Nursing and Infection Prevention Roles

- Promote optimal use of diagnostic tests and microbiology cultures
  - Verify reason for test is appropriate
  - Use proper specimen collection technique and transport to a laboratory in a timely manner
  - Ensure specimens are collected before antimicrobials are started
Example

Accuracy of CDI Diagnosis

• Sensitive diagnostic testing methods allow for rapid identification of patients with CDI
  • Prompt initiation of CDI therapy improves patient outcomes
  • Prompt initiation of Contact precautions minimizes transmission risk to others

• Sensitive diagnostic tests sometimes used inappropriately
  • Detect asymptomatic *C. difficile* colonization
  • Initiate unnecessary CDI therapy
Example

**CDI Testing**

- CDI testing should be limited to symptomatic patients with unformed stool
  - Presence of unexplained and new-onset diarrhea
  - >3 unformed stools over 24 hours
- Implement pre-agreed criteria for CDI testing
  - Algorithm to direct proper testing
  - Discontinue laxatives 24-48 hours prior to testing
  - Laboratory rejects testing if formed stool (does not conform to shape of container)
Example CDI Testing Algorithm
Tracking: Antimicrobial Stewardship / Infection Prevention Collaboration

• Conduct HAI surveillance
  – Use surveillance data to prioritize ASP interventions
• Consult regarding use of NHSN (Hospitals only)
  – NHSN Antimicrobial Use and Resistance (AUR) module tracks and analyzes antimicrobial use and resistance trends
Reporting: Antimicrobial Stewardship / Infection Prevention Collaboration

• Provide feedback of HAI data
  – Clinicians, patient safety and medical executive committees, board of directors, and other stakeholders

• Provide feedback that is timely, frequent, individualized, non-punitive, and customized
Example
Establish CDI Reduction Goals for the ASP

• Include the hospital infection preventionist as an active ASP participant
• Use CDI surveillance data to prioritize ASP interventions
  – Example: Identify locations and service lines with the highest CDI incidence
• Track and report CDI incidence as a primary ASP outcome
Education: Antimicrobial Stewardship / Infection Prevention Collaboration

• Create educational strategies to address each discipline’s clinical interests
  – Include why infection prevention and antimicrobial stewardship is of value to staff and their patients
• Consider team-oriented and problem-based trainings, including multidisciplinary workshops, bedside teaching, and simulation-based training
Nursing as the Hub of Communication for Antimicrobial Use Stakeholders

- Physicians
- Administration
- Infectious Disease Consultants
- Pharmacy
- Case Management
- Microbiology
- Infection Prevention
- Patients/Residents and Families
Facilities work together to protect patients.

Common Approach (Not enough)
- Patients can be transferred back and forth from facilities for treatment without all the communication and necessary infection control actions in place.

Independent Efforts (Still not enough)
- Some facilities work independently to enhance infection control but are not often alerted to antibiotic-resistant or C. difficile germs coming from other facilities or outbreaks in the area.
- Lack of shared information from other facilities means that necessary infection control actions are not always taken and germs are spread to other patients.

Coordinated Approach (Needed)
- Public health departments track and alert health care facilities to antibiotic-resistant or C. difficile germs coming from other facilities and outbreaks in the area.
- Facilities and public health authorities share information and implement shared infection control actions to stop spread of germs from facility to facility.
Antimicrobial Stewardship Across Transitions of Care

• Establish **consistency of practice and messaging** about antimicrobial use across diverse care settings

• Ensure communication of **antimicrobial indication and anticipated duration** when patients transfer between facilities
  
  – Avoid duplicative or unnecessarily prolonged courses of antimicrobial therapy, which increase CDI risk

• Ensure communication and documentation of **patient symptoms** upon transfer
  
  – Ensure appropriate diagnostic testing and infection control measures implemented promptly
Interfacility Transfer Communication Tool

- Document antimicrobials patient is receiving, including:
  - Antimicrobial name, dose, frequency
  - What infection is being treated
  - Start and anticipated stop dates
Summary

• Antimicrobial stewardship and infection prevention programs complement each other to promote patient safety

• Infection prevention and nursing staff have critical roles to play in antimicrobial stewardship programs
Questions?

For more information or consultation, contact HAIProgram@cdph.ca.gov or (510) 412-6060.