Infection Prevention

Physician Orientation

Healthcare Associated Infections (HAIs)

- Over 2 million HAIs each year in U.S.
- 90,000 deaths
- 30-50% preventable
- Compliance with Infection Prevention best practices **will** reduce HAIs and improve patient outcomes
- Physicians are leaders and role models to influence team to follow best practices for preventing infections

Publicly Reported North Carolina Healthcare Associated Infection (HAI) Data

View North Carolina quarterly HAI reports (Provider Version and Consumer Version) for all hospitals in North Carolina
http://epi.publichealth.nc.gov/cd/hai/figures.html

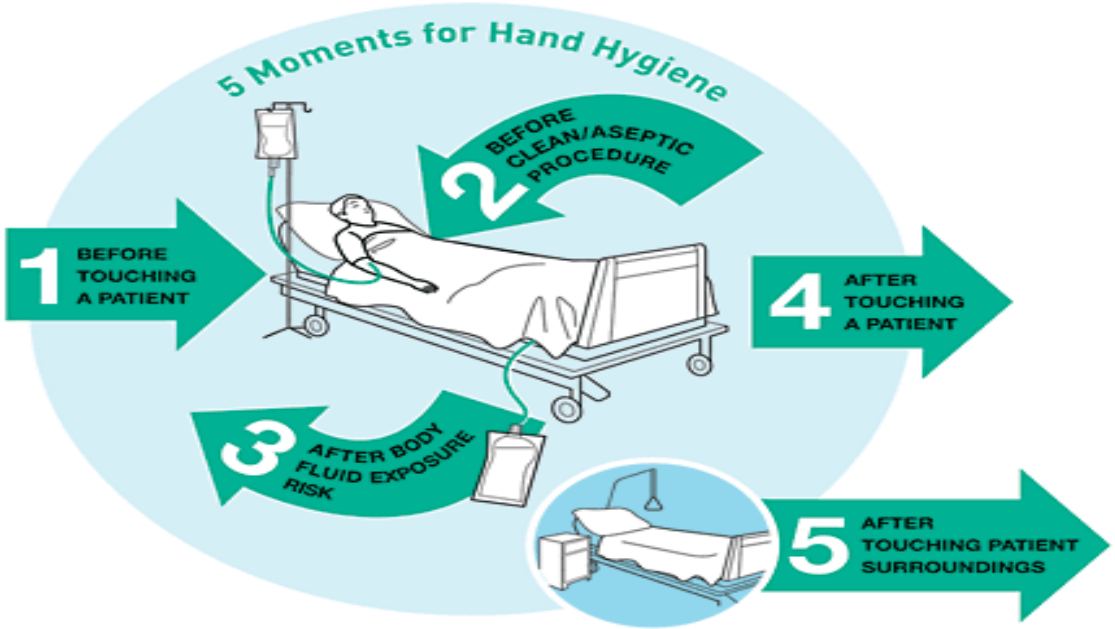
- Central Line Associated Bloodstream Infection (CLABSI)
- Catheter Associate Urinary Tract Infection (CAUTI)
- Surgical Site Infection (SSI-colon and abdominal hysterectomy)
- Lab ID Hospital Onset Clostridium difficile
- Lab ID MRSA Bacteremia

NCPH
North Carolina Public Health

Hand Hygiene

- Cornerstone for Prevention of HAIs
- Clean your hands **before** and **after** each patient as you enter and exit the patient room
- Clean your hands according to WHO 5 Moments:

Gloves are **never** a substitute for hand hygiene



Hand Hygiene

- Use **hospital approved lotions** to reduce hand dermatitis from products (other lotions may inactivate hand hygiene agents)
- Employees contact Teammate Health if reactions to hand hygiene agents occur
- **Artificial nails not allowed** because they harbor microorganisms (have been associated with outbreaks)
- Keep nails less than ¼ inch to avoid harboring of microorganisms

Soap and Water Hand Hygiene Indications

15 Second Hand Wash with Soap and Water

- Hands visibly soiled
- Before eating
- After toileting
- After visiting **Contact Enteric** precautions patient (C. difficile, norovirus)
- **In most other situations, alcohol hand rub is as, or more, effective**

Alcohol Hand Rub

- Dispense foam/gel into palm of one hand and rub hands together, **covering all surfaces** until hands are dry
- Use disposable towel to turn off faucet
- Technique is important!

Standard Precautions

- Assume all patients are potentially infectious, wearing appropriate personal protective equipment (PPE) depending on the task performed to protect yourself from exposure to body fluids, non-intact skin, and mucous membranes
- Assure adequate PPE availability
- **Always** use sharps safety devices

Role of Environment

- Recent evidence that **contaminated surfaces play an important role in transmission of HAIs**
- Pathogens can live on equipment and surfaces for months
- Numerous outbreaks from contaminated equipment
- Disinfect tools (stethoscope, otoscope, etc.) after use with hospital approved disinfectant wipes




Multidrug Resistant Organisms (MDROs)

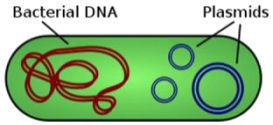
- Multiple MDROs have developed related to antibiotic exposure
- Antibiotic stewardship is a commitment to use antibiotics only when necessary and to choose the right antibiotics in the right way.
- **Judicious antibiotic use will delay development of MDROs**
- See Physician Connect → Infectious Disease for antibiotic stewardship recommendations

MDROs

- See Physician Connect →Infectious Disease for current facility Antibiograms
- Over 2 million MDRO infections in U.S. every year with at least 23,000 deaths
- Current Status:

CDC Urgent Threats	CDC Serious Threats
Clostridium difficle	MRSA
Carbapenem-resistant Enterobacteriaceae (CRE)	Extended Spectrum Beta Lactamase producing Enterobacteriaceae (ESBLs)

Carbapenem Resistant Enterobacteriaciae (CRE)



- Enterobacteriaciae - gram negative organisms common residents of GI tract are a frequent cause of HAIs
- Growing number are **resistant to almost all antibiotics** including carbapenems
- In many cases no antibiotics left to treat them
- **Spread very quickly** in healthcare facilities (plasmid transfer)
- Rapidly growing problem in healthcare facilities with **numerous outbreaks**
- Strict contact precautions and hand hygiene, CHG bathing where appropriate, good cleaning of the environment and antibiotic stewardship effectively reduce spread

Isolation Precautions

3 routes of transmission when Standard Precautions alone are not adequate:

- Contact
  - Contact Enteric
- Droplet
- Airborne

Contact Precautions

Indications:

- Multidrug-Resistant Organisms (MDRO)
  - MRSA
  - VRE
  - CRE
  - ESBL
- Scabies & lice
- Wounds with uncontained drainage

Personal Protective Equipment (PPE):

- Gloves and gown **UPON EVERY ROOM ENTRY**
- Hand hygiene upon room entry/exit

Active Surveillance Cultures for MRSA

Admission Nasal Screen

- High risk patients
  - Hospitalized in past year
  - Dialysis patients
  - Transfers from hospitals, LTC, rehab, group homes, or jails
  - Patient reported or MD documentation of MRSA

Weekly Nasal Screen

- All ICU patients

Positive MRSA Screen or Clinical Culture

- Placed on Contact precautions
- Flagged as “Active MRSA” on Diagnosis and Problem list in Cerner

		176116017	MRSA	MRSA	3/18/2011	Active

- “MRSA” label on inpatient banner bar

MRSA Clearance Criteria

- Must have 2 negative MRSA nasal screens at least 24 hours apart **at a minimum of one year after** last positive MRSA clinical culture or PCR

***No MRSA antibiotics can be given within 48 hours of qualifying clearance nasal screens**

MRSA Prevention

- Automatic Decolonization
  - Goal to prevent hospital acquired MRSA infection in those found to be colonized
  - MRSA decolonization will automatically be ordered in the following:
    - Patients with MRSA active on problem list at time of admission
    - Patients with an admission diagnosis of MRSA
    - Patients with a new MRSA positive result during the hospitalization (if not decolonized already during current admission)
      - 5 days of Intranasal mupirocin twice daily
      - 5 days of CHG baths (longer if central line in place or in ICU where daily CHG baths are protocol)

Contact Enteric Precautions

Indications:

- C. difficile
- Norovirus
- Acute diarrhea with unknown cause

PPE:

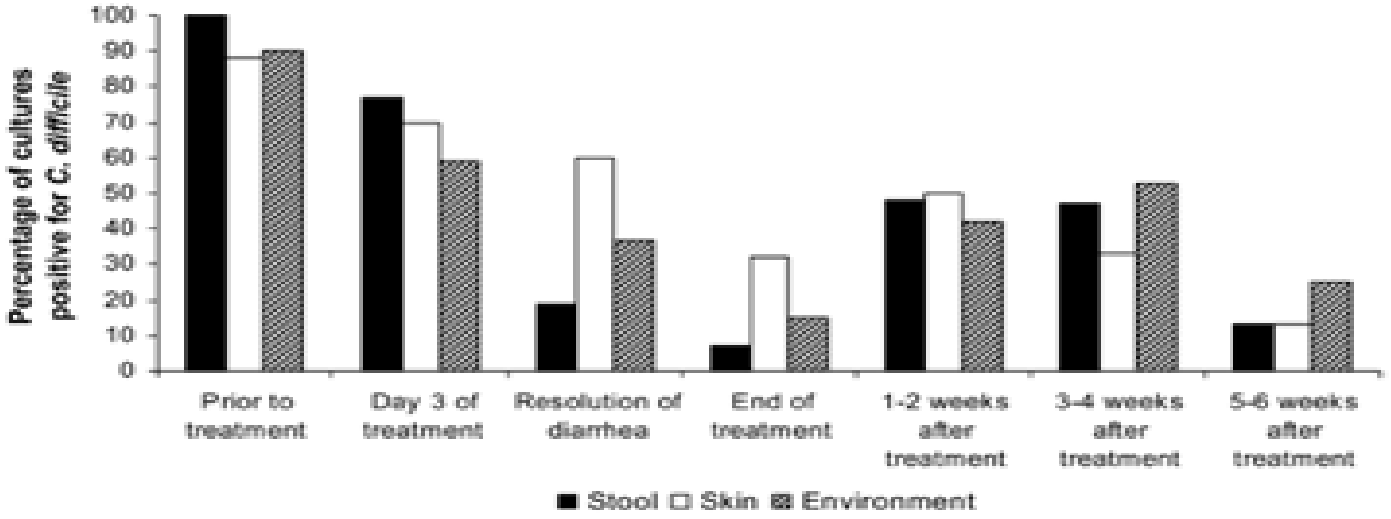
- Gloves and gown UPON EVERY ROOM ENTRY
- Hand Hygiene upon room entry
- **Wash hands using soap and water upon room exit**
- **Bleach wipes to disinfect equipment**

C difficile

- Spore forming gram positive anaerobic bacillus producing toxins A and B
  - Epidemic B1/NAP1/027 strain producing 16 fold higher concentration of toxins is now common in U.S.
- Causes a range of diarrhea illness up to pseudomembranous colitis requiring colectomy, with severe illness increasing
- Steep increase in number of cases in last 10 years
- Spores persist for months in environment and require sporicidal agent such as bleach to kill
- Antibiotic exposure and fecal-oral transfer by hands of healthcare worker are primary risk factors

C diff background information

PERCENT OF STOOL, SKIN, AND ENVIRONMENT CULTURES POSITIVE FOR *C. difficile*



Skin (chest and abdomen) and environment (bed rail, bedside table, call button, toilet seat)

Sethi AK, et al. ICHE 2010;31:21-27

C difficile Contact Enteric Isolation

- All gastroenteritis- contact enteric until diarrhea resolved or back to baseline
- C difficile:
  - Initiate precautions when test is ordered
  - Continue isolation for duration of hospitalization
  - Continue isolation on readmission if positive test in past 8 weeks
  - Continue isolation if on C diff treatment

C. Diff Pearls

- Test only symptomatic patients with no alternate cause for loose stool (i.e. laxatives, underlying disease, etc)
- **Only one sample can be sent for C diff within a 7 day period – no benefit to more tests**
- Serial C. diff testing and test for cure at the end of therapy are **no**t best practice
- Recurrence of symptoms within 7 days of end of therapy likely represents recurrence, MD should restart therapy but no need to retest

C difficile Testing

- Most CHS Primary Enterprise C diff testing involves Initial Enzyme immunoassay for Antigen and Toxin
  - If discrepant results (i.e. Antigen positive but Toxin negative) then sample automatically reflexed to C. difficile PCR testing

Maintain or Discontinue Contact Enteric Precautions based on test guidelines below:

Antigen	Toxin	Isolation
Negative	Negative	Discontinue Isolation
Positive	Positive	Continue Isolation for duration of hospitalization
Negative	Positive	
N/A	PCR Positive	
Positive	Negative	Continue Isolation until results of *C. diff* PCR test* are known, PCR test is performed automatically by the lab
***Additional test: *C. difficile* PCR**		
Toxin DETECTED		Continue Isolation for duration of hospitalization
Negative		Discontinue Isolation

C. difficile Screening Standing Order Implemented May 2016

- Nursing will screen patients for *C. diff* criteria upon admission & in daily, ongoing assessments
- If screening criteria met, patient is deemed as high risk for *C. diff* and an order will be placed automatically for ***C. diff* stool specimen** & **Contact Enteric Isolation**

C. diff Screening Criteria

High risk patients are identified if they have:

- ≥ 3 watery stools in the last 24hrs NOT related to a clinical condition or medication

AND

- Any one of the following criteria:
  - * History of C. diff
  - * Recent antibiotic use
  - * A transfer patient
  - *Fever > 100.4
  - * WBC > 12,000

- This is based on the "*Clostridium difficile* Screening Standing Physician Order"
- Includes: Inpatient & Observation Acute Care Patients ≥ 18 years, Rehab patients

Droplet Precautions

Indications:

- Influenza*
- Bacterial meningitis
- Pertussis
- Signs and symptoms of respiratory infection (undiagnosed)

PPE:

- **Surgical Mask required upon entry to room**
- Hand hygiene upon room entry and exit

*For influenza or suspected influenza N95 mask should be worn when performing aerosol producing procedures such as bronchoscopy, intubation, etc.

Influenza

- Droplet precautions required for confirmed or suspected influenza
- Droplet precautions may be D/C**
  - after 7 days **and** afebrile >24 hours
  - alternate diagnosis confirmed or initial influenza PCR negative (off antivirals)

**(Immunocompromised patients or children must have negative repeat PCR to d/c isolation as these groups have prolonged viral shedding)

Influenza Testing

- **PCR Influenza test is the recommended test for all inpatients** (order as “Respiratory Viral Panel PCR”) when testing is indicated
- DFA Influenza test is the recommended test for outpatients unless immunosuppressed. Influenza in outpatients is primarily a clinical diagnosis
- A rapid influenza test **should not be used** due to low sensitivities

Influenza Vaccine

- Influenza can be transmitted 1 day prior to symptom onset
- Influenza is leading cause of vaccine preventable death
- Prevent influenza related deaths in high risk patients by vaccination
- Required to get an annual influenza vaccine or complete a declination form
- **Mandatory masking** is required for all patient care activities (within 6 feet of patients) if not vaccinated when influenza season is declared
  - Change surgical mask when visibly soiled or after use in an isolation room

Respiratory virus

- Place all patients on contact and droplet when RVP is ordered
- Immunocompetent
  - Depending on results of RVP can deescalate to contact or droplet if appropriate
- Infants, children and immunocompromised
  - Continue on droplet and contact precautions for duration of illness
- Duration-
  - At least 7 days or longer until symptom resolution and afebrile >24 hrs.
  - Influenza- Will need repeat RVP PCR to be negative for children and immunocompromised prior to discontinuation of isolation

Airborne Precautions

Indications:

- Tuberculosis (suspected or confirmed pulmonary TB)
- Disseminated shingles
- Varicella

PPE:

- **N95 or PAPR upon room entry**
- **Annual fit testing**

Negative Pressure room required

Tuberculosis

- Order appropriate diagnostic tests for signs or symptoms of active TB
- Patients at high risk include: HIV infected, foreign born, close contacts of active TB, correctional facility residents, medically underserved, and alcohol abusers
- Implement **airborne precautions** if active pulmonary, laryngeal, or draining extrapulmonary TB suspected
- Criteria for D/C airborne precautions:

  - Alternate diagnosis confirmed
  - 3 negative smears 8 hours apart (1 early morning)
  - Effective therapy at least 2 weeks **and** clinically improving

Prevent Device Associated Infections

- Every day an invasive device is in increases the risk of infection
- Assess the need for devices daily and remove when no longer necessary

Prevent Central Line Associated Bloodstream Infections (CLABSI)

Central Line Insertion Bundle
Perform **hand hygiene** before and after catheter insertions or manipulation
Use **chlorhexidine**/alcohol antiseptic for skin preparation (back and forth motion and allow to air dry)
Use **full barrier** precautions during insertion (sterile gown and gloves, cap, mask, and full body drape)
Avoid using the **femoral** site in adults (except hemodialysis/advanced kidney disease)
Assess the need for the catheter each day and **remove ASAP**
Use **BioPatch** chlorhexidine disk at insertion site

Prevent Catheter Associated Urinary Tract Infections (CAUTI)

- Use foley catheter only for approved indications.
- Consider alternatives such as in and out catheterization or condom catheters if possible.
- Order ‘Urinary Catheter Protocol’ whenever a foley is placed.
- RN daily assesses for necessity and removes catheter when patient no longer meets approved indications
- Risk of infection increases 5% each day catheter remains in place

Urinary Catheter Protocol Approved Indications

- Bladder outlet obstruction
- Urological/Perineal procedures
- Catheters inserted by urology
- Continuous Bladder Irrigation
- Movement intolerance (e.g., respiratory or hemodynamic instability).
- Prolonged immobilization due to unstable spine/pelvic/hip fractures
- Epidural in place
- Stage III / IV/unstageable pressure ulcer to sacrum / perineum AND incontinent
- Critically ill patient requiring monitoring of urinary output every 1 - 2 hours(e.g. Acute CHF/SIADH/ARF/Acute raised ICP/code sepsis first 24 hours only, large volume resuscitation(>30 ml/kg), therapeutic hypothermia, vasoactive medications)
- Chemically paralyzed or sedated AND ventilated patient
- End-of-life for comfort
- Prolonged deep sedation (greater than 2 hrs)

Surgical Site Infection Prevention

- Use appropriate pre-op antibiotics for surgery (cards posted in OR)
  –Complete pre-op antibiotics within 1 hour before incision time (2 hours for vancomycin)
  – Discontinue pre-op antibiotics within 24 hours after surgery (48 hours for cardiothoracic surgery)

- Consider use of alcohol containing surgical prep (ChloraPrep, Duraprep™, etc) todecrease risk of surgical site infections*

  *Darouiche RO *et al* Chlorhexidine–Alcohol versus Povidone–Iodine for Surgical-Site Antisepsis *New England Journal of Medicine* 2010;362:18-26

- Remove hair, if needed, by clipping and not shaving with a razor
- Maintain blood glucose below 180 mg/dl through post-op day 2
- For colorectal surgery, maintain normal body temperature during procedure and on arrival in PACU

- Pre-op shower with chlorhexidine night before and morning of surgery, consider in pre-op area

Exposures to Infectious Agents

- First, if exposed to blood, body fluids with visible blood, or internal body fluids wash the affected area with soap and water or rinse eyes with water
- For Bloodborne Pathogen exposure management, **promptly** contact Teammate Health at 704-355-SAFE (7233)
- You will be guided to complete all necessary steps and given any recommended post-exposure prophylaxis (within 2 hour time frame for high risk HIV exposure)
- Other exposures (TB, *N. meningitidis*, pertussis, varicella, scabies, etc) are managed by Teammate Health and Infection Prevention

  - Individuals exposed are contacted for recommended follow-up upon laboratory confirmation

Health Department Reporting

- Physicians are required by NC state law to report communicable diseases to county health department
- See Physician Connect → Infectious Disease → Infection Prevention → **NC Communicable Disease Manual** to locate list of diseases and conditions reportable to county health department and reporting form
- Physician's responsibility to report inpatient and ER clinical syndromes

HOW TO REPORT A COMMUNICABLE DISEASE

County Health Departments

Contact Health Department based on residence of patient

- Cabarrus Health Department – 704-920-1208
- Mecklenburg Health Department – 704-336-4671
- Rowan Health Department – 704-216-8784
- Stanly Health Department – 704-986-3036

Resources

Carolinas HealthCare System | PhysicianConnect

- **Infection Prevention Department** – 704-337-0018
- **Infection Prevention Manual** (Intranet) – People Connect → Policies → Other Facility Policies → Infection Prevention
- People Connect → Physician Connect → **Infectious Disease**
  - News and Alerts**:** Health Department and Infection Prevention alerts are posted
  - Guidelines
  - Antibiogram