Beth Ann Ayala, Jim Lewis, and Tom Patterson

Educating for Quality Improvement & Patient Safety

The Team

CSE participants

Tom Patterson, MD - Professor of Medicine Division Head and Chief, Infectious Diseases, UTHSCSA

Jim Lewis , PharmD - Manager of the Anti-Infective Program UHS

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UHS team

Aaron Owens, MD

Carol Mancinas

Lacey Bonkofsky and EVS

UHS Microbiology Laboratory

Elaine Jones and Mary Anne Peinemann &

UHS Nurse Educators

What We Are Trying to Accomplish?

Aim Statement: The project aims to decrease the incidence of healthcare acquired *Clostridium difficile* infection at University Hospital to zero **within the next 4 months.**

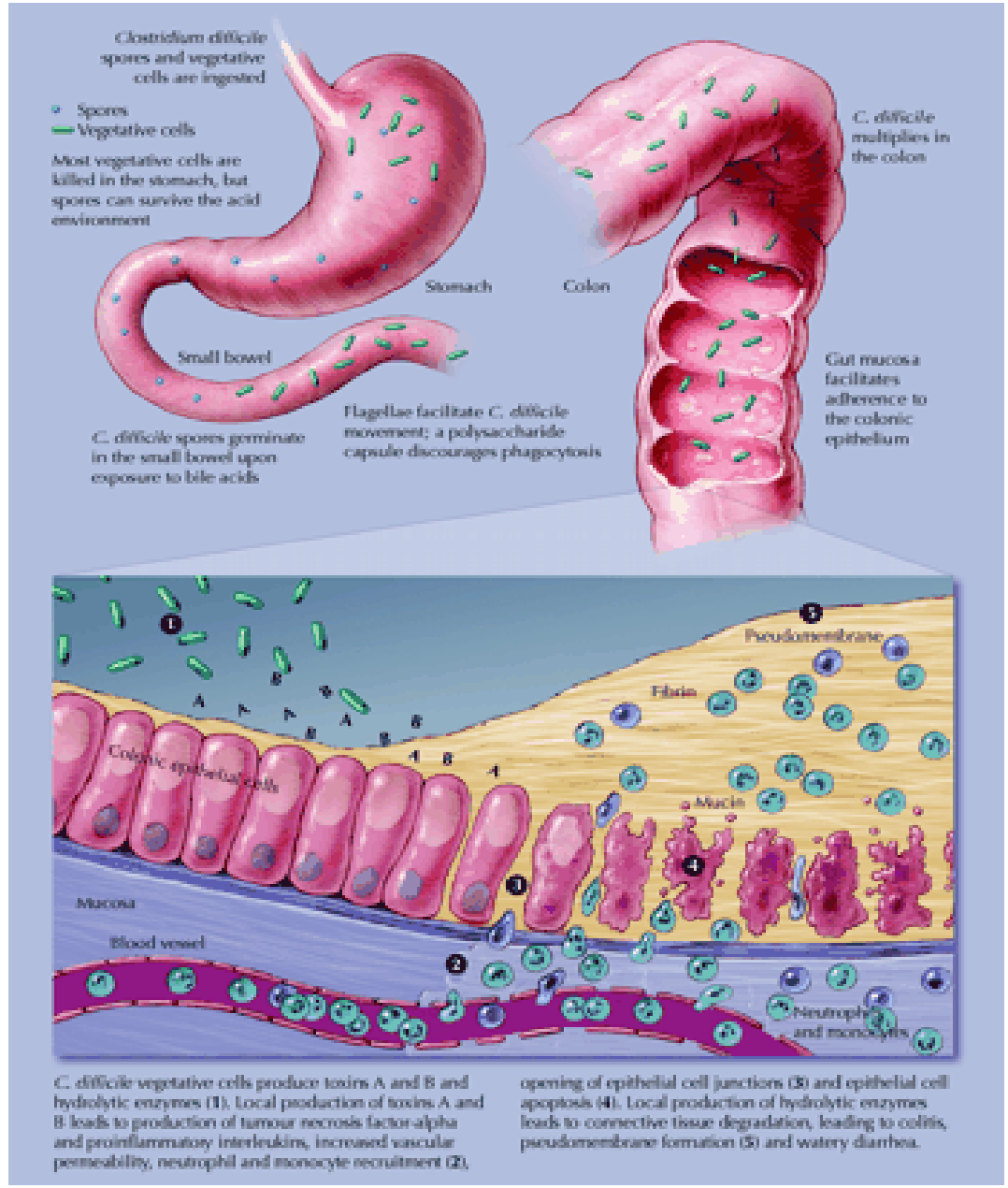
ZERO
IS POSSIBLE

Clostridium difficile: The Problem

- Major problem healthcare associated infection globally
- Emergence of hypervirulent epidemic strain
- Gastrointestinal pathogen
  - Severe, watery diarrhea
  - Major risk factor: multiple antibiotics
- Complications: dehydration, electrolyte imbalance, sepsis, bowel perforation, death
- Difficult to treat; relapses common

Pathogenesis & Epidemiology

- Patients become colonized in hospital
- Opportunistic bowel pathogen
- Antibiotic use associated with infection
- Toxin produced disease
- Spores resistant to killing by alcohol hand gel
- Contribution of environmental contamination to spread
- Healthcare associated transmission common



Clostridium difficile: The Problem

- Increased LOS
  - Average 4 days longer (up to 3 weeks)
- Estimated $1 billion/year in US
- Spore-forming organism
- Enhanced Contact Precautions
  - Gowns and gloves
  - Sink handwashing
    - instead of instant alcohol antisepsis
  - Special disinfection
    - 1:10 hypochlorite (bleach) solution

Factors Associated with Healthcare Associated Transmission

- Delayed diagnosis
  - Failure to suspect diagnosis
  - Diagnostic methods insensitive or not rapid:
    - Toxin A/B immunoassay (sensitivity 32-73%)
    - Cytotoxicity and toxigenic culture (more sensitive but slow)
    - Gluteralderhyde Dehydrogenase (GDH) enzyme (requires confirmation; variable sensitivity)
    - PCR (sensitive and rapid; acquisition costs)
- Inappropriate antibiotic use
- Lack of adequate *C. difficile* infection treatment
- Lapses in infection control (hand washing, contact precautions, environmental cleaning)

Previous Interventions

- Enhanced contact isolation precautions specific for *Clostridium difficile* re-enforced (January 2009)
  - Requires hand washing with soap and water
- Bleach cleaning in rooms with patients known to have *Clostridium difficile* (April 2009)
  - EVS access to Infection Control database
  - Bleach wipes
- PCR Toxin Assay (February 2010)
  - Increased assay sensitivity
  - Decreased turn around time

STOP

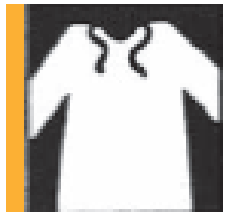
Contact Precautions Enhanced

ALTO

Visitors must go to nursing station before entering room

Wash hands with soap and water before entering and after leaving room

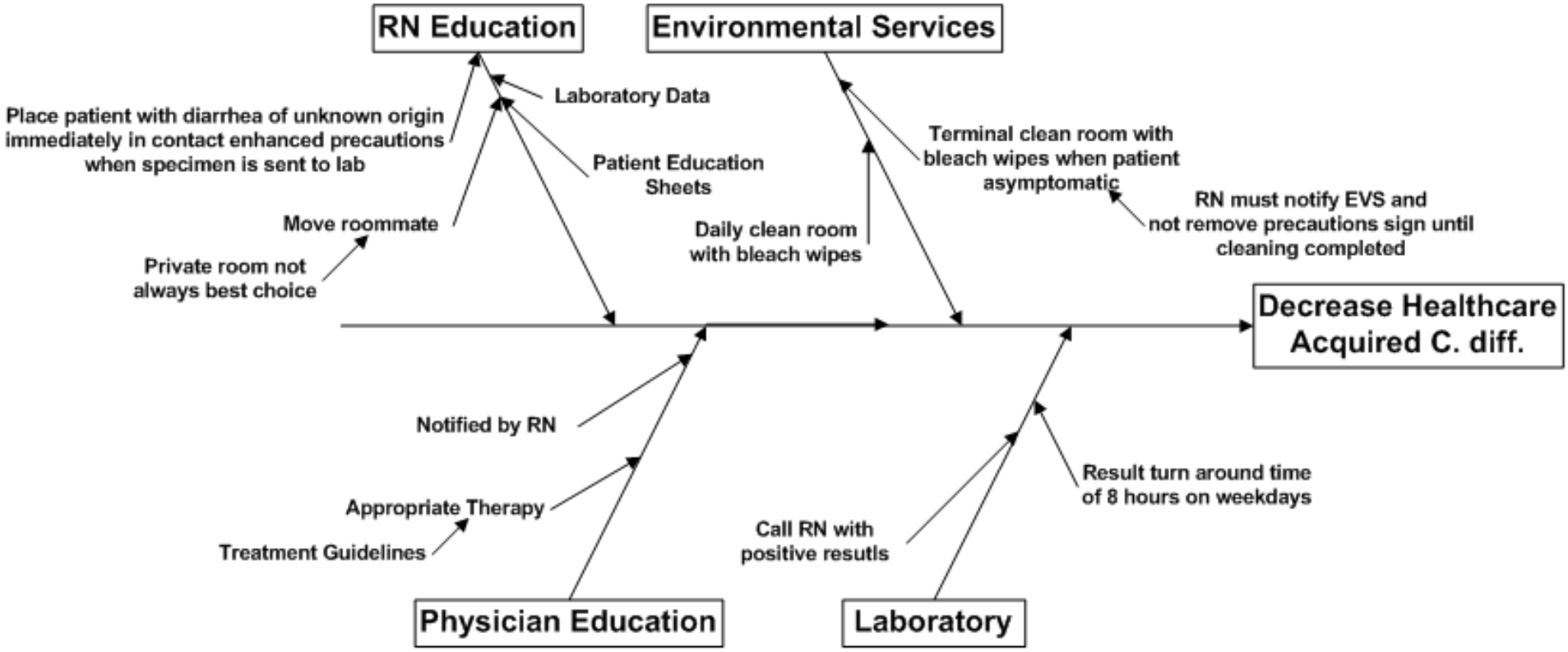
Wear gloves when entering room/cubicle



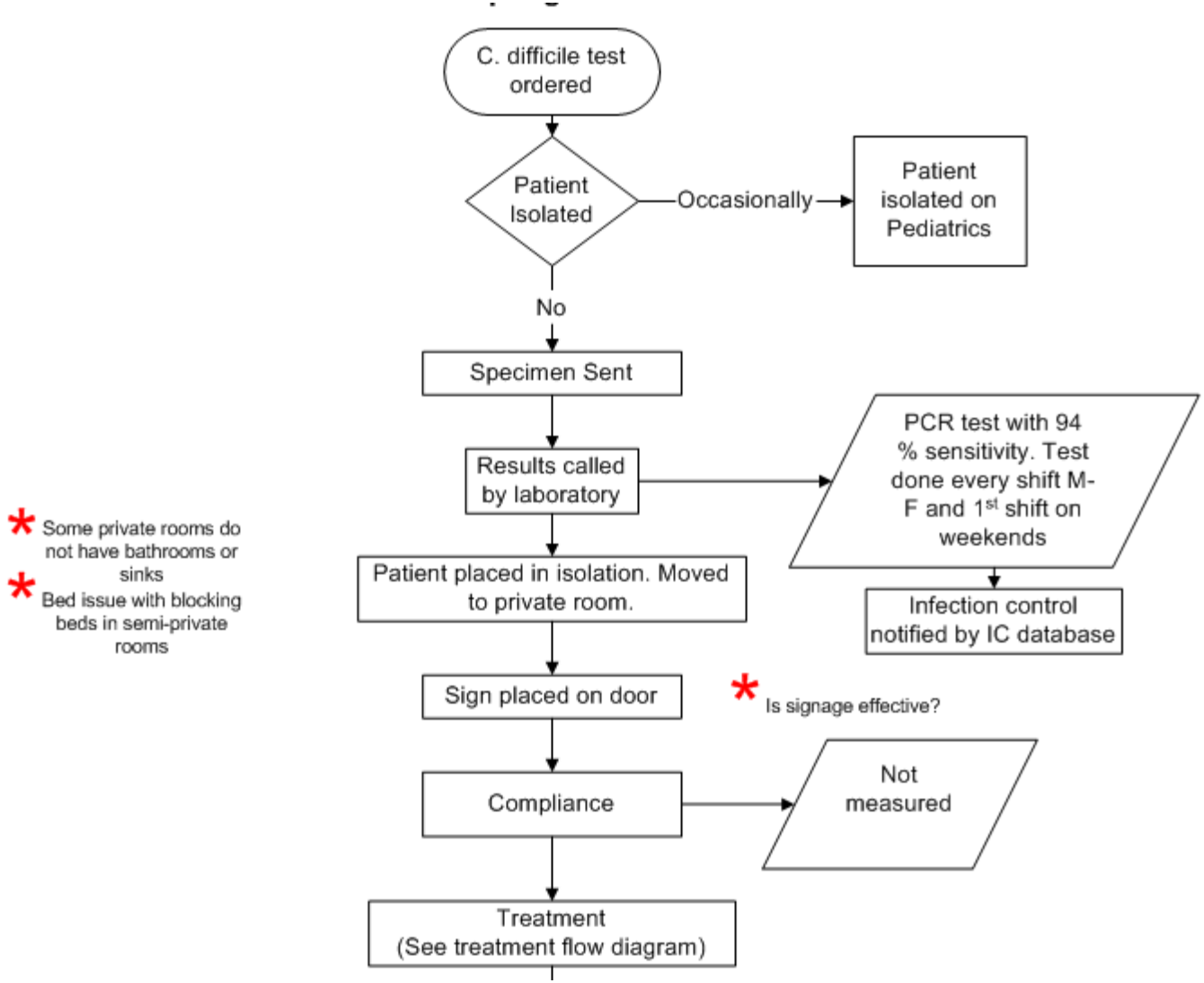
Wear gown when entering room/cubicle

Use patient-dedicated equipment or single-use, disposable equipment. Clean and disinfect all equipment before removing from environment.

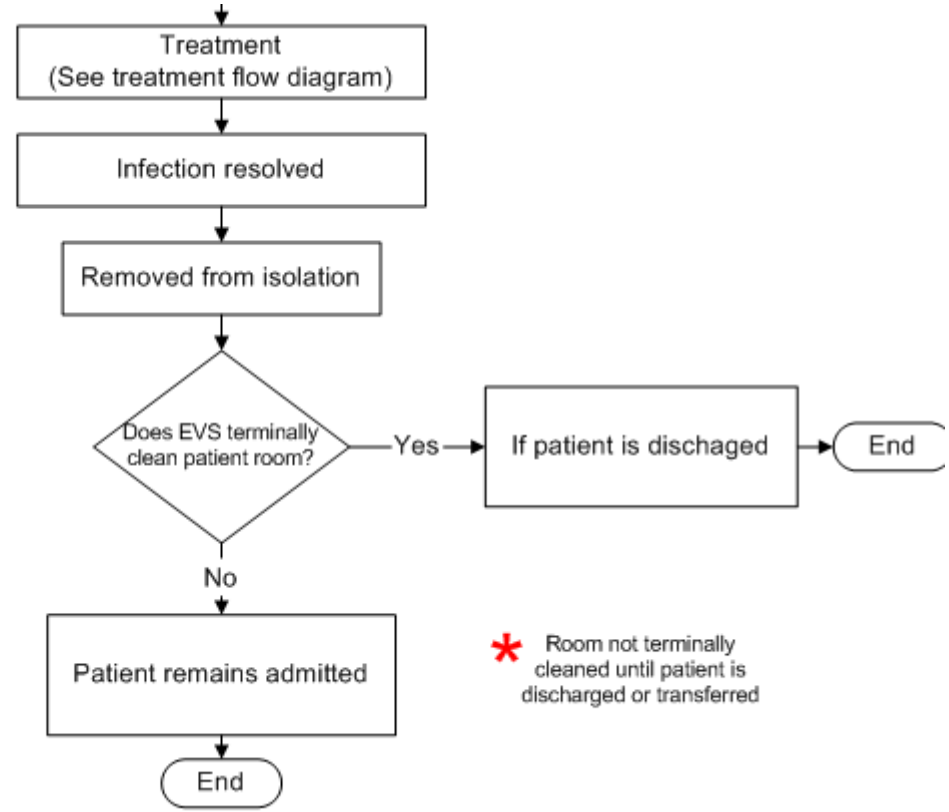
Cause and Effect



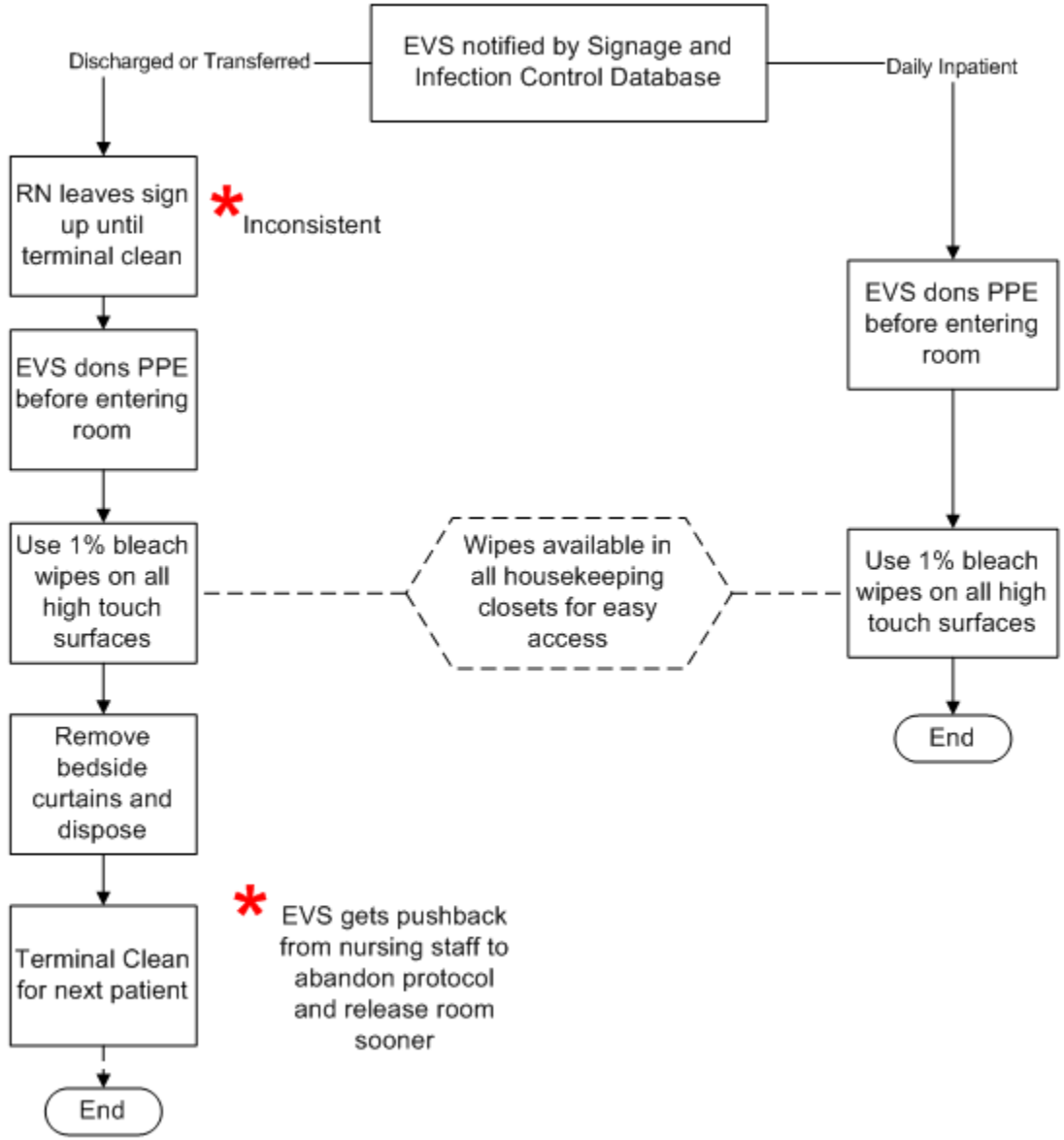
Isolation of *Clostridium difficile* infected patients



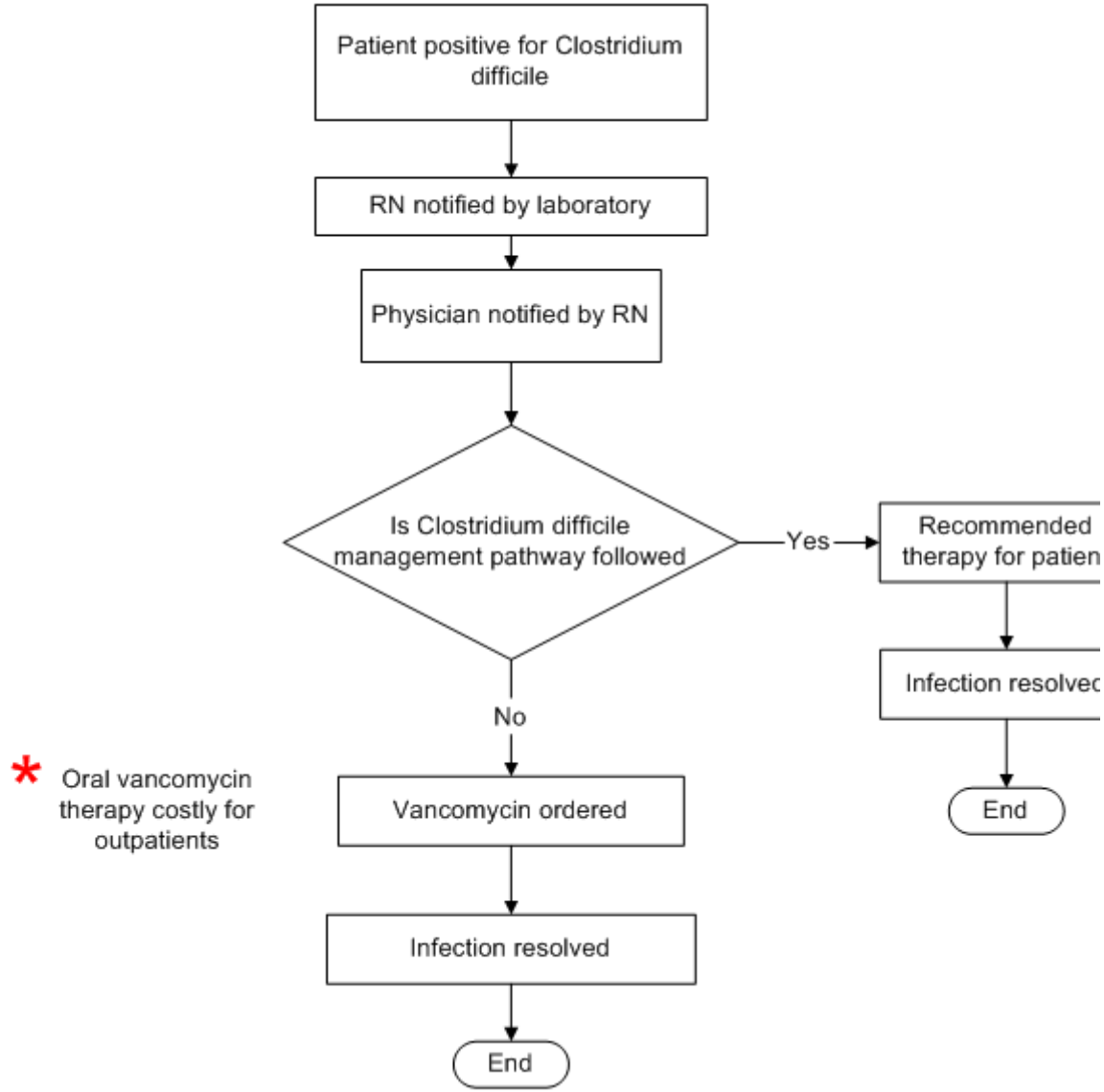
Isolation of *Clostridium difficile* infected patients Continued



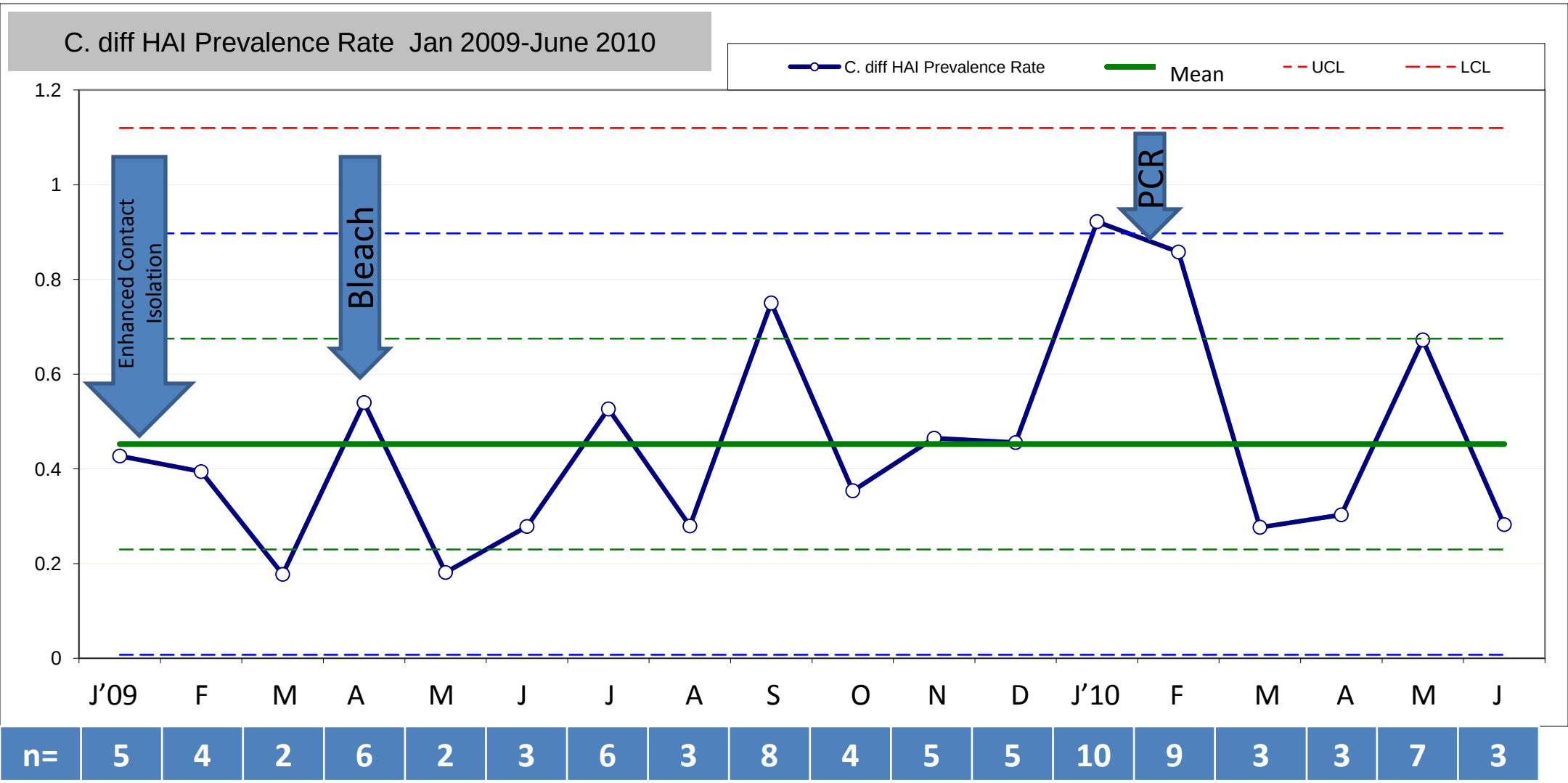
Environmental Services Flow Sheet



Treatment of *Clostridium difficile* infected patients



Pre-Intervention Data

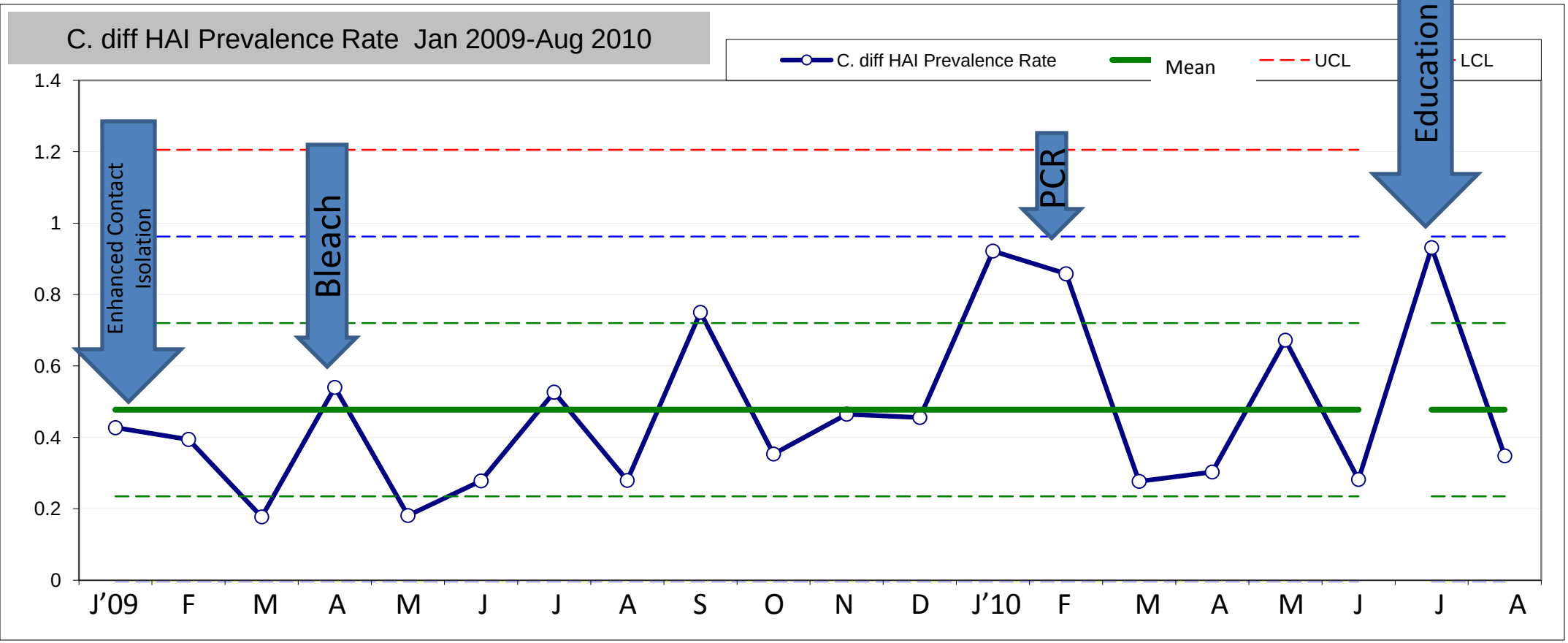


n=	5	4	2	6	2	3	6	3	8	4	5	5	10	9	3	3	7	3

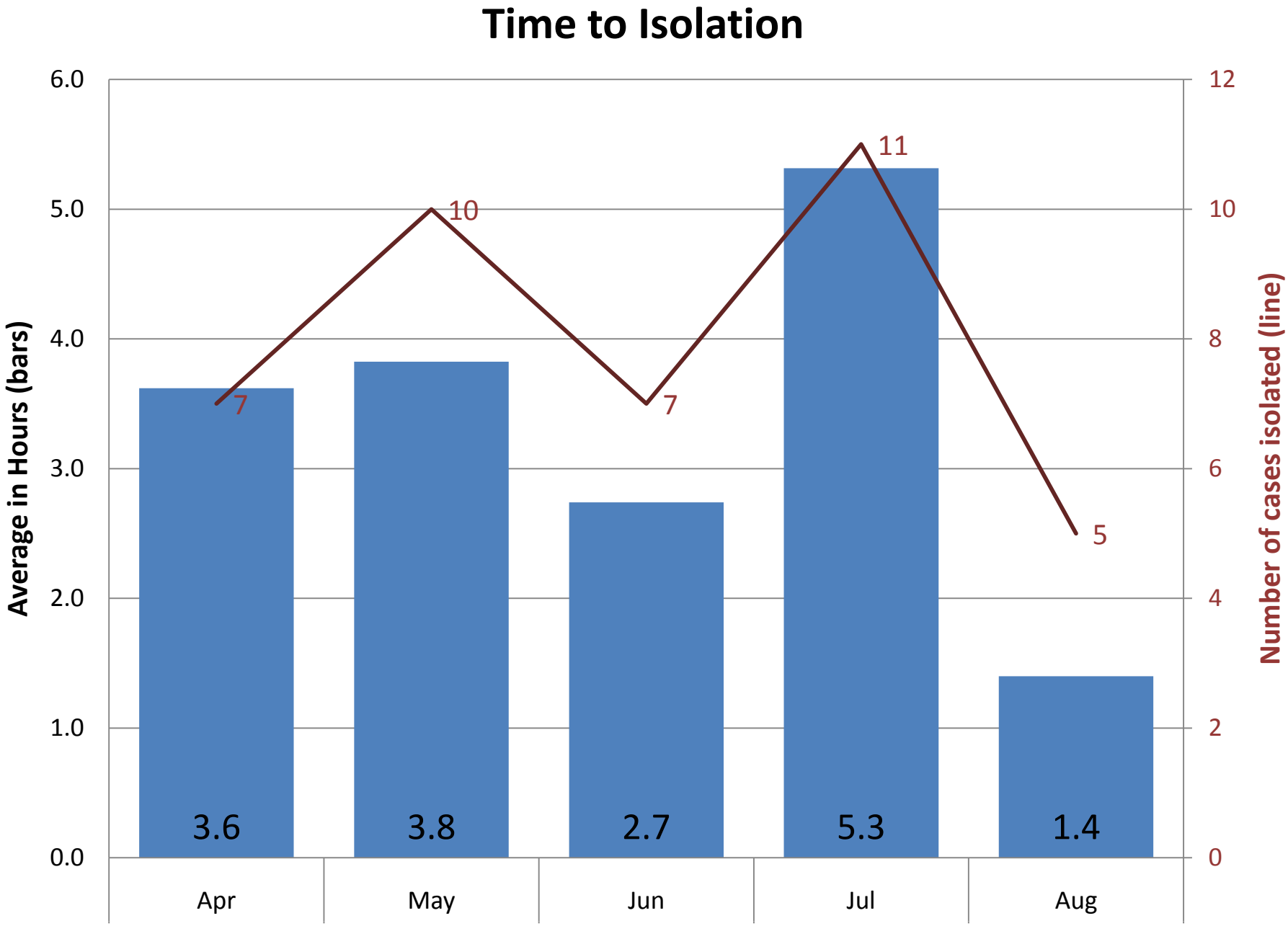
Interventions

- Time to isolation and compliance with isolation
- Education
  - Residents/Hospitalists (Dr. Owens)
  - Nurse Educators and Infection Control Coordinators
    - Focus on room assignment
    - Contact enhanced precautions immediately
    - Hand washing with soap
    - Treatment guideline available
    - Patient/family education
- Discontinuation of isolation *after terminal room cleaning*

Post-Intervention Data



n=	5	4	2	6	2	3	6	3	8	4	5	5	10	9	3	3	7	3	10	4


Time to Isolation
Average in Hours (bars)
Number of cases isolated (line)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
12
10
8
6
4
2
0
3.6
3.8
2.7
5.3
1.4
7
10
7
11
5
Apr
May
Jun
Jul
Aug

Clostridium difficile Positive Patients 6/1/10-8/31/10

- 14 Patients
- Mean number of antibiotics received prior to diagnosis = 2.9 (range 0-6)
  - Most common: Piperacillin/Tazo, IV vanco, Cefepime, Ceftriaxone, Meropenem
- Mean number of days in hospital before diagnosis = 10.7 (range 4-30)

Treatment

- Treatment (n=14)
  - Oral metronidazole – 6
  - Oral vancomycin
    - 250mg Q6h – 1
  - IV metronidazole + oral vancomycin – 4
  - Oral metronidazole + oral vancomycin – 1
  - Started metronidazole then changed to oral vanco – 1
  - No therapy started at UHS - 1

Challenges Related to Intervention

- Limitations of building
  - Four bed rooms
  - Rooms without sinks
- Isolation compliance
  - Ongoing efforts for data collection
- Terminal clean
  - Education of EVS
  - Education of nursing staff
  - Education of physicians
  - Education of pharmacists and other personnel

Next Steps

- EVS database for process and work flow tracking. Will allow monitoring of terminal cleaning compliance.
- Observation of Enhanced Contact Precautions compliance
- Site specific education to both pediatric and observation unit staff.
- Update and teaching of treatment guidelines

Conclusion: Zero is Possible!

- Healthcare associated *C. difficile* infection remains a significant challenge
- Multiple interventions directed at reducing healthcare acquired infection
  - Enhanced contact precaution isolation
  - Education
  - Terminal clean
- Zero is possible!!!!

ZERO
IS POSSIBLE

Thank you!

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Educating for Quality Improvement & Patient Safety