Infectious Disease in PA/LTC an Update
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• Dr. Leible has no financial disclosures relevant to this presentation.

Introduction
Objectives

The participant will be able:

1. To list current agents listed as MDROs
   a. MRSA, VRE, ESBL, CRE, and c. difficile
2. To discuss the role of the medical director to assist a facility with staying in compliance with state and federal guidance for infection control in long term care.
3. Discuss the role of antibiotic stewardship in long term care
4. Discuss immunizations in long term care

Immunizations

- Pneumococcal
  - PV13 (13 valent conjugated)
  - PPSV23 (23 valent polysaccharide)

- “Shingles shot”

- Influenza
  - High dose
  - Trivalent
  - Quadrivalent
Varicella Zoster Vaccination

- Vaccine recipients 60-80 years had 51% fewer episodes
  - Efficacy declines with increasing age
  - Significantly reduces the risk of post herpetic neuralgia
- Live attenuated virus Adults ≥ 60
Regulatory Mandate: 483.65 Infection Control

- F-Tag 441 (R) – “Facility must:
  - Establish and maintain an Infection Control Program
  - Provide a safe, sanitary, comfortable environment
  - Help prevent development and transmission of disease and infection”

Components of an Infection Control Program

- Program development and oversight
- Policies and procedures
- Documentation
- Infection control professional (ICP) or Infection Preventionist (IP)
- Communicable disease reporting
- Education
- Antibiotic Stewardship
- Surveillance
  - Monitoring
  - Data analysis

Standard precautions

Based upon the principle that all blood, body fluids, non intact skin, and mucous membranes may contain transmissible infectious agents. Intention is to apply to all individuals in healthcare settings.

Hand hygiene, safe injection practices, proper use of PPE, resident placement, care of the environment (including laundry)
Contact precautions

- To prevent infections that are spread by person to person contact. Requires use of appropriate PPE, inc. gown and gloves on entering the contact precaution room. PRIOR to leaving room PPE is removed and hand hygiene performed.
- Can cohort with a roommate without invasive devices, open wounds, and NOT immunocompromised.

Droplet precautions

- Occurs at close proximity.
- Distance not exact studies have shown 3 to 10 feet. Masks are to be used within 6 to 10 feet of a resident or upon entry into a resident’s room with respiratory droplet precautions.
- Can cohort or share a room with a roommate with limited risk factors.

Resistant Organisms in Non-Hospital Settings: CDC Guidance

- Standard and Contact precautions; and consider:
  - Patient placement - Private room, if possible. (when not available, cohort). Another option is to place an infected patient with a patient who does not have risk factors for infection.
  - Group activities – Maintaining socialization and access to rehab is important. Infected or colonized patients should be permitted to participate in group meals and activities if draining wounds are covered, bodily fluids are contained, and the patients observe good hygienic practices.
SHEA/APIC Guidelines

- 2008 Infection Prevention and Control in Long Term Care Facilities
- Addresses recommendation for transmission-based isolation precautions
- Special population need to consider individual resident's clinical situation

Am J Infection Control 2008; 36: 504-35

Infection Control Surveillance

SOM defines
- Outcome
- Process

SHEA/APIC
- Active cases
- Colonization

MDRO

- CDC identifies Urgent and Serious threats
- Urgent Pathogens
  - C. diff, CRE, N. gonorrhea
- Serious pathogens
  - Multi drug resistant acinetobacter
  - ESBL, VRE, MRSA
Susceptibility to MDRO
- Elderly
- High ADL dependence
- Prior antibiotic use
- Presence of indwelling devices
  - G tube, foley

Susceptibility C. Diff
- Frequent receipt of antimicrobial agents
- Frequent or prolonged hospitalizations
- Presence of underlying comorbid medical conditions
- Use of feeding tubes (nasogastric, gastrostomy)
- Use of acid suppressant medications
- Age-related effects on host defense mechanisms
  - Decreased gastric acidity
  - Diminished antibody response to *C. difficile* toxins
  - Impaired *C. difficile*-specific neutrophil phagocytosis

Simor AE. Diagnosis, management, and prevention of CDI in long-term care facilities: a review. JAGS 2010; 58(8):1556-64.

Susceptibility VRE
- Risk factors for colonization
  - Recent treatment with oral or parenteral Vancomycin or cephalosporins
  - Recent treatment with anti-anaerobic drugs (metronidazole, clindamycin, imipenem)
  - Prolonged hospitalization
  - Proximity to patient colonized by VRE (not clearly demonstrated in LTC)
Carbapenem-resistant Enterobacteriaceae (CRE)

- Important pathogens
  - High mortality rates (up to 40-50%)
  - In addition to beta lactams/carbapenem resistance confer high rates of resistance to many other antibiotics
- Predominantly found in
  - E. coli
  - Klebsiella pneumoniae

CDC 2012 CRE Toolkit

CRE

- Data based on 6 months of reporting by NY hospitals (July 1 – December 31, 2013)
  - 93% klebsiella 7% e. coli
- Aveg age 69
- Body site
  - 50% urine
  - 20% respiratory
  - 12% skin and soft tissue
  - 6% other

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CRE Bloodstream Infections

- Of "community-onset" cases, many patients had recent healthcare exposures
  - 36% had been discharged from same hospital within last 30 days
  - 45% were admitted from a nursing home
CRE

- Precautions
  - Single rooms for those elders at highest risk of transmitting to others
  - Individualizing to clinical situation

ESBL

- 26,000 health care associated Enterobacteriaceae infections are caused by ESBL-enterobacteriaceae
- Enzymes that mediate resistance to extended spectrum cephalosporins and monobactams
  - Cefaz, cefotaxime, ceftriaxone and aztreonam
  - Does NOT affect cefoxitan, cefotetan, or carbapenams

Multi drug resistant Acinetobacter

- 12,000 healthcare-associated Acinetobacter infections occur in the U.S. of which 7,000 are multidrug-resistant
  - Approx 500 deaths per year
- At least 3 different classes of antibiotics no longer cure resistant Acinetobacter infections
MRSA

- Over 80,000 invasive MRSA infections and 11,285 related deaths per year (2011)
- Severe MRSA infections commonly occur during or soon after inpatient medical care
- Between 2005 and 2010, overall rates of invasive MRSA dropped 31% predominantly due to improved central line maintenance procedures

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MRSA

- In LTC
  - Infection rates
    - Colonized = 10%/yr
    - Non colonized = 2-4%/yr
  - Colonization not clearly related to MRSA-induced morbidity
  - Non-MRSA mortality in colonized residents is 2-3 times higher than in non-colonized (probably reflecting functional status and underlying disease).

VRE

- Enterococci
  - (E. faecalis & E. faecium)
  - Normal inhabitants of the bowel
  - Often resistant to aminoglycosides
  - When high resistance occurs to gentamycin and streptomycin, there is usually no reliably bactericidal regimen
**Clostridium difficile**

- 250,000 infections per year requiring hospitalizations or affecting hospitalized patients
- 14,000 deaths per year
- C. diff deaths increased 400% between 2000 and 2007 because of the emergence of a strain resistant to fluoroquinolones
- 50% of infections occur in those younger than 65 but 90% of the deaths are in >65

**C. Diff**

- 20% of hospital onset CDI occurred in NH residents
- 67% of nursing home onset CDI occurred in patients discharged from an acute care hospital within 30 days

**Definitions for infections**

**Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria**

Nimalie D. Stone, MD, et al

Infect control Hosp Epidemiol 2012; 33(10):965-977
Definitions for Infection

- Paper outlines surveillance definitions for
  - UTI with and without catheters
  - Skin, soft tissue, and mucosal infections
  - Respiratory tract infections
  - Gastrointestinal infections

National Action Plan to Prevent HAI

- April 2013 Phase 3 LTC
  - Estimates of HAI in SNF/NH residents 1.4 to 5.2 infections/1000 resident days
  - Most frequent cause of transfers to acute care and 30 day readmissions
  - Action plan identified 5 priority areas in the LTC action plan: UTI and CAUTI, CDI, resident influenza and pneumococcal vaccinations and health care professional influenza vaccinations

National Action Plan to Prevent HAI

- Antimicrobials account for approx 40% of all systemic drugs in long term care
- A long term care resident is 50-70% likely to have at least one antibiotic in year
  - Inappropriate use occurs 49-62% of the time
  - Incidence of MDRO 12.7/1000 resident days
**National Action Plan to Prevent HAI**

- HAI plan of action for snf/nh
  - Antibiotic stewardship
  - Promoting influenza vaccination
  - Tracking hospitalizations and readmissions

**NATIONAL STRATEGY FOR COMBATING ANTIBIOTIC-RESISTANT BACTERIA**

- **Vision:** The United States will work domestically and internationally to prevent, detect, and control illness and death related to infections caused by antibiotic-resistant bacteria by implementing measures to mitigate the emergence and spread of antibiotic resistance and ensuring the continued availability of therapeutics for the treatment of bacterial infections.
- Presidential Executive Order
- September 2014

**National Strategy for Combating Antibiotic Resistant Bacteria**

**Goals and Objectives**

- Slow the emergence of resistant bacteria and prevent the spread of resistant infections;
- Strengthen national One-Health surveillance efforts to combat resistance;
National Strategy for Combating Antibiotic Resistant Bacteria

- Advance development and use of rapid and innovative diagnostic tests for identification and characterization of resistant bacteria;
- Accelerate basic and applied research and development for new antibiotics, other therapeutics, and vaccines; and
- Improve international collaboration and capacities for antibiotic-resistance prevention, surveillance, control, and antibiotic research and development

Antibiotic stewardship

- A. Strengthen antibiotic stewardship in inpatient, outpatient, and long-term care settings by expanding existing programs, developing new ones, and monitoring progress and efficacy.

Antibiotic Stewardship

- Working definition – evaluation and optimization of antibiotic use
- Antibiotic stewardship programs (ASPs) new to LTC
- Increased disease in LTC caused by multi-drug resistant organisms (MDROs)
Antibiotic Stewardship

- Point prevalence of antibiotic usage
  LTC  7%-10%
- 50%-70% residents will be treated with
  at least 1 antibiotic course/yr.
- 25%-75% of systemic antimicrobials
  and up to 60% topical inappropriately
  prescribed in LTC

Goals of Antibiotic Stewardship

- Optimize clinical outcomes/minimize
  adverse consequences of antibiotic use
  - reduce antibiotic related toxicity
  - reduce selection of pathogens (C. Diff.)
  - reduce emergence of resistance

Barriers to Antibiotic Stewardship

- lack of administrative buy-in and infra-
  structure
- absence of EMR
- lack of LTC related published guidelines
- lack of appropriate staff training
- lack of access to infectious disease experts
- lack of onsite pharmacy support
ASP Implementation Strategies

- Passive monitoring
  - most basic intervention
  - antibiotic usage pattern
  - facility antibiogram

- Education
  - multi-faceted approach most affective
  - target nurses and physicians/non-physician practitioners
  - provide info
  - establish diagnostic/treatment algorithm

Facility Antibiogram

ASP Implementation Strategies

- “Front-End” Approaches – less to more restrictive
  - Influence initial antibiotic choice
  - Provide treatment guidelines to prescriber
  - Develop infection specific treatment algorithm
  - Use antibiotic justification form
  - Mandate pre-authorization

- “Back-End” Approach
  - Concurrent review of antibiotic therapy
  - More time consuming/labor intensive
Antibiotic Time Out

- Antibiotic orders should have a dose, duration and indication
- Culture before treating
- Upon receiving results of culture reassess therapy

Assessing Antibiotic Appropriateness

- Adherence to facility guidelines
  - Adjustment of therapy according to culture results
  - Appropriate dose/duration of therapy

ASP Summary

- Prevalent in acute care – emerging in LTC
- Increasing MDRO related disease in LTC/significant inappropriate antibiotic use
- Considerable challenges to ASP implementation exist
- Studies show benefit
- Stepwise approach necessary

Annals of LTC 2011;19[4]:20-25
**NHSN**
- Infections in Long Term Care reporting
- 94% of acute care hospitals are already reporting HAI
- Goal that all health care facilities be reporting by 2020

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**Summary**
1. Know who your infection control preventist/practitioner is in your building
2. Know what your policies and procedures say (when can elders come out of isolation/off precautions)
3. Start an antibiotic stewardship program in your facility

**HAND HYGEINE**

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**References**
- List available upon request