Infection Control, Outbreaks, and Antibiotic Stewardship Programs

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Section 483.80 – Infection Control

The Infection Prevention and Control Program must include the following parts:

- A system for preventing, identifying, reporting, investigating, and controlling infections and communicable diseases that:
  - Covers all residents, staff, volunteers, visitors, and other individuals providing services under a contractual arrangement;
  - Is based on the individual facility assessment;
  - Follows accepted national standards;
- Written standards, policies and procedures in accordance with §483.80(a)(2);
- A system for recording incidents identified under the IPCP and corrective actions taken by the facility; and
- An antibiotic stewardship program (ASP) (FSS1).
**Scope of Infection Control**

- **STANDARD PRECAUTIONS**
  - Handwashing
  - Barrier precautions
  - Sharps disposal

- **ENVIRONMENTAL CONTROL**
  - Physical facility
  - Patient care equipment
  - Water, Air, Food
  - Solid waste, Liquid waste

- **EMLOYEE HEALTH**
  - CD Reporting
  - HBV screening & immunization
  - BBFE
  - TB
  - MMR, Varicella
  - Work restriction
  - Prophylactic Rx: Mng, Pert, TB, HAV, HBV, HIV

- **IC COMMITTEE IC POLICIES**

- **ISOLATION PRECAUTIONS**

- **SURVEILLANCE**
  - Nosocomial infection
  - Surveillance system
  - Antibiotic sensitivity

- **COMMUNICABLE DISEASE CONTROL IN HOSPITAL**
  - Reporting of disease
  - MRSA, C. *diff.*, CRE, Candida
  - Preventive treatment of exposed

- **SPECIAL PROCEDURES**
  - Cardiovascular access lines
  - Wound care
  - Urinary catheter
  - Artificial ventilation

- **STERILIZATION**
  - IC supports CSS
    - (Central Sterilization & Supply)

- **HOUSEKEEPING LINEN**

**Infection**

- **The entrance and development of an infectious agent** in a human or animal body, **whether or not** it develops into a disease

- An infectious agent is a micro- or macro-organism capable of producing an infection or an infectious disease

- An infectious disease is an illness caused by a specific infectious agent or its toxic product that results from transmission of that agent or its product from an infected person, animal, or reservoir to a susceptible host

- **A few words you may hear in front of infection:**
  - Asymptomatic and Symptomatic
  - Subclinical or Clinical
  - Inapparent or Apparent
Clinical/Symptomatic/Apparent Infection

• An infection that results in signs and symptoms. Some of these may be general and obvious others may be very minor and less obvious
  • Fever, malaise
  • Inflammation, heat, pain, erythema
  • Change in enzyme levels, composition of bodily fluids
• Remember: Immunocompromised patients do not show signs of infection as normal patients
  • Neutropenic patients (≤ 500 neutrophils /ml) show no pyuria, no purulent sputum, little infiltrate and no large consolidation on chest X-ray Subclinical/Asymptomatic/Inapparent Infection

  • Does not mean that “all is quiet”. It may cover some very active processes as in the asymptomatic phase of HIV infection, tuberculosis infection, hepatitis B carrier state.

Colonization: Definition

• The presence of a microorganism on/in a host, with growth and multiplication of the organism, but without interaction between host and organism (no clinical expression, no immune response).
• You wouldn’t know it was there unless you looked for it (via lab tests)
• Oftentimes it will lead you somewhere you shouldn’t go (maybe away from the true villain!).
Exposure: Definition

- Simply coming into contact with anything (capable of causing disease)
- The definition of exposure can vary depending on what organism you are referencing.
  - An airborne organism vs a bloodborne organism
  - An organism requiring droplet precautions vs an organism requiring contact precautions

Exposure-Infection Spectrum
Flora at Colonization Sites

**OROPHARYNX**
- *Streptococcus viridans* group
- *Streptococcus pyogenes*
- *Streptococcus pneumoniae*
- Staphylococci
- *Moraxella catarrhalis*
- *Neisseria* spp
- *Corynebacterium* spp
- *Haemophilus* spp
- Anaerobes: *Bacteroides*, *Candida albicans*

**NASOPHARYNX**
- Staphylococci
- *Streptococci*
- *Moraxella catarrhalis*
- *Neisseria* spp
- *Haemophilus* spp

**SKIN**
- Staphylococci
- Corynebacteria
- *Propionibacteria*
- *Candida*
- *Malassezia furfur*

**CONJUNCTIVA**
- Staphylococci
- Corynebacteria
- *Haemophilus*

**GENITOURINARY TRACT**
- Staphylococci, *Streptococci*
- Enterococci
- *Lactobacillus* spp, *Corynebacterium*
- *Neisseria* spp, Anaerobes
- *Candida albicans*

**UPPER INTESTINE**
- *Streptococci*
- *Lactobacillus* spp
- *Candida* spp

**LOWER INTESTINE**
- *Aerobic G-bacilli*: *E.coli*, *Klebs*
- *Enterobacter*, *Proteus*, *Serratia*
- *Providencia*, *Bacteroides*, Anaerobic
- *Enterococci*, *Streptococci*, *Candida*

Viruses on Building Surfaces

- **Respiratory syncytial virus**
  - Hospitals (23)
  - Countertops, cloth gowns, rubber gloves, paper facial tissue, hands (33)

- **Rhinovirus**
  - Not found
  - Skin, hands (30), door knob, faucet (52)

- **Influenza virus**
  - Day care centers, homes, nursing home (51)
  - Towels, medical cart items (51)

- **Parainfluenza virus**
  - Officers (data not published), hospitals (23)
  - Desks, phones, computer mouse (Boone and Gerba, submitted)

- **Coronavirus**
  - Hospitals (23), apartment (62)
  - Phones, doorknobs, computer mouse, toilet handles (23), latex gloves, sponges (53)

- **Norovirus**
  - Nursing homes (6), hotels, hospital wards, cruise ships, recreational centers (22, 38, 61)
  - Carpets, curtains, lockers, bed covers, bed rails, drinking cups, water jug handle, lampshade (6, 38)

- **Rotavirus**
  - Day care centers, pediatric ward (6)
  - Toys, phones, toilet handles, sinks, water fountains, door handles, play areas, refrigerator handles, water play tables, thermometers, play mats (6, 38, 70)
  - Paper, china (2), cotton cloth, latex, glazed tile, polystyrene (1)

- **Hepatitis A virus**
  - Hospitals, schools, institutions for mentally handicapped, animal care facilities, bar (22)
  - Drinking glasses (72), paper, china (2), cotton cloth, latex, glazed tile, polystyrene (1)

- **Adenovirus**
  - Bars, coffee shops (7, 24)
  - Drinking glasses (24), paper, china (2), cotton cloth, latex, glazed tile, polystyrene (1)

- **Astrovirus**
  - Schools, pediatric wards, nursing homes (39)
  - Paper, china (2)

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Infectious Dose

<table>
<thead>
<tr>
<th>Microorganisms or diseases</th>
<th>Infectious Dose</th>
<th>Route</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycobacterium tuberculosis, bovis</td>
<td>10</td>
<td>Inhalation</td>
<td></td>
</tr>
<tr>
<td>Bacillus anthracis</td>
<td>8,000-50,000</td>
<td>Inhalation</td>
<td></td>
</tr>
<tr>
<td>Tularemia (Francisella tularensis)</td>
<td>5-10</td>
<td>Inhalation</td>
<td></td>
</tr>
<tr>
<td>Tularemia (Francisella tularensis)</td>
<td>10,000,000</td>
<td>Ingestion</td>
<td></td>
</tr>
<tr>
<td>Q fever (Coxiella burnetii)</td>
<td>10</td>
<td>Inhalation</td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td>800+</td>
<td>Inhalation</td>
<td></td>
</tr>
<tr>
<td>Coxsackie A21 virus (Enterovirus)</td>
<td>18</td>
<td>Inhalation</td>
<td></td>
</tr>
<tr>
<td>Adenovirus</td>
<td>150+</td>
<td>Intranasal</td>
<td></td>
</tr>
<tr>
<td>Respiratory syncytial virus</td>
<td>100-600</td>
<td>Intranasal</td>
<td></td>
</tr>
<tr>
<td>Norovirus</td>
<td>10</td>
<td>Ingestion</td>
<td></td>
</tr>
<tr>
<td>Rotavirus</td>
<td>1-5</td>
<td>Ingestion</td>
<td></td>
</tr>
<tr>
<td>Histoplasma capsulatum</td>
<td>10</td>
<td>Inhalation</td>
<td>Mice</td>
</tr>
<tr>
<td>Syphilis</td>
<td>57</td>
<td>Intradermal</td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>10</td>
<td>Intravenous</td>
<td></td>
</tr>
<tr>
<td>Typhoid fever</td>
<td>100,000</td>
<td>Ingestion</td>
<td></td>
</tr>
<tr>
<td>E. coli</td>
<td>100,000,000</td>
<td>Ingestion</td>
<td></td>
</tr>
<tr>
<td>Enterohaemorrhagic E. coli 0157: H7</td>
<td>10</td>
<td>Ingestion</td>
<td></td>
</tr>
<tr>
<td>Bacillus cereus</td>
<td>1,000,000</td>
<td>Ingestion</td>
<td>per gram</td>
</tr>
<tr>
<td>Campylobacter jejuni</td>
<td>500</td>
<td>Ingestion</td>
<td></td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td>100,000</td>
<td>Ingestion</td>
<td>per gram</td>
</tr>
<tr>
<td>Hepatitis A virus</td>
<td>10-100</td>
<td>Ingestion</td>
<td></td>
</tr>
</tbody>
</table>

When not specified, the dose is the number of organisms.

Where do healthcare infections come from?

- Colonization
- Food & Water
- Hands: HCW, visitors

- Others:
  - Fomites
  - Environment
Transmission

• Cases
• Index – the first case identified
• Primary – the case that brings the infection into a population
• Secondary – infected by a primary case
• Tertiary – infected by a secondary case

Transmission

• May be transmitted via direct contact or indirect contact
  • Direct Contact – Transferred directly from an infected/colonized person to another person.
    • Likely to occur in common areas like recreation rooms, rehabilitation rooms, and dining rooms.
    • May also occur in patient rooms while visiting one another.
  • Indirect Contact – Transferred indirectly from an infected/colonized person to another via an intermediary person or object.
    • Clothing, uniforms, laboratory coats, gowns, hands, high-touch surfaces, carts, wheelchairs, walkers, etc.
Contact Transmission

- Gastrointestinal, respiratory, skin, wound infections
- Colonization with multidrug resistant bacteria
- Enteric infections, enteroviral infections in infants
- RSV, parainfluenza,
- Infectious skin infections: HSV, impetigo, cellulitis, scabies, staphylococcal furunculosis,
- Viral hemorrhagic conjunctivitis, viral fevers
- Some respiratory infections, bronchiolitis in infants, children
- Abscess, draining wound

Skin Hand Flora

**RESIDENT FLORA**
- Survives on the skin more than 24 hours
- Not easily removed, hours of scrubbing
- Complete sterilization impossible
- Low virulence
- Staphylococci, diphteroides,
- mostly Gram +,
- very few Gram -

**TRANSIENT FLORA**
- Survive on skin less than 24 hours
- Easily removed with soap and water
- Acquired during contacts with contaminated areas mouth, nose, perineal area, genitals, anal area, catheter, bedpan, urinal, patient care casual contact
- May have high virulence

**Humans sheds # 300,000,000 squames/day (4 to 25 mm) able to carry bacteria**
Contact: Fecal-Oral

• Typhoid fever
• Shigella
• Cholera
• Polio
• Coxsackie, Echo, Reo
• Norwalk agent
• Rotavirus
• Hepatitis A, Hepatitis E

Droplet Transmission

• Hemophilus influenzae
• Meningococci
• Pneumococcal infections (invasive, resistant)
• BACTERIAL RESPIRATORY Infections
  • Diphtheria, Pertussis, pneumonic plague, Mycoplasma pneumoniae
  • Streptococcal pharyngitis, pneumonia, scarlet fever
• VIRAL RESPIRATORY Infections
  • Adenovirus, Influenza, Mumps, Parvovirus, Rubella
• ANY PAROXYSMAL COUGH (Pertussis?)
Airborne Transmission

• Droplet nuclei = droplets less than 5 µ in diameter
  • from evaporation of larger droplets
  • or from direct formation during coughing, speaking, singing
• Transmission may occur over long distance

Transmitted by D.N.
• Tuberculosis (Infectious)
• Suspects of TB: request sputum smear
• Measles
• Varicella
• Smallpox (hemorrhagic)

How to Prevent Healthcare Acquired Infections

• Standard Precautions
• Transmission-based Precautions
• Proper Disinfection/Sterilization Practices
Standard Precautions

• Same concept as UNIVERSAL PRECAUTIONS
  • Precautions should be taken for any contact with Blood and Body Fluid (UP)
  • AND for any contact with secretions and excretions, mucous membranes, damaged skin, contaminated environment and equipment

Standard Precautions

• Five main components:
  • Hand Hygiene
  • Use of Personal Protective Equipment (PPE)
  • Respiratory Hygiene and Cough Etiquette
  • Safe Injection Practices
  • Safe Handling of Potentially Contaminated Equipment or Surfaces

• Represent the Minimum Infection Prevention Measures in ANY Healthcare Setting
• Designed to Protect Healthcare Workers (HCWs)
• Designed to Prevent the Spread of Infections Among Patients
**Handwashing**

- Beginning and end of day
- Before & after each patient contact
- Before and after gloving
- Anytime after contact with
  - Blood & body fluid
  - Secretions /excretions
  - Mucous membranes
  - Damaged skin
  - Contaminated environment
  - Contaminated equipment

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**WHO Handwashing Technique**

- Washing hands with soap and water is the best way to reduce the number of germs on them. If soap and water are not available, use an alcohol-based hand sanitizer that contains at least 60% alcohol. Alcohol-based hand sanitizers can quickly reduce the number of germs on hands in some situations.
- BUT sanitizers do not eliminate all types of germs: Not effective on spores.
- Hand sanitizers are not effective when hands are visibly dirty.
### Hand Hygiene

<table>
<thead>
<tr>
<th>Interventions compared</th>
<th>Mean log reduction (95% CI), log$_{10}$ CFU/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm water and plain soap</td>
<td>No hand hygiene</td>
</tr>
<tr>
<td>Warm water and plain soap</td>
<td>Alcohol-based handrub</td>
</tr>
<tr>
<td>Cold water and plain soap</td>
<td>No hand hygiene</td>
</tr>
<tr>
<td>Cold water and plain soap</td>
<td>Alcohol-based handrub</td>
</tr>
<tr>
<td>Warm water and plain soap</td>
<td>Antiseptic hand wipe</td>
</tr>
<tr>
<td>Warm water and antibacterial soap</td>
<td>No hand hygiene</td>
</tr>
<tr>
<td>Warm water and antibacterial soap</td>
<td>Alcohol-based handrub</td>
</tr>
<tr>
<td>Cold water and plain soap</td>
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<tr>
<td>Antiseptic hand wipe</td>
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<td>Antiseptic hand wipe</td>
<td>Alcohol-based handrub</td>
</tr>
<tr>
<td>Cold water and plain soap</td>
<td>Warm water and antibacterial soap</td>
</tr>
<tr>
<td>Warm water and plain soap</td>
<td>Cold water and plain soap</td>
</tr>
<tr>
<td>Alcohol-based handrub</td>
<td>No hand hygiene</td>
</tr>
</tbody>
</table>

### Gloves

**FOR ANY CONTACT WITH**
- Blood and Body Fluids
- Secretions & excretions
- Mucous membranes
- Damaged skin
- Contaminated environment or equipment

**DO NOT REPLACE**
Handwashing

If it is wet, red or dirty
Wash, glove then wash
**Eye Protection/ Face Shield**

**RISK OF SPRAY or SPLASH**
- of blood,
- body fluid,
- secretion
- excretion
  in FACE OR EYE

**Surgical Masks**

- **STANDARD PRECAUTIONS**
  For personnel to protect from splashes/sprays of BBF/SE

- **DROPLET PRECAUTIONS**
  to prevent large droplets (>5μm) on/from patient

- For patients
  to prevent emission of droplet (large and droplet nuclei)
Gown

- **STANDARD PRECAUTION**
  - To protect from splashes/sprays of large quantities of BBF/S E

- **CONTACT PRECAUTION**
  - To protect contamination of personnel clothing

Correct Sequence Donning PPE
Respiratory Etiquette

Injection Safety

• The three golden rules of injection safety:
  • Never administer medications from the same syringe/needle/IV bag to more than one patient.
  • Never enter a vial with a used (non-sterile) syringe or needle.
  • Never administer medications from a single-dose vial to multiple patients.
Injection Safety

• Other important rules/habits to follow:
  • Use of multi-use vials should be kept to a single patient if at all possible.
  • Multi-use vials should never enter point-of-care areas (patient areas).
  • Store, access, and prepare medications in a clean area on a clean workspace which is separate from point-of-care areas.
  • Pre-filled syringes should be used as is. Never alter their solution.
  • IV bags and their tubing should be thought of just like single-use vials with the same rules applied (see above)
  • Use prepared medications (reconstituted, drawn syringes) within an hour of preparation whenever possible unless prepared in an ISO class 5 area (laminar flow hoods).
  • Institute drug diversion monitoring systems (cameras, barcode logs) and security measures (pharmacy prep, access cards) to prevent or identify possible drug diversion events/personnel.
  • Disinfect blood glucose meters after each use.
  • Discourage transporting medications in coat or pant pockets.
Contact Precautions

- Private room (*)
- Gloves when entering room,
- change glove after infectious contact
- Gown when entering room if substantial contact will occur

Droplet Precautions

Large particle droplets (>5μ) emitted when coughing, sneezing, talking & performance of procedures

- Private room
- Mask when entering room

Use STANDARD PRECAUTIONS at ALL times for ALL patients
Airborne Precautions: Signage

**Morbidity Regional Medical Center**

**AIRBORNE ISOLATION PRECAUTIONS**

Visitors ~ See Nurse before entering

Clean Hands ~ N-95 or PAPR ~ Negative Pressure / Door Closed

PAPR for High Hazard Procedures (Ben other side)

Use STANDARD PRECAUTIONS at ALL times for ALL patients

Patient Placement

- **Droplet and Contact**
  - Private room preferred
  - or cohort with same infection
  - or at least 3 feet between beds
  - Use common sense: do not mix in immunocompromised patient with infected one

- **Airborne**
  - Private room with ventilation control
    - Negative air pressure
    - >6 air exchange /hour
    - HEPA filtered or exshaut out
    - PATIENT wears surgical mask if coughing & when transported
Sterilization

- Complete removal or destruction of all forms of microbial life
  - bacteria,
  - viruses,
  - fungi
  - spores
- Probabilistic notion
  - No absolute assurance that there is 0 microorganism
  - Sterility assurance level (SAL) used as measure of sterility
  - SAL = probability of survival of a microorganism after sterilization process
  - Expressed as log10 (probability of survival)
  - SAL of 6 = < 1 chance in a million (10^-6) that a particular item is contaminated
  - SAL = 6 acceptable for critical item.

Disinfection

- Process that eliminates defined pathogens
- Not all microbial forms
- Main difference with sterilization = the lack of sporocidal activity
- Categorized into 3 levels:
  - High,
  - Intermediate
  - Low:
Resistance of Microorganisms

Sterilization
- Bacillus stearothermophilus
- Bacillus subtilis
- Clostridium sporogenes

High Level Disinfection
- Mycobacteria, TB bacilli

Intermediate Disinfection
- Hydrophilic viruses
  - Polio, Coxsackie, Rhino

Low Disinfection
- Vegetative fungi & bacteria
- Lipophilic viruses
  - Trichophyton, Cryptococcus, Candida
  - Pseudomonas, Staphylococcus, Salmonella
  - HSV, CMV, RSV, HBV, HIV

Other Stuff
- Cleaning = the removal of adherent visible soil (blood, protein substance and debris), dust or other foreign material by manual or chemical process
- Sanitizing = process that reduces microbial population on object to a safe level
- Decontamination = process that removes pathogenic microorganisms from an object to make it safe to handle
Spaulding Classification

<table>
<thead>
<tr>
<th>Item</th>
<th>Contact with</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>Tissue, vascular space</td>
<td>Sterilization</td>
</tr>
<tr>
<td>Semicritical</td>
<td>Mucous membrane/Non</td>
<td>High level disinfection</td>
</tr>
<tr>
<td></td>
<td>intact skin</td>
<td></td>
</tr>
<tr>
<td>Noncritical</td>
<td>Intact skin only, not</td>
<td>Intermediate or low</td>
</tr>
<tr>
<td></td>
<td>mucous membranes</td>
<td>level disinfection</td>
</tr>
</tbody>
</table>

Use Spaulding with a Grain of Common Sense

- Interpret with common sense
  - Mouth pieces have to be disinfected to a high level
  - Silverware simply cleaned
  - However both come into contact with mouth mucosa

- Other considerations:
  - Feasibility of the disinfection method
  - Effect of disinfectant on instrument (for example tonometer tips do not take well to heavy use of disinfectants)
  - Safety to employee
Factors Affecting Effectiveness of Disinfection

- Cleaning
  - Residual particles harbor & shelter from disinfectant
  - Organic load restrict disinfectants effectiveness of alcohol, phenols, chlorine & iodines

- Nature of object: crevices, hinges, lumens more difficult to disinfect.

- Concentration of disinfectant:
  - Diluted during application
  - Lose potency with time

- Time of contact

- Physical and chemical environment:
  - temperature, water hardness, pH

Wiping /Soaking /Contact time

- Using a germicide soaked cloth:
  - Consider time needed to kill
  - All germicides require minimum time
  - If wiped surface is dry before required disinfection time: disinfection cannot be assured
  - Wiping would remove a large amount of contamination and the germicide may kill some left over microorganisms but there is no assurance that all microorganisms were killed
Transferring patients to other facilities

- Implement systems to designate patients known to be colonized or infected with a targeted MDRO
- Notify receiving healthcare facilities and personnel prior to transfer of such patients within or between facilities

Employee Health (Vaccinations)

- Louisiana vaccination requirements for HCW and patients
- Formulate a comprehensive vaccination policy and review at least annually
- Consider offering recommended or needed vaccines at certain times of the year (Oct 1 for Influenza)
- Maintain up-to-date HCW vaccination/serological testing records
  - Recommended information to capture for each vaccine:
    - Date of Administration
    - Vaccine Manufacturer and Lot Number
    - Edition and distribution date of the Vaccine Information Statement (VIS)
    - Name, address, and title of the person whom administered the vaccine
### Vaccine Recommendations

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Schedule</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A (HAV) recombinant vaccine</td>
<td>2 doses 4 weeks apart (third dose 5 months after second); booster doses not necessary; all doses should be administered IM in the deltoid</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postexposure: HCP at risk for exposure to blood or bodily fluids (see Table 4)</td>
</tr>
<tr>
<td>Hepatitis B immune globulin (HBIG)</td>
<td>0.06 mL/kg IM as soon as possible after exposure, if indicated</td>
<td>Postexposure prophylaxis (see Table 4)</td>
</tr>
<tr>
<td>Influenza vaccine (TIV and LAIV)</td>
<td>Annual vaccination with current seasonal vaccine. TIV is available in IM and ID formulations. LAIV is administered intranasally.</td>
<td>All HCP</td>
</tr>
<tr>
<td>Measles live-virus vaccine</td>
<td>2 doses SC; ≥2B days apart</td>
<td>Vaccination should be recommended for all HCP who lack presumptive evidence of immunity; vaccination should be considered for those born before 1957.</td>
</tr>
<tr>
<td>Mumps live-virus vaccine</td>
<td>2 doses SC; ≥2B days apart</td>
<td>Vaccination should be recommended for all HCP who lack presumptive evidence of immunity; vaccination should be considered for those born before 1957.</td>
</tr>
<tr>
<td>Rubella live-virus vaccine</td>
<td>1 dose IM; (However, due to the 2-dose requirements for measles and mumps vaccines, the use of MMR vaccine will result in most HCP receiving 2 doses of rubella-containing vaccine.)</td>
<td>Vaccination should be recommended for all HCP who lack presumptive evidence of immunity; vaccination should be considered for those born before 1957.</td>
</tr>
<tr>
<td>Tetanus and diphtheria (toxoids) and acellular pertussis (Tdap)</td>
<td>1 dose IM as soon as feasible if Tdap not already received and regardless of interval from last Td. After receipt of Tdap, receive Td for routine booster every 10 years.</td>
<td>All HCP, regardless of age.</td>
</tr>
<tr>
<td>Varicella vaccine (varicella zoster virus live-virus vaccine)</td>
<td>2 doses 4–8 weeks apart if aged ≥13 years.</td>
<td>All HCP who do not have evidence of immunity defined as: written documentation of vaccination with 2 doses of varicella vaccine; laboratory evidence of immunity [1] or laboratory confirmation of disease; diagnosis or verification of a history of varicella disease by a health-care provider [2], or diagnosis or verification of a history of herpes zoster by a health-care provider.</td>
</tr>
<tr>
<td>Varicella-zoster immune globulin</td>
<td>125U/10 kg IM (minimum dose: 125U); maximum dose: 625U</td>
<td>Persons without evidence of immunity who have contraindications for varicella vaccine and who are at risk for severe disease and complications; known or likely to be susceptible who have direct, nontransient exposure to an infectious hospital staff worker or patient</td>
</tr>
<tr>
<td>Quadrivalent meningococcal conjugate vaccine (tetraserum) (A,C,Y,W) for HCP ages 19–54 years, Quadrivalent meningococcal polysaccharide vaccine for HCP age ≥55 years</td>
<td>1 dose; booster dose in 5 years if person remains at increased risk</td>
<td>Clinical and research microologists who might routinely be exposed to isolates of Neisseria meningitidis</td>
</tr>
<tr>
<td>Typhoid vaccine IM, and oral</td>
<td>IM vaccine: 1 dose, booster every 2 years; Oral vaccine: 4 doses on alternate days. Manufacturer recommends revaccination with the entire 4-dose series every 5 years.</td>
<td>Workers in microbiology laboratories who frequently work with Salmonella typhi.</td>
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<tr>
<td>Inactivated poliovirus vaccine (IPV)</td>
<td>For unvaccinated adults, 2 doses should be administered at intervals of 4–8 weeks; a third dose should be administered 6–12 months after the second dose.</td>
<td>Vaccination is recommended for adults at increased risk for exposure to polioviruses including health-care personnel who have close contact with patients who might be excreting polioviruses. Adults who have previously received a complete course of poliovirus vaccine may receive a lifetime booster if they remain at increased risk for exposure.</td>
</tr>
</tbody>
</table>

---

### Facility Risk Assessment

**FACILITY ASSESSMENT**

Pursuant to §483.70(e) (F383), the facility must conduct and document a facility-wide assessment to determine what resources are necessary to care for its residents competently during both day-to-day operations and emergencies. The facility must review and update that assessment, as necessary, and at least annually. The facility must also review and update the IPCP, its policies and protocols to include a system for preventing, identifying, reporting, investigating, controlling infections and communicable diseases for residents, staff, and visitors.
## Facility Risk Assessment

### Program Components Table

<table>
<thead>
<tr>
<th>Potential Risk/Problem</th>
<th>Probability of Performance</th>
<th>Impact</th>
<th>Infection Prevention Systems</th>
<th>Score</th>
<th>Goal</th>
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### Additional Tables

#### Policy and Procedures

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#### Handout of DON Boot Camp (2017)

Munley & Salinas, Louisiana Dept. of Health
Contact

Benjamin Munley, MPH
Epidemiologist
Louisiana Office of Public Health
Infectious Disease Epidemiology Section
Benjamin.Munley@LA.gov
504-568-8321

Outbreaks in Long-term Care
What is an Outbreak?

- Increase in occurrence of an infection, disease, complication
- Minimum number depends on the background rates:
  - 2-3 cases of a rare infection might be an outbreak
  - Significant increase in large rates
- Usually decision made empirically on experience
- Statistical tests:
  - Higher rates: Comparison of observed vs expected rate

Objective of Outbreak Investigation

- Identify source/mode of spread of outbreak
- Prevent further transmission
- Learn lessons for future outbreaks
Reporting

• Report triggered by:
  • Abnormal pattern (increase) in routine surveillance
  • Increase from microbiology lab
  • Unusual organism identified
  • Report from residents, families, employee

• Reason for reporting:
  • Genuine concern to prevent future infections
  • Prevent adverse publicity
  • Disgruntled employee or whistle blower

Contact Info: (504)568-8313/1(800)256-2748

<table>
<thead>
<tr>
<th>Region</th>
<th>Epidemiologist</th>
<th>Phone #</th>
<th>Email</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Marceia Walker</td>
<td>(504) 568-8293</td>
<td><a href="mailto:Marceia.Walker@la.gov">Marceia.Walker@la.gov</a></td>
</tr>
<tr>
<td>2</td>
<td>Gillian Richardson</td>
<td>(504) 568-8293</td>
<td><a href="mailto:Gillian.Richardson@la.gov">Gillian.Richardson@la.gov</a></td>
</tr>
<tr>
<td>3</td>
<td>Raychel Berkheimer</td>
<td>(504) 568-8307</td>
<td><a href="mailto:Raychel.Berkheimer@la.gov">Raychel.Berkheimer@la.gov</a></td>
</tr>
<tr>
<td>4</td>
<td>Angie Orellana</td>
<td>(337) 262-1641</td>
<td><a href="mailto:Angie.Orellana@la.gov">Angie.Orellana@la.gov</a></td>
</tr>
<tr>
<td>5</td>
<td>Natalie Christophe</td>
<td>(337) 262-5322</td>
<td><a href="mailto:Natalie.Christophe@la.gov">Natalie.Christophe@la.gov</a></td>
</tr>
<tr>
<td>7</td>
<td>Calandre Singh</td>
<td>(318) 676-5424</td>
<td><a href="mailto:Calandre.Singh@la.gov">Calandre.Singh@la.gov</a></td>
</tr>
<tr>
<td>6/8</td>
<td>Michele Pogue</td>
<td>(318) 484-2162</td>
<td><a href="mailto:Michele.Pogue@la.gov">Michele.Pogue@la.gov</a></td>
</tr>
<tr>
<td>9</td>
<td>Lauren Kleamenakis</td>
<td>(504) 568-8318</td>
<td><a href="mailto:Lauren.Kleamenakis@la.gov">Lauren.Kleamenakis@la.gov</a></td>
</tr>
</tbody>
</table>
Confidentiality

• Protected if investigation led by the State:
  • HIPAA allows reporting to Public Health for investigations
  • State Law requires confidential data to be available to Public Health
  • State Law guarantees confidentiality of details of the investigation
  • State Law prevents details of the investigation to be subject to subpoena

Outbreak Response

• Describe the problem
  • Collect basic information
  • Event description
  • Clinical records
  • Lab confirmations
  • Info useful to complete/confirm initial story

• ID Epi may:
  • Request a line list of ill residents
  • Request samples be collected for testing at State Public Health Lab for identification or confirmation
  • Maps of the facility, list of activities, or menus
  • Offer recommendations on isolation, prophylaxis, and infection control
Line Listing

<table>
<thead>
<tr>
<th>Case #</th>
<th>Patient Name</th>
<th>Patient DOB</th>
<th>Sex (M/F)</th>
<th>Unit/Room</th>
<th>Symptoms</th>
<th>Illness Onset Date</th>
<th>Lab Results</th>
<th>Hospitalized? /Date</th>
</tr>
</thead>
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</tr>
</tbody>
</table>

Prevention at Source of Infection

- Human source:
  - Isolation or treatment of the human source

- Isolation ineffective if asymptomatic cases or carriers

- Length of time the patient is infectious after treatment must be known
Prevention of Transmission

• Contact and indirect contact: Prevent contact, wear gloves if contact if necessary

• Airborne:
  • Wearing mask with sufficient filtering ability
  • Simple surgical mask sufficient for large droplet (as long as the mask is dry)
  • Masks with HEPA type filters for droplet nuclei

• Food and water borne: Avoid suspected food and water

Prevention: Protection of At Risk Person

• Protection of susceptible individuals
• Immunization (passive or active, if time permits)
• Chemoprophylaxis
Outbreak Case Study

• You work at a nursing home with 100 residents living between 4 wings.
• Each wing has its own nursing station.
• There are both shared and private rooms, a community dining room, activity room, and a room for physical therapy and rehabilitation.
• All food is prepared on-site.

• On August 7th at 4 pm, Ginger, a female resident begins experiencing symptoms of vomiting and diarrhea. Ginger lives in a shared room, but her roommate is not exhibiting any symptoms.
• Between 6 pm and 8 pm, 3 more residents begin experiencing the same symptoms of vomiting and diarrhea. Each of those residents have private rooms.

  • What type of transmission precautions do you implement?
  • Who is isolated and where?
• By 10 pm on the night of August 7th, a total of 7 residents have become ill with vomiting and diarrhea. They are in multiple wings of the building. 2 residents have been transferred out to the nearest hospital. You decide to call the Infectious Disease Epidemiology 24-hr on-call phone to report the outbreak.

  • What information should you have prepared for ID Epi?
  • What questions might ID Epi ask?
  • What recommendations might be made?

• On August 8th, 2 nurses, designated to work at different nursing stations, call out of work because they are experiencing nausea and diarrhea and 3 more residents became ill overnight. You decide to close all community areas and residents will be receiving their meals in their rooms.

  • Per ID Epi’s request, you are able to collect 4 stool samples from symptomatic residents, which are promptly delivered to the State Public Health Laboratory.

  • What additional steps should be taken to prevent any further spread of disease?
• On August 9th sanitarian services is sent out to inspect food prep areas and find no breaches. You interview food prep workers and all deny feeling ill or having symptoms of vomiting and diarrhea.

• Over the last 24 hours, 4 more residents become ill. 2 had shared rooms with earlier symptomatic residents and 2 stay in private rooms. In total, there have been 14 residents and 2 nurses reported as ill.

• ID Epi reports that all 4 stools samples collected tested positive for Norovirus.

  • Why is the identification of Norovirus important?

• Based on the identification of Norovirus, all staff are briefed on the importance of thorough hand washing with soap and water, as Norovirus is not killed by use of hand sanitizer.

• Over the next 72 hours, no more residents become ill.

• All common areas and commonly touched surfaces (handrails, doorknobs, therapy equipment) are cleaned and disinfected with a bleach solution and on August ___ you decide to open up all community areas and activities to asymptomatic residents.

  • What would be an appropriate day to open up community areas?
CMS Phase 2 Requirements for Long-Term Care

Effective: November 28, 2017

Revision to State Operations Manual (SOM) Appendix PP for Phase 2, F-Tag Revisions, and Related Issues (Infection Control and Antibiotic Stewardship: pp. 628 – 667)


CMS Phase 2: Infection Prevention and Control Program

- 483.80(a)(1): A system for preventing, identifying, reporting, investigating, and controlling infections and communicable diseases for all residents, staff, volunteers, visitors, and other individuals providing services under a contractual arrangement based upon the facility assessment conducted according to 483.7(e) and following accepted national standards
**CMS Phase 2: Infection Prevention and Control Program**

- **483.80(a)(2):** Written policies and procedures addressing:
  - A system of surveillance designed to identify possible communicable diseases or infections before they can spread
  - When and whom possible incidents of communicable disease or infections should be reported
  - Standard and transmission-based precautions to be followed to prevent spread of infections
  - When and how isolation should be used for a resident
  - The circumstances under which the facility must prohibit employees with a communicable disease or infection skin lesions from direct contact with residents or their food
  - The hand hygiene procedures to be followed by staff involved in direct resident contact

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**CMS Phase 2: Infection Prevention and Control Program**

- **483.80(a)(3):** An antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.

- **483.80(a)(4):** A system for recording incidents identified under the facility’s IPCP and the corrective actions taken by the facility.

- **483.80(f):** Annual review of the IPCP and update their program as necessary.
National Healthcare Safety Network (NHSN)

- What is NHSN?
  - The nation’s most widely used healthcare-associated infection tracking system.
  - NHSN provides medical facilities, states, regions, and the nation with data collection and reporting capabilities needed to:
    - Identify infection prevention problems by facility, state, or specific quality improvement project
    - Benchmark progress of infection prevention efforts
    - Drive national progress toward the elimination of HAIs

https://www.cdc.gov/nhsn/index.html
CMS Phase 2: Antibiotic Stewardship

Why Antibiotic Stewardship?

• Antibiotic overuse contributes to the growing problems of *Clostridium difficile* infection and antibiotic resistance in healthcare facilities

• Reducing unnecessary antibiotic use can decrease antibiotic resistance, *Clostridium difficile* infections, and healthcare costs, and improve patient outcomes

• Interventions to improve antibiotic use can be implemented in any healthcare setting – from the smallest to the largest.
Antibiotic Use in Long-Term Care

Summary of Core Elements for Antibiotic Stewardship in Nursing Homes

• Leadership commitment – Demonstrate support and commitment to safe and appropriate antibiotic use in your facility.

• Accountability – Identify physician, nursing and pharmacy leads responsible for promoting and overseeing antibiotic stewardship activities in your facility.

• Drug expertise – Establish access to consultant pharmacists or other individuals with experience or training in antibiotic stewardship for your facility.
Summary of Core Elements for Antibiotic Stewardship in Nursing Homes

- **Action** – Implement at least one policy or practice to improve antibiotic use.
- **Tracking** – Monitor at least one process measure of antibiotic use and at least one outcome from antibiotic use in your facility.
- **Reporting** – Provide regular feedback on antibiotic use and resistance to prescribing clinicians, nursing staff and other relevant staff.
- **Education** – Provide resources to clinicians, nursing staff, residents and families about antibiotic resistance and opportunities for improving antibiotic use.

<table>
<thead>
<tr>
<th>1. Leadership Commitment</th>
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<tbody>
<tr>
<td>Facility leadership, both owners and administrators can:</td>
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<tr>
<td>• <strong>Write statements</strong> in support of improving antibiotic use to be shared with staff, residents and families</td>
</tr>
<tr>
<td>• <strong>Include stewardship-related duties</strong> in position descriptions for the medical director, clinical nurse leads, and consultant pharmacists in the facility</td>
</tr>
<tr>
<td>• <strong>Communicate</strong> with nursing staff and prescribing clinicians the facility’s expectations about use of antibiotics and the monitoring and enforcement of stewardship policies</td>
</tr>
<tr>
<td>• <strong>Create a culture</strong>, through messaging, education, and celebrating improvement, which promotes antibiotic stewardship</td>
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</table>
2. Accountability

- Empower the medical director to set standards for antibiotic prescribing practices for all clinical providers credentialed to deliver care and be accountable for overseeing adherence
- Empower the director of nursing to set the practice standards for assessing, monitoring and communicating changes in a resident’s condition by front-line nursing staff
- Engage the consultant pharmacist in supporting antibiotic stewardship oversight through quality assurance activities such as medication regimen review and reporting of antibiotic use data

3. Drug Expertise

- Receiving support from infectious disease consultants and consultant pharmacists with training in antibiotic stewardship can help a nursing home reduce antibiotic use and experience lower rates of positive C. difficile tests
  - **Work with a consultant pharmacist** who has received specialized infectious diseases or antibiotic stewardship training
  - **Partner with antibiotic stewardship program leads** at the hospitals within your referral network
  - **Develop relationships** with infectious disease consultants in your community interested in supporting your facility’s stewardship efforts
4. Take Action through Policy and Practice Change to Improve Antibiotic Use

- The introduction of new policies and procedures which address antibiotic use should be done in a step-wise fashion so staff become familiar with and not overwhelmed by new changes in practice

- Prioritize interventions based on the needs of your facility and share outcomes from successful interventions with nursing staff and clinical providers

Policy

- Documentation of dose, duration, and indication
- Develop facility-specific treatment recommendations
- Establish best practices for use of microbiology testing
  - Identifying and reducing inappropriate use of laboratory testing may be a high-yield effort for improving antibiotic use and reducing other management costs

Intervention

- Reduce antibiotic prophylaxis for prevention of UTIs and in asymptomatic bacteriuria
- Develop and implement algorithms for the assessment of residents
- Perform antibiotic “time-outs”
  - An antibiotic “time-out” is a formal process designed to prompt a reassessment of the ongoing need for and choice of an antibiotic once more data is available including: the clinical response, additional diagnostic information, and alternate explanations for the status change which prompted the antibiotic start
5/6. Tracking and Reporting Antibiotic Use and Outcomes

- **Process Measures:** Tracking how and why antibiotics are prescribed
  - Perform reviews on resident medical records for new antibiotic starts to determine whether the clinical assessment, prescription documentation and antibiotic selection were in accordance with facility antibiotic use policies and practices

- **Antibiotic Use Measures:** Tracking how often and how many antibiotics are prescribed
  - Track the amount of antibiotic used in your nursing home to review patterns of use and determine the impact of new stewardship interventions

- **Antibiotic outcome measures:** Tracking the adverse outcomes and costs from antibiotics
  - Monitor clinical outcomes such as rates of C. difficile infections, antibiotic-resistant organisms or adverse drug events to demonstrate that antibiotic stewardship activities are successful in improving patient outcomes

---

**Summary Report of Infections and Antibiotic Use**

(This example focuses on data for evaluating antibiotic use for suspected UTIs)

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<tr>
<th>Month</th>
<th>Number of Resident Days</th>
<th>Number of Antibiotic Rx</th>
<th>Number of Antibiotic Rx Divided by Number of Resident Days</th>
<th>Number of Residents Receiving Antibiotics for UTI (incl. Repeats)</th>
<th>Number of UTI SEBAR Forms Used</th>
<th>Number of UTIs That Met Diagnostic Criteria</th>
<th>Number of Negative Cultures</th>
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[https://www.ahrr.gov/sites/default/files/wysiwyg/nhguide/3_TK2_T3-Sample_Monthly_Summary_Reports_Final.pdf](https://www.ahrr.gov/sites/default/files/wysiwyg/nhguide/3_TK2_T3-Sample_Monthly_Summary_Reports_Final.pdf)
SBAR for Suspected UTI

**Situation**
I am contacting you about a suspected UTI for the above resident.
Vital Signs: BP ______/______ HR ______ Resp. Rate ______ Temp ______

**Background**
Active diagnoses or other symptoms (especially, bladder, kidney/gastrointestinal) Specify:
☐ No ☐ Yes The resident has an indwelling catheter
☐ No ☐ Yes Patient is on dialysis

**Assessment Input (check all boxes that apply)**
Resident WITH indwelling catheter
The criteria are met to initiate antibiotics if one of the below are selected:
☐ No Yes
☐ Yes Fever of 100°F (38°C) or rectal temperature ≥ 100°F
☐ Yes 1. Acute dysuria alone
☐ Yes 2. Single temperature of 100°F (38°C) and at least one new or worsening of the following:
☐ Yes Frequency
☐ Yes Gross hematuria
☐ Yes Back or flank pain
☐ Yes Urinary incontinence

Resident WITHOUT indwelling catheter
Criteria are met if one of the three situations are met:
☐ No Yes
☐ Yes 1. Acute dysuria alone
☐ Yes 2. Single temperature of 100°F (38°C) and at least one new or worsening of the following:
☐ Yes Frequency
☐ Yes Gross hematuria
☐ Yes Back or flank pain
☐ Yes Urinary incontinence

**Request for Physician/NP/PA Orders**
Orders were provided by physician through ☐ Phone ☐ Fax ☐ In Person ☐ Other:
☐ Order UT:
☐ Urine culture
☐ Encourage ______ ounces of liquid intake ______ times daily until urine is light yellow in color.
☐ Record voids intake:
☐ Assess vital signs for ______ days, including temp, every ______ hours for ______ hours.
☐ Notify physician/NP/PA if symptoms worsen or if unresponsive in ______ hours.
☐ Initiate the following antibiotic:
Antibiotic: ______ Dose: ______ Route: ______ Duration: ______
☐ No ☐ Yes Pharmacist to adjust for renal function
☐ Other

Physician/NP/PA signature ____________________________ Date/Time ____________________________

https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/4_TK1_T1-SBAR_UTI_Final.pdf

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**Summary Report of Antibiotic Agents in Use**
(This example focuses on tracking use of specific antibiotics of concern in the nursing home)

<table>
<thead>
<tr>
<th>Month</th>
<th>[Antibiotic Name]</th>
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<td>Jan</td>
<td>In each cell, enter the number of prescriptions or residents receiving this agent</td>
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https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/3_TK2_T3-Sample_Monthly_Summary_Reports_Final.pdf
7. Education

- Nursing homes should provide antibiotic stewardship education to clinicians, nursing staff, residents and families
  - Effective educational programs address both nursing staff and clinical providers on the goal of an antibiotic stewardship intervention, and the responsibility of each group for ensuring its implementation
    - Flyers, pocket-guides, newsletters, electronic communications
    - Interactive academic detailing (e.g. face-to-face interactive workshops) has the strongest evidence for improving medication prescribing practices

- Nursing homes should engage residents and their family members in antibiotic use and stewardship educational efforts to ensure clinicians have their support to make appropriate antibiotic use decisions.

Outbreak Resources

- LA Infectious Disease Epidemiology fact sheets, guidance, contact info: [www.infectiousdisease.dhh.la.gov](http://www.infectiousdisease.dhh.la.gov)
- Influenza Outbreak Guidance: [https://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm](https://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm)
Infection Prevention Resources

- Reportable Diseases in Louisiana:
- National Healthcare Safety Network (NHSN):
  [https://www.cdc.gov/nhsn/](https://www.cdc.gov/nhsn/)
- Infection Prevention in Aging Research Group:
  [http://infectionpreventioninaging.org/resources/](http://infectionpreventioninaging.org/resources/)
- National Nursing Home Quality Improvement Campaign:
  [https://www.nhqualitycampaign.org/goalDetail.aspx?g=inf](https://www.nhqualitycampaign.org/goalDetail.aspx?g=inf)
- CDC Infection Prevention Guidelines and Resources:
- Infection Control Transfer Forms:
  [https://www.cdc.gov/HAI/prevent/prevention_tools.html](https://www.cdc.gov/HAI/prevent/prevention_tools.html)

Antibiotic Stewardship Resources

- CDC – Tools, Factsheets, Expert Commentary:
  [https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html](https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html)
- Core Elements of Antibiotic Stewardship for Nursing Homes:
  [https://www.cdc.gov/longtermcare/pdfs/core-elements-antibiotic-stewardship.pdf](https://www.cdc.gov/longtermcare/pdfs/core-elements-antibiotic-stewardship.pdf)
- Appendix A: Policy and Practice Actions to Improve Antibiotic Use:
- Appendix B: Measures of Antibiotic Prescribing Use and Outcomes:
- Checklist:
Antibiotic Stewardship Resources


• Minnesota ASP Toolkit for Long-term Care Facilities: http://www.health.state.mn.us/divs/idepc/dtopics/antibiotic_resistance/asp/ltc/


Contact

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