



# The Jigsaw Puzzle of CDI & ASP

Kristi Koch, BSN, RN

Coordinator of Infection Prevention and Control

Brett Randolph, RPh, MBA

Director of Pharmacy



**GRAND LAKE**<sup>™</sup>  
HEALTH SYSTEM

# Disclosures

*The presenters do not have (nor does any immediate family member have) actual or potential conflict of interest, within the last twelve months; a vested interest in or affiliation with any corporate organization offering **financial support or grant monies** for this continuing education activity; or any affiliation with an organization whose philosophy could potentially bias their presentation.*

# Healthcare Facility Profile

- \* Joint Township District Memorial Hospital, part of the Grand Lake Health System
- \* DNV Accreditation / ISO Certification
- \* Rural community hospital; full-service comprehensive healthcare
  - \* ED - 11 beds
  - \* Med/Surg - 32 beds
  - \* ICU - 6 beds
  - \* Obstetrics - 9 beds
  - \* Newborn Care - 10 beds
  - \* Transitional Care - 15 beds
  - \* Inpatient Rehab - 4 beds
  - \* Geriatric Psych Unit
    - \* By the end of 2017



# GLHS Local Drivers

## Boarder Approach to Solving the Puzzle

- \* Development of Infection Control Committee
  - \* DNV regulatory OFIs
- \* Hospital Engagement Network (HEN)
  - \* CDI and ASP initiatives
- \* Hospital Improvement Innovation Networks (HIIN)

# Objectives – CDI Prevention

- \* Review the epidemiology & impact of *Clostridium difficile* infection (CDI).
- \* Discuss assessment of infection prevention strategies to reduce the incidence of healthcare-associated CDI.
- \* Identify process measures impacting CDI in the hospital setting & special approaches implemented to advance basic practice.



# *Clostridium difficile* Background

- \* *C. difficile*, a Gram-positive, spore-forming anaerobic organism, causes disease by producing two toxins.
  - \* A third binary toxin (BI/NAP1/027) - epidemic strain.
- \* Spore producer – spores survive on environmental surfaces for months.
- \* Spread by transfer directly from the contaminated environment to the patient or by transfer on the hands of HCP.
- \* Any hospitalized patient can acquire *C. difficile*, but for CDI to occur, must receive antimicrobials to disrupt the normal bacterial flora.

# Epidemiology Host Risk Factors

- \* Advancing Age
  - \* Incidence higher among persons >65 years<sup>1</sup>
- \* Underlying illness
- \* Immunosuppression
- \* **Exposure to antibiotics**
- \* **Exposure to healthcare facility**
- \* Gastric acid suppression



# We know how *C. difficile* spreads...

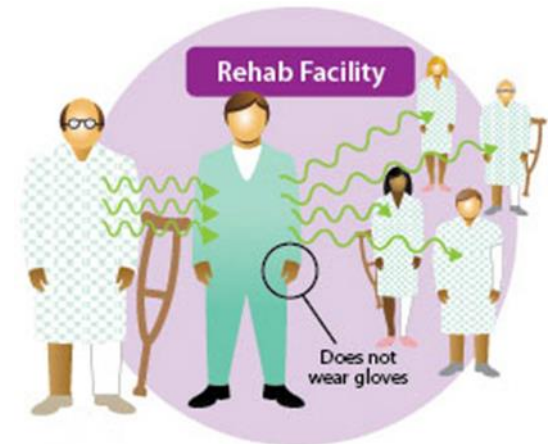


68 yr. old diagnosed w/pneumonia.  
Antibiotic Rx – he is now at risk for CDI (for several months)



**One Month Later**

Hospitalized for a leg fracture.  
HCP caring for a CDI patient, spreads it with contaminated hands

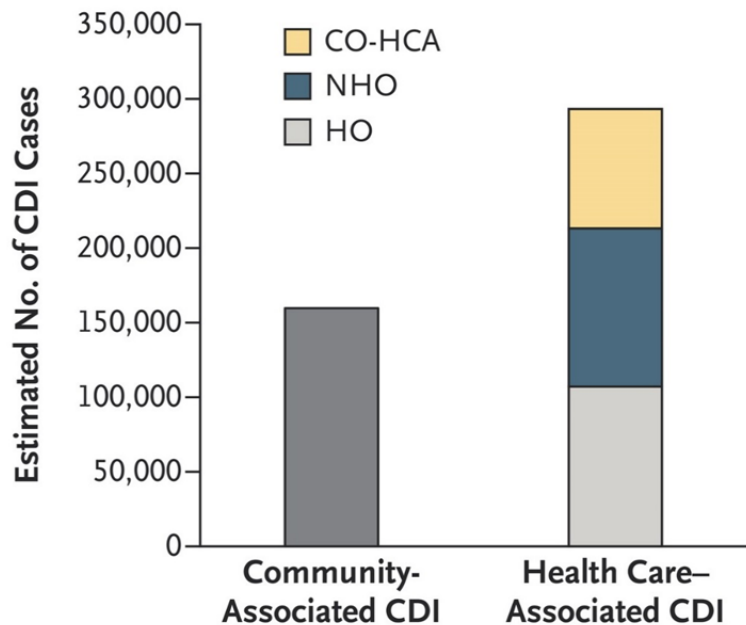


**Two Days Later**

Transfer to Rehab Facility. Onset diarrhea; but not tested. HCP infects other patients.



# Estimated CDI Burden



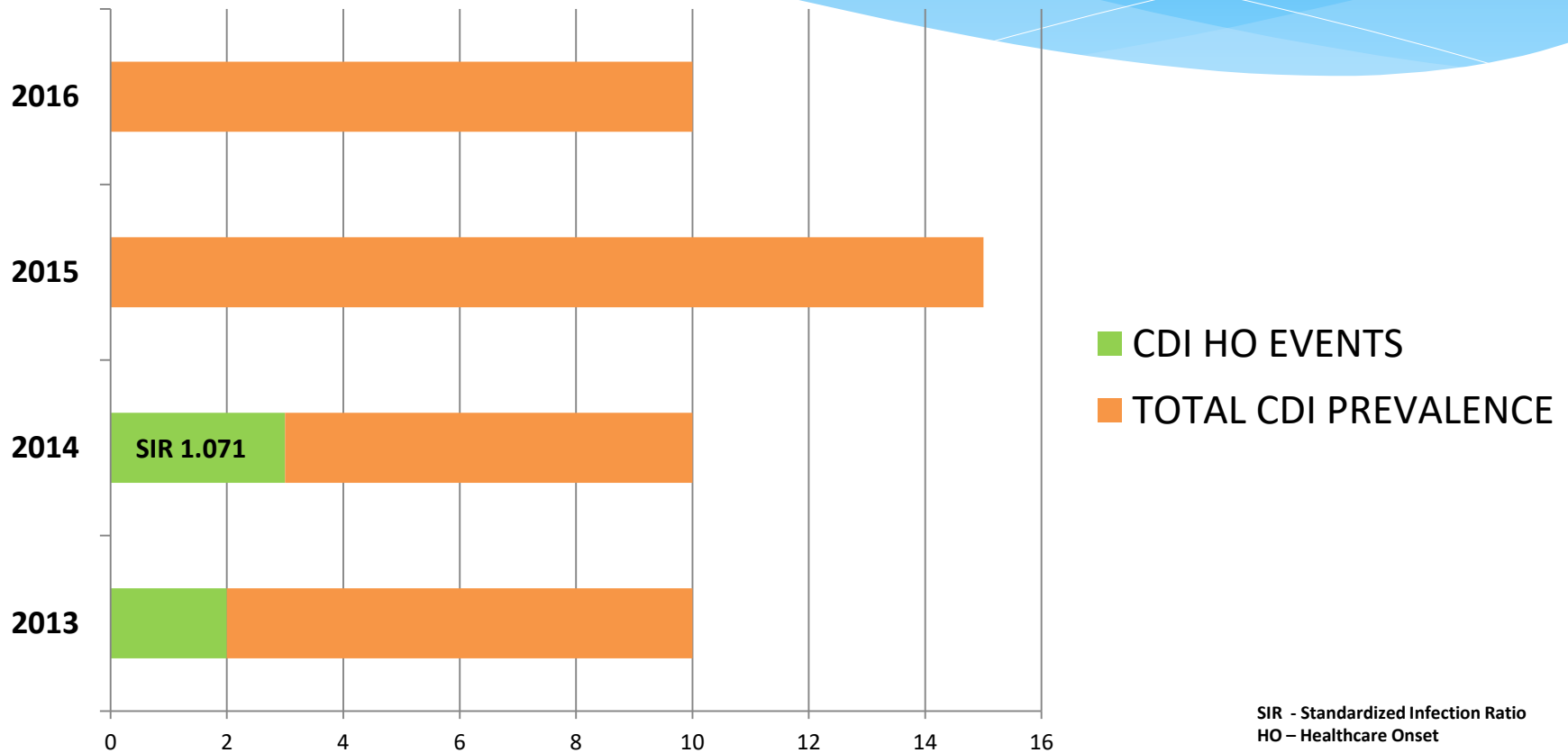
Estimated U.S. Burden of CDI, According to the Location of Stool Collection and Inpatient Health Care Exposure.

CO-HCA: Community onset healthcare-associated  
NHO: Nursing home onset  
HO: Hospital onset

- \* 453,000 CDI cases<sup>1</sup>
- \* 293,000 healthcare-associated
- \* 160,000 Community-associated
- \* 94% of CDI cases were related to healthcare

# Inpatient Quality Reporting


## CDI Rates – Local Epidemiology



SIR - Standardized Infection Ratio  
HO - Healthcare Onset

# CDI Prevention Initiative Begins

**C. difficile Infection Prevention Strategies Gap Analysis**

 OHIO HOSPITAL ASSOCIATION

Offic Action(s)	Gap Analysis Questions	Yes	No	If answered question "No"-Identify the Specific Action plan(s) including persons responsible and timeline to complete
<b>General Infrastructure, Capacity, and Processes</b>				
	1. Is senior leadership involved in promoting CDI prevention activities?	<input type="checkbox"/>	<input type="checkbox"/>	
	2. Is unit-level leadership involved in CDI prevention activities?	<input type="checkbox"/>	<input type="checkbox"/>	
	3. Does your facility currently have a team/work group focusing on CDI prevention?	<input type="checkbox"/>	<input type="checkbox"/>	
	4. Does your facility have a staff person with dedicated time to coordinate CDI prevention activities?	<input type="checkbox"/>	<input type="checkbox"/>	
	5. Does your facility provide training on hand hygiene to all healthcare personnel:			
	a. Upon hire?	<input type="checkbox"/>	<input type="checkbox"/>	
	b. At least annually?	<input type="checkbox"/>	<input type="checkbox"/>	
	6. Does your facility provide training on use of personal protective equipment (PPE) to all personnel who use PPE, including proper PPE selection, donning/doffing, and disposal?			
	a. Upon hire?	<input type="checkbox"/>	<input type="checkbox"/>	
	b. At least annually?	<input type="checkbox"/>	<input type="checkbox"/>	
	7. Does your facility provide training on cleaning and disinfecting to all personnel with this responsibility (e.g., environmental services staff, nursing staff)?			

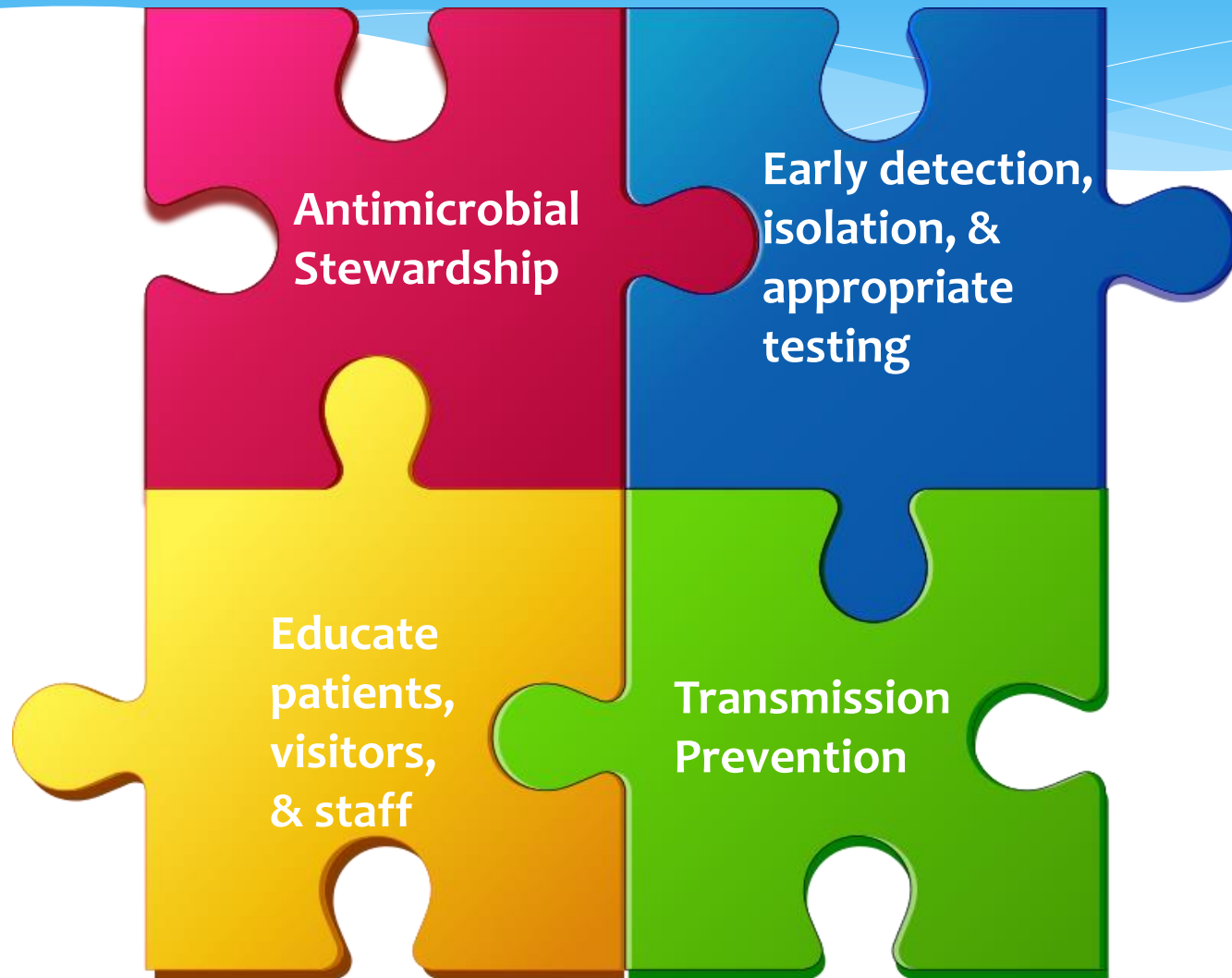
- \* Journey up the CDI Prevention Initiative
  - \* HEN 2.0
  - \* Multidisciplinary work group
- \* OHA CDI Gap Analysis:
  - \* General infrastructure/processes
  - \* Antibiotic Stewardship
  - \* Early recognition/testing
  - \* Isolation precautions/hand hygiene
  - \* Environmental cleaning & disinfection

# Current State “in pieces”

- \* Gap analysis captured awareness & perceptions of current practice
- \* Prioritized core strategies
  - \* OHA HEN 2.0 CDI Driver Diagram & Change Ideas
- \* Action plan- focus on key prevention targets:
  - \* Antimicrobial exposure
  - \* Acquisition of *C. difficile*



# Strategies to Prevent CDI



# Early Detection & Isolation










## **Implemented special approaches for CDI prevention:**

- \* Actively assess every patient every shift for evidence of clinically-significant diarrhea without identified cause. Nurse-driven protocols.
- \* Initiate presumptive Contact Precautions PLUS while CDI results are pending.
- \* If positive result, Contact Precautions PLUS continues for the duration of hospitalization.
  - \* Special circumstances for skilled nursing unit

# Appropriate Testing

## Bristol Stool Chart

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on its surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces. <b>Entirely Liquid</b>

- \* Rapid diagnostic technology  
NAAT – PCR test
- \* Established rules for testing
  - \* Stool chart Types 6-7
  - \* Restrictions
- \* Avoid repeat testing or  
“test of cure”
- \* Lab-based alert system

# Transmission Prevention



## Contact Precautions PLUS



**ALL Visitors:** Please **STOP** at the Nurse's Station **BEFORE** entering



Wear gloves before entering this room



Wear a gown before entering this room



Clean with BLEACH



**REQUIRED** soap & water wash  
**DO NOT** use hand sanitizer

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- \* Contact Precautions PLUS
- \* Signage -visual cues
  - \* Improved Communication
- \* Private room
- \* Gown & gloves required
- \* Bleach clean
- \* Soap & water hand hygiene required
- \* Dedicated care equipment



# Transmission Prevention, cont'd

## Contact Precautions PLUS

Enteric contact precautions PLUS for clinically-significant diarrhea (3 or more within 24-hour time period).

Examples: C. diff, Norovirus, Rotavirus,

1. Place patient in a **private room**
2. Post **Contact Precautions PLUS** sign
3. Don **Gown & Gloves** for every encounter
4. Hand washing with **soap & water** for 15-20 seconds is required. (Alcohol hand rubs are not effective).
5. Patient care **equipment dedicated** to the room.
6. Alert **Housekeeping** for additions to routine cleaning & discharge cleaning.
7. Use **bleach** wipes to clean & disinfect equipment

### If the patient MUST leave the room:

- **Communicate** Contact Precaution PLUS status to receiving unit &/or transport staff
- Place **clean gown** on the patient
- Instruct **patient to wash their hands** with soap & water (if not able, provide hand sanitizer).
- Make sure **diarrhea is contained**
- Place **clean linens** on cart or wheelchair. If ambulatory, instruct patient not to touch the environment.
- Staff remove PPE & perform hand hygiene before transport. Don clean PPE to handle patient at transport destination.
- After transport/at point of use, **bleach wipe** all non-dedicated equipment used (wheelchair, monitors, etc.)

\* **Contact Precautions PLUS**

\* **Reverse side**

\* **Quick reference guide**

\* **Patient transport information**

\* **Communication – receiving & transport staff**



# Transmission Prevention - Hand Hygiene

- \* Soap & water **required** with known or suspected CDI
- \* Alcohol-based hand rubs not effective against C. difficile
  - \* **STOP!**
- \* Hand hygiene observations (OHA & internal secret shoppers)
- \* Engage patients & visitors
  - \* Post discharge survey



# Transmission Prevention - Environmental Hygiene

- \* Adequate environmental hygiene protocols
  - \* Daily & Terminal
  - \* Product & Process
- \* EVS unit specific checklists
- \* Modified amount of time to terminally clean
- \* “Patient- Ready Room Sign”
- \* Methods to evaluate & validate environmental cleaning
  - \* ATP
  - \* Fluorescent gel marker



# Fitting Pieces Together to Prevent Transmission



## R – I – G – H – T Bundle

- \* Rapidly identify
- \* Isolation –presumptive enteric precautions
- \* Gown & gloves universal
- \* Hand hygiene – soap & water required
- \* Time to use bleach

### Implement the **R – I – G – H – T Bundle** to prevent *C. diff*

#### **R**apidly recognize & identify clinically-significant diarrhea

Assess every patient, every shift for clinically-significant diarrhea (3 or more unformed loose-watery stools within a 24 hour time period). If no known medical reason & *C. diff* testing is ordered, place in Contact Precautions PLUS.

#### **I**solation **Contact Precautions PLUS**

When *C. diff* testing is ordered or if clinically-suspected, patient should be in a private room, post enteric precautions sign & isolation cart outside the room. Place bleach wipes, dedicated equipment (disposable stethoscope, thermometer, blood pressure cuff) in the room. Place an isolation trash can & Dinamap in the room (remove all unnecessary supplies).

#### **G**own & Gloves required for every encounter

Universal gown & gloves required. Don all PPE outside the isolation room & doff all PPE before exiting the room. Dispose in isolation trash can.

#### **H**and hygiene: soap & water required Put **STOP** sign on foam.

Strict use of antimicrobial soap & water for at least 15 seconds. Engage patient & visitors as partners in prevention.

#### **T**ime to use **BLEACH**: daily & terminal cleaning

Alert Housekeeping for special additions to daily cleaning (high touch areas cleaned twice daily with bleach-based cleanser) and terminal bleach clean at discharge or transfer.

**Contact Precautions PLUS** for entire hospitalization. Physician may discontinue isolation if an effective course of treatment is completed **and** > 48 hours without clinically-significant diarrhea or other associated symptoms.

# Education Piece

NEW

- \* New CDI education module for HCP
- \* Simulations with nursing /clinical HCP
- \* Media blitz topic-specific campaign – facility wide
- \* Added CDC FAQs resource for patients & family

## FAQs (frequently asked questions)

### about "Clostridium Difficile"

#### What is Clostridium difficile infection?

*Clostridium difficile* [pronounced KLO-STRID-ee-um dif-uh-SEEL], also known as "C. diff" [See-dif], is a germ that can cause diarrhea. Most cases of C. diff infection occur in patients taking antibiotics. The most common symptoms of a C. diff infection include:

Watery diarrhea  
Fever  
Loss of appetite  
Nausea  
Belly pain and tenderness

#### Who is most likely to get C. diff infection?

The elderly and people with certain medical problems have the greatest chance of getting C. diff. C. diff spores can live outside the human body for a very long time and may be found on things in the environment such as bed linens, bed rails, bathroom fixtures, and medical equipment. C. diff infection can spread from person-to-person on contaminated equipment and on the hands of doctors, nurses, other healthcare providers and visitors.

#### Can C. diff infection be treated?

Yes, there are antibiotics that can be used to treat C. diff. In some severe cases, a person might have to have surgery to remove the infected part of the intestines. This surgery is needed in only 1 or 2 out of every 100 persons with C. diff.

#### What are some of the things that hospitals are doing to prevent C. diff infections?

To prevent C. diff infections, doctors, nurses, and other healthcare providers:

- Clean their hands with soap and water or an alcohol-based hand rub before and after caring for every patient. This can prevent C. diff and other germs from being passed from one patient to another on their hands.
- Carefully clean hospital rooms and medical equipment that have been used for patients with C. diff.
- Use Contact Precautions to prevent C. diff from spreading to other patients. Contact Precautions mean:
  - o Whenever possible, patients with C. diff will have a single room or share a room only with someone else who also has C. diff.
  - o Healthcare providers will put on gloves and wear a gown over their clothing while taking care of patients with C. diff.
  - o Visitors may also be asked to wear a gown and gloves.
  - o When leaving the room, hospital providers and visitors remove their gown and gloves and clean their hands.

- o Patients on Contact Precautions are asked to stay in their hospital rooms as much as possible. They should not go to common areas, such as the gift shop or cafeteria. They can go to other areas of the hospital for treatments and tests.

#### Only give patients antibiotics when it is necessary.

#### What can I do to help prevent C. diff infections?

- Make sure that all doctors, nurses, and other healthcare providers clean their hands with soap and water or an alcohol-based hand rub before and after caring for you.

If you do not see your providers clean their hands, please ask them to do so.

#### Only take antibiotics as prescribed by your doctor.

- Be sure to clean your own hands often, especially after using the bathroom and before eating.

#### Can my friends and family get C. diff when they visit me?

C. diff infection usually does not occur in persons who are not taking antibiotics. Visitors are not likely to get C. diff. Still, to make it safer for visitors, they should:

- Clean their hands before they enter your room and as they leave your room
- Ask the nurse if they need to wear protective gowns and gloves when they visit you.

#### What do I need to do when I go home from the hospital?

Once you are back at home, you can return to your normal routine. Often, the diarrhea will be better or completely gone before you go home. This makes giving C. diff to other people much less likely. There are a few things you should do, however, to lower the chances of developing C. diff infection again or of spreading it to others.

- If you are given a prescription to treat C. diff, take the medicine exactly as prescribed by your doctor and pharmacist. Do not take half-doses or stop before you run out.
- Wash your hands often, especially after going to the bathroom and before preparing food.
- People who live with you should wash their hands often as well.
- If you develop more diarrhea after you get home, tell your doctor immediately.
- Your doctor may give you additional instructions.

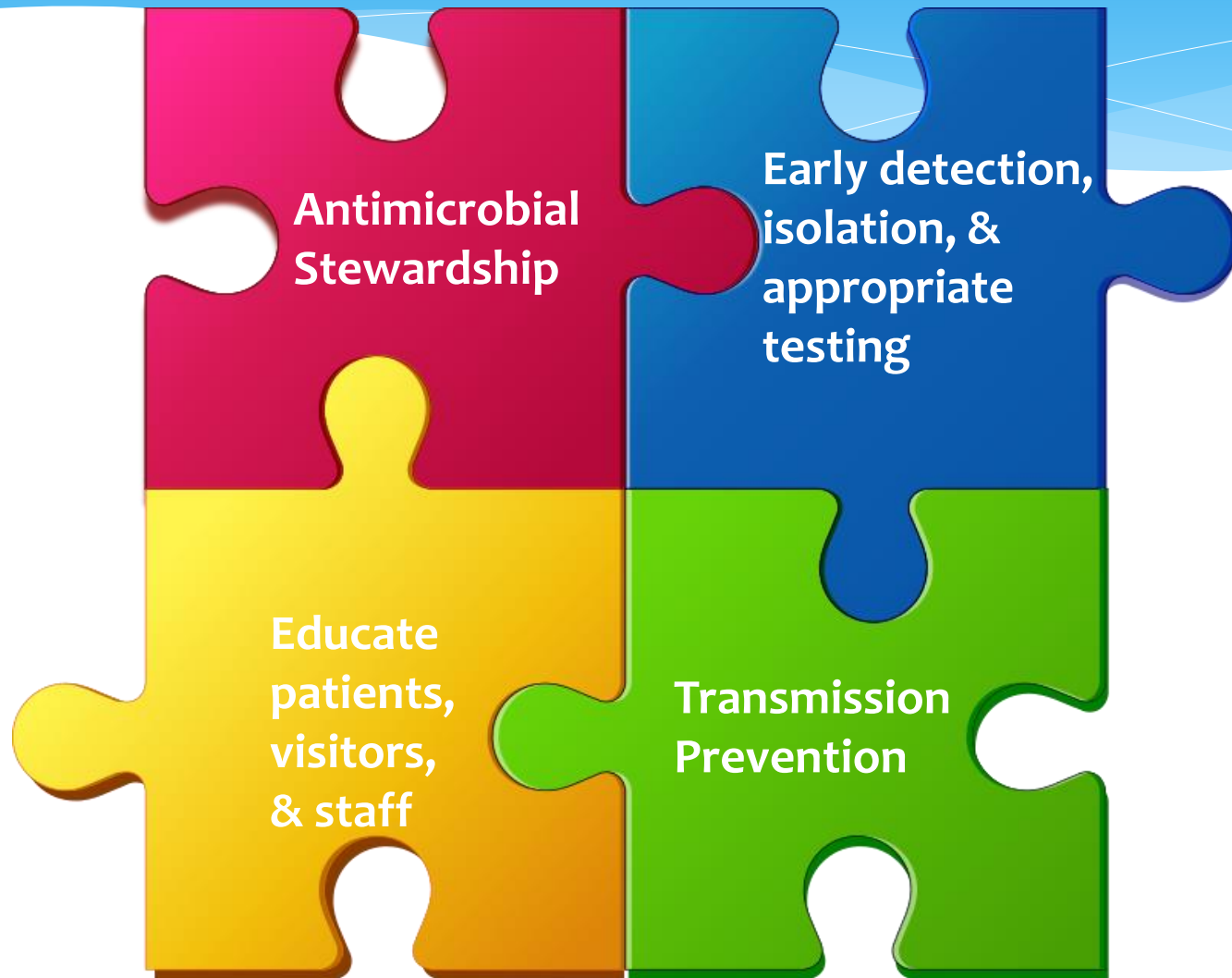
If you have questions, please ask your doctor or nurse.

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Citation:

# Antimicrobial Stewardship





# Objectives - ASP

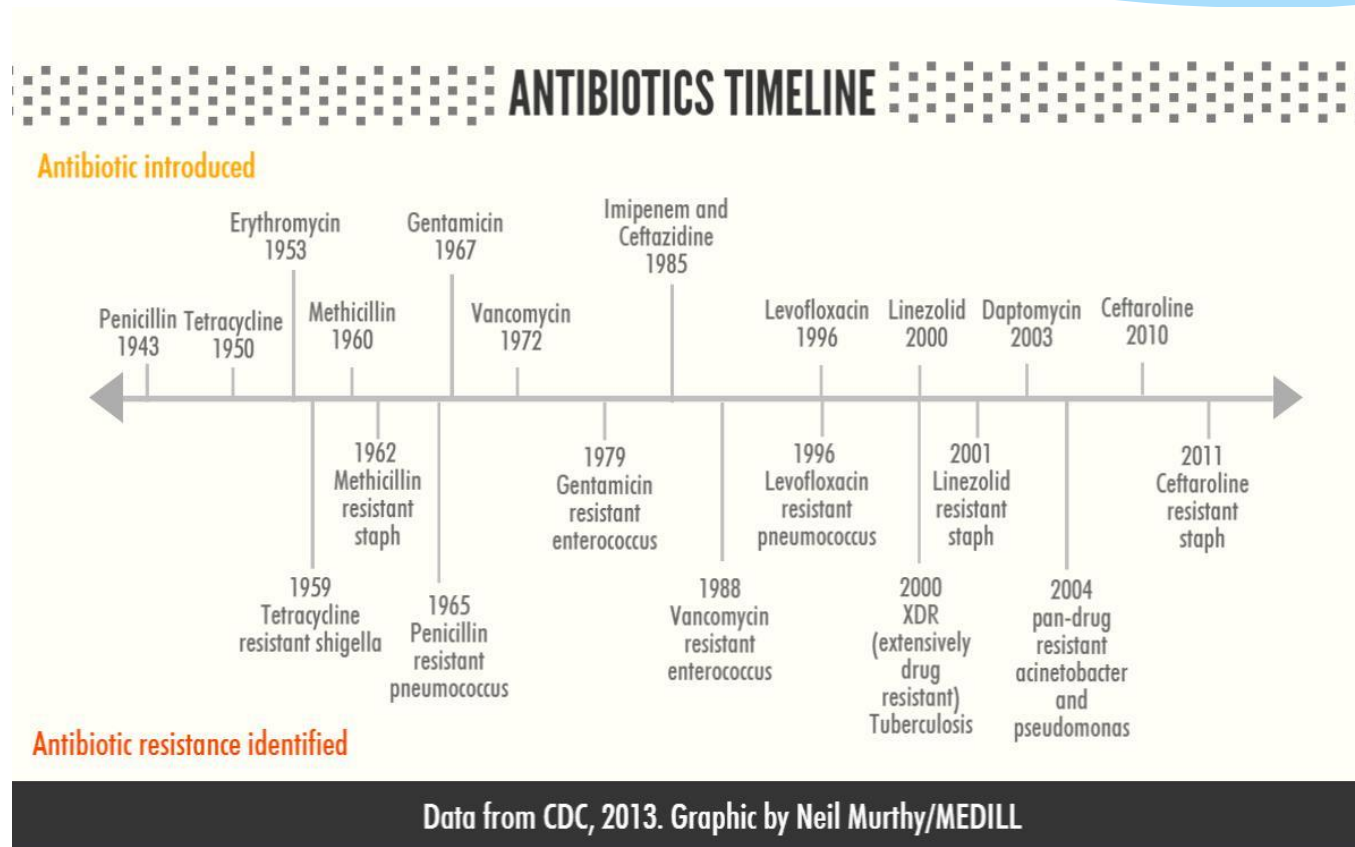
- \* Define an antimicrobial stewardship program (ASP) and understand the significance in the healthcare environment
- \* Identify the core basics of an ASP program and how to apply them in a small to medium sized facility
- \* Identify key approaches to implementing strategies to improve reduce antibiotic utilization to include potential strategies for deployment in your organization
- \* Describe a variety of methodologies in which you can evaluate the outcomes associated with ASP initiatives

# Antimicrobial Stewardship Program (ASP)

- \* Acronyms: AMS, AS, ASP
- \* Definition: The optimal ***selection, dose, and duration*** of an antimicrobial that results in the best clinical outcome for the treatment of infection, with minimal toxicity to the patient and minimal impact on subsequent development of resistance.



# Antibiotic Timeline



# ASP Resources

## Box Top Puzzle Picture

- \* Core Elements of Hospital Antibiotic Stewardship Programs from the Centers for Disease Control (CDC)  
[www.cdc.gov/getsmart/healthcare/pdfs/checklist.pdf](http://www.cdc.gov/getsmart/healthcare/pdfs/checklist.pdf)
- \* Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America  
<http://cid.oxfordjournals.org/content/early/2016/04/11/cid.ciw118.full.pdf+html>
- \* National Quality Forum (NQF) Playbook: A Practical Approach to Antibiotic Stewardship  
[www.qualityforum.org/Publications/2016/05/Antibiotic\\_Stewardship\\_Playbook.aspx](http://www.qualityforum.org/Publications/2016/05/Antibiotic_Stewardship_Playbook.aspx)

# GLHS Local Drivers

## Boarder Approach to Solving the Puzzle

- \* Development of Infection Control Committee
  - \* DNV regulatory OFIs
- \* Hospital Engagement Network (HEN)
  - \* CDI and ASP initiatives
- \* Hospital Improvement Innovation Networks (HIIN)

# IDSA / SHEA Guidelines

- \* Updated guidelines for developing programs to enhance antimicrobial stewardship published in 2007
- \* IDSA / SHEA consensus guidelines extensively endorsed
- \* Primary goal
  - \* Optimize clinical outcomes while minimizing unintended consequences of antibiotic use
- \* Secondary goal
  - \* Reduce healthcare cost without compromising quality of care

# National Discussion - ASPs

- \* President's Executive Order and National Strategy
- \* Presidents Council of Advisors on Science and Technology (PCAST) Report to the President
- \* National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB)

# Regulatory Compliance for ASPs

- TJC
  - MM.09.01.01
  - 8 Elements of Performance
- CMS - §482.42(b) and §485.640 for CAH
  - Infection Control CoPs in place
  - CoPs proposed for hospitals “...require a hospital to develop and maintain an ASP as an effective means to improve hospital antibiotic-prescribing practices and curb patient risk...”
- HFAP – Infection Prevention and Control and Antibiotic Stewardship standards
- DNV - Survey designation “MIR” (managing infection risk)

# Core Elements / TJC EP #5

- \* Establish a team to focus on Antimicrobial Stewardship activities, with leadership support, to drive implementation of strategies and track outcomes



# Infection Control Committee (ASP Core Team)



## Others

### Considerations:

- Hospital Administrators
- QA/PI
- Key Partners: surgeons, pulmonologist
- Lab / Micro





# GLHS Actions / ASP Areas of Focus

## Institutional Drivers

- \* Preauthorization / Restrictions\*
- \* Audit and Feedback (PAF)\*
- \* Antibigram
- \* Duration requirements / ASO
- \* Order Set Review (evidence-based)
  - \* Develop for common conditions (CAP, UTI, SSTI, surgical prophylaxis, sepsis)
- \* ATIs (AGs; pip/tazo EI)
- \* Education

## Patient Specific Interventions

- \* IV to PO
- \* Dose Optimization
  - \* PCK dosing AGs and vanco
- \* Dose adjustments / organ dysfunction
- \* Lab monitoring

\*Considered Core Strategies by IDSA/SHEA  
Dellit TH, et al. Clin Infect Dis. 2007;44(2):159-177.



# GLHS Actions / ASP Areas of Focus (cont.)

## Institution Drivers

- \* Preauthorization / Restrictions: CDI and fidaxomicin (Difcid); IDSA / SHEA guidelines metronidazole / vancomycin / fidaxomicin; ID consult; documented failure on prior agents before fidaxomicin; Cdiff isolate
- \* Audit and Feedback (PAF): physician quality review committee structure; DUEs
- \* Antibigram
  - \* ASP overlay in C&S reports; ‘hide drugs based on bugs’; led to issues with EMR / patient on abx?
  - \* AG ATI: pseudomonal resistance (tob preferred)
- \* Order Set review: duration requirements / ASO: CAP – 5 days, HCAP – 7 days, sepsis – 10 days; evidence-based practice (drugs, dose, route, freq, dur)
- \* ATIs (AGs; pip / tazo EI)
- \* Education

# GLHS Actions / ASP Areas of Focus (cont'd)

## Patient Specific Interventions

- \* IV to PO: conservative medical staff (automatic for H2, PPI, not Abx)
- \* Dose Optimization: PCK dosing (AGs, Vanco) – recommend vs. automatic
- \* Dose adjustments / organ dysfunction (renal / hepatic) – recommend vs. automatic
- \* Lab monitoring: sCr / CrCl, renal list, vanco, tob/gent, C&S reports (sensitivities)



# GLHS Goals / Outcomes Measures

- \* Establish ASP
- \* Abx Cost / CMI APD reduction (25% 2016; 5% 2017)
- \* Carbapenem Cost / CMI APD reduction (5% in 2017)
- \* Vanco trough < 10 @ < 30% overall: RPh quality assessment
- \* PPI purchases - PO vs IV comparison < 70%
- \* Pharmacist interventions: documentation; estimated cost savings based on intervention
- \* C Diff infection rates / adherence to guidelines (MUE in 2017)

# 2016 Measurable Goals

	Baseline				
	2015	1Q 2016	2Q 2016	3Q 2016	4Q 2016
Antibiotic Expense		\$ 46,226.01	\$ 32,530.34	\$ 26,888.79	\$ 27,828.34
CMI		1.2401	1.2319	1.3168	1.3306
Adjusted Patient Days		3988	3486	3618	3714
Abx / CMI APD	\$7.91	\$9.35	\$7.58	\$5.64	\$5.63
% Decrease from Baseline		15.4%	-4.4%	-40.2%	-66.1%
% Decrease from Previous Quarter			-23.4%	-34.2%	-17.8%
% Vanco Troughs < 10		58%	36%	14%	18%
% PPI Purchases PO vs IV		66%	72%	68%	52%



# Future / Forward Looking Goals 2017 and Beyond

- \* Package 'Nuts and Bolts' of ASP / Centralize
- \* IV-PO: Antimicrobials
- \* QA/PI: DOT / DDD
- \* Indications for Use on Abxs
- \* PCN Allergy Testing
- \* Review of MRSA agents, high risk for CDI

# ASP Binder Materials

## Antimicrobial Stewardship Program Contents

- \* Mission / Vision / Goals
- \* Procedures
- \* Team Members
- \* Antibigram
- \* Outcomes
- \* Education
- \* References

# Other AS Resources

- CDC Get Smart for Healthcare is a CDC campaign focused on improving prescribing practices in inpatient healthcare facilities. [www.cdc.gov/getsmart/healthcare/index.html](http://www.cdc.gov/getsmart/healthcare/index.html)
- CDC Overview and Evidence to Support Stewardship  
[www.cdc.gov/getsmart/healthcare/evidence.html](http://www.cdc.gov/getsmart/healthcare/evidence.html)
- Training Programs
  - MAD-ID <http://mad-id.org/antimicrobial-stewardship-programs/>
  - SIDP [http://s3.proce.com/res/pdf/SIDP-ASP\\_Announcement.pdf](http://s3.proce.com/res/pdf/SIDP-ASP_Announcement.pdf)



# Q & A / Discussion

- \* Questions?
- \* Comments?
- \* Shared Learning Opportunities?

