How to Prevent, Identify and Track Infections

Presenter: Angela Craig

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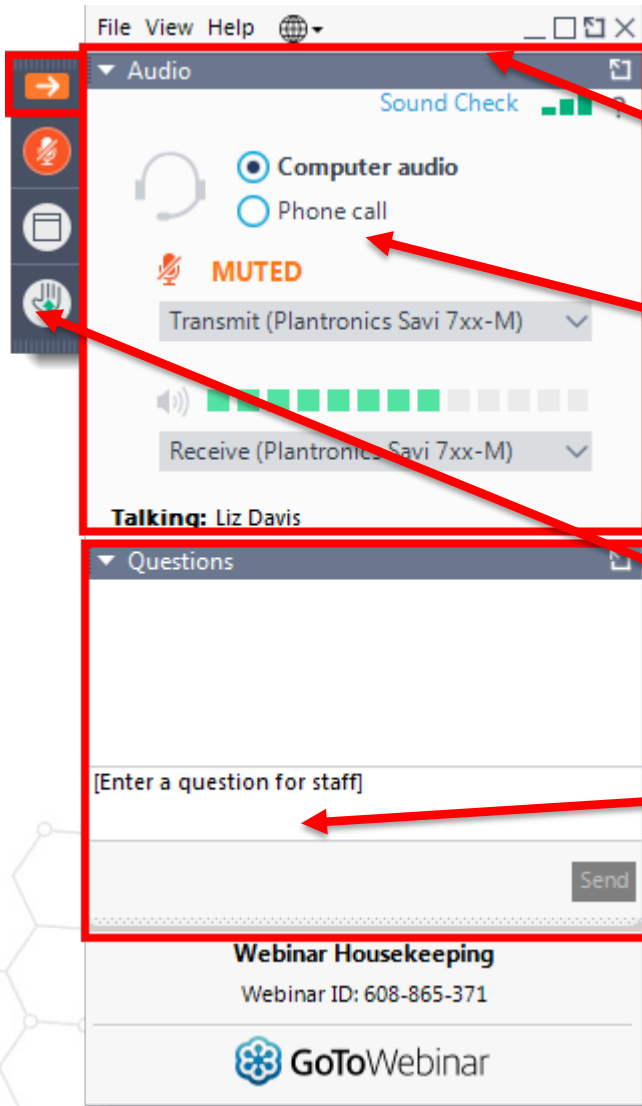
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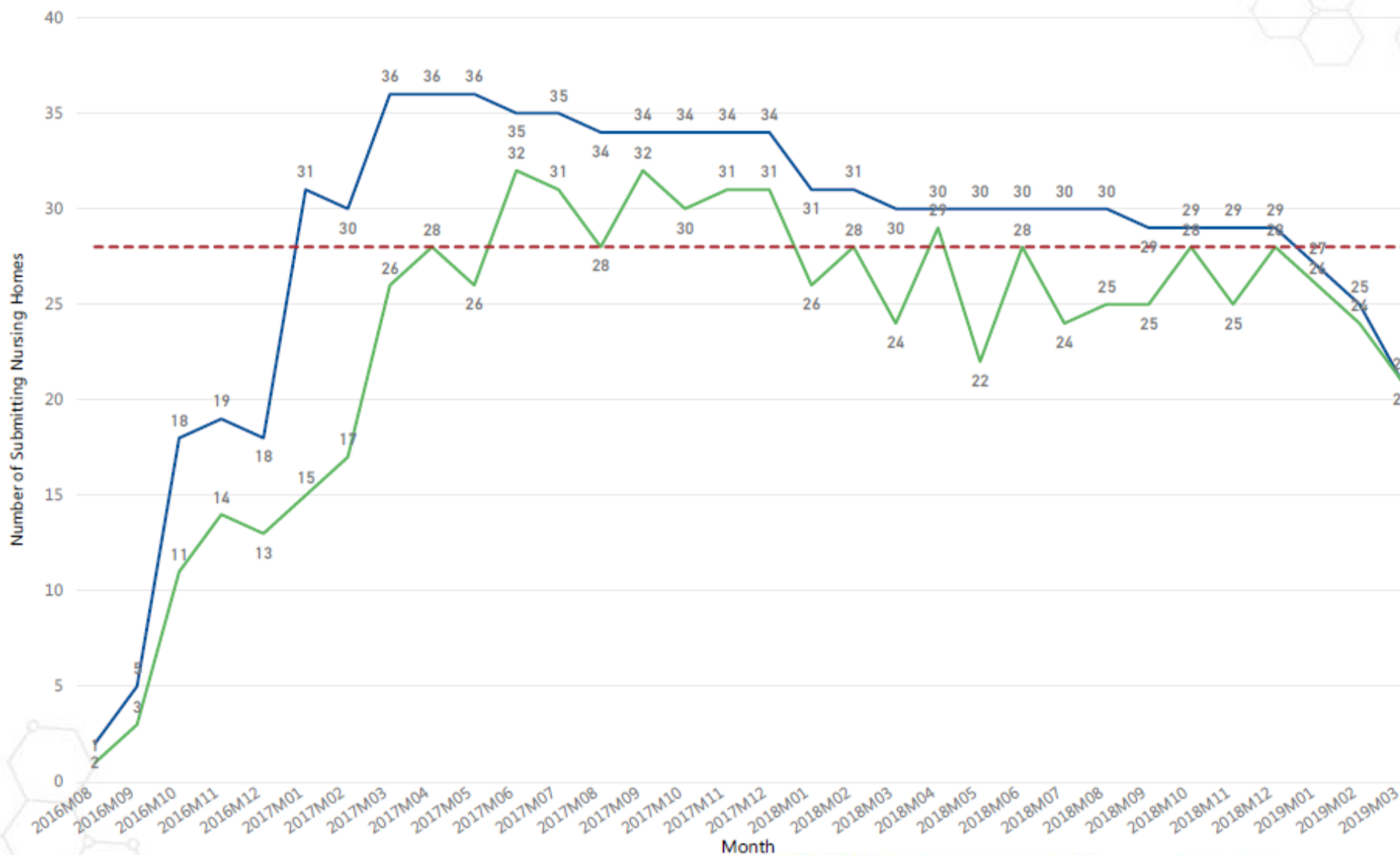
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Multi-state alliance for powerful change composed of three nonprofit, healthcare quality improvement consulting companies

Alabama's Monthly NHSN Data Submission

Indiana's Monthly NHSN Data Submission

●Total NHs Submitting ●Total NHs Submitting Timely ●Goal Submission

-Timely Submission: Submitting data for a month within 30 days from the last day of that month.
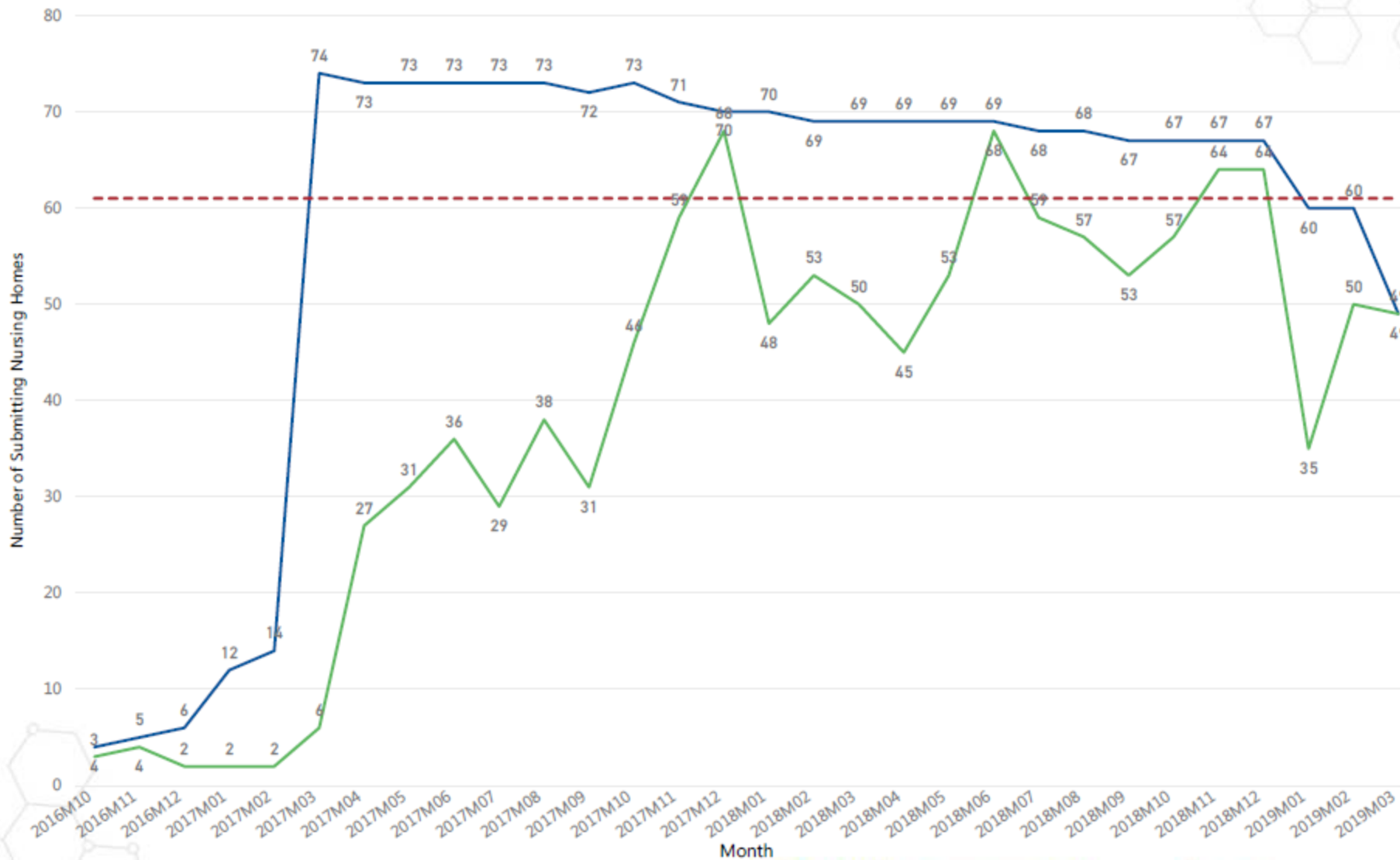
Kentucky's Monthly NHSN Data Submission

● Total NHs Submitting ● Total NHs Submitting Timely ● Goal Submission

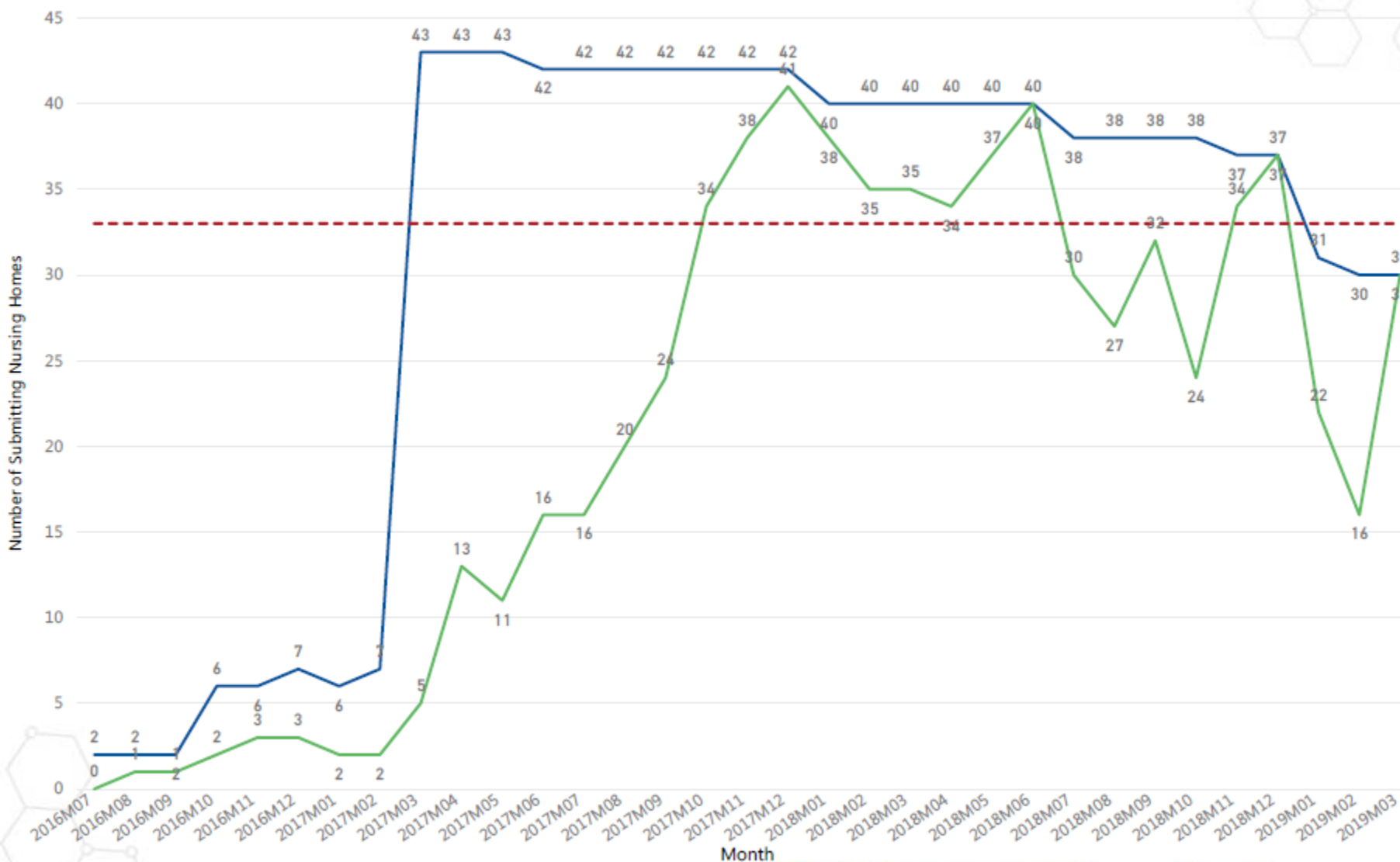-Timely Submission: Submitting data for a month within
30 days from the last day of that month.

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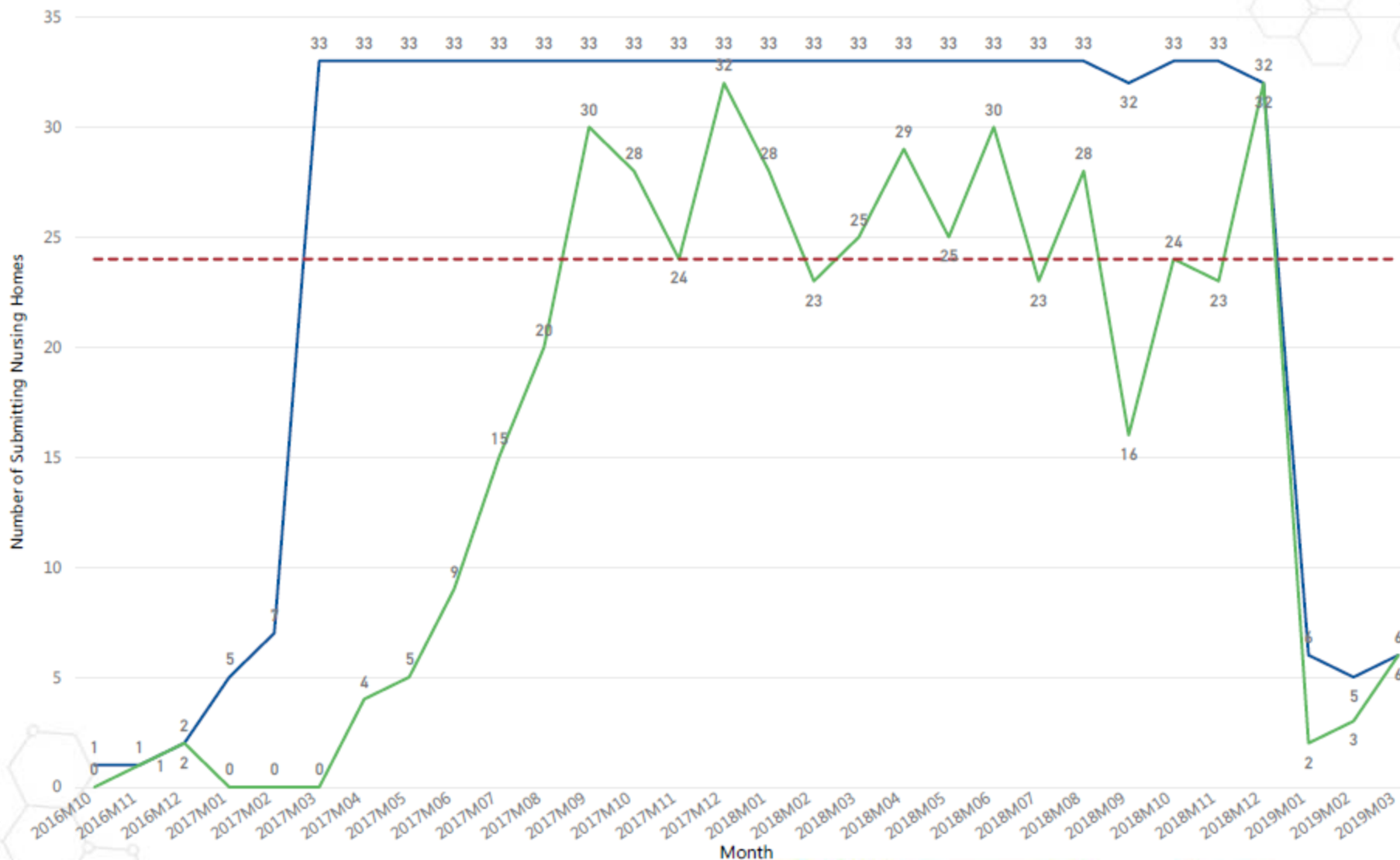Mississippi's Monthly NHSN Data Submission

● Total NHs Submitting   ● Total NHs Submitting Timely   ● Goal Submission

-Timely Submission: Submitting data for a month within 30 days from the last day of that month.

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Tennessee's Monthly NHSN Data Submission

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Disclosures

- Advisory Board with Sepsis Alliance for the Sepsis Coordinator Network
- KOL Advisory Committee with Baxter
- Tennessee Hospital Association Sepsis Consultant
- Consultant with Atom Alliance and Qsource
  - Webinar series for Extended Care
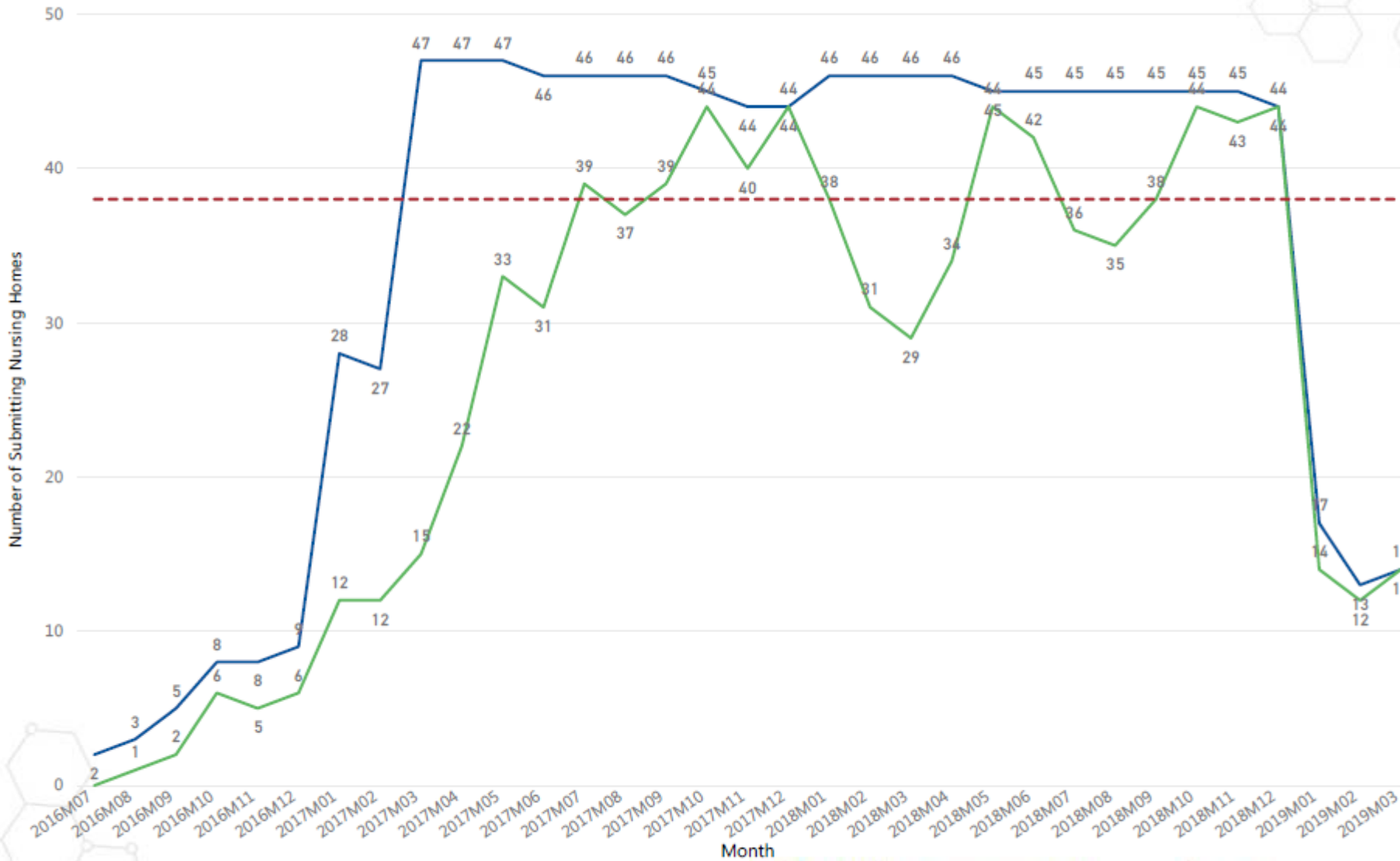- Consultant with Edwards Lifesciences
  - Speakers bureau

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Objectives

- Discuss Definition for *Clostridium difficile* (*C-diff*)
- Identify risk factors for *C-diff*
- Identify gaps in current practice
- Discuss ways to correct gaps and have accountability for best practice

Polling Question

What best describes your facility?

- Acute Care Hospital

- LTACH

- Nursing Home

- Other

Polling Question

Do you know your institution's *C. diff* rates?

- Yes
- No

Statistics with *C.diff*

- It's estimated to cause **almost half a million illnesses** in the United States each year.

- About **1 in 5 patients** who get *C. diff* will get it again.

- Within a month of diagnosis, **1 in 11 people over age 65** died of a healthcare-associated *C. diff* infection.

https://www.cdc.gov/cdiff/risk.html

Clostridium difficile Infection (CDI) is Costly

- Attributable cost/patient: $6,100-11,300

- Associated with longer length of stay (~3 days increase) and readmissions

- CDI reoccurs in 15-35% of pts with 1 previous event, 33-65% in pts with > 2 episodes of CDI

Dubberke ER, et al. *Clin Infect Dis* 2012;55:S88–92; Zimlichman E, et al. *JAMA Intern Med* 2013;173(22):2039-46

Health Research & Educational Trust (2017). *Clostridium difficile Infection Change Package: 2017 Update.* Chicago, IL: Health Research & Educational Trust. Accessed at www.hret-hiin.org.

Butler M,et al. Early Diagnosis, Prevention, and Treatment of *Clostridium difficile*: Update. Comparative Effectiveness Review No. 172. AHRQ Publication No. 16-EHC012-EF. Rockville, MD: Agency for Healthcare Research and Quality; March 2016.

Clostridium difficile Infection is Costly
(continued)

- Publicly reported

- Costs related to CDI are estimated at $4.8 billion for acute care facilities alone

- Rates linked to the Hospital-Acquired Condition (HAC) and Value Based Purchasing (VBP) programs

Dubberke ER, et al. *Clin Infect Dis* 2012;55:S88–92; Zimlichman E, et al. *JAMA Intern Med* 2013;173(22):2039-46
Health Research & Educational Trust (2017). *Clostridium difficile Infection Change Package: 2017 Update*. Chicago, IL: Health Research & Educational Trust. Accessed at www.hret-hiin.org.
Butler M,et al. Early Diagnosis, Prevention, and Treatment of *Clostridium difficile*: Update. Comparative Effectiveness Review No. 172. AHRQ Publication No. 16-EHC012-EF. Rockville, MD: Agency for Healthcare Research and Quality; March 2016.

Economic Burden of Healthcare-Acquired Infections (HAIs):

- 5 Major Infections=9.8 billion

  - SSI's, CLABSI's, VAP/VAE, CAUTI's, C-Diff

- SSI's (33.7%)

- VAP (31.6%)

- CLA-BSI (18.9%)

- C-Diff (15.4%)

- CA-UTI <1%

50% HAIs Preventable

Per Case Basis

SSI	CLABSI	VAP	CAUTI	C-Diff
$20,785	$45,814	$40,144	$896	$11,285

Zimlichman E, et al. JAMA Intern Med, 2013; 173:2039-46

What is *C-diff*?

What is *C-diff*? (continued)

- *Clostridium difficile* (also known as *C. diff*) is a bacterium that causes diarrhea and colitis (inflammation of the colon).

- It is an anaerobic, spore-forming bacteria spread through fecal-oral transmission

- A *C.diff* infection (CDI) colonizes the large intestine and releases two toxins that can cause a number of illnesses including diarrhea, colitis and sepsis. Colonized pts do not always present symptoms

https://www.cdc.gov/cdiff/what-is.html

http://www.hret-hiin.org/Resources/cdi/17/clostridium-difficile-infection-cdi-change-package.pdf

NHSN Definitions

- Healthcare Facility Onset (HO):
  - \> 3 days after admission
- Community Onset (CO):
  - Inpatient ≤ 3 days after admission
- Community-Onset Healthcare Facility-Associated:
  - Patient discharged from HCF < 4 weeks prior

Standardized Infection Ratio (Goal < 1)

$$SIR = \frac{\# \text{ HO CDI Observed}}{\# \text{ HO CDI Expected}}$$

Risk Factors for *C.diff*

- *C. diff* bacteria is commonly found in the environment, but most cases of *C. diff* occur while you're taking antibiotics or not long after you've finished taking antibiotics. People on antibiotics are **7 to 10 times more likely** to get *C. diff* while on the drugs and during the month after.

- Antibiotics affect your microbiome by wiping out bad germs but also the good germs that protect your body against infections.

- The effect of antibiotics can last as long as several months. If you come in contact with *C. diff* germs during this time, you can get sick.

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Risk Factors for *C.diff* (continued)

- Age (more than 80% of *C. diff* deaths happen among those 65 and older)
- Complicated medical care and extended stays in healthcare settings, especially hospitals and nursing homes
- Certain antibiotics, such as fluoroquinolones
- A weakened immune system
- Previous infection with *C. diff* or known exposure to the germs

More
C. diff risk factors

65 and older

hospitalization

weakened immune system

previous infection

Complications of *C.diff*

Most common:
- dehydration
- inflammation of the colon, known as colitis
- severe diarrhea

Common complications of *C. diff* | dehydration | colitis | severe diarrhea

More Complications from *C.diff*

- Serious Intestinal Conditions
- Sepsis
- Death
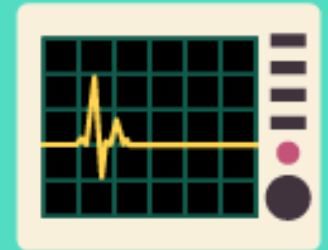
C.diff Prevention Strategies

- Antimicrobial Stewardship
  - Focus on antimicrobial use and determine appropriateness
  - Limit antimicrobial use
- Rapid Identification and Diagnosis
  - Utilize Decision Trees
  - Rule out CDI in pts with diarrhea
- Prevention of Transmission
  - Establish guidelines for using contact precautions
  - Hand hygiene focus
  - Environmental controls

C.diff Gap Analysis

Current activities survey:

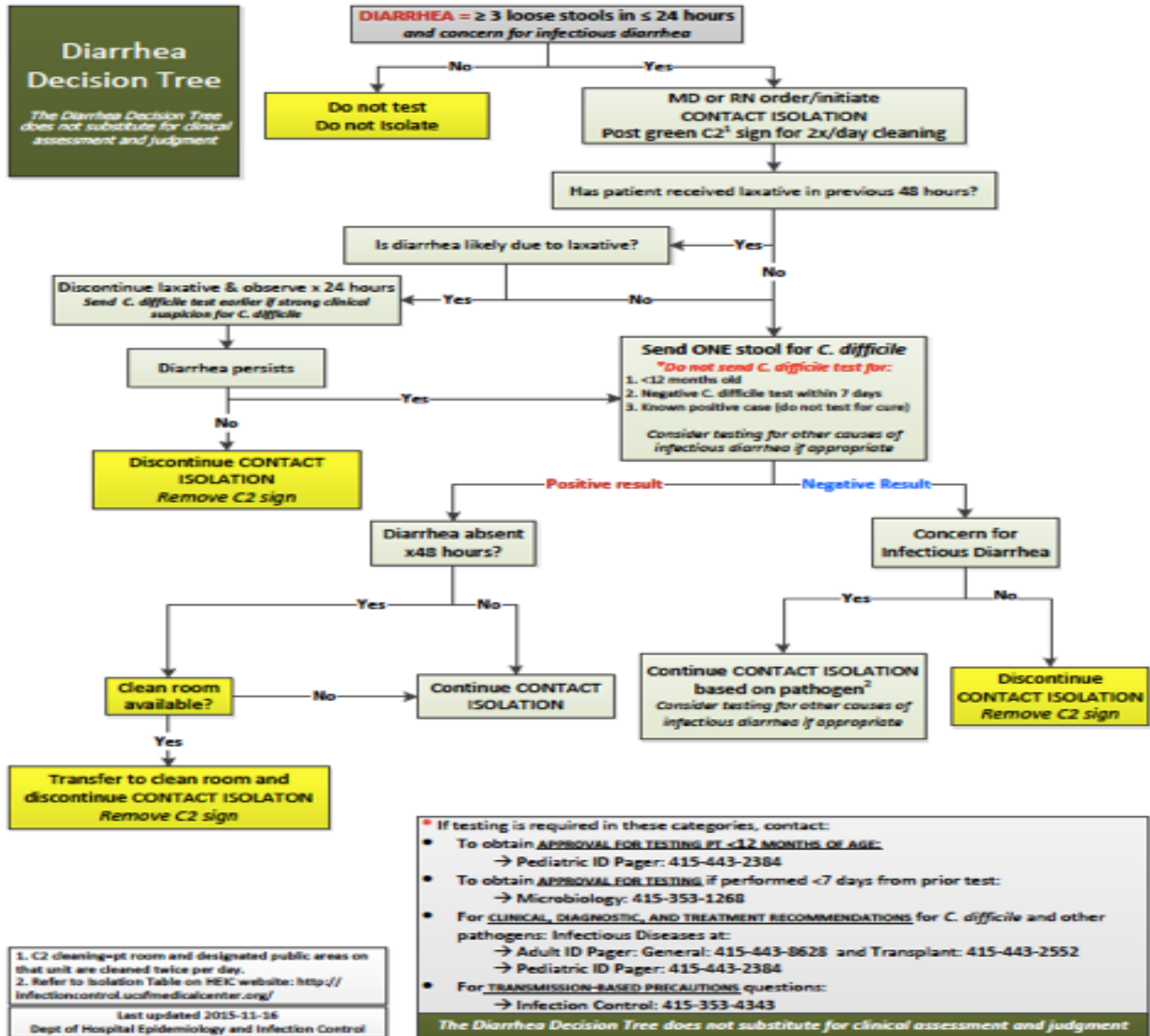|		YES	NO	N/A
	SECTION 1. KNOWLEDGE AND COMPETENCY			
	Early identification			
Q1	Do direct care personnel* identify and communicate new or worsening diarrhea?			
Q2	Do nursing personnel* obtain a stool specimen for *C. difficile* testing only when a resident is having watery diarrhea?			
Q3	Do nursing personnel know the appropriate way to collect and submit a stool specimen for *C.difficile* testing?			
Q4	Do medical personnel* know the *C. difficile* testing (e.g., EIA "toxin" vs. molecular "PCR") being performed by the laboratory?			
	Rapid containment			
Q5	Do healthcare personnel* know what precautions are used to prevent the spread of *C. difficile?*			
Q6	Do nursing personnel know to implement contact precautions for residents known or suspected of having CDI?			
Q7	Do residents with CDI and their family members receive education about the use of hand washing and contact precautions to prevent transmission of CDI?			

C.diff Gap Analysis (continued)

SECTION 2. INFECTION PREVENTION POLICIES AND INFRASTRUCTURE		YES	NO	N/A
Early identification				
Q1	Is there a protocol for notifying medical personnel when a resident develops new or worsening diarrhea?			
Q2	Does your nursing home have a policy that allows nursing personnel to collect and order a stool for *C. difficile* testing?			
Q3	Is there a protocol for notifying medical personnel of the results of a *C. difficile* test?			
Rapid containment				
Q4	Does your nursing home have a policy that allows nursing personnel to implement contact precautions when a resident develops new or worsening diarrhea?			
Q5	Is there a visual tool (e.g., sign) used to communicate to healthcare personnel and visitors when contact precautions are in use for a resident with known or suspected CDI?			
Q6	Are there adequate supplies of gowns/gloves immediately available in all resident care areas*?			
Q7	Does your nursing home dedicate resident equipment when contact precautions for CDI are in use?			
Q8	Does your nursing home have a policy or procedure to provide separate toilets for residents with CDI who are sharing a room with residents without CDI?			

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Diarrhea Decision Tree

The Diarrhea Decision Tree does not substitute for clinical assessment and judgment

DIARRHEA = ≥ 3 loose stools in ≤ 24 hours and concern for infectious diarrhea

- No → **Do not test Do not Isolate**
- Yes → **MD or RN order/initiate CONTACT ISOLATION** Post green C2[1] sign for 2x/day cleaning

Has patient received laxative in previous 48 hours?

- Yes → **Is diarrhea likely due to laxative?**
  - Yes → **Discontinue laxative & observe x 24 hours** Send C. difficile test earlier if strong clinical suspicion for C. difficile
    - **Diarrhea persists**
      - No → **Discontinue CONTACT ISOLATION** Remove C2 sign
      - Yes →
  - No →
- No →

Send ONE stool for C. difficile
Do not send C. difficile test for:
1. <12 months old
2. Negative C. difficile test within 7 days
3. Known positive case (do not test for cure)

Consider testing for other causes of infectious diarrhea if appropriate

- **Positive result** → **Diarrhea absent x48 hours?**
  - Yes → **Clean room available?**
    - No → **Continue CONTACT ISOLATION**
    - Yes → **Transfer to clean room and discontinue CONTACT ISOLATON** Remove C2 sign
  - No → **Continue CONTACT ISOLATION**
- **Negative Result** → **Concern for Infectious Diarrhea**
  - Yes → **Continue CONTACT ISOLATION based on pathogen[2]** Consider testing for other causes of infectious diarrhea if appropriate
  - No → **Discontinue CONTACT ISOLATION** Remove C2 sign

1. C2 cleaning=pt room and designated public areas on that unit are cleaned twice per day.
2. Refer to Isolation Table on HEIC website: http://infectioncontrol.ucsfmedicalcenter.org/

Last updated 2015-11-16
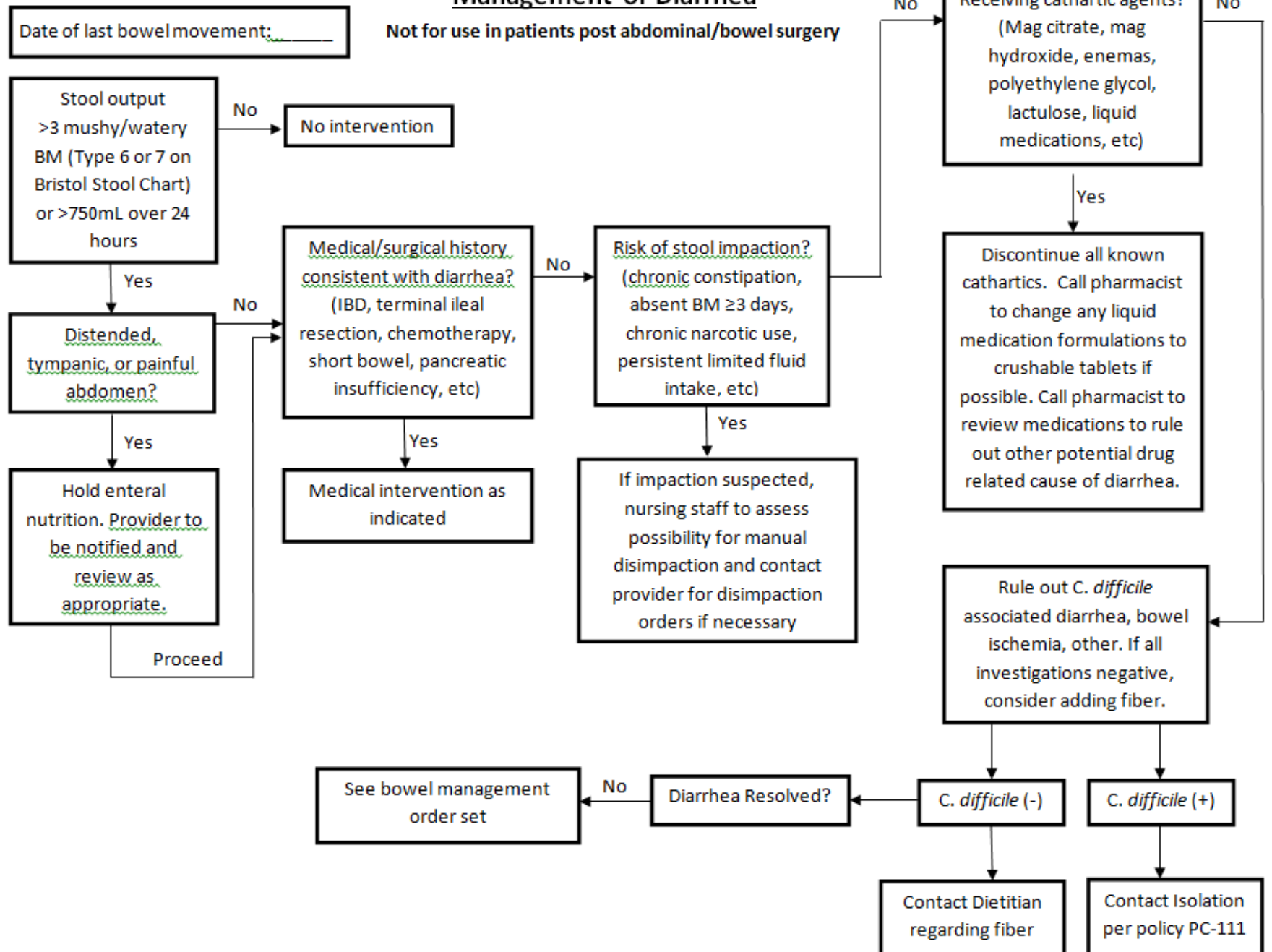Dept of Hospital Epidemiology and Infection Control

* If testing is required in these categories, contact:
- To obtain APPROVAL FOR TESTING PT <12 MONTHS OF AGE:
  → Pediatric ID Pager: 415-443-2384
- To obtain APPROVAL FOR TESTING if performed <7 days from prior test:
  → Microbiology: 415-353-1268
- For CLINICAL, DIAGNOSTIC, AND TREATMENT RECOMMENDATIONS for C. difficile and other pathogens: Infectious Diseases at:
  → Adult ID Pager: General: 415-443-8628 and Transplant: 415-443-2552
  → Pediatric ID Pager: 415-443-2384
- For TRANSMISSION-BASED PRECAUTIONS questions:
  → Infection Control: 415-353-4343

The Diarrhea Decision Tree does not substitute for clinical assessment and judgment

Management of Diarrhea

Not for use in patients post abdominal/bowel surgery

Date of last bowel movement: _____

Stool output >3 mushy/watery BM (Type 6 or 7 on Bristol Stool Chart) or >750mL over 24 hours

— No → No intervention

— Yes ↓

Distended, tympanic, or painful abdomen?

— Yes ↓ Hold enteral nutrition. Provider to be notified and review as appropriate. → Proceed

— No → Medical/surgical history consistent with diarrhea? (IBD, terminal ileal resection, chemotherapy, short bowel, pancreatic insufficiency, etc)

— Yes ↓ Medical intervention as indicated

— No → Risk of stool impaction? (chronic constipation, absent BM ≥3 days, chronic narcotic use, persistent limited fluid intake, etc)

— Yes ↓ If impaction suspected, nursing staff to assess possibility for manual disimpaction and contact provider for disimpaction orders if necessary

— No → Receiving cathartic agents? (Mag citrate, mag hydroxide, enemas, polyethylene glycol, lactulose, liquid medications, etc)

— Yes ↓ Discontinue all known cathartics. Call pharmacist to change any liquid medication formulations to crushable tablets if possible. Call pharmacist to review medications to rule out other potential drug related cause of diarrhea.

— No → Rule out C. *difficile* associated diarrhea, bowel ischemia, other. If all investigations negative, consider adding fiber.

↓ splits into:

C. *difficile* (-) → Diarrhea Resolved? — No → See bowel management order set

C. *difficile* (-) ↓ Contact Dietitian regarding fiber

C. *difficile* (+) ↓ Contact Isolation per policy PC-111

Electronic Bowel Management Tab

Date of last BM
00/00/0000

Stool Type Form Scale
☐ Stool Type

7. Rule out C.difficile Associated Diarrhea (CDAD)

1. Is the patient post abdominal or bowel surgery?
☐ yes (stop questionnaire now)
☐ no (proceed to next question)

After >=3 mushy/watery stools (Type 6 or 7 on the Bristol Stool Chart) in 24 hr

send stool sample for C.diff testing unless the patient has recently received

laxatives and/or prokinetics or has another medical condition

2a. Constipation:Greater than 24 hrs since admission and no bowel movement?
☐ No, there is a BM documented (proceed to question 2b)
☐ Yes, there has not been a BM (order Bowel Management Protocol-constipation in CPOE)

causing diarrhea.

2b. Stool output >=3 mushy/watery BM or >750mL over 24 hours
☐ no- may stop questionnaire now
☐ yes-proceed to next question

8. C. difficile(+)
☐ yes – contact Isolation per policy PC-111
☐ no – contact dietitian for fiber assessment (proceed to next question)

3. Distended, tympanic, or painful abdomen?
☐ no (proceed to next question)
☐ yes (proceed to next question) - Hold enteral nutrition. Provider to be notified and review as appropriate.

9. Diarrhea still present?
☐ no- may stop questionnaire now
☐ yes - contact provider for further pharmacological treatment

4. Med/surg history consistent with diarrhea? (IBD, chemo, short bowel, etc)
☐ yes – medical intervention as needed (may stop questionnaire now)
☐ no (proceed to next question)

5. Risk of stool impaction? (chronic constipation, chronic narcotic use, etc)
☐ yes – if impaction suspected, nursing staff to assess possibility for manual disimpaction and contact provider for disimpaction orders if necessary (may stop questionnaire now)
☐ no (proceed to next question)

6.Receiving cathartic agents? (Mag citrate, mag hydroxide, enemas, Miralax, etc)
☐ yes - d/c all known cathartics.Call Pharm.D. to change liquid meds to crushable tablets if possible and to rule out other potential drug related causes of diarrhea. Order Bowel Management Protocol-diarrhea in CPOE
☐ no – proceed to next box

Bristol Stool Chart

Antibiotic Stewardship

Polling Question

Does your facility have a point person responsible for antibiotic stewardship outcomes?

- Yes
- No
- Unknown

Type in chat who is the identified leader role at your facility (some may be pharmacists, some may be physician, etc.)

Gap Analysis for Antibiotic Stewardship

SECTION 1. KNOWLEDGE AND COMPETENCY		YES	NO	N/A
Q1	Do direct care personnel*understand how to recognize changes in a resident that might indicate a new infection or other concerning condition?			
Q2	Do direct care personnel understand how to communicate information to medical personnel* when a resident has a change that might indicate a new infection or other concerning condition?			
Q3	Do nursing personnel* receive any periodic training or education about appropriate antibiotic use?			
Q4	Are medical personnel given any resources to help guide decisions about when to suspect a resident has an infection or needs an antibiotic?			
Q5	Do residents and family receive education about appropriate antibiotic use?			
SECTION 2. INFECTION PREVENTION POLICIES AND INFRASTRUCTURE		YES	NO	N/A
Q1	Do direct care personnel document changes in a resident that might indicate a new infection or other concerning condition?			
Q2	Do nursing personnel communicate information to medical personnel when a resident has a change that might indicate a new infection or other concerning condition?			
Q3	Does your nursing home have a pharmacist or physician who provides guidance or expertise on antibiotic use?			
Q4	Does your nursing home use standardized order forms for antibiotic prescriptions including documentation of indication and anticipated duration of therapy?			
SECTION 3. MONITORING PRACTICES		YES	NO	N/A
Q1	Does the pharmacy service provide a monthly report of antibiotic use (e.g., new orders, number of days of antibiotic treatment) for the nursing home?			
Q2	Does your nursing home have a process to perform a follow-up assessment 3 days after a new antibiotic start to determine whether the antibiotic is still indicated and appropriate?			
Q3	Does your nursing home provide feedback on antibiotic prescribing practices to medical personnel?			
Q4	Does the laboratory provide your nursing home with a report of antibiotic resistance in bacteria identified from cultures sent from your nursing home (e.g., antibiogram)?			

Appropriate Room Cleaning
and
Handwashing

Gap Analysis for Handwashing

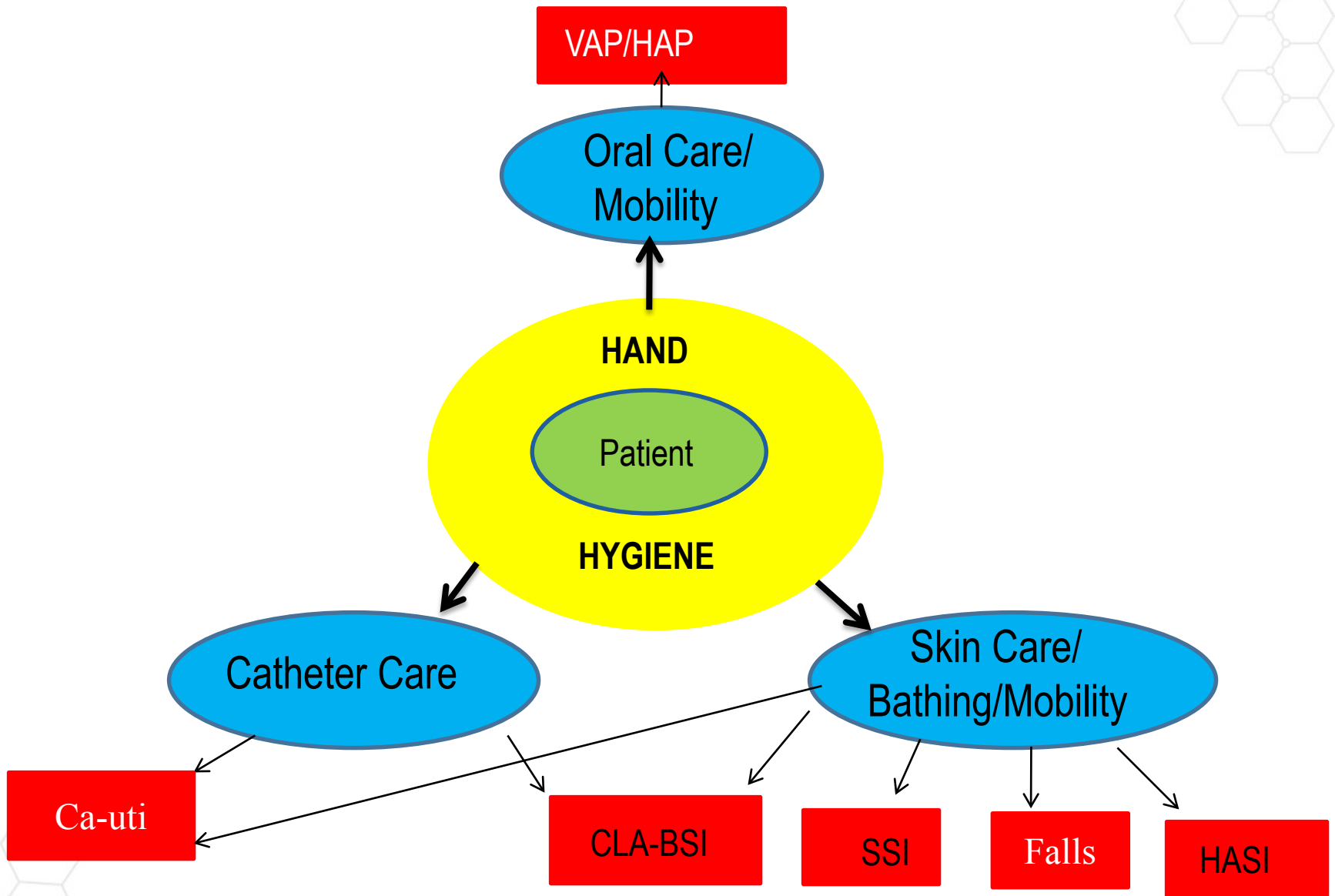| SECTION 1. KNOWLEDGE AND COMPETENCY				
		YES	NO	N/A
Q1	Does your facility have an annual hand hygiene training program for all healthcare personnel*?			
Q2	Can healthcare personnel describe situations when hand washing with soap and water is preferred over use of alcohol-based hand products?			
Q3	Does your nursing home assess healthcare personnel hand hygiene technique (i.e., they can do hand hygiene properly)?			
Q4	Does your nursing home assess healthcare personnel knowledge of indications for hand hygiene during resident care activities?			
Q5	Do residents and family members receive education about the importance of hand hygiene in prevention the spread of infections?			
SECTION 2. INFECTION PREVENTION POLICIES AND INFRASTRUCTURE				
		YES	NO	N/A
Q1	Does your nursing home have a written hand hygiene policy?			
Q2	Has your nursing home assessed the availability of hand hygiene products in all resident care areas*?			
Q3	Has your nursing home assessed healthcare personnel satisfaction with hand hygiene products available in all resident care areas?			
Q4	Does your nursing home utilize cues to action (e.g., posters, pamphlets, resident engagement) to enhance healthcare personnel and visitors awareness and performance of appropriate hand hygiene?			
SECTION 3. MONITORING PRACTICES				
		YES	NO	N/A
Q1	Does your nursing home monitor healthcare personnel adherence to hand hygiene at regular intervals?			
Q2	Does your nursing home have a process for providing feedback to healthcare personnel about hand hygiene performance?			

Why cant we just do the basics?

Handwashing is the #1 way of preventing infections

Your patients lives are in your hands so…

WASH THEM!!!!

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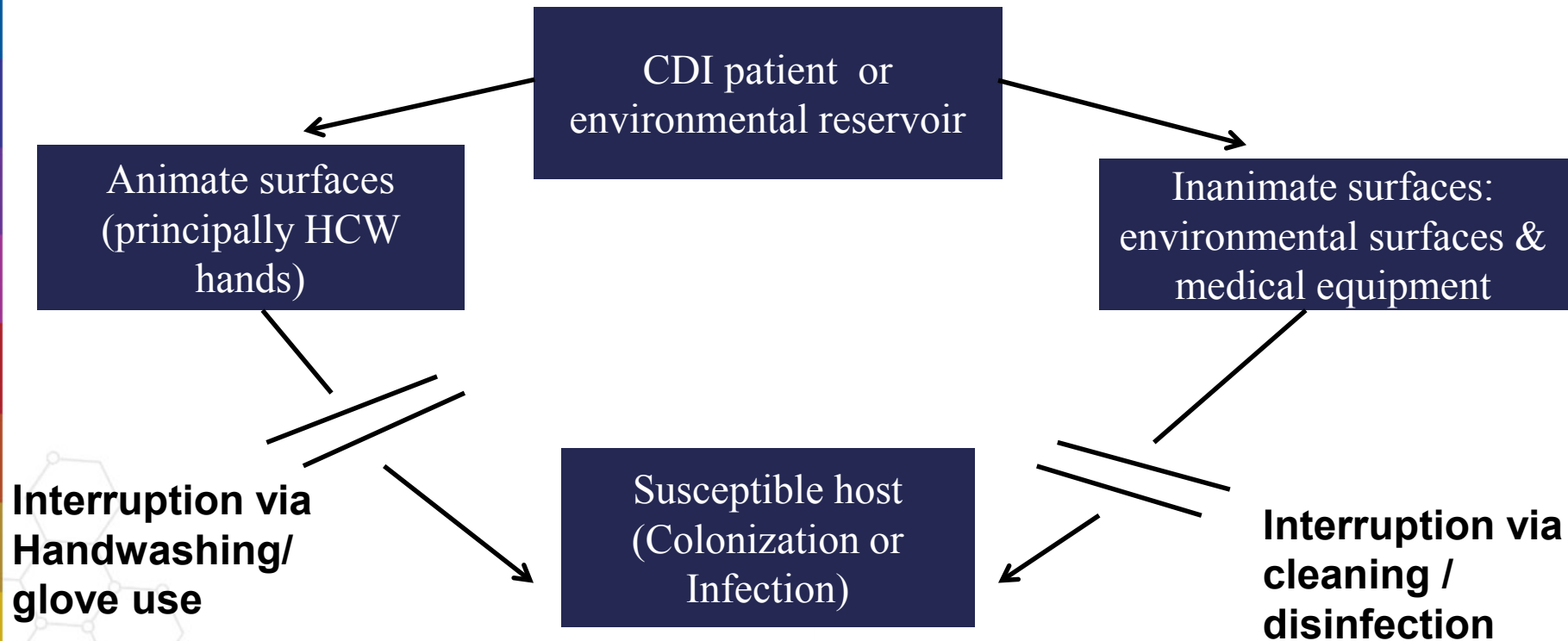Alliance for Powerful Change

Vollman KM. Intensive Crit Care Nurs, 2013;22(4): 152-154

C. difficile in the Environment

- **Survival of Spores**
  - Spores survive for up to 5 months
- **Transmission Mechanisms in the Environment**

CDI patient or environmental reservoir

Animate surfaces (principally HCW hands)

Inanimate surfaces: environmental surfaces & medical equipment

Susceptible host (Colonization or Infection)

Interruption via Handwashing/ glove use

Interruption via cleaning / disinfection

Diagram adapted from Rutala WA, In: "SHEA Practical Healthcare Epidemiology" 3rd ed, 2010

Polling Question

Does your facility systematically audit environmental cleaning of rooms?

- Yes
- No

Type into chat frequency and method of audit.

Education

- Make it fun!
- Make it catchy!

Bowel Management

CDC Reference Sheet

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:
  - Whenever possible, patients with *C. diff* will have a single room or share a room only with someone else who also has *C. diff*.
  - Healthcare providers will put on gloves and wear a gown over their clothing while taking care of patients with *C. diff*.
  - Visitors may also be asked to wear a gown and gloves.
  - When leaving the room, hospital providers and visitors remove their gown and gloves and clean their hands.
  - 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

No need to re-invent the wheel

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.
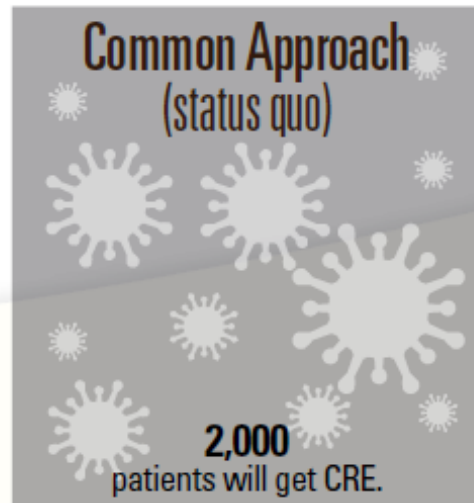
ACUTE CARE HOSPITAL

ALERT

NURSING HOME

ALERT

LONG-TERM ACUTE CARE FACILITY

ALERT

ALERT

PUBLIC HEALTH DEPARTMENT

ACUTE CARE HOSPITAL

NURSING HOME

ALERT

ALERT

CDC Vital Signs 2015

We MUST work together to save lives!

More patients get infections when facilities do not work together.
(Example: 5 years after CRE enters 10 facilities in an area sharing patients)

Common Approach (status quo)
2,000 patients will get CRE.
CRE will impact **12%** of patients.

Independent Efforts
1,500 patients will get CRE.
CRE will impact **8%** of patients.
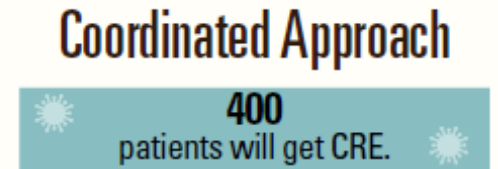
Coordinated Approach
400 patients will get CRE.
CRE will impact **2%** of patients.

SOURCE: CDC Vital Signs, August 2015.

CDC Vital Signs 2015

Questions?

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