ANTIMICROBIAL STEWARDSHIP IN SEPSIS CARE

OHA Statewide Sepsis Initiative

April 19, 2017

OHA QUALITY PROGRAMS TEAM

Collaborating for a Healthy Ohio

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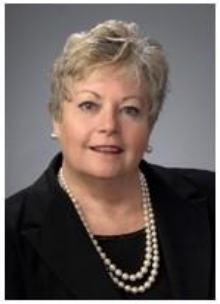


Ellen Hughes

Ryan Everett

Carol Jacobson

Rhonda Major-Mack

Paul Hicks

Dorothy Aldridge

REGIONAL OUTREACH

- Interactive programming presented by James O’Brien, MD, MS – Chair, Sepsis Alliance Board of Directors

- 2.0 AMA PRA Category 1 credits

REGIONAL SESSIONS

"Sepsis: A Medical Emergency"

Targeting providers in the regions of Ohio

- SE: Feb.14, 10 am-noon at Union Hospital, Dover
- NE: March 9, 2:30pm-4:30pm at Summa Health, Akron
- NW: March 23, 10:30am-12:30pm at Hilton Garden Inn, Perrysburg
- **Central: April 24, 7:30am-9:30am at Mount Carmel East Siegel Center, Columbus**

SEPSIS: A MEDICAL EMERGENCY

2 Options for Attendance:

- Link to attend ***by webcast***: zoom.us/webinar/register/9be7912a11fb9acac5b9141539e44ee6%20

- Link to attend ***in person***: www.eventbrite.com/e/sepsis-a-medical-emergency-tickets-32412523731?aff=erelpanelorg

SAVE THE DATE

10th Annual OHA Quality Summit

Wednesday – June 14, 2017

Hilton at Easton, Columbus, Ohio

Topics:

- Antimicrobial Stewardship
- Iatrogenic Delirium
- Sepsis

Poster Presentations are encouraged

10TH ANNUAL OHA QUALITY SUMMIT

- No cost to attend
- Lunch provided
- Registration is required

Registration open now at:

ohiohospitals.org/annual-meeting

REMINDER

- Monthly submission of process measure data

The Integration of Infection Control and Antimicrobial Stewardship with Sepsis Initiatives

Cindy Hou, DO, MBA, FACOI
Marianne Kraemer, RN, MPA, ED.M, CCRN

Kennedy Health - New Jersey

April 19, 2017

KENNEDY HEALTH

About Kennedy Health

Fast Facts

- 2016 revenue: $610.7 million
- 4,800+ associates in all hospitals and subsidiaries
- More than 1,000 physicians

Total # Licensed Beds: 607

- 196 - Kennedy-Cherry Hill
- 181 - Kennedy-Stratford
- 230 – Kennedy - Washington Township

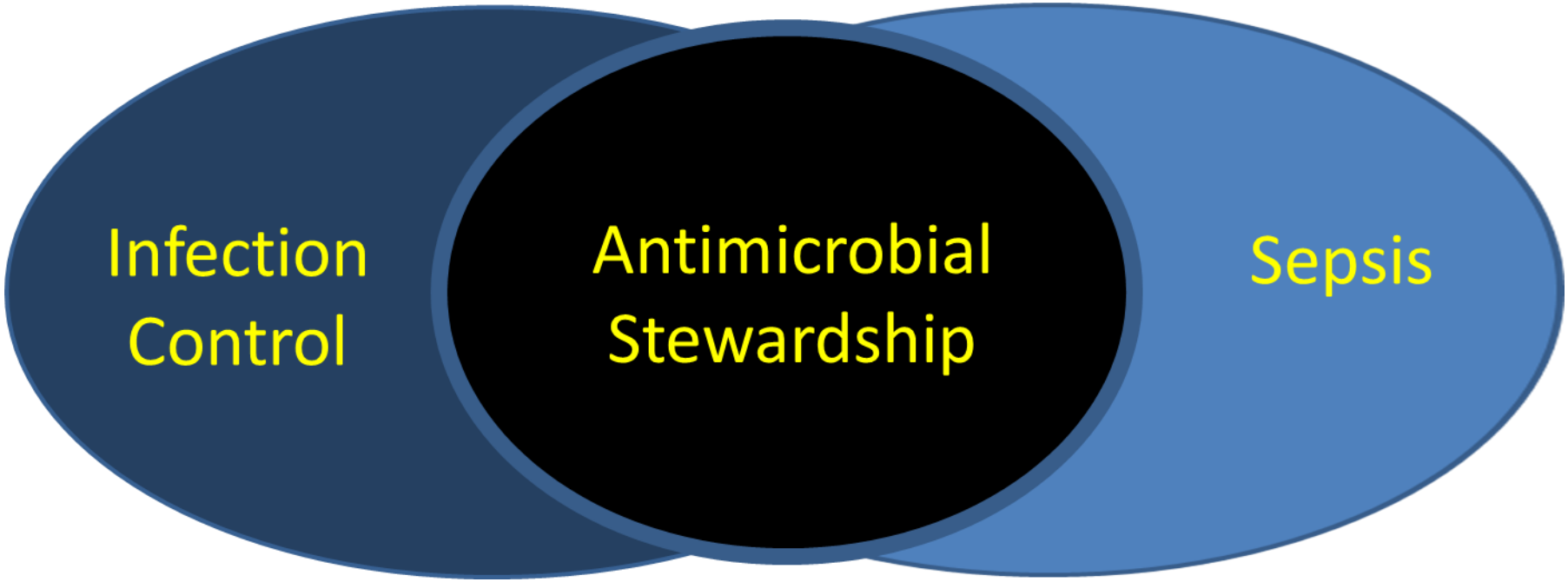
KENNEDY HEALTH

KENNEDY HEALTH

Learning Objectives

- Define Sepsis and Antimicrobial Stewardship
- Understand how infection prevention can help prevent cases of sepsis
- Review of cultures can help to combat sepsis

The Kennedy Health Integrated Model of Stewardship



Define Sepsis
and
Antimicrobial Stewardship

Sepsis Defined

Understanding Sepsis

What is Sepsis?

Sepsis is a toxic response to an infection. Every year, severe sepsis strikes more than a million Americans. According to the Centers for Disease Control (CDC), up to 50 percent of these people die — far more than the number of U.S. deaths from prostate cancer, breast cancer and AIDS combined. Sepsis occurs when the body is fighting an infection, like pneumonia or a urinary tract infection (UTI). Sepsis is a medical emergency that requires early detection and treatment.

What are Some Signs and Symptoms of Sepsis?

- a fast heart rate
- fever
- breathing too quickly
- low blood pressure
- too little urine
- mental confusion

Treating Sepsis

How Is Sepsis Treated?

With antibiotics. Patients are also often given IV fluids.

How can Sepsis be Prevented?

- If you have an infection and generally don't feel well, see your primary healthcare provider.
- Ask people to wash their hands to prevent the spread of germs.
- Get your flu shot!
- If you have certain medical conditions, or are elderly, ask your doctor or nurse if you should get a pneumonia vaccine.

How Can I Get More Information?

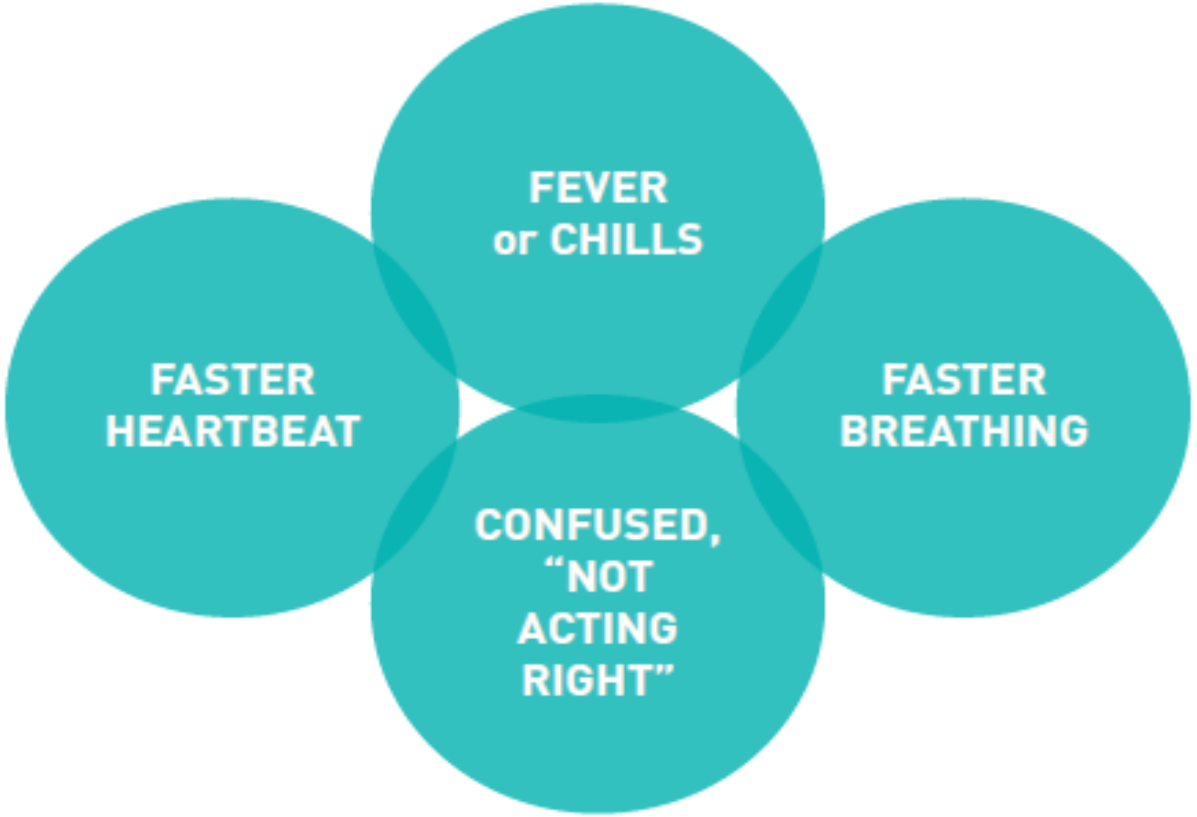
Visit the Centers for Disease Control & Prevention (CDC) website: http://www.cdc.gov/sepsis/.

Be a Lifesaver: Know the Symptoms of Sepsis

KENNEDY HEALTH

Speak Up! Let's Beat **Sepsis** Together.

Tell your nurse if you or a loved one experience these symptoms:



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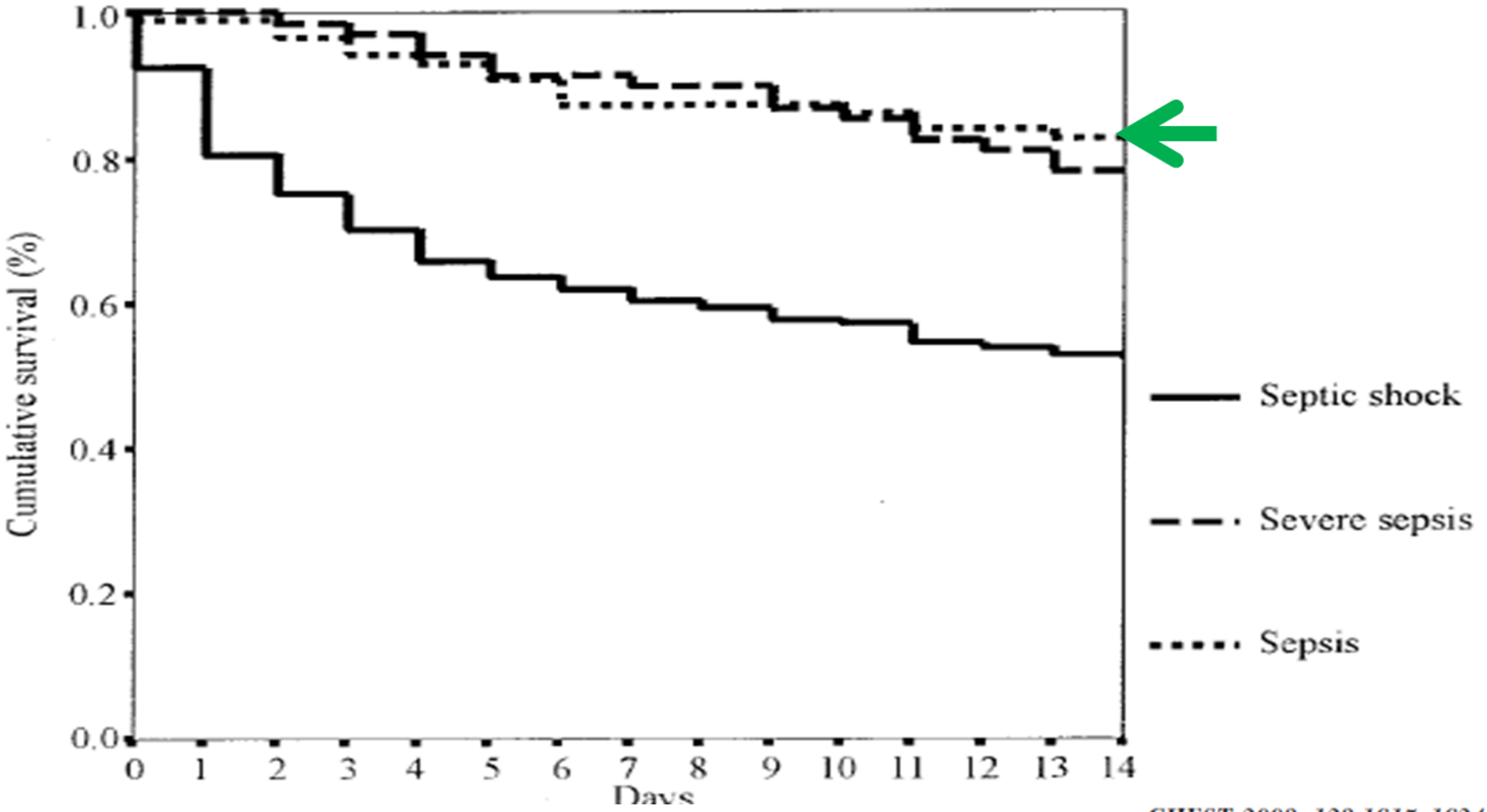
Sepsis and Survival



CHEST 2003; 123:1615–1624

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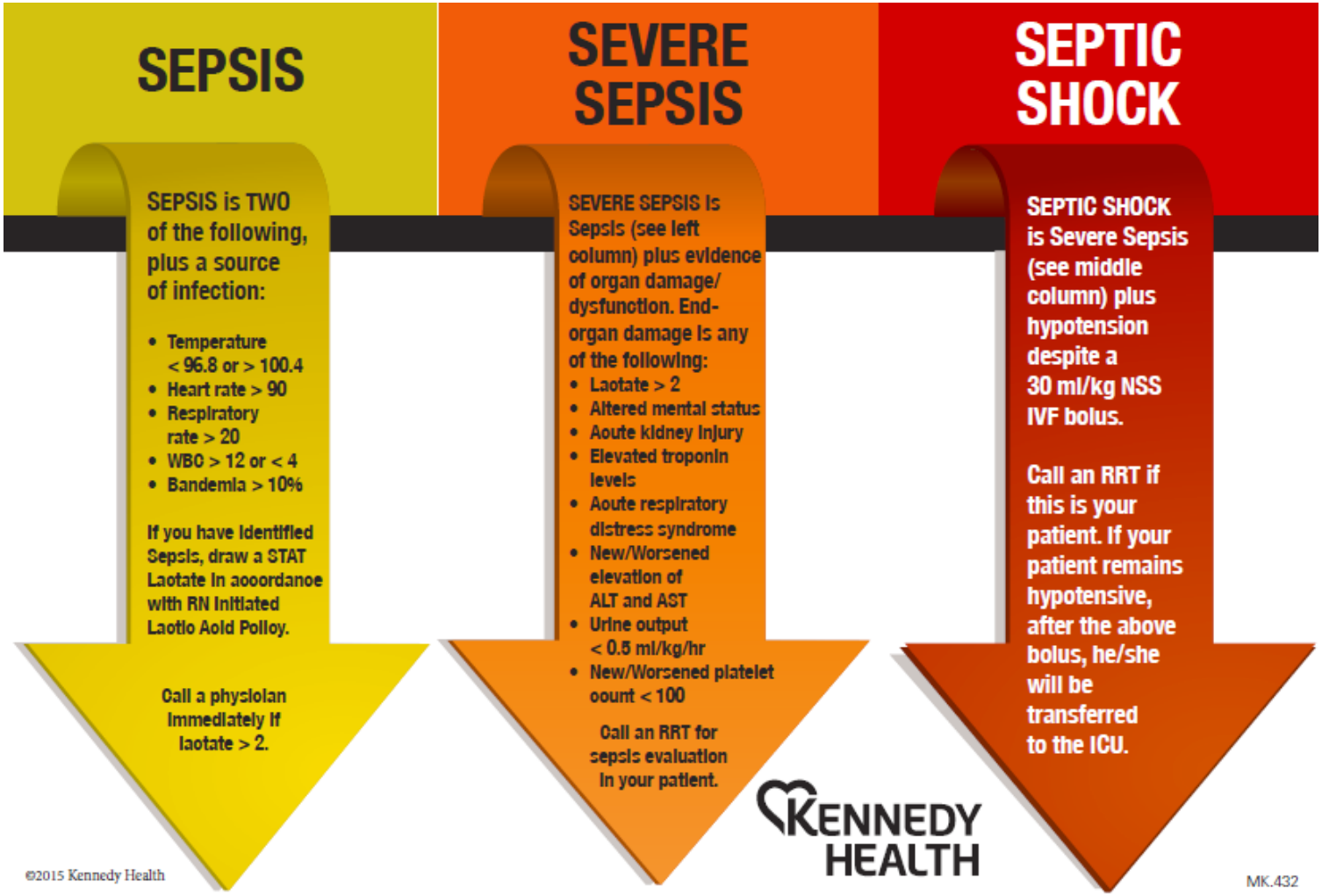
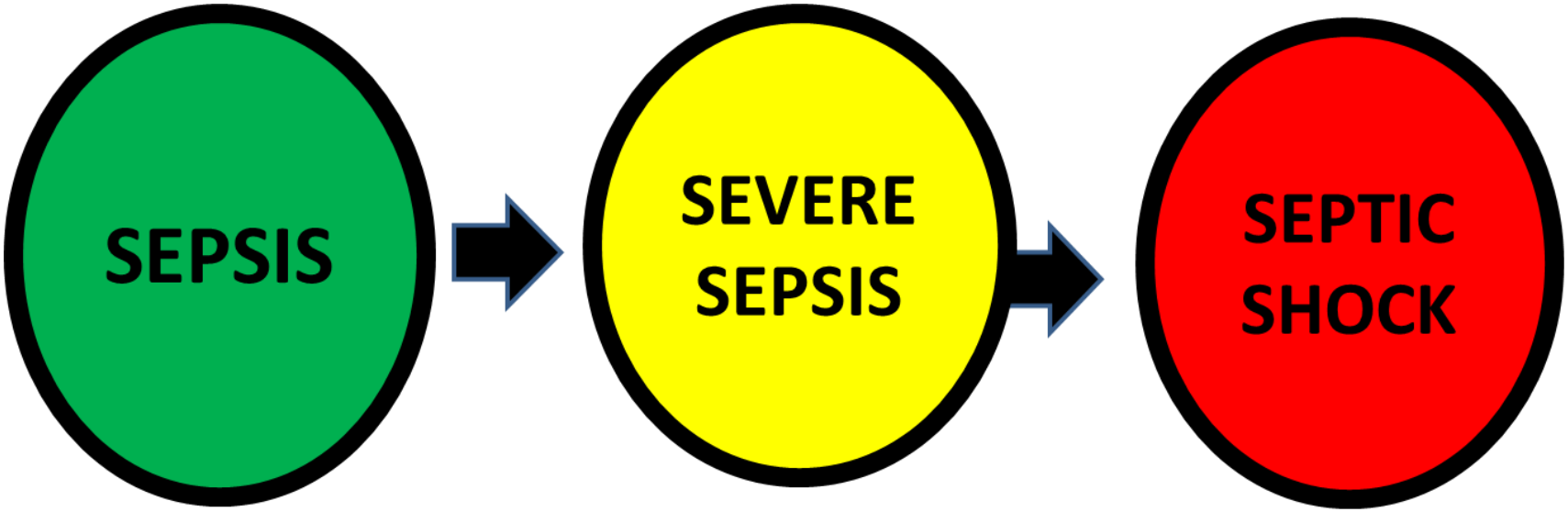
Sepsis: Putting It All Together



Sepsis Cascade

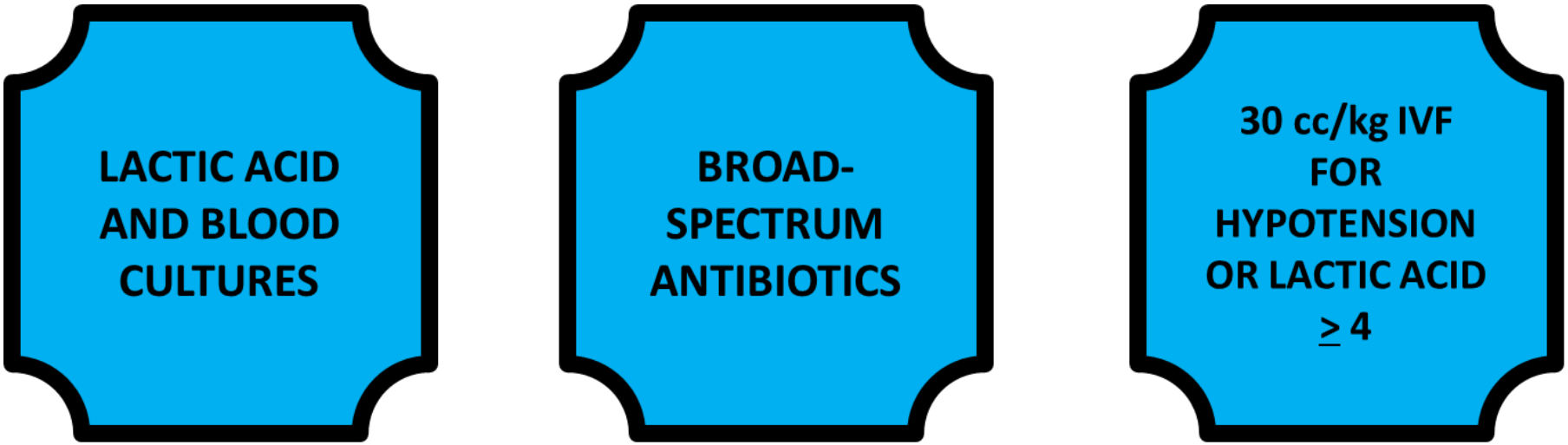


SIRS CRITERIA WITH INFECTION

SEPSIS AND ORGAN DYSFUNCTION
LACTIC ACID ≥ 2

SEVERE SEPSIS WITH BP REFRACTORY TO 30 cc/kg, PRESSOR(S)
LACTIC ACID ≥ 4

3-Hour Bundle to Beat Sepsis



Blood cultures BEFORE antibiotics!

Antibiotic(s) tailored to the specific patient and the possible bacteria

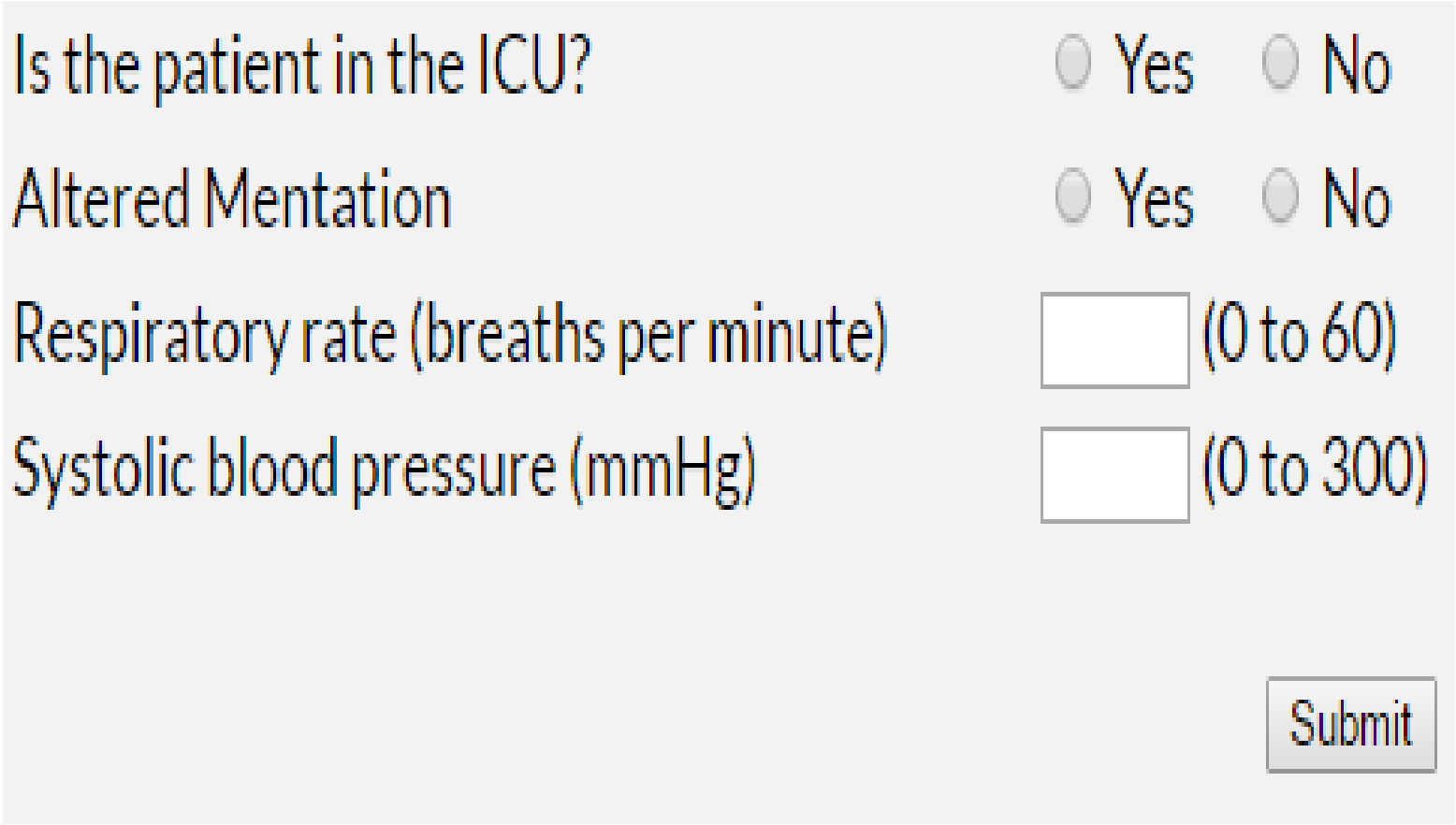
Exact amount must be reached for 30 cc/kg bolus

qSOFA Score

- Quick Sepsis Organ Failure Assessment Score – when suspect infection, predict who is at risk for mortality. Higher the score = greater risk.
- Score = 0 to 3.
- 1 point for low blood pressure (SBP≤100 mmHg), high respiratory rate (≥22 breaths per min), or altered mentation (Glasgow coma scale<15).
- qSOFA reference site: www.qsofa.org

qSOFA Calculator

qSofa Calcuator: http://qsofa.org/calc.php



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Sepsis-3

- Prior sepsis definitions in 1991, 2001 -> Sepsis-3 (2015).
- 2015 Definition of sepsis as “life-threatening organ dysfunction caused by a dysregulated host response to infection.”
- 2015 Clinical Criteria for sepsis: Suspected or proven infection and organ dysfunction (an increase in SOFA score of ≥2 points).

JAMA. 2016;315(8):801-810. doi:10.1001/jama.2016.0287

Sepsis-3: Sepsis and Septic Shock

- 2015: No more mention of severe sepsis.
- 2015 Definition of septic shock as "a subset of sepsis in which underlying circulatory and cellular/metabolic abnormalities are profound enough to substantially increase mortality."
- 2015 Clinical Criteria for septic shock: sepsis + vasopressor for MAP $\geq$ 65 and lactic acid > 2, even with adequate IVF.

JAMA. 2016;315(8):801-810. doi:10.1001/jama.2016.0287

Antibiotic Stewardship, Defined

Infectious Diseases Society of America (IDSA):

- "…coordinated interventions designed to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy, and route of administration."
- *Antibiotic dose, duration, and route for a specific indication.*

Clinical Infectious Diseases® 2016;62(10):e51–e77

Antibiotic Stewardship: Goals

- **IDSA:**
  - "Antimicrobial stewards seek to achieve optimal clinical outcomes related to antimicrobial use, minimize toxicity and other adverse events, reduce the costs of health care for infections, and limit the selection for antimicrobial resistant strains."
  - Reduction in *Clostridium difficile* infection (CDI).

Clinical Infectious Diseases® 2016;62(10):e51–e77

Antimicrobial Stewardship:
Admission Through Discharge

AT ADMISSION

- Source of the infection
- Labs, cultures & studies
- Review old cultures
- Clarify antibiotic allergies
- Age/Cr/seizures/QTC
- Antimicrobial selection based on most likely source/pathogen(s)

HOSPITAL COURSE

- **Antibiotic Time-Out:** Antimicrobial necessity
  - If NO infection, STOP
- De-escalate antimicrobials to most narrow spectrum based on culture results, if available
- Antimicrobial dose, duration, and stop date based on site of infection

AT DISCHARGE

- **Medication Reconciliation**
  - Assess necessity for antimicrobials, narrow spectrum, dose, duration, and stop date
- If antimicrobials are no longer needed, **STOP**
- Counsel patient on taking antimicrobials as prescribed

Kennedy Health, CDiff Task Force, 2015

KENNEDY UNIVERSITY HOSPITAL

The Right Antibiotic Makes a Difference!

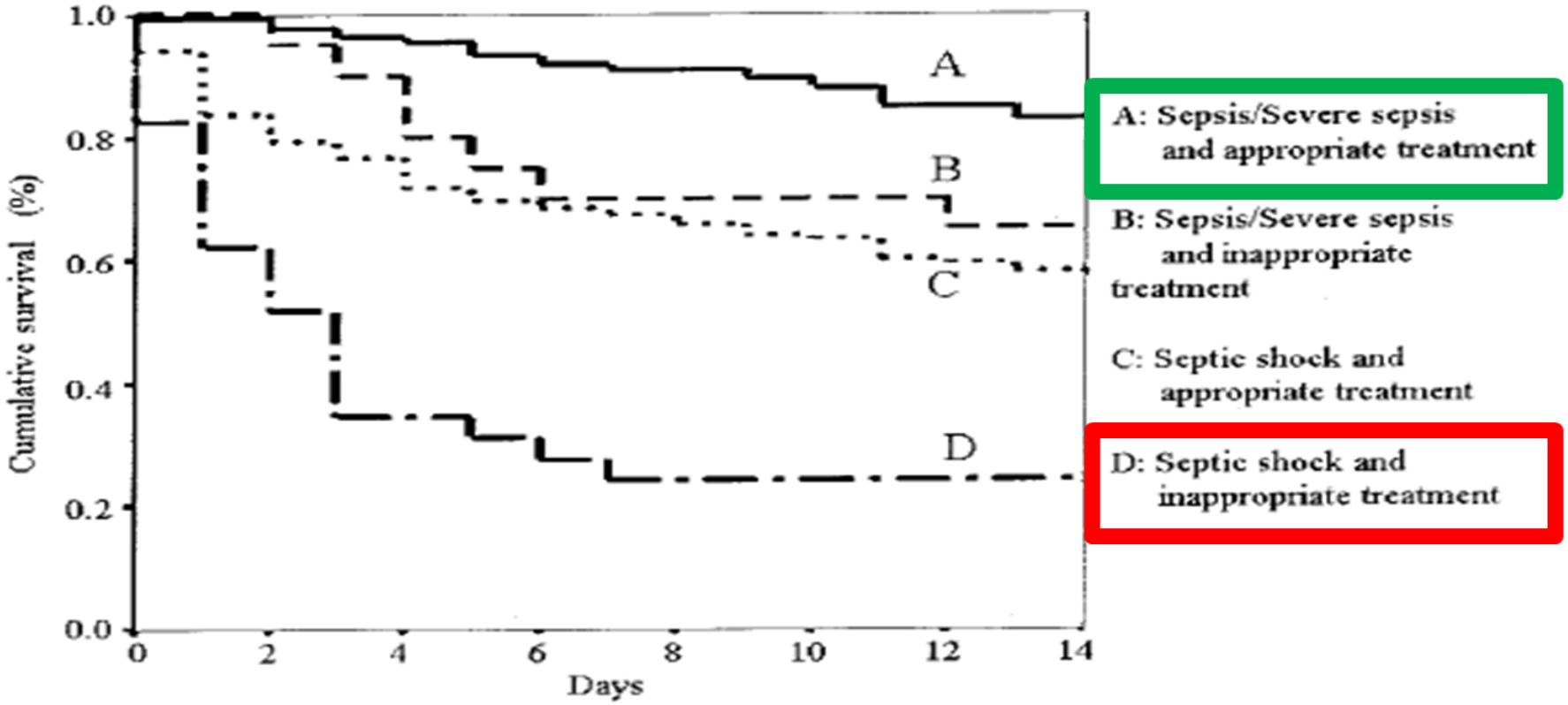

FIGURE 2. Survival rate according to the presence of shock and empiric antibiotic treatment (log-rank test, $p < 0.001$).

CHEST 2003; 123:1615–1624

KENNEDY HEALTH

Understand How Infection Prevention Can Help Prevent Cases Of Sepsis

The Relationship of Infection Prevention to Sepsis and Antimicrobial Stewardship

- To reduce the chances of employing broad-spectrum antibiotics for sepsis, prevent infections from occurring in the first place.

- To reduce the chances of acquiring multi-drug resistant pathogens, which makes treatment of sepsis more challenging, emphasize infection control measures.

For example: How to Prevent Multi-Drug Resistant CRE

- CRE – Carbapenem-Resistant Enterobacteriaceae
- Hand Hygiene
- Contact precautions if infected/colonized with CRE
- Minimize use of devices (ventilator, central line)
- Antimicrobial Stewardship
- Environmental cleaning

www.cdc.gov/hai/pdfs/cre/CRE-guidance-508.pdf

Educate Patients (and their Families) About Infection Prevention, Antibiotic Stewardship & More

- The informed patient is more likely to be compliant with therapy, and can be a “co-pilot” in preventing infection and in understanding when antibiotics are needed - and when they are not.

- The informed family member can also learn how to prevent infection.

Staff Reminders

Patients Can Acquire Device-Related Infections and Get Septic From This.

Any device foreign to the human body is a risk factor for infection, but the risk for infection can be decreased with attention to infection prevention at insertion, maintenance, and removal when no longer necessary.

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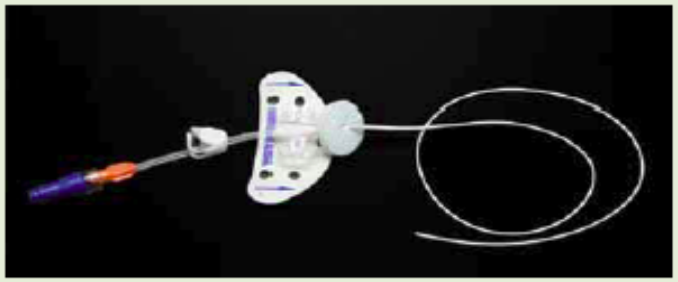
Life Cycle Approach

CLABSI Prevention:

Preventing Infections throughout the Life Cycle of a Central or PICC Line



Before Insertion:
Evaluate Peripheral IV options, IV to PO meds, and line necessity

Line Insertion Bundle:
Perform Hand Hygiene, Time-Out, Upper Site Preferred, Chlorhexidine Prep, Maximal Barrier Precautions, US Guidance

Maintenance Bundle:
Execute Hand Hygiene, Hub Care, Site Care, Tubing Care, # Line Days and Line Site

Line Removal:
Ask daily if line is absolutely necessary. Remove central lines before leaving ICU!

THE KENNEDY CLABSI TASK FORCE, 2013

KENNEDY HEALTH SYSTEM

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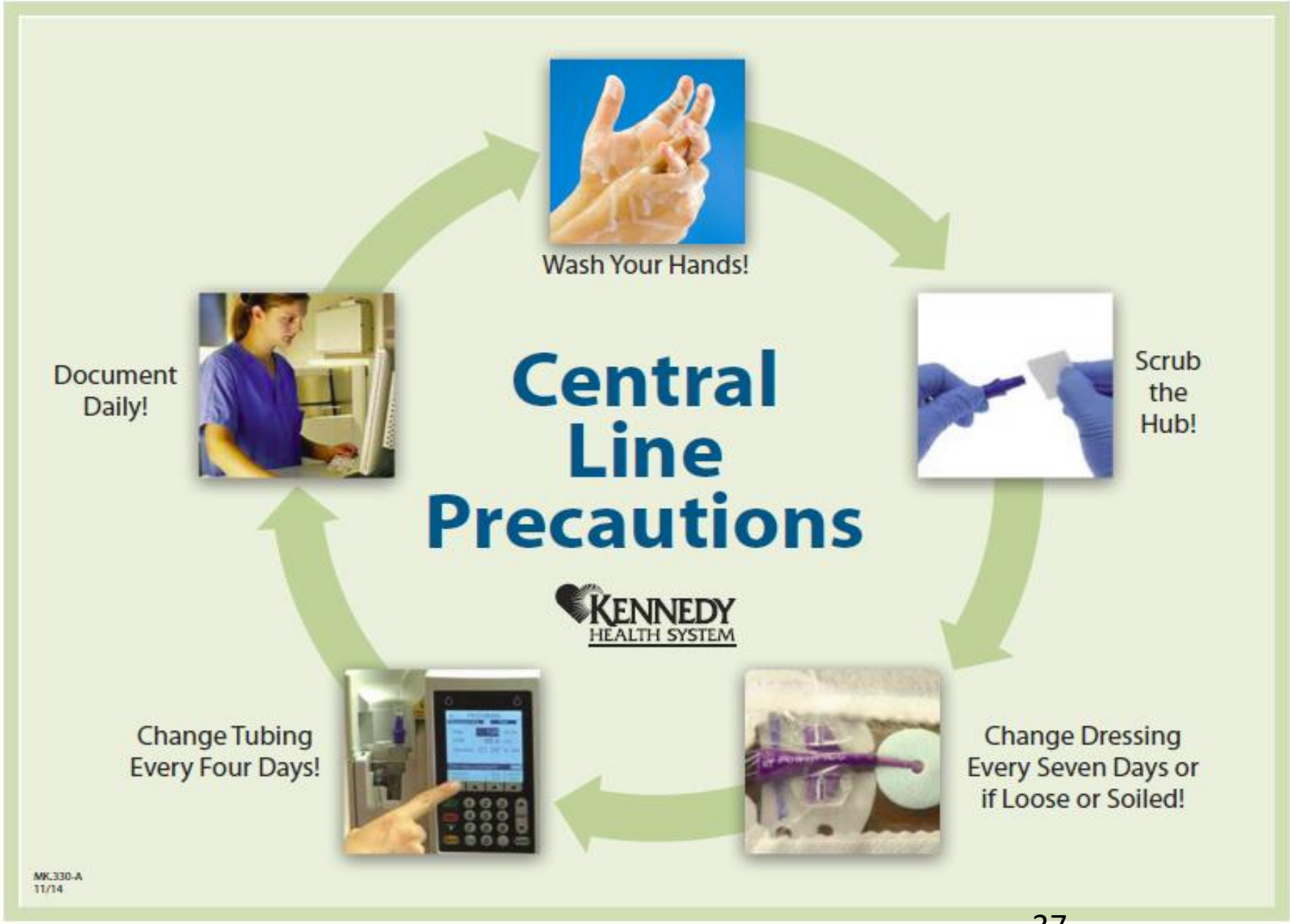
Five Precautionary Steps



Focus on Hand Hygiene

Prevent Catheter-Associated Urinary Tract Infections (CAUTIs)

HAND HYGIENE

INSERTION
- Indicators for Foley
- Peri-Care prior to insertion
- Each insertion attempt requires new kit
- Alternatives:
  - Straight catheter
  - Urinal
  - Texas catheter

MAINTENANCE
- Red seal intact
- Peri-care
- Keep bag below the bladder & above floor
- Empty bag before transport
- Stat lock present
- Proper technique if hand irrigation needed (U-1 Policy)

REMOVAL
- Reassess daily if Foley is needed
- Assess for constipation, a risk factor for urinary retention
- Reassess if catheter is chronic

RE-INSERTION
- Reassess indicators for Foley
- Bladder scan and straight catheter x 2
- Check U1 (Foley) Policy for reinsertion

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Kennedy CLABSI and CAUTI Task Force

CDiff Colonization vs. *CDiff* Infection

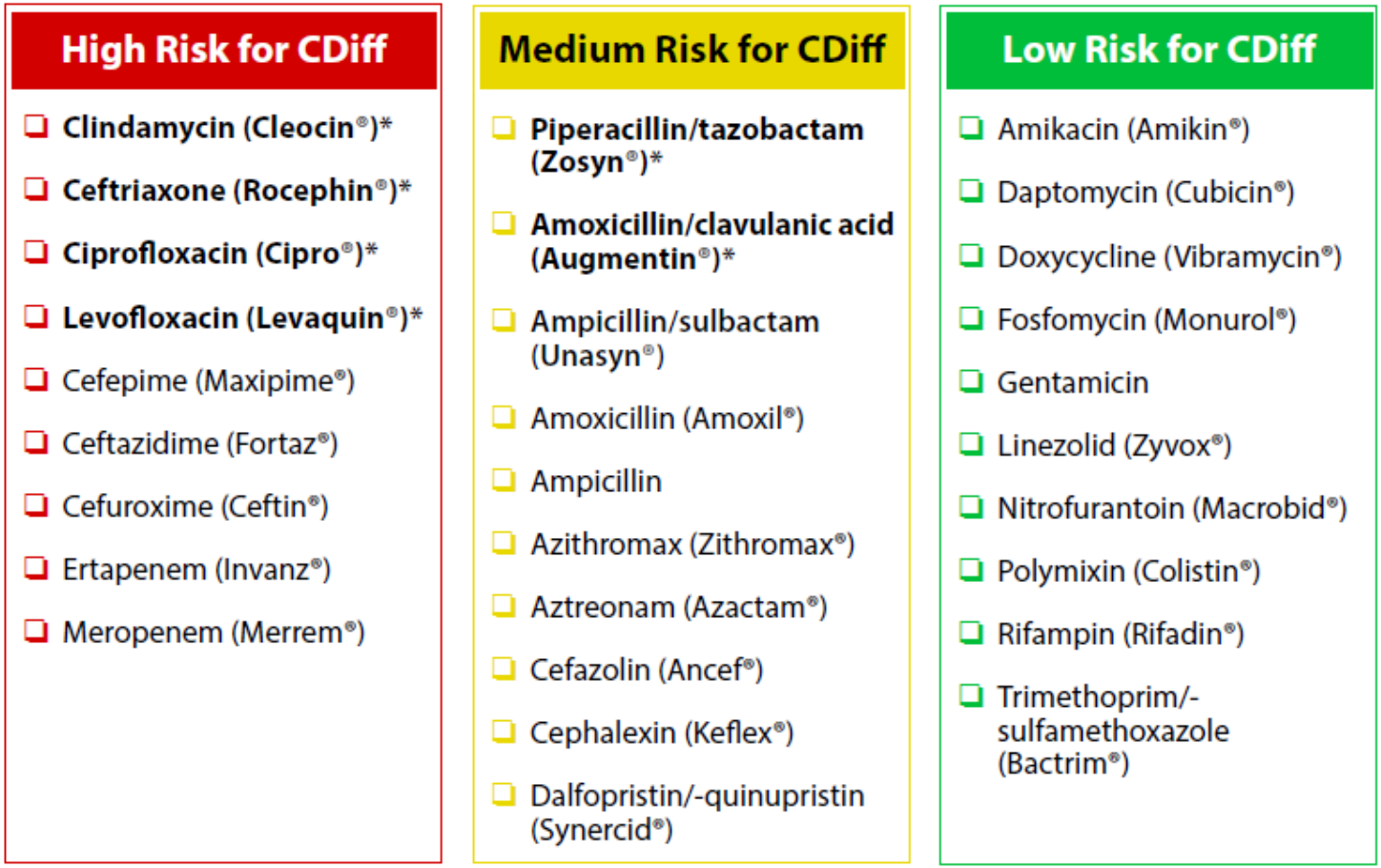
- Colonization is more common than infection.
  - No symptoms AND +*CDiff* test.
- Infection = *CDiff* symptoms AND +*CDiff* test.
- *CDiff* FAQ

https://www.cdc.gov/hai/organisms/cdiff/cdiff_faqs_hcp.html

Clostridium difficile (*CDiff*)Infection

- Is the diarrhea just antibiotic-associated/tube-feeds/laxatives? If yes, would NOT check *CDiff.*
- If the patient has two infections - *CDiff* and a second infection - can the antibiotic for the infection be changed to one less likely to irritate the *CDiff?*
- If an infection needs to be treated (and there is no *CDiff*), can one be chosen which is less likely to induce *CDiff?*

Antibiotics: A Risk Factor for CDiff



* Highest Association with CDiff

Kennedy CDiff Task Force, 2015

KENNEDY HEALTH

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Additional Nursing Initiatives

- Device infection drill-down with key stakeholders.
- Lessons learned shared through shift huddles, department newsletters, safety call reports.
- Urinary Catheter Rounds: shift Nursing Supervisor rounds with Charge Nurse.
- Charge Nurse and Nursing Supervisor rounds: all patients discharged from ICU to intermediate unit to assess transition status.

Infection Control and Prevention Drill-Down Case Review

The following data points used for discussion and review of any device related/non-device infections.

- Attendees
- Date of hospital admission
- Date of drill-down
- Reason for case review
- Unit/ location of patient when device inserted
- Date /time of device insertion
- Date of positive cultures
- *Antibiotics used*
- Review of bundle elements—met/unmet
- General discussion of clinical course
- Lessons learned
- How information to be disseminated back to clinical staff:

This form is not part of the permanent record. Review of information is shared at Patient Safety Committee.

Review of Cultures Can Help Combat Sepsis

Nursing Antibiotic Rounds: Reviewing a Culture

- To promote awareness of antimicrobial stewardship for nursing systemwide.
- Nurse rounds 1:1 with IP and clinical nurse to review why patient is on antibiotic(s).
- Discussed microbiology report and its relation to ordered antibiotic.
- Brought discussion to physician.

Kennedy Health: Preliminary Findings of Nursing Antibiotic Rounds

Findings:

- Not familiar with how to interpret microbiology report.
- Not familiar with all classes of antibiotics.
- Do not see uniqueness of antibiotics.
- *Potassium analogy to antibiotics.*

Kennedy Nursing
Antimicrobial Stewardship Course

- Synthesize the interpretation of the Culture and Sensitivity report.
- Identify actions, indications and dosing for Antibiotics.

Match a Culture with an Antibiotic

- Pre- and post-knowledge assessment in one Critical Care Unit.
- Results -> review by IP and Clinical Educator.
- Post knowledge assessment -> improved understanding/reading of microbiology report.

Tailoring an Antibiotic to a Culture

- Get on an appropriate antibiotic to fight against sepsis.
- IP and clinical nurse rounded -> informed primary service or infectious diseases to review antibiotic and microbiology report.
- Teamwork to get the patient on a susceptible antibiotic.

Examples of Kennedy's Antimicrobial Stewardship Initiatives

- Patient Education on Nursing Portal: Antibiotics, *CDiff*, among others.
- Mandatory ID Consult for any patient
  1) who has sepsis, severe sepsis, and septic shock.
  2) on more than two antibiotics.
  3) who has *CDiff.*

Blood Cultures

- Blood cultures = 24 hrs category, 48 hrs name of pathogen, 72 hrs sensitivity results.
- Bacteria can come in different categories and different shapes.
  - Cocci looks like a circle.
  - Rod looks like a small rod.
- Two of the most common bacterial types are categories of gram negative or gram positive.
- If you put them together, you might get a preliminary result called to nursing, eg., "gram negative rods," or "gram positive cocci." These are "positive blood cultures."

Timing

- However, that initial *preliminary result* takes time to come back. It roughly takes about 24 hours after bcx are drawn, and sometimes 36 hours if drawn in the afternoon or evening.

- So, if a patient has an infection or is septic (think 3-hour bundle), empiric antibiotics are often given. Empiric means you choose an antibiotic that could work for the patient—specific to the type of infection you *believe is going on* (while you wait for cultures to incubate).

Sepsis and Blood Cultures

- It is important to recognize that people who have sepsis do not necessarily have positive blood cultures.
- Also, if you have a positive blood culture, they can be pathogenic (=sepsis), or contaminants, eg., if the skin is not cleaned properly, if the technician does not properly handle specimen (=Not a pathogen).
- Every blood culture is held – incubated for 5 straight days—sneaky—HD patients who have positive blood cultures can have "late growth" – positive blood cultures after more than 24 hours.

Adjustments in Antibiotics

- *Example:* Let's say that a 70-year-old man comes in septic. He is given empiric cefazolin pending cultures.
- Microbiology calls that this patient has *gram positive cocci* in the blood. RN calls physician.
- Physician reviews differential diagnosis *of gram positive cocci.*
- Let's say the physician chooses to continue cefazolin.

Sensitivity Results

- In the petri dish, which antibiotics would definitely work for your bugs? Generally speaking:
  - S = sensitive; it works (some exceptions, eg. MSSA, MRSA)
  - I = indeterminate
  - R = resistant; that antibiotic does NOT work.

Sensitivity Results, cont'd

- **A number is listed next to each sensitivity result = minimum inhibitory concentration -> lowest concentration of antimicrobial to inhibit growth of bacteria after overnight incubation.**
- **For MRSA, if vancomycin is sensitive but MIC = 1.5 to 2, chance vancomycin might not work.**

Blood Culture Example Sensitivity Results

- **Antibiotic** ***Staphylococcus aureus***

- **Ceftaroline** **0.5 S**

Summary

- Define Sepsis and Antimicrobial Stewardship.
- Understand how infection prevention can help prevent cases of sepsis.
- Review of cultures can help to combat sepsis.

How to Contact Us

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Q & A

Please submit your questions via the Chat Box feature

OHA collaborates with member hospitals and health systems to ensure a healthy Ohio

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