C.diff: Are We Doing Enough to Protect Our Patients?

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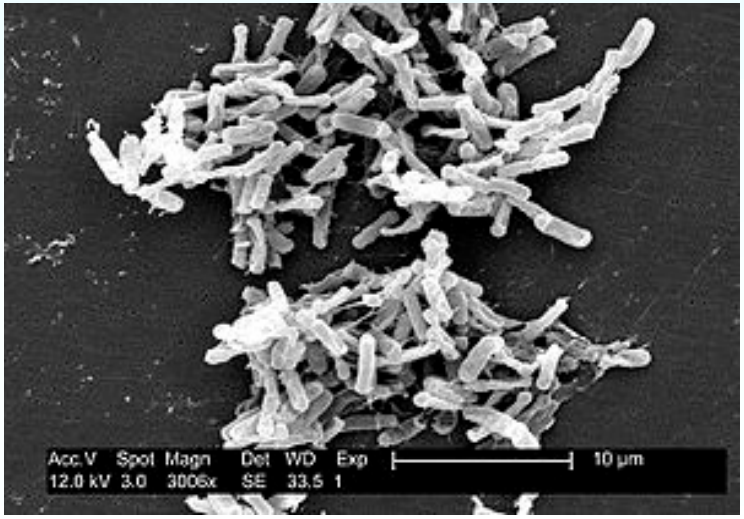
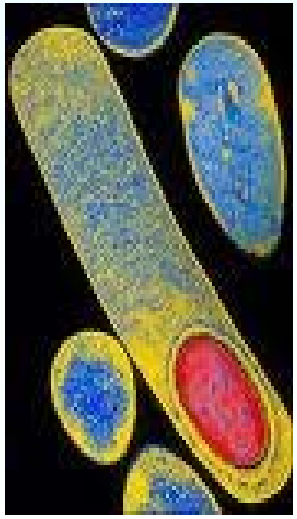
Hatton Research Forum

What is C. diff?

- *Clostridium difficile*
- Gram-positive, spore forming bacteria that causes diarrhea and other intestinal diseases when competing bacteria is wiped out by antibiotics





What diseases result from a C. diff infection?

- Pseudomembranous colitis (PMC)
- Toxic megacolon
- Perforations of the colon
- Sepsis
- Death (rarely)

Clinical Symptoms

- Significant diarrhea (new onset of > 3 partially formed or watery stools per 24 hr period)
- Recent antibiotic exposure
- Fever
- Abdominal pain
- Loss of appetite
- Nausea
- Foul stool odor

Which patients are at increased risk?

Patients with:

- Antibiotic exposure
- GI surgery/manipulation
- Long length of stay in healthcare settings
- Serious underlying illness
- Immunocompromising conditions
- Advanced age

How is C. diff transmitted?

- C. diff is shed in feces
  - Any surface, device or material that comes into contact with feces becomes contaminated
    - Commodes
    - Bathing tubs
    - Rectal thermometers
  - Spores transferred to patients via the hands of healthcare personnel who have touched a contaminated surface or item

How is C. diff infection treated?

- In approximately 20% of patients, infection will resolve within 2-3 days of discontinuing antibiotic to which pt was previously exposed
- Treated with 10 days of antibiotics
  - Metronidazole
  - Vancomycin
- Repeat testing after treatment is not recommended

How can C. diff infection be prevented?

- Use antibiotics judiciously
- Use contact precautions for pts with known or suspected infections
  - Place pts in private rooms, or cohort with other pts with C. diff
  - Use gloves when entering pt room and during care
  - Perform hand hygiene after removing gloves
- Continue precautions until diarrhea ceases

Quiz

True or false:

Alcohol based hand sanitizer kills C. diff spores

False!

- Alcohol does not kill C. diff spores
- You must wash your hands with soap and water
- However, even using soap and water, it is difficult to remove spores
  - Removal or inactivation of C. diff spores is more challenging than any other common pathogen

Surface Disinfecting

- Use an EPA-registered hypochlorite-based disinfectant for environmental surface disinfection after cleaning
- Clean all surfaces thoroughly, especially those likely to come in contact with feces

What are the numbers?

- 300,000 C. diff infections per year
- Annual direct medical costs of HAIs to U.S. hospitals ranges from 28.4 to 33.8 billion dollars
- 98,000 preventable deaths per year

A hospital system can drastically reduce HAIs by looking in the mirror.

Of the 98,000 preventable deaths each year, 90,000 are due to infectious disease, according to IOM.

Scientists cultured the imprint of a HCW's gloved hand after examining a pt with C. diff.

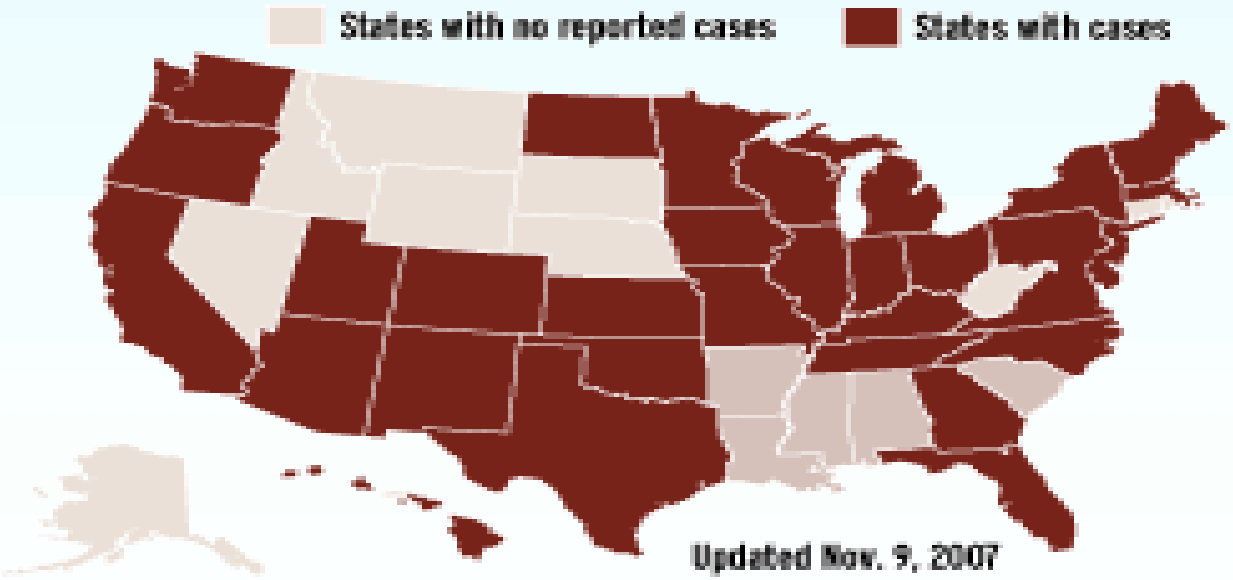
The larger yellow colonies are clusters of the potentially deadly bacteria.

The patient had showered an hour before the specimen was collected.

C. diff is getting tougher…

- A more severe strain of C. diff appeared in the early 2000s and has been associated with a higher number of treatment failures and deaths

States with NAP1 strains of C. difficile, November 2007



Source: CDC

Let’s admit to the public that HCWs need to make changes to prevent the spread of HAIs.

As HCWs, we *are* interested in a “culture of safety” in the hospital to achieve a “zero denominator” for HAIs.

Culture of Safety

It is only through **“genuine communication”** and **accountability** for one’s behavior in the hospital community, that we will foster a “culture of safety”, that will help prevent the spread of infectious disease, hence HAIs.

A key component to the **Champion Handwasher Hospital Campaign** success is based upon one’s **personal awareness and personal accountability**; not age, educational accomplishments or level of authority in the hospital community.

Hand Awareness

- Knowing where your hands are and what they are doing at all times
- Scientifically stated it is the integration of hand hygiene, respiratory etiquette and cross-contamination awareness in a best practice model

How New is Hand Awareness?

- John Snow MD (1854): Broad Street pump handle and Cholera epidemic
- Ignaz Semmelweis MD (1847): Perinatal mortality reduced by using a dilute chlorine solution rinse between the morgue and L&D suite.
- Although it took 20 years for acceptance of both their discoveries now described as positive deviance.
- Will Sawyer MD (1999): The 4 Principles of Hand Awareness as primary infection prevention.
- **Let's not wait 20 years to accept and miss the opportunity to prevent many HAIs.**

What do we need to change today to prevent HAIs?

1.) Practice the 4 Principles of Hand Awareness

2.) Stop keyboard and RFID gun cross contamination during patient care

3.) Remove neck ties

4.) Stop using cell phones during patient care

5.) There will be more suggestions to better engineer the patient care process

The 4 Principles of Hand Awareness

1. **Wash your hands when they are dirty and before eating.**
2. **Do not cough into your hands.**
3. **Do not sneeze into your hands.**
4. **Above all, do not put your fingers into your eyes, nose or mouth.**

*Endorsed by the AMA and the AAFP (2001)

*Referred to as individual ideas for flu prevention by CDC, but not packaged as an integrated concept.

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Amazing “preventable” statistics in the U.S. from the CDC and Prevention!

- **90,000** patients die each year from HAIs
- **2,000,000** HAIs occur each year, at a cost of $6.7 billion
- **5,000** people die from food borne illness annually,
- **76,000,000** cases of food borne illness annually
- More than **300,000** hospitalizations due to food borne illness
- **33,000,000** hospital admissions annually

More “preventable” statistics in the U.S. from the CDC and Prevention!

- **52,000,000** Upper respiratory infections occur each year
- **164,000,000** days lost from school due to illness
- **22,000,000** days lost from school due to the common cold
- **36,000** people die from the flu and flu-like illness annually
- **800,000,000** patient visits annually

What are the 10 deadliest weapons?

Our Fingers and Thumbs!

Hand Awareness

- People who are **“Hand Aware”** are much less likely to contaminate themselves, another person, patient, device or surface.
- Why would anyone **knowingly** give themselves E.Coli 0157:H7, MRSA,VRE, Shigella, Pertussis, Croup, Meningitis,TB, Flu, Strep, Impetigo, Pink Eye, Hepatitis A, C. diff and many others?

Respiratory Etiquette

- Principles 2 and 3
- Do not cough or sneeze into your hand. Use a sleeve, tissue, crook of your elbow, etc., anything except a bare hand. Very few people are running to the sink to wash their hands after coughing or sneezing.
- Pertussis, viral illness, pneumococcus, meningococcus, SARS, Mumps, Measles, Rubella, and many similar diseases would be prevented by diligent practicing of the 4 Principles of Hand Awareness.

Respiratory Etiquette

Hand Hygiene

- Principles 1 and 4
- Handwashing **is** publicly discussed
- Mucus membrane contact has **NOT** been **publicly discussed** as it should be, to **prevent inoculation and colonization**

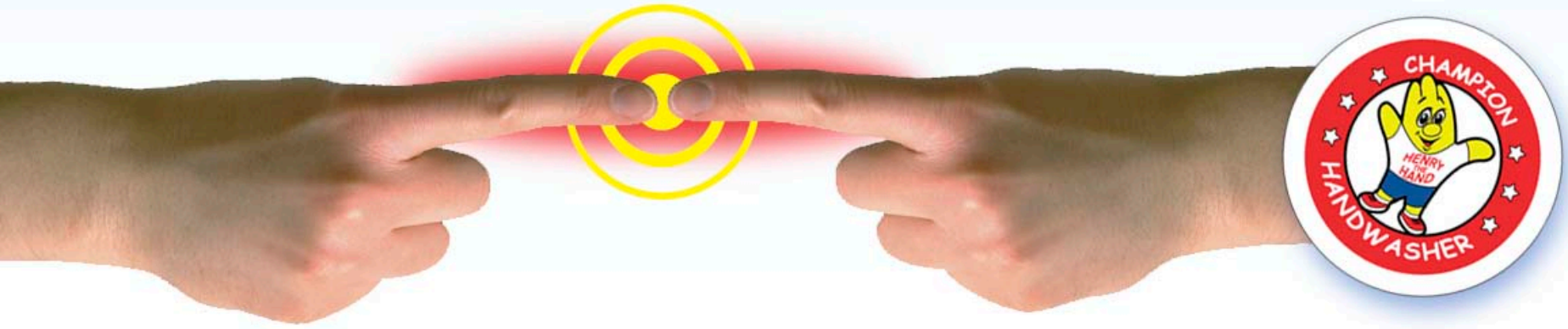
Hand Hygiene

The Hand is quicker than the eye!

- People “unknowingly” **touch a contaminated surface**, then **transmit** the organism to another surface, themselves or a patient due to “unconscious” personal habits.

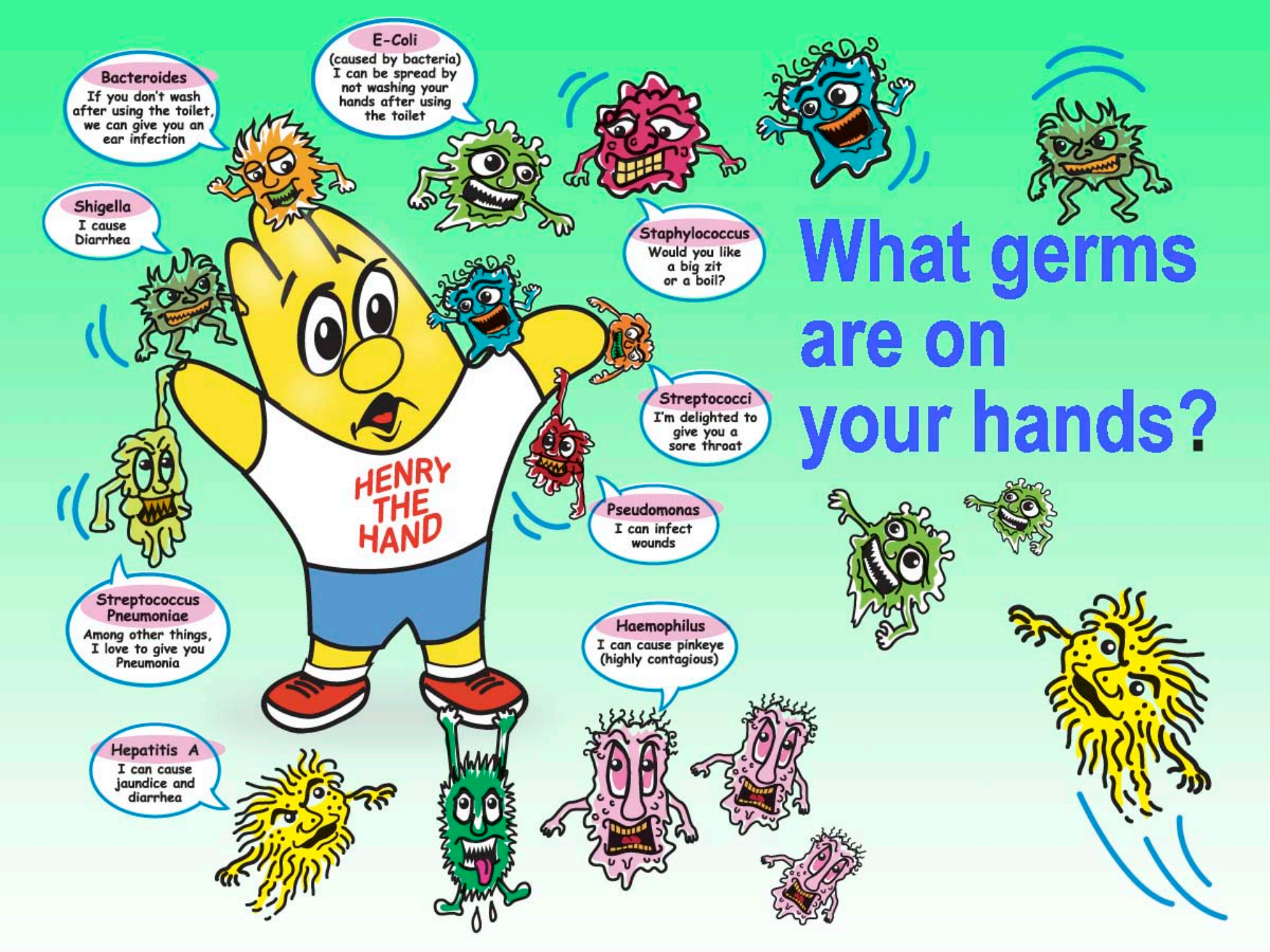
The Hand is quicker than the eye!

- Unfortunately the **single act** of handwashing or sanitizing alone **does not prevent** cross-contamination!



Surface bacterial counts

- 2.7 million bacterial cells/square inch on a drinking fountain
- 33,800 bacteria/sq. inch on a cafeteria tray
- 3,200 bacteria cells/sq. inch on a toilet seat
- 260 bacterial cells/sq. inch on key boards
- 740 bacterial cells/sq. inch on ear phones


What germs are on your hands?
HENRY THE HAND
Bacteroides
If you don't wash after using the toilet, we can give you an ear infection
E-Coli
(caused by bacteria) I can be spread by not washing your hands after using the toilet
Shigella
I cause Diarrhea
Staphylococcus
Would you like a big zit or a boil?
Streptococci
I'm delighted to give you a sore throat
Pseudomonas
I can infect wounds
Streptococcus Pneumoniae
Among other things, I love to give you Pneumonia
Haemophilus
I can cause pinkeye (highly contagious)
Hepatitis A
I can cause jaundice and diarrhea

When did the CDC and Prevention first address the issues of **mucus membrane colonization** self inoculation and cross contamination?

1983

How do you change HCWs' habits?

CDC, SHEA and many notable scientists put together a review in the MMWR in 2002

First, you draw the HCWs attention to **"what is your (their) habit?"**

You will need to invoke a Positive Deviance technique!

How do you change peoples' habits?

You help them change by a few simple techniques (positive deviance) which help them **stop the health risk behavior:** i.e. touching their eyes, nose or mouth (mucus membranes)

Guideline for Hand Hygiene in Health-Care Settings

J.M. Boyce and D. Pittet

Factors necessary for change include:

1. Dissatisfaction with current situation
2. Perception of alternatives, and
3. Recognition, both at the individual and institutional level, of the ability and potential to change.

The first two necessitate a system change and the latter requires education.

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Improvement in infection control practices requires:

1. Questioning basic beliefs
2. Continuous assessment of the group (or individual) stage of behavioral change
3. Interventions with an appropriate process of change, and
4. Supporting individual and group creativity.

Because of the process of change, **single interventions often fail**. Thus, a multimodal, multidisciplinary strategy is necessary.

Let’s Get Started

Let’s admit to ourselves that **humans are responsible** for transmitting disease and contaminating surfaces in the community setting.

Lets agree that we each have **personal habits that may** be contributing to the spread of infectious disease.

Let’s agree to **not take offense** when someone comments to us about our Hand Awareness technique.

Let’s agree that we are **all sensitive** about our personal habits and we **agree** to accept more public accountability that we want to **protect** our family and friends.

Lets agree that this process makes each and everyone of us a little **nervous**.

Identify the Champion Handwasher

- One individual (coach) who is responsible for coordinating the efforts of the healthcare team ensuring that this campaign **succeeds to benefit the patients** in our hospital
- They are the contact point
- Promote **periodic "reinforcement activities**" in the hospital to maintain a high level of compliance for the team, to ensure the hospital's success

Champion Handwasher Hospital Campaign to Prevent HAIs

It requires **team work** and **true** collaboration to improve the outcome.

It is **human behavior "habits" and administrative barriers** that need to be overcome **to achieve a "culture of safety".**

We need to promote **"genuine" communication across levels of authority** to be successful.

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Every successful team requires a **coach.**

What are we doing at TriHealth?

- Conducted a survey of Bethesda North employees to determine if infectious disease awareness increases hand hygiene compliance
  - Surveyed employees, and then posted daily counts of C. diff, MRSA and VRE positive pts in unit
  - Currently in data entry phase
- Currently designing a study to determine the incidence of C. diff in patients who spent ≥24 hours in the ICU during 2010

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