Hand Hygiene Surveillance
the Science and the Pragmatics

Deb Patterson Burdall PhD, RN-BC,
CIC, FAIPC
Baldwin Hill Solutions LLC, Infection Prevention for Long Term Care
Assistant Professor, University of Iowa College of Nursing

Learning Objectives

• Describe the goal of hand hygiene surveillance
• Differentiate between different hand hygiene methodologies
• Incorporate an understanding of human attitudes and behavior into a pragmatic approach to hand hygiene

Hands Are Amazing

Slide: E. Soda MD
Why Do We Perform Hand Hygiene Surveillance?

Infection Prevention and Control

Reported worldwide hand hygiene participation rates ranging from 5% to 89%
Overall average reported to be 38.7%


Why is Hand Hygiene Surveillance Important?
Hand Hygiene Prevents Infections!

What Have You Touched Today?

(Slide: E. Sode MD, CDC)
What We Are Doing Is Not Working

- Carbapenem Producing Organisms (CPO)
- Spread by healthcare workers
- No decolonization strategy
- Few antibiotic treatment options available
- High mortality rate
- Resistance can hop between bacteria
- High speed/rate of transfer of drug-resistance

Candida auris (C. auris) Emergence in the US

C. auris Prevalence, March 2017

Prevalence=1.5% (1/69)

- C. auris positive (1)
- Screened negative for C. auris (45)
- Not tested for C. auris (in/and or not in room) (3)

PPS # 1
Black, S.R. CDC Vital Signs Town Hall
April 10, 2018

vSNF A Vent-Floor
1/30/18 C. auris Prevalence

Prevalence=43% (29/70)

- C. auris positive (29)
- Screened negative for C. auris (31)
- Not tested for C. auris (in/and or not in room) (5)

PPS # 2
Black, S.R. CDC Vital Signs Town Hall
April 10, 2018
Instead of stomping out fires and relying on dogma, what is needed is a thoughtful, evidence based approach to basic care. A marathon, not a sprint. Instead of stomping out fires and relying on dogma, what is needed is a thoughtful, evidence based approach to basic care. A marathon, not a sprint.

High C’s of Infection Prevention

- Clean Hands and Gloves
- Clean Clothes
- Clean Equipment
-Contained Drainage
-Covered Wounds
-Careful Antibiotic Use
-Collaborative Approach

Hand Hygiene!

Septimus et al., 2014; Wentzel & Edmond, 2010

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Instead of stomping out fires and relying on dogma, what is needed is a thoughtful, evidence based approach to basic care. A marathon, not a sprint.
Are you using Entry/Exit or 5 Moments or a selection of the 5 Movements? (e.g. 1, 4, 5)

Define Your Hand Hygiene!


WHO Guidelines on Hand Hygiene in Health Care, WHO, 2009

Joint Commission

• Can use either CDC or WHO guidelines
• Formulate goal for hand hygiene and improve compliance
• Facility based goals
• One missed hand hygiene opportunity cited as a deficiency under Infection Prevention and Control (IC) Standard IC.02.01.01, EP 2

CDC

1. The following performance indicators are recommended for measuring improvements in HCWs' hand-hygiene adherence:
• Periodically monitor and record adherence as the number of hand-hygiene episodes by HCWs. Adherence will be expressed as a proportion of hand-hygiene opportunities, by ward or by service. Provide feedback to personnel regarding their performance.
• Monitor the volume of alcohol-based hand rub (or detergent used for handwashing or hand antisepsis) used per 1,000 patient-days.
• Monitor adherence to policies dealing with wearing of artificial nails.
• When outbreaks of infection occur, assess the adequacy of health-care worker hand hygiene.

WHO Definition of Handwashing

Techniques for Washing Hands with Soap and Water

- The CDC Guideline for Hand Hygiene in Healthcare Settings (PDF, 1.3 MB) recommends:
  - When cleaning your hands with soap and water, wet your hands first with water, apply the amount of product recommended by the manufacturer to your hands, and rub your hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers.
  - Rinse your hands with water and use disposable towels to dry. Use towel to turn off the faucet.
  - Avoid using hot water, to prevent drying of skin.
  - Other entities have recommended that cleaning your hands with soap and water should take around 20 seconds.
  - Either time is acceptable. The focus should be on cleaning your hands at the right times.

Fingernail Care and Jewelry

- Germs can live under artificial fingernails both before and after using an alcohol-based hand sanitizer and handwashing.
- It is recommended that healthcare providers do not wear artificial fingernails or extensions when having direct contact with patients at high risk (e.g., those in intensive-care units or operating rooms).
- Keep natural nail tips less than ¼ inch long.
- Some studies have shown that skin underneath rings contains more germs than comparable areas of skin on fingers without rings.
- Further studies are needed to determine if wearing rings results in an increased spread of potentially deadly germs.
• Beware of water reservoirs! Water management is critical!!
• Bacteria
  • Legionella and other Gram-negative bacteria
  • Nontuberculous Mycobacteria
  • *Elizabethkingia meningoseptica* (EKM)
  • *Elizabethkingia anophela* (EKA)
• Acinetobacter baumanii (also dry surfaces)
• Occasional fungi and viruses
• Waterborne outbreaks occurred in healthcare settings
• Emergence of new reported reservoirs
  • Electronic faucets (*Pseudomonas aeruginosa* and *Legionella*)
  • Sinks (EKA, EKM, CRE)
• Decorative water wall fountains (*Legionella*)

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**Techniques for Using Alcohol-Based Hand Sanitizer**

When using alcohol-based hand sanitizer:

- Put product on hands and rub hands together
- Cover all surfaces until hands feel dry
- This should take around 20 seconds

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**How to Handrub?**

**WHO Definition of Hand Rub**
What is a Multimodal Approach?

The 5 part WHO Multimodal Hand Hygiene Improvement Strategy

- System change – alcohol-based handrub at the point of care
- Training and education
- Observation and feedback
- Reminders in the workplace
- Creating a safety culture

The WHO 5 steps to implementation

- Step 1: Facility preparedness (Months 1-3)
- Step 2: Baseline evaluation (Months 4-5)
- Step 3: Implementation (Months 6-7-8)
- Step 4: Follow-up evaluation (Months 9-10)
- Step 5: Action planning & review (Months 11-12)
What is Surveillance?

• “The ongoing, systematic collection, analysis, and interpretation of health-related data essential to planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those responsible for prevention and control.” CDC / Thacker & Birkhead, 2008

What is Process Surveillance?

What are we trying to achieve?

• “A process is the series of steps taken to achieve an outcome.” Lee et al., AJIC 2007

Public Reporting of Hospital Hand Hygiene Compliance—Helpful or Harmful?

Muller & Detsky, JAMA, 2010
Indicator-based or Evidence-based?

- Hand hygiene rates as an outcome for a hand hygiene program (Indicator-based)
- Hand hygiene rate monitoring tied to infection rates (Evidence-based)

REMEMBER

The desired outcome is not just improved hand hygiene
The desired outcome should be reduced infection and colonization

Direct Observation

- Gold Standard
- Portable
- Adaptable
- Paper tool or electronic tool
- Observe technique (does HH meet definition?)

- Time, labor, and training intensive
- Hawthorne Effect
- Sample size challenges

Sources: Boyce, 2017, 2019
Hand Hygiene Apps

Free hand hygiene observation apps. Can be customized to adapt to specific units and tasks.

Electronic Surveillance

- Badges, dispenser activation or door entry
- Reduced Bias and Hawthorne effect
- Automated data analysis
- Covers all shifts

- Expense
- Placement
- Installation and maintenance
- Validation

Sources: Boyce, 2017, 2019
Images: Swipesense

Cameras

- Reduced Bias
- Reduced Hawthorne effect
- Covers all shifts
- Qualitative information (quality and timing of hand hygiene)

- Expense
- Placement
- Installation and Maintenance
- Data analysis
- Privacy concerns

Sources: Boyce, 2017, 2019
Ward, Schweizer, Polgreen, Gupta, Reisinger, Perencevich, (2014)

Automated and electronically assisted hand hygiene monitoring systems: A systematic review

• Assess the existing evidence (42 articles included)
• Adoption and accuracy of automated systems
• Electronically enhanced direct observations
• Reviews of the effectiveness of such systems in health care settings
• Most sensor networks or monitoring systems only capture Moments 1 and 4, recorded by proxy room entry and exit.
• Future studies should be undertaken that assess the accuracy, effectiveness, and cost-effectiveness of such systems.
• Facilities should pilot test systems compared to gold-standard, directly observed compliance surveillance.

Sunkesula et al., 2015

Comparison of hand hygiene monitoring using the 5 Moments for Hand Hygiene versus a wash in-wash out method.

• Direct Observation of 283 room entries
• 70% vs 72%
• Wash in/wash out required 148 hand hygiene events not required by 5 Moments
• Similar overall rates of hand hygiene compliance
• 75% private rooms

Entry/Exit

What about rooms with more than one patient?
Monitoring hand hygiene: Meaningless, harmful, or helpful? (AJIC, 2013)

“Pressure to report high hand hygiene rates may create negative consequences.”

Find out what is really happening with hand hygiene. Work from an evidence-based framework, not an indicator based framework. Separate the real from the ideal. Start from a baseline of reality.

Considerations

- What is Positive Deviance?
- What is Human Factors Engineering?
- What is a Multimodal Approach?
- What is a Quality Assurance Performance Improvement Project?
- What is an Interdisciplinary Team?
- Why Should I Care? This is a presentation about hand hygiene surveillance!
• Find Change Champions
  • Individuals or groups who figure out uncommon behaviors and strategies
  • Find better solutions to problems than their peers
  • Access to the same resources and facing similar or worse challenges
  • Asset-based, problem-solving, community-driven approach
  • Enables the community to discover successful behaviors and strategies and
  • Develop a plan of action

Source: Positive Deviance Collaborative

Changing the paradigm: messages for hand hygiene education and audit from cluster analysis.

• Communicated and received input from healthcare personnel
  • Positive opinions
  • Pragmatism
  • Skepticism

Wash with soap and water best
Need at Point of Care
Don’t Like
I like this sanitizer
ABHR needs to smell nice
Need, Good, Hand, Sanitizer
Human Factors Engineering

- “Examines the relationship between human beings and the systems with which they interact.” (Kohn, Corrigan, Donaldson, 1999)
- “Define human factors as: the study of all the factors that make it easier to do the work in the right way.” (WHO)

Dunne, Kingston, Slevin & O’connell (2018)
Editorial. Hand hygiene and compliance behaviours are the under-appreciated human factors pivotal to reducing hospital-acquired infections

- Focus on hand hygiene is timely and worthy
- Represents a quandary
- “Hand cleansing is simultaneously a simple activity and an activity too simple for those sometimes seeking elaborate solutions to healthcare associated infection challenges globally.”
- Increased data increases healthcare system complexity
- Communicate with healthcare personnel

Jacob, Herwaldt & Durso 2018
Preventing healthcare-associated infections through human factors engineering

- Healthcare personnel need help
- Reduce and simplify steps in delivering care
- Simplify workflow
- Communicate and receive input from healthcare personnel

Changing the paradigm: messages for hand hygiene education and audit from cluster analysis.

- How healthcare workers accept and make sense of the hand hygiene message is likely to contribute to the success and sustainability of initiatives to improve performance.
- Cluster analysis identified clusters of belief about hand hygiene


Nudging to improve hand hygiene.

- Nudging "A friendly push to encourage desired behavior."
- Communicated and received input from healthcare personnel
- Reminders based on cognitive biases
- Posters

Hand Hygiene in Skilled Nursing

- Nursing homes MUST develop, implement, and maintain an effective, comprehensive, data-driven QAPI program
- Focuses on indicators of the outcomes of care and quality of life
- Interdisciplinary team
- Family members may bring a different perspective
- Communicate and receive input from healthcare personnel
The QAPI plan
- Process for identifying and correcting quality deficiencies
- Track and measure performance
- Establish goals and thresholds for performance measurement
- Identify and prioritize quality deficiencies
- Systematically analyze underlying causes of systemic quality deficiencies
- Develop and implement corrective action or performance improvement activities
- Monitor or evaluating the effectiveness of corrective action/performance improvement activities
- Revise as needed

Performance Improvement Projects (PIP)
- Implement performance improvement projects
- Focus on meaningful topics
- Charter PIP teams
- Communicate and receive input from healthcare personnel
- Support staff in being effective PIP team members
- Use tools that support effective teamwork
- Plan, implement, measure, monitor, and document changes, using a structured PI approach

Barriers
Protection Motivation Theory for Healthcare Personnel

Glove Use

Threat Event: Distastefulness and Danger

Threat Appraisal

Probability of Threat Event

Efficacy of Coping Response

Self Efficacy


Planning for Infection Prevention

Protection Motivation Theory

Glove Use

Threat Event: Distastefulness and Danger

Probability of Threat Event

Efficacy of Coping Response

Protection Motivation

Coping Appraisal

Threat Appraisal

Self Efficacy

The Five Facets of Glove Use ©

1. Touch Points (Gloved and Bare-Handed)
2. Gloved Touch Points
3. Glove Change Points
4. Actual Glove Changes
5. Glove Changes at a Glove Change Point

Burdsall et al., 2016 AJIC, 45(9), 940-945

The Two Indicators of Inappropriate Glove Use ©

1. Failed Glove Changes
2. Contaminated Touch Points

Burdsall et al., 2016 AJIC, 45(9), 940-945
Five Facets of CNA Glove Use

- 2213 Total Touch Points
- 1774 Gloved Touch Points
- 339 Glove Change Points
- 160 Actual Glove Changes
- 111 Glove Changes at a Glove Change Point

Burdsall et al., JCAHO 2016, 45(9), 940-945

Remove Soiled Brief

Contaminated Touch Points
Move lift into place and transfer resident to wheelchair with contaminated gloves.

Push Wheelchair with contaminated gloves.

Contaminated Touch Points.
Two Indicators of Inappropriate CNA Glove Use

- **227 FAILED OR MISPLACED GLOVE CHANGES**
- **782 CONTAMINATED TOUCH POINTS**

Norwegian Institute of Public Health: The Invisible Challenge II – Spread of bacteria in hospital settings

- [https://youtu.be/9R8fHo6WfY](https://youtu.be/9R8fHo6WfY)
What Does this Mean for Hand Hygiene Surveillance?

• Humans perform hand hygiene, 24/7: Don't forget that
• Know why you are collecting hand hygiene data
• Know what your compliance really is, don’t fool yourself
• Look for hidden barriers
• The people who do the work already have the solutions
• Involve the interdisciplinary team in solving the problems
• Mixed surveillance (electronic plus direct observation) may give a more balanced and accurate reflection of true hand hygiene (Boyce, 2017, 2018)
• Focus on the long game: Evidence-based improvement in hand hygiene to reduce infections, not to game the system takes time and interdisciplinary approaches

Realize we are part of a larger healthcare community and must work together in a spirit of cooperation.
Questions?
Dburdsall@gmail.com

References

- Agency for Healthcare Research and Quality (AHRQ) https://www.ahrq.gov/
- Association for Professionals in Infection Prevention and Control (APIC) www.apic.org
- Centers for Disease Control and Prevention (2017) www.cdc.gov
References

- Swipesense (iScrubLite). https://www.swipesense.com/iscrub