Sepsis: Back & to the Future
Universal Hygiene for Sepsis Prevention

Oct. 6, 2022
Our Mission

Advancing Health in Indiana
- Engage and inspire health care providers
- Create safe cultures
- Create reliable systems of care
- Prevent patient harm in Indiana

PREVENT PATIENT HARM
To create high reliability organizations who collaborate and engage in continuous improvement to achieve best in class outcomes

IMPROVE COMMUNITY HEALTH
To partner with communities and stakeholders to develop, plan, and coordinate initiatives that span the prevention and care continuum

INCREASE PATIENT AND FAMILY ENGAGEMENT
To engage patients and families in all aspects of their care and seek their input and inclusion in advisory capacities throughout organizations

LEAD A CULTURE OF SAFETY
To create an environment of mutual trust, respect, and transparency among organizations, patients, and families
# IHA 2022 Sepsis Awareness Month Webinars

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Click on link to access recording for each webinar
Objectives

1. Describe recommendations and barriers for universal hygiene
2. Describe partnerships to successfully accomplish universal hygiene
3. Discuss implications of universal hygiene recommendations across the continuum of care.
Connect to Purpose Story

What hygiene practices did you change?

IHAconnect.org/Quality-Patient-Safety
October is Dental Health Month!

- **Toothbrush education**

- The consensus recommendation is for people to brush their teeth for two minutes twice a day with a toothbrush that has soft bristles.

- Replace toothbrushes every three to four months or more often if the bristles are visibly matted or frayed.
## Impact of Healthcare Associated Conditions

<table>
<thead>
<tr>
<th>Harm</th>
<th>Cost per Case</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLABSI</td>
<td>$48,108</td>
<td>18%</td>
</tr>
<tr>
<td>Surgical Site Infection</td>
<td>$28,219</td>
<td>3%</td>
</tr>
<tr>
<td>Ventilator Associated Pneumonia</td>
<td>$47,238</td>
<td>39%</td>
</tr>
<tr>
<td>CAUTI</td>
<td>$13,393</td>
<td>10%</td>
</tr>
<tr>
<td>C.Difficile</td>
<td>$17,260</td>
<td>11%</td>
</tr>
<tr>
<td>MRSA</td>
<td>$17,000</td>
<td>27%</td>
</tr>
<tr>
<td>Pressure Ulcer (3+)</td>
<td>$17,000</td>
<td>7%</td>
</tr>
<tr>
<td>VTE</td>
<td>$17,367</td>
<td>10-15%</td>
</tr>
<tr>
<td>Adverse Drug Event</td>
<td>$5,746</td>
<td>11% (excess anticoag)</td>
</tr>
<tr>
<td>Injury from Fall</td>
<td>$6,694</td>
<td>n/a</td>
</tr>
<tr>
<td>All Other HACs</td>
<td>$17,000</td>
<td>n/a</td>
</tr>
<tr>
<td>Readmissions</td>
<td>$14,394</td>
<td>n/a</td>
</tr>
</tbody>
</table>


References available on request
Sepsis costs

### Additional Complications: Pneumonia and Sepsis

The death rate from pneumonia in the US has had little improvement since antibiotics became widespread more than half a century ago.¹ Pneumonia is the most common cause of sepsis and septic shock, causing 50% of all episodes.

<table>
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<tr>
<th>Rank</th>
<th>Condition</th>
<th>Cost</th>
<th>Cost Per Hospitalization</th>
</tr>
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<tr>
<td>1</td>
<td>Sepsis</td>
<td>$24 billion</td>
<td>$11,244</td>
</tr>
<tr>
<td>2</td>
<td>Osteoarthritis</td>
<td>$17 billion</td>
<td>$16,148</td>
</tr>
<tr>
<td>3</td>
<td>Childbirth</td>
<td>$13 billion</td>
<td>$3,529</td>
</tr>
</tbody>
</table>

¹Epidemiology and Costs of Sepsis in the United States—An Analysis Based on Timing of Diagnosis and Severity Level [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6250243/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6250243/)
Patient & Family Engagement & Informed Consent?

- Although decreased, 3% of all hospitalized patients acquire an HAI (Shiraly et al., 2020)
- 4.8% to 34.5% of patients or caregivers were informed of risk of acquiring nosocomial infection (Landerfelt et al, 2020)
Back to Hygiene Bundle

- **Hygiene (1800’s)**
- **Universal Precautions (AIDS CRISIS 1983-85+)**
- **Standard Precautions (1996)**
  - HH, PPE, respiratory/cough etiquette, patient isolation, soiled equipment handling, sharps safety, safe injection practices, sterile instrument safety, environmental infection control & prevention
- **Transmission Based Precautions (2012)**
  - Limited period of time
- **Universal Hygiene & Patient & Family Engagement (evolving)**

Factors Associated With Adherence to Hygiene-related Behaviors and Viral Mitigation Protocols During the COVID-19 Pandemic, Modum Bad, June 2020
Universal Hygiene – Conceptual Definition

**Universal**
- including or covering all or a whole collectively or distributively without limit or exception; especially-- available equitably to all members of a society
- a culture trait characteristic of all normal adult members of a particular society

**Hygiene**
- a science of the establishment and maintenance of health
- conditions or practices (as of cleanliness) conducive to health

**Universal Hygiene:** Condition or practices of cleanliness that are conducive to health and are equitably available to all members of a society

IHAcnnect.org/Quality-Patient-Safety
Scope of Universal Hygiene

**Inclusions**

- Personal hygiene—a preventive health measure to maintain cleanliness of one’s body and clothing to preserve (or optimize) overall health and well-being
- Environmental hygiene—measures used to improve the basic environmental connections affecting human health

**Exclusions**

- Cyber hygiene
- Mental hygiene (1921)
- Sleep hygiene?
- Personal Service hygiene
- Kitchen/process hygiene?
- Herzberg’s Job Satisfaction Motivator and Hygiene Factor Theory
- Animal Hygiene
- Personality Hygiene
- Food hygiene
# Universal Hygiene Shared Language

<table>
<thead>
<tr>
<th>Donning and doffing</th>
<th>Action</th>
<th>Example safety statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to rounding</td>
<td>Assign roles, including the clinical assessor and the personal protective equipment (PPE) spotter. This sets expectations and provides role clarity.</td>
<td>Both physicians: “When we round today, let’s agree that during donning and doffing, that no other tasks will be completed so that we can maintain our focus.”</td>
</tr>
<tr>
<td>Predonning</td>
<td>Review tasks that need to be completed inside the patient’s room before the assessor pauses to don PPE. Signal this with a safety statement.</td>
<td>Assessor: “Please spot me when I’m donning my PPE. Do not hesitate to correct errors to ensure my safety and the safety of our team.”</td>
</tr>
<tr>
<td>Donning</td>
<td>Employ silence during application of PPE to ensure the assessor focuses on the task and the spotter actively observes.</td>
<td>Assessor: “I have now put on my PPE. Am I safe to enter the patient’s room?”</td>
</tr>
<tr>
<td>Preadothing</td>
<td>Assessor announces exit from patient’s room. This cues the spotter to observe the doffing of PPE and to be alert for lapses to create situational awareness.</td>
<td>Assessor: “All eyes on me. I am leaving the patient’s room and I will be removing my PPE.”</td>
</tr>
<tr>
<td>Doffing</td>
<td>Assessor focuses on the task of doffing while the spotter actively observes. If focus is broken, or an impending error occurs, use a safety statement for correction.</td>
<td>Spotter: “Stop! You are about to touch your face. Please perform hand hygiene before removing your mask.”</td>
</tr>
<tr>
<td>After patient assessment</td>
<td>Debrief any safety issues and lapses in infection control procedures. This normalizes the shared responsibility for safety.</td>
<td>Spotter: “You were speaking while you were doffing your PPE. I believe this leads to your distraction and subconscious attempt to touch your face. Let’s agree that we will remain silent during doffing so that you can focus on removal of PPE while I spot you.”</td>
</tr>
</tbody>
</table>

(Goulding, et al, 2020)
Universal Hygiene Operational Definition—scores on adaptable scales

**Adherence to social distancing protocols**

**Supplementary Table S1.** Questions measuring degree of adherence to implemented social distancing protocols (SDPs).

<table>
<thead>
<tr>
<th>Item number</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have stayed at home if I have experienced symptoms involving coughing, headaches, mild fever, or any respiratory problems.</td>
</tr>
<tr>
<td>2</td>
<td>I have adhered to the guidelines of keeping one-meter distance from peers both indoors and outdoors, with the exception of those in my household.</td>
</tr>
<tr>
<td>3</td>
<td>I have adhered to the guidelines of avoiding private social gatherings involving more than 20 peers.</td>
</tr>
<tr>
<td>4</td>
<td>I have adhered to the guidelines of avoiding public transportation unless necessary with regards essential activities.</td>
</tr>
<tr>
<td>5</td>
<td>I have avoid crowded places unless unavoidable with regards to essential activities such as medical visits.</td>
</tr>
</tbody>
</table>

**Adherence to WHO-recommended hygienic behaviors**

**Supplementary Table S2.** Questions measuring degree of adherence to WHO-recommended hygienic behaviors (HBB) further implemented by the Norwegian government.

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<thead>
<tr>
<th>Item number</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have covered my mouth with a tissue or my elbow when I have coughed or sneezed with other individuals present.</td>
</tr>
<tr>
<td>2</td>
<td>I have regularly and thoroughly washed my hands thoroughly (i.e., for a minimum duration of 20 seconds) with soap or used alcohol-based hand rub outside of my home after touching shared surfaces (e.g., doorknobs); after coughing or sneezing; visits to the toilet; and before eating.</td>
</tr>
<tr>
<td>3</td>
<td>I have regularly and thoroughly washed my hands thoroughly (i.e., for a minimum duration of 20 seconds) with soap or used alcohol-based hand rub at home before preparing any food, before eating, and after coughing or sneezing.</td>
</tr>
<tr>
<td>4</td>
<td>I have avoided touching my eyes, mouth, and nose when I am outside of my home or when I have not washed my hands.</td>
</tr>
<tr>
<td>5</td>
<td>I have handled shared surfaces (e.g., doorknobs) in alternative ways such as touching them with tissues or gloves.</td>
</tr>
<tr>
<td>6</td>
<td>I have disinfected shared surfaces and objects that I use frequently at multiple locations such as my phone or computer.</td>
</tr>
<tr>
<td>7</td>
<td>I have avoiding hugging or shaking hands with individuals outside of my household.</td>
</tr>
</tbody>
</table>

Five-point Likert scale (0: Never; 1: Rarely; 2: Sometimes; 3: Often; 4: Always); Ebrahami et al, 2020)
Universal Hygiene & HAI’s

The Joint Commission Hand Hygiene standards

HFAP Clean Hands Count Initiative

Access more data on this topic in the associated statistical brief.

AHRQ Statistical Brief #262, Aug 2020
Community/Individual Infection Impact

**Post-Op Sepsis Hospitalization**
+$28-38k
34x increased mortality risk
LOS +12.5d

**Impact on Quality of Life**

**Lost Productivity**

**Family Caregiving Needs**

**Role of Prevention on**
Cost of Care, Quality of Life, Social impact?

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Prevention activities are typically categorized by the following three definitions:

1. **Primary Prevention**—intervening before health effects occur, through measures such as vaccinations, altering risky behaviors (poor eating habits, tobacco use), and banning substances known to be associated with a disease or health condition.

2. **Secondary Prevention**—screening to identify diseases in the earliest stages, before the onset of signs and symptoms, through measures such as mammography and regular blood pressure testing.

3. **Tertiary Prevention**—managing disease post diagnosis to slow or stop disease progression through measures such as chemotherapy, rehabilitation, and screening for complications.
Sepsis Prevention Model


Fig. 1
Preventive strategies along the sepsis chain of events. ICU intensive care unit
Population and systems-based approaches for sepsis prevention


Primary Prevention of Infections and Sepsis Onset
- Immunization
- Hygiene
- Public Awareness
- Antibiotic Prophylaxis
- Manage Risk Factors

Secondary Prevention (Early Detection and Treatment)
- Sepsis care bundles
- Emergency provider awareness & triage
- Sepsis alerts and rapid response teams in hospitals

Tertiary Prevention (limit consequences of sepsis)
- ICU care to minimize morbidity of critical illness
- Rehabilitation
- Post-ICU clinics
Risk factors for sepsis

- Recent UTI, pneumonia, or operative event
- Diabetes
- Immunosuppressive therapy (chemo, transplant)
- Elective surgery
- Chronic renal failure
- Alcohol abuse
- Splenectomy
- Sickle Cell Disease
- Non-modifiable factors: age (very old or young), gender (M>F), race (B>W)

(Kumar et al, 2006; Torres et al, 2004; Englert & Ross, 2015)
March 2021: Focus on Interdisciplinary Infection Prevention Team
Healthcare Transitions are Dangerous!

Can we message Universal Hygiene repeatedly, consistently across continuum?

Geriatric patients’ continuum of care

Ham et al., 2014, p. 15

IHAconnect.org/Quality-Patient-Safety
Partnering for Prevention

- Hand Hygiene
- Mobility
- Nutrition
- Immunization
- Oral Hygiene
  - Address post-sepsis symptoms
  - Hydration
  - Sepsis education
  - Sepsis source specific education
  - Medical follow-up 1-3days
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>19-26 years</th>
<th>27-49 years</th>
<th>50-64 years</th>
<th>≥65 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Influenza inactivated (IIV4) or Influenza recombinant (RIV4)</strong></td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or Influenza live attenuated (LAIV4)</td>
<td>or 1 dose annually</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tetanus, diphtheria, pertussis</strong></td>
<td>1 dose Tdap each pregnancy; 1 dose Td/Tdap for wound management (see notes)</td>
<td>1 dose Tdap, then Td or Tdap booster every 10 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Tdap or Td)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pneumococcal</strong> (PCV15, PCV20, PPSV23)</td>
<td>1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)</td>
<td></td>
<td></td>
<td>1 dose PCV15 followed by PPSV23 OR 1 dose PCV20</td>
</tr>
</tbody>
</table>
Tdap Vaccines

• Can prevent tetanus, diphtheria, and pertussis.

• Adults should receive a booster dose of either Tdap or Td (a different vaccine that protects against tetanus and diphtheria but not pertussis) every 10 years. OR after 5 years in the case of a severe or dirty wound or burn. OR with each pregnancy. Children have different recommendations that can be found on the CDC website.

• Contraindications: allergy to vaccine, severe reaction to vaccine such as coma or seizure, nervous system problems or seizures, history of Guillain-Barré Syndrome.

• There are two Tdap vaccines used in the United States: Adacel® and Boostrix®.
• There are two Td vaccines used in the United States: TENIVAC® and TDVAX®.
Patient & Family Engagement: Sepsis Patient & Caregiver Education

SEE IT, STOP IT, SURVIVE IT.

I am a sepsis survivor, what now?

What can I do to improve my recovery?

Caregiver Instructions for Patients Recovering from Sepsis

Common Symptoms After Sepsis

www.survivesepsis.com
Sepsis Prevention & Recovery

Most common reasons for hospital readmission are another infection such as pneumonia or a urinary infection, or worsened heart failure or chronic obstructive pulmonary disease.

- See your primary care provider within a week after hospital discharge. Confirm with your primary care provider what medications you should be taking after hospitalization.
- Take over the counter and prescription medicine as instructed by your doctor. Antibiotics, antiviral, or antifungal medicine should be continued until instructed to stop, even if feeling better.
- Practice oral hygiene with toothpaste and mouthwash four times a day to prevent pneumonia (the most common cause of sepsis).
- Avoid sitting without moving for long periods of time and take short walks every one to two hours to improve blood flow and breathing. Ask for help if you feel weak or unsteady.
- Keep recommended immunizations up to date like flu, pneumonia, shingles, and COVID-19.
- Wash hands with soap and water when visibly soiled, prior to eating, and after toileting.
- Keep cuts clean and covered until healed.
- Keep well-hydrated to prevent infections and to enhance stability of blood pressure, balance, digestion of medicines, adequate fluids to brain to keep alertness, heart, kidneys, and skin. Drink enough fluid to keep your urine pale yellow. If urine is darker in color, increase intake of fluids. New problems with thinking or confusion may be avoided by drinking plenty of fluids.
- Seek good quality and length of time sleeping. Do not take sleeping medications without consulting your primary care provider.
- Eat healthy foods to maintain strength and continue healing, such as plenty of vegetables, fruits, whole grains, low-fat dairy products, and lean protein. Avoid alcohol, caffeinated beverages, and computer screen time before bed.
Non-Vent Hospital Acquired Pneumonia

- Nurses: Barbara Quinn & Dr. Diane Baker @ Sutter Health, California
- Pneumonia is #1 hospital acquired infection according to CDC-
- 15-31% death rate from hospital acquired pneumonia
- “They go to the operating room within 20 minutes of brushing teeth” -- & gargle
- Brushing teeth several times per day cut hospital pneumonias by 70% with 50,000 toothbrushes expenditure

Nonventilator Hospital Acquired Pneumonia—New Study Jan 2020

- **Lit Review:**
  - 50% of hospital sepsis cases associated with pneumonia

- **Results**
  - HCUP Data 2012 with ICD-9 codes of pneumonia & sepsis, excluding POA, excluding VAPs
  - 84% from non-healthcare, 7% from other healthcare facility
  - 36% of patients who developed non-vent hospital acquired pneumonia also developed sepsis-21% in hospital mortality
  - 39% discharged to healthcare facility, 57% to non-healthcare setting
They recommend “oral hygiene be maintained, if not improved, during a SARS-CoV-2 infection in order to reduce the bacterial load in the mouth and the potential risk of bacterial superinfection.”

Sampson et al (2020); https://www.nature.com/articles/s41415-020-1747-8
Universal Hygiene Behaviors

The Norwegian COVID-19 Study of Mental Health and Adherence (to Social Distancing & Hygienic Behavior)

**WHO Hygienic Behaviors**

- Covered mouth with tissue or elbow with sneeze or cough
- Regularly wash hands thoroughly after touching shared surfaces, coughing/sneezing, toileting and before eating
- Wash hands at home before preparing food, eating and after coughing/sneezing
- Avoided touching eyes, mouth and nose when outside home or when I haven’t washed hands
- Handled shared surfaces in alternative ways such as touching with tissues or gloves
- Disinfected shared surfaces and objects that I use frequently at multiple locations such as my phone or computer
- Avoided hugging or shaking hands with individual outside of my household

**Additional Universal Hygiene behaviors**

- Oral Hygiene
- Mask wearing during (pandemic? Flu season?)

Ebrahimi et al, 2020
Visualize Goals of Universal Hygiene with Appreciative Inquiry

• **Five Core Processes (D’s) of Appreciative Inquiry**
  1. Choose the positive as the focus of inquiry (Definition)
  2. Inquire into exceptionally positive moments (Discovery)
  3. Locate themes that appear in stories (Discovery)
  4. Create shared images of a preferred future (Dream)
  5. Innovate ways to create that future (Design & Destiny/Delivery)

Watkins & Mohr, Appreciative Inquiry: Change at the Speed of Imagination, p. 47; www.centerforappreciativeinquiry.net
There are six points at which the chain can be broken, and a germ can be stopped from infecting another person:

- **Infectious agent** is the pathogen (germ) that causes diseases
- **Reservoir** includes places in the environment where the pathogen lives (this includes people, animals and insects, medical equipment, and soil and water)
- **Portal of exit** is the way the infectious agent leaves the reservoir (through open wounds, aerosols, and splatter of body fluids including coughing, sneezing, and saliva)
- **Mode of transmission** is the way the infectious agent can be passed on (through direct or indirect contact, ingestion, or inhalation)
- **Portal of entry** is the way the infectious agent can enter a new host (through broken skin, the respiratory tract, mucous membranes, and catheters and tubes)
- **Susceptible host** can be any person (the most vulnerable of whom are receiving healthcare, are immunocompromised, or have invasive medical devices including lines, devices, and airways)

**BE AN INTERRUPTER!**
Are there differences in universal hygiene practices between the low risk and complex patient?
Low Risk Patient Hygiene Activities
Complex Patient

Ports of Entry
Hygiene Activities

Complex Patient
Four Moments for Healthcare Facility Visitor Hygiene

- Entering the Medical Center
- After Touching Shared Items
- Entering and Exiting a Patient's Room
- Exiting the Medical Center

Please Clean Your Hands

Help Prevent Germ Transmission
We Welcome You to Use Hand Sanitizer Dispensers & Hand Washing Facilities

Knighton et al., 2020
IHAConnect.org/Quality-Patient-Safety

Linear approach in one system—alcohol based or handwashing
Call to Action

• Identify what strengths and opportunities exist in your unique setting for Universal Hygiene

• Evaluate how you are empowering ALL staff, patients, family and caregivers as infection preventionists
Resources

- **CDC HAI Prevention Gap Analyses for Acute Care, LTC, outpatient & Hemodialysis**
- **CDC HAI Multi-setting Prevention Tools**
- **AHRQ HAI Prevention Tools & Resources**
- **The Joint Commission Speak Up Videos & Infographics**
- **AHRQ Toolkit to Engage High-Risk Patients In Safe Transitions Across Ambulatory Settings**
Polling Questions
Infection Prevention Week
Oct. 16 – 22, 2022
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