2014 Arizona Long-Term Care Infection Prevention and Control Collaborative

APIC Consulting Services, Inc.

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Introductions and Audience

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Objectives

- Identify infection prevention challenges in the long-term care setting
- Teach the basics of infection prevention and understand the essential components of an effective infection prevention program
- Understand the management of multidrug-resistant organisms (MDROs)

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Program Checklist

- APIC LTC Guide, Figure 3.1, p. 28-29 (also on CD-ROM)
- Mark this page and fill it out during the day

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Infection Surveillance

- APIC LTC Guide Chapter 4, p. 40
- What is surveillance?

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Surveillance

- What is surveillance?
  - Ongoing

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Surveillance

- **What is surveillance?**
  - Ongoing
  - Systematic collection

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Surveillance

- **What is surveillance?**
  - Ongoing
  - Systematic collection
  - Analysis

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Surveillance

- **What is surveillance?**
  - Ongoing
  - Systematic collection
  - Analysis
  - Interpretation

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Surveillance

- **What is surveillance?**
  - Ongoing
  - Systematic collection
  - Analysis
  - Interpretation
  - Dissemination

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Surveillance

- **What is surveillance?**
  - Ongoing
  - Systematic collection
  - Analysis
  - Interpretation
  - Dissemination
- **Identify infections and infection risk**

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Surveillance

- **What is surveillance?**
  - Ongoing
  - Systematic collection
  - Analysis
  - Interpretation
  - Dissemination
- **Identify infections and infection risk**
- **Reduce morbidity and mortality**

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Surveillance

- **What is surveillance?**
  - Ongoing
  - Systematic collection
  - Analysis
  - Interpretation
  - Dissemination
- **Identify infections and infection risk**
- **Reduce morbidity and mortality**
- **Improve resident and staff health status**

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Surveillance plan

- **Risk assessment**
- **Indicator selection**
- **Population at risk**
- **Definition of infection**
- **Internal or external comparison**
- **Data collection methods- active or passive**
- **Methods to analyze and interpret data**
- **Dissemination and evaluation of data**

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Risk Assessment (APIC LTC Guide, p. 25; CD-ROM)

- **Annual review**
- **Population served**
- **Community**
- **Device use**
- **Immunizations**
- **Hand hygiene compliance**
- **Isolation philosophy**
- **Antimicrobial stewardship**
- **Environmental cleaning and disinfection**
- **Care delivery interruptions**

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Indicator Selection

- **Example, p. 26**
- **Write a goal and objective statement**

Goal: Maximize voluntary employee participation in influenza vaccination by the end of 2014

Objective: 90 percent of all eligible employees will receive influenza vaccination by December 31, 2014

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Definition of Infection

- **APIC LTC Guide, p. 55**
  - Stone et al., ICHE, 2012

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Definition of infection

Clear case definition

- **Upper respiratory tract**
  - Cold
  - Influenza
- **Lower respiratory tract**
  - Pneumonia
  - Other LRI
- **Urinary tract**
  - With or without a catheter

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Definition of infection

- **Skin/Soft tissue**
  - Surgical site
  - Cellulitis
  - Pressure ulcer
  - Infestations
- **Conjunctivitis**
- **Gastroenteritis**

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Internal or external comparison

Goals of the program are established

- **External comparisons require same definitions and population at risk**
- **Beware of flaws in Quality Indicator methodology**
- **Consider in internal measurement**
- **APIC LTC Guide CD-ROM has template report form**

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Data Collection

Ease of information gathering

- **Nurses line list**
- **Change of condition report**
- **Radiology reports**
- **Laboratory reports**
- **Temperature log**
- **ADL sheets**
- **Nurse and physician progress notes**

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Data analyses

Accessible and easy to understand

- Report an infection rate; for example, infections per 1000 resident-days
- Internal comparisons can be done using *p*-chart, run chart or similar statistical method

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Report writing and evaluation

Practical interventions

- Report each site of infection separately
- Do not report the total infection rate
- Use indicators selected based on the risk assessment
- Talk about the resident who got an infection, not about the rate of infection

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Policy on definitions

- Used for surveillance purposes only; not a substitute for medical diagnosis or treatment
- Needs to be reviewed and approved by the ICC
- Criteria differentiate between colonization and infection
- Provide consistent information, regardless of individual healthcare provider practices

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Policy on definitions

- Physician's written or verbal diagnosis alone does not meet the definition of infection (some exceptions apply)
- Each site of infection is counted separately, even on the same resident
- Report the healthcare associated infections (HAI) as part of quality improvement

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Case study

- Use line listing example provided
- Read the scenario
- Answer the questions

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Analysis

- Measure effectiveness of interventions
- Identify potential outbreaks
- Rates measure occurrence over time; allow interfacility comparison
- Basic skills
  - Arithmetic
  - Create charts, graphs

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Rate calculation

- **Incidence rate (APIC LTC Guide, p. 48)**
  - Number of new infections
  - Population at risk (resident-days)

New infections / Resident-days X 1000 = Infection rate

Example: 4 UTI / 310 resident days X 1000

The rate is 12.9 infections per 1000 resident-days

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Rate calculation

- **Prevalence rate (APIC LTC Guide, p. 48)**
  - Number of infections
  - Population at risk (residents)

Infections / Residents X 100 = Infection rate

Example: 4 UTI / 10 residents X 100

The rate is 40% for UTI

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Rate calculation

- **Attack rate (APIC LTC Guide, p. 48)**
  - Number of new infections
  - Population at risk (residents, staff, family)

New infections / Population at risk X 100 = Infection rate

Example: 33 cases influenza / 222 residents, staff, family X 100

The influenza rate is 15%

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Comparison

- **When is the infection rate too high?**
- **How do we compare to the national or local average?**
- **What has our infection rate been in the past?**
- **What infection rate is acceptable?**
- **Consider joining NHSN for LTC (p. 52)**

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Epidemiology

- ***Epidemiology***
  - Greek origin meaning, "The study of what is upon the people"
    - *Epi* means "upon, among"
    - *Demos* means "people, district"
    - *Logos* means "study, word, discourse"
- **Patterns, cause, effect**
- **Person, place, time**
- **Population based**

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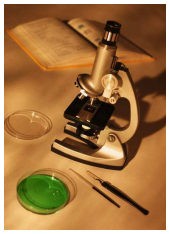
Microbiology Review

- **Definitions**
  - Colonization
  - Infection
  - Exogenous
  - Endogenous
  - Aerobic
  - Anaerobic



Microbiology. Ready Reference for Microbes, 3rd edition. Author: Kathy Brooks,

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Why?

- **A basic understanding of how microbes effect human wellness and disease is a foundation on which the practice of infection prevention and control are built**
  - Where are microbes
  - How long do microbes live
  - How are microbes transmitted
  - What is the incubation period
  - How pathogenic is a microbe
  - How does the body respond to a microbe

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Predisposing risk factors

- **Foreign body**
  - Implants
  - Catheters
- **Bypassing physical barriers**
  - Tracheostomy
  - Skin tears
- **Antimicrobial use**

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Types of microbes

- **Bacteria**
  - Staphylococcus aureus
- **Virus**
  - Influenza
- **Fungus (yeast and mold)**
  - Thrush
- **Parasites**
  - Scabies

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Microbe identification

- **Laboratory specimen**
  - Gram stain, india ink, AFB smear
  - Microscopic
  - Growing an agar plate
  - Chemical testing
    - Toxins
    - Antibodies

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Bacteria

- **Require nutrients to grow**
- **May become dormant for long periods of time**
- **Oxygen requirements**
- **Effect of temperature**
- **Infectious dose**

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Virus

- **Require a host cell to reproduce**
  - Host cell is specific
- **Can be dormant for long time periods**
- **Does not grow with standard laboratory methods**
- **Detection is usually measured by the host response (titer)**

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Fungus

- **Opportunistic**
- **Frequently found in the environment**

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Parasites

- **Free living organisms**
  - Some are visible (lice)
- **Host specific**
- **Includes arthropods (insects)**
  - Infestation not an infection
  - May transmit other diseases

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Specimen collection

- **Technique**
- **Transport media**
- **Refrigerate or not?**
- **Limitations**

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Serological testing

- **Antigen (protein)**
- **Antibody (host response to antigen)**
- **Used for test for many conditions:**
  - Group a streptococcus
  - Hepatitis B
  - Measles

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Antimicrobial susceptibility

- **Most often reported**
  - S, I, or R
- **Sometimes as MIC (minimal inhibitory concentration)**
- **Testing may not reflect how the drug performs in the body**

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MDRO Management and Isolation Precautions

- **APIC LTC Guide, Chapter 5**
  - MDRO defined
  - Reduce risk of transmission
  - Standard precautions
  - Transmission-based precautions

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What Constitutes an MDRO?

- **An organism that is resistant to a significant antibiotic (VRE)**
- **An organism that is resistant to one class or more of antibiotics (CRE, ESBL, MRSA)**
- **An organism that is sensitive to only 2 antibiotics or less**
- **ANY organism can become an MDRO!**

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How are MDROs Created?

- **Over-utilization or inappropriate use of antibiotics can create an MDRO**
- **Prescribing antibiotics for conditions that are not bacterial infections**
- **Prescribing antibiotics for patients that are colonized rather than infected**
- **Not completing a course antibiotics as prescribed by MD.**

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MDRO (1)

- **MRSA (methicillin resistant *Staphylococcus aureus*)**
  - Most common MDRO
- **VRE (vancomycin resistant enterococcus)**
  - Found in *Enterococcus faecalis* and *Enterococcus faecium*
- ***Clostridium difficile***
  - Most common cause of antibiotic-associated diarrhea
  - 90%+ of CDI related to ATB usage
  - Produces spores that can survive on environmental surfaces for up to six months

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MDRO (2)

- **ESBL (extended spectrum beta lactamase)**
  - Found in Klebsiella p. and *E. coli*
  - Resistant to penicillins and cephalosporins
- **MDR Gram Negative Bacilli**
  - Acinetobacter and *Pseudomonas aeruginosa*
- **CRE (carbapenem resistant enterobacteriacae)**
  - Most commonly in US- Klebsiella and *E. coli*
  - Resistance to carbapenems can be found in pseudomonas
  - Now found in 43 of the United States
- **NDM (New Delhi metallo beta lactamase)**
  - *Klebsiella pneumoniae* is the most common form
  - Associated with healthcare in India and Pakistan

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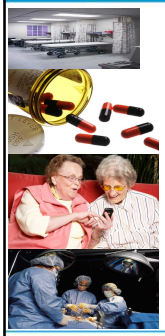

RISK FACTORS for an MDRO

- **Patient age greater than 65 years old**
- **Over utilization or improper use of ATB (broad spectrum ATB)**
- **Diminished mental cognition**
- **Recent surgery**
- **Prolonged or repeated hospital stays**
- **Compromised immune system**
- **Use of medications (steroids, PPI)**
- **Invasive procedure sites (GT, FC)**
- **Severe illness or disability (decreased mobility)**

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How Do MDROs Spread?

- What are the common modes for transmission?
- What do we consider contaminated?

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Facts

- Once a person develops an infection caused by an MDRO it is likely that the person will remain COLONIZED with this organism indefinitely.
- Culture is not needed after symptoms have resolved to confirm colonization.
- Experts agree that "clearance cultures" or "tests for cure" are neither needed nor recommended!

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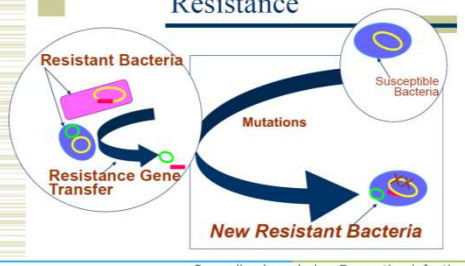
Emergence of Antimicrobial Resistance



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Infection vs. Colonization

- **Infection**
  - Resident manifests signs and symptoms of an infectious process
  - Culture positive
  - Antibiotic may be necessary
- **Colonization**
  - Resident's symptoms have resolved (no clinical signs of having an infection)
  - Culture remains positive
  - No need for antibiotic

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Isolation

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Isolation

- Implement isolation when you get confirmation that a resident has an infection caused by a significant pathogen (MDRO or scabies or norovirus)
- Implement isolation when you suspect certain infections like *C. difficile*, norovirus or scabies.
- Use the least restrictive isolation precautions to maintain your infected resident*

* CMS State Operations Manual, Appendix PP - Guidance to Surveyors for Long Term Care Facilities

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Isolation Systems

- **Contact****
- **Droplet**
- **Airborne**

** Most often used

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Question

- **What type of isolation is needed for a resident with MRSA of the respiratory tract?**
- **For a resident colonized with MRSA of nares?**

A. Contact
B. Droplet
C. Airborne
D. Standard Precautions

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What's the Difference?

Standard Precautions

- **Used for all residents regardless of state of infection or colonization**
- **PPE considered when HCW to come in contact with blood, body fluids, lesions or non-intact skin**
- **PPE to consider is gloves, gown, mask**
- **Decision to use PPE is that of HCW depending on possibility of exposure**

Transmission Based Precautions

- **Used when a significant pathogen is either suspected or confirmed to cause active infection**
- **PPE must be worn by all HCW coming in contact with infected resident and the environment of resident**
- **PPE to consider: gloves, and gown (at the minimum) possibly mask**

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Transmission-Based Isolation

- **Things to consider:**
  - Understand the mode of transmission of microorganism
  - Educate resident and family why isolation is necessary
  - Signage (be sure to use the correct sign)
  - Isolation PPE close at hand (cart) with equipment needed (gloves, gowns and mask if needed)
  - Dedicate non-critical care equipment to isolated resident
  - Educate patient, families and staff on the importance of hand hygiene and use of PPE
  - Review with EVS the need for disinfecting the environment often and with proper tools and disinfectants.

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Who are We Protecting?

Standard Precautions:

- **The healthcare workers**

Transmission-based Isolation Precautions:

- **All the other residents & HCWs**

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Cohorting

- **Placement of residents with other residents with same organism causing an active infection**
- **Each case must be assessed on its own merits.**
- **At times, we may need to cohort staff, not only the residents.**
- **Some MDRO infected residents may be permitted to room with another resident without infection or wounds or invasive procedure sites (GT or FC)**

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Discontinuation of Isolation

- **Assess resident for signs and symptoms of active infection**
- **Follow your written policy**
- **Resident is on isolation precautions due to symptoms of infection caused by significant pathogen**
  - Not because resident is on an antibiotic
- **Once S/S have abated, isolation may be DC'd**
  - You may want an observation period before DCing isolation
- **Document**
- **IP or DON or MD can DC isolation**

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Question?

- **Mr. Smith has an ESBL infection in a sacral wound. He is on Contact Isolation Precautions. The serous drainage is contained and covered by a dressing. He has 3 days left on his antibiotic. Can Mr. Smith go to the dining room to have lunch?**
- **Can you permit isolation residents to leave their room? MRSA, VRE, *C. difficile*?**
  - If yes, under what circumstances?
  - If no, what is your justification?

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Let Us Be Clear!

- **When isolation needed, isolate the germ**
- **Use least restrictive measures to ensure quality of life for affected resident and yet provide safety for others in the facility**
- **Monitor and enforce infection prevention and control practices (don't assume it is done by all)**
- **Educate and educate more!**
- **Follow up to assure HCWs understanding**
- **Document**

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CDC's "Control Interventions for MDROs"

- **Administrative support (policies and procedures)**
- **Education**
- **Judicious use of antibiotics**
- **MDRO surveillance**
- **Infection control precautions**
- **Environmental measures**

CDC Centers for Disease Control and Prevention

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Antimicrobial Resistance Trends in Phoenix, AZ*

Organism	% of isolates 1978 (then)	% of isolates 2010 (now)
MRSA	0	55-65
VRE	0	25-45
Pneumococcus	0	20-35
ESBL	0	<2-7
CRE	0	2-8
Eythromycin –R Pertussis	0	1 patient

*Saubolle MA. The Why for Surveillance and the Antibiogram

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Judicious Use of Antibiotics

- **LTCFs should have an antimicrobial stewardship program.**
  - Review antibiotic usage
  - Report to QA meeting findings on ATB usage
  - Utilize antibiogram tool for appropriate selection of ATBs
    - Train your licensed nurses to discuss antibiogram findings with your physicians

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What is an Antibiogram?

- A cumulative susceptibility table (summary of your past culture sensitivities)
- A tool for clinicians to use as a reference guide for facility specific resistance patterns
- Used to estimate the prevalence of antimicrobial resistance
- Physicians can use this to choose empiric therapy ATB

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Benefits of Antibiogram

- Lends information to raise awareness of resistance problems in a facility
- Supports use of optimal empiric therapy
- Assists in identifying opportunities to reduce inappropriate antibiotics.
- Assists in identifying the most cost-effective ATB for resident (most narrow spectrum ATB)
- Provide best opportunity for immediate and effective treatment of resident

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Benefits of Antibiograms

- Supports facility surveillance program
- Can assist with antimicrobial stewardship by tracking emergence of antibiotic resistance
- Can improve resident outcomes
  - Reduce residents exposure to broad spectrum ATB thereby prevent development of MDROs
  - Reduces treatment failures
- Can reduce healthcare related costs

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In Summary

- Hand Hygiene
- Standard Precautions
- Transmission-Based Isolation, when appropriate
- Environmental Sanitation
- Antimicrobial Stewardship
- Educate!!!!!

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Infection Control is a Team Sport!

- Establish a strong Infection Prevention and Control Program.
- Make it an interdisciplinary program
- Utilize your resources adequately
- Educate
- Execute
- Audit/Monitor
- Re-Educate
- IT NEVER ENDS!

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Preventing Transmission of Infection: Is The Answer Blowing In The Wind?

How many times must a doctor be told
Wash your hands and wear gloves, please?
Yes, and how many times will another stand by
Pretending he just doesn't see?
And how many times must we remind
Those things that we touch must be cleaned?
The answer, my friend, is blowin' in the wind
The answer is blowin' in the wind.

Performed by Brent Kirby www.brentkirby.com

Donskey CJ. Clin Infect Dis 2010;50:1458-61

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Seasonal Influenza

- **APIC LTC Guide, Chapter 8**
  - What are the 7 symptoms of influenza?
  - What percentage of the population gets seasonal influenza?
  - How long does it take to develop immunity after vaccination?
  - Who is recommended to get an annual influenza vaccine?

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Seasonal Influenza

- **Viral upper respiratory illness**
- **Transmission occurs person-to-person with large droplet exposure**
- **Person is infectious 1-2 days before symptoms, up to 4-5 days after symptoms start**
- **First 3 days are most infectious**

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Influenza

- **Diagnosis by clinical symptoms and /or lab testing**
  - Request influenza rapid test from nasopharyngeal swab within 3 days of onset
  - If lab test is positive, consider antiviral therapy
- **Monitor respiratory illness from Nov-Apr**
- **Use written definition to define a case**
- **Define an outbreak in advance and follow-up protocols**
  - One laboratory confirmed case is commonly used

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Annual checklist (APIC LTC Guide, p. 131)

- **Planning**
  - Set vaccination goals and provide regular feedback
  - Healthy People 2020 goal is 90% for residents and staff
  - Consider vaccine or mask policy
- **Education**
- **Link with local health department**
- **Individual case management**
- **Outbreak management**

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Influenza vaccines

- **Trivalent flu vaccine (2 flu A, 1 flu B)**
  - Standard dose trivalent IM injection
    - Egg based: Age 6 months and older
    - Cell culture based: 18 years and older
    - Egg free: Ages 18-49 years
  - High-dose trivalent IM injection
    - Age 65 and older
  - Intradermal trivalent shot
    - Age 18-64 years
- **Quadrivalent flu vaccine (2 flu A and 2 flu B)**
  - Standard dose quadrivalent
    - IM injection: Age 6 months and older
    - Nasal spray: Healthy people 2 through 49 years of age

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Nursing Care

- **APIC LTC Guide Chapter 6**
- **Nursing Assessment**
  - Respiratory
  - Gastrointestinal
  - Skin and Wound
  - Urinary Tract
  - Infusion therapy
  - High risk co-morbidities
    - Diabetes
    - Sexual health
    - Substance abuse
    - BMI

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Individual infection risk

- **Infection Risk Scale (p. 95)**
- **Admission and periodic**
- **Identifies risk of infection**
- **Can be used in facility risk assessment**

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Respiratory

- Chronic disease
- Antibiotic overuse
- Community acquired pneumonia risk
- Physical assessment
- Vaccination history

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Gastrointestinal

- Chronic disease
- Normal bowel flora
- Changes in diet and medication
- Socialization and community living

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Skin and Wound

- Chronic disease
- Skin integrity
- Moisture and sheering
- Sun exposure
- Neurological impairment
- Infestations

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Urinary Tract

- **Symptomatic vs. Asymptomatic**
- **Appropriate use of urine catheter**
  - Alternates to catheterization
    - Bladder scan
    - Intermittent catheter
    - Condom catheter
    - Suprapubic catheter
- **Appropriate care of urine catheter**
  - Seal intact
  - Empty with urinal; establish change schedule
  - If UTI suspected, replace catheter before collecting specimen (APIC LTC Guide, p. 101)
  - Keep bag as empty as possible; before moving

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Infection prevention interventions

- **Hand hygiene**
- **Nutrition and Hygiene**
- **Oral Care**
- **Intravascular infection**
  - Type of access device (PIV, PICC, Port)
  - Dressings
  - Administration sets
- **Supportive culture for resident safety**

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Environment and Equipment

- **APIC LTC Guide Chapter 10**

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Objectives

- **Participants will be able to understand & discuss:**
  - Differences between various cleaning and disinfecting terminology and practices
  - How to administer an effective environmental sanitation services program in LTC
  - The role of the environmental in transmission of infection
  - The need for oversight and follow-up in the area of environmental services
  - Alternative methods for disinfection

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Environmental Contamination: Is There a Link to HAI Acquisition

- **Patients admitted to rooms previously occupied by patients with MRSA, VRE, and *Acinetobacter baumanii* are at risk of acquiring organisms from the environment**

Huang, et al; Arch Intern Med 2006; 166:1945-1951
Hardy,et al; ICHE 2006; 27:127-132
Sexton et al; JHI 2006;62: 187-194
Martinez et al; Arch Intern Med 2003;163: 1905-1912

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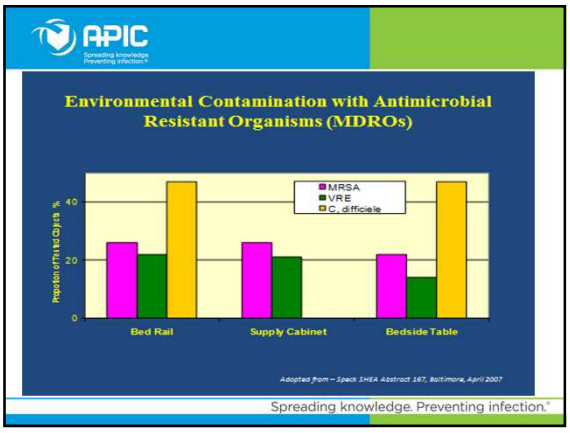
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Environmental Contamination with Antimicrobial Resistant Organisms (MDROs)
MRSA
VRE
C. difficile
Proportion of Isolates Cultured %
40
20
0
Bed Rail
Supply Cabinet
Bedside Table
Adopted from – Speck SHEA Abstract 167, Baltimore, April 2007
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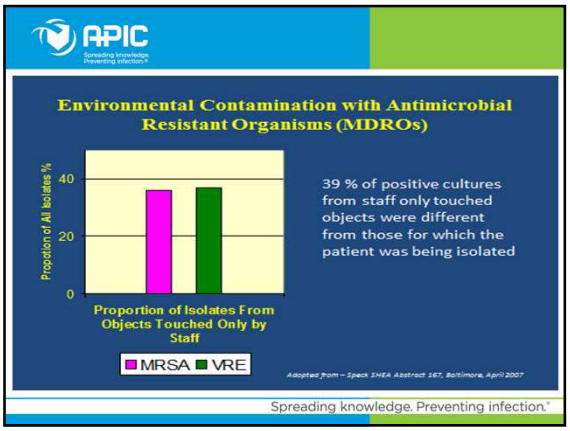
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Environmental Contamination with Antimicrobial Resistant Organisms (MDROs)
Proportion of All Isolates %
40
20
0
Proportion of Isolates From Objects Touched Only by Staff
MRSA VRE
39 % of positive cultures from staff only touched objects were different from those for which the patient was being isolated
Adopted from – Speck SHEA Abstract 167, Baltimore, April 2007
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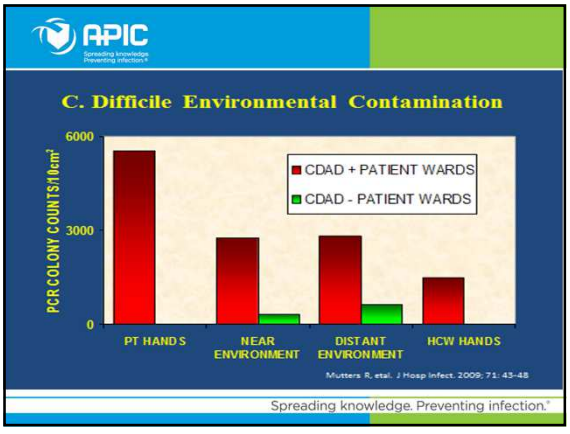
APIC
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C. Difficile Environmental Contamination
PCR COLONY COUNTS/10cm²
6000
3000
0
CDAD + PATIENT WARDS
CDAD - PATIENT WARDS
PT HANDS
NEAR ENVIRONMENT
DISTANT ENVIRONMENT
HCW HANDS
Mutters R, etal. J Hosp Infect. 2009; 71: 43-48
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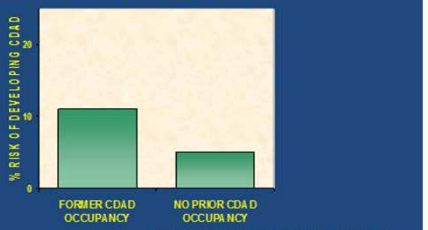
C. difficile Transmission From Prior Room Occupants



Shaughnessy et al. Abstract K-4194 IDSA / ICAAC. October 2008

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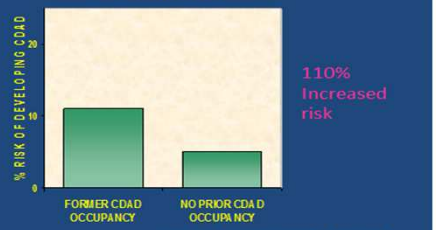
C. difficile Transmission to Prior Room Occupants



Shaughnessy et al. Abstract K-4194 IDSA / ICAAC. October 2008

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Pathogen Survival on Environmental Surfaces[1]

Organism	Length of Survival
Clostridium difficile	>5 months
Staphylococci	7 months
VRE	4 months
Acinetobacter baumanii	5 months
Norovirus	3 weeks
Escherichia coli	1.5 hours up to 16 months
Klebsiella spp.	2 hours up to >30 months
SARS, HIV etc	Days to weeks
Pseudomonas aeruginosa	6 hours to 16 months

1 Kramer et al. How Long do Nosocomial pathogens persist on inanimate surfaces? A systematic review. BMC Infectious Diseases 2006, 6:130. www.biomedcentral.com/1471-2334/6/130

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Cleaning

- Removal of visible soil, blood, protein material, microorganisms, and other debris from the surfaces, crevices, joints and lumens of instruments and equipment
- Done by mechanical or manual process
- Done before disinfection or sterilization process
- Cleaning reduces the bioburden and removes foreign material that can interfere with processing

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Disinfection

- Thermal or chemical destruction of pathogenic and other types of microorganisms
- Considered less lethal than sterilization
- Does not necessarily destroy ALL microbial forms, e.g. spores

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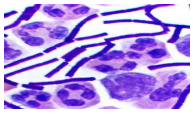
Sanitize

- The process whereby the number of microbes are reduced to a safe level



Sterilize

- The process whereby ALL microorganisms are inactivated or killed

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Spaulding Classification

- **Categories based on degree of risk of infection**
  - Critical
  - Semi Critical
  - Non Critical
- **Level of disinfection intended use**

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Critical Category

- **Items that contact sterile tissue or the vascular system**
  - Surgical items
  - Cardiac & urinary catheters
  - Ultrasound probes used in sterile body cavities
- **Level of Processing required: *Destruction* of all microorganisms including spores.**

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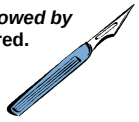
Semi-critical Category

- **Items that contact mucous membranes or non-intact skin**
  - Respiratory therapy and anesthesia equipment
  - Endoscopes
  - Laryngoscope blades
  - Esophageal probes

- **Level of process required: *Cleaning followed by HLD,* at minimum, sterilization, if preferred.**



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Non-critical Category

- **Items that contact intact skin:**
  - Bedpans
  - B/P cuffs
  - Linens
  - Bedrails
  - Bedside tables
  - Level of processing required***: Cleaning followed by LLD*** -destroys vegetative bacteria, mycobacteria, most viruses, most fungi but not spores.
  - Use EPA registered hospital disinfectant with tuberculocidal activity

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Levels of Disinfection (1)

- **High level disinfection (HLD) Chemical: Used for critical care items and semi-critical items**
- **Hydrogen peroxide**
- **Glutaraldehyde**
- **Paracetic acid with hydrogen peroxide**
- **Chlorine**
  - Must have FDA approval
  - Check manufacturer's recommendations for chemical compatibility

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Other Items to Consider

- **Glucometer**
  - Use manufacturer recommended product for cleaning and disinfecting
  - Never reuse lancets or needles or finger-stick devices for more than one person
  - Never use insulin pen for more than one person
  - Always change gloves between finger sticks and HH to follow
- **Gait belt**
- **Lift Slings**

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Levels of Disinfection (2)

- **High level disinfection: Used to destroy or decrease level of activity of bacteria in critical areas & on critical items**
  - Viruses (non-enveloped and enveloped), fungi, mycobacterium tuberculosis
  - Will kill some, but not all bacterial spores

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Levels of Disinfection (3)

- **Intermediate level disinfection: Used in some semi-critical items**
- **Destroys vegetative bacteria, most viruses, fungi, & M. tuberculosis but not bacterial spores**
- **Low Level disinfection: Used for non-critical items and environmental surfaces.**
  - Kills most vegetative bacteria, some fungi and enveloped viruses
  - Least effective disinfection process
  - Does not kill bacterial spores of M. tuberculosis

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Disinfectants Must be EPA Approved

- **Hospital disinfectants are EPA approved for use in hospitals and other medical facilities and must kill microorganisms often found in healthcare i.e., *S. aureus, S. enterica* and Pseudomonas**
- **Label must have EPA registration number**
- **Label must display kill claim of organisms**
- **Label must display hazards related to humans & animals (with recommendations of PPE)**
- **Contact times must be listed on label**
- **Label will have treatment information if splashed into eyes or ingested**

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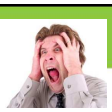
What Would You Do?



- During survey, a facility was found to have a resident with CRKP. The surveyor inquired what disinfectant product was being used for the environment. The DSD produced a product with an EPA approved kill claim for Klebsiella spp on the label. The surveyor told the DSD it was not an appropriate product because the label did not specifically state 1:10 bleach dilution and was not for CRKP. Surveyor demanded all products, including wipes be discarded!

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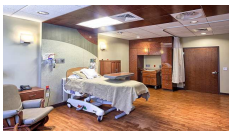
Role of the Environment

- Residents shed microorganisms into the health care environment through coughing, sneezing, diarrhea.
- Designation of a resident's environment differs depending on the nature of the healthcare setting.



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Monitoring and Cleaning Practices

- **Multiple studies have shown that EVS personnel wipe only 50% of surfaces targeted for cleaning.**[1]
- **Environmental rounds**
- **Visual inspection**
- **Environmental monitoring systems for quality improvement**
  - Use checklists as audit tool (Table 10.6, p. 169)
  - Resident satisfaction surveys
  - Include staff in auditing practices and give them feedback
  - Environmental marking (fluorescent marking of hard surfaces)

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Resident's Environment

- **Acute care:**
  - Inside curtain + BR
- **LTC:**
  - Bed space + BR+ personal mobility devices + dining areas
- **Mental Health:**
  - Bed space + shared space (group rooms, dining areas, common showers & BR)

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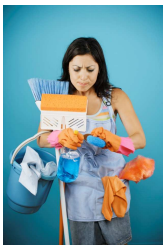
Environmental Service Issues

- **Language barriers**
- **Training**
  - Dilution of product (automated vs. manual)
  - Sequence of room cleaning
  - Whose responsibility is it?
- **Monitoring compliance**



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General Principles (1)

- Clean surfaces before disinfecting
- Select products that meet your needs
- Prepare solutions in clean containers
- Follow recommended dilution recommendations
- Change cleaning solutions every 3 rooms and as needed
- Change cleaning cloths/rags with each patient

CDC, www.cdc.gov/ncidod/dhqp/gl_environinfection.html, 2003

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General Principles (2)

- Change reusable mopheads with each solution change and as needed
- Clean from clean areas to dirty
- Check label for any special storage or disposal instructions
- Check label for recommended contact time
- Make sufficient fresh cleaning solution for daily cleaning. Discard remaining solution after 24 hours.

CDC, www.cdc.gov/ncidod/dhqp/gl_environinfection.html, 2003

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Education and Training

- Hand hygiene
- Standard precautions
- Isolation and PPE use
- High touch surfaces
- Use housekeeping audit/checklist tools
- Role play
- Use validation tools

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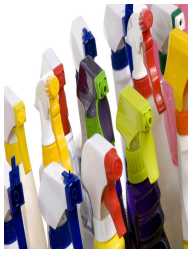
SDS Information

- Be sure to have material safety data information on all chemicals used
- Make information sheets available to all staff (bilingual, if needed)
- Educate staff on correct usage of these sheets
- Be sure all chemical bottles are labeled correctly and stored safely



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Trash

- Facility trash containers should be lined
- Trash bags should never be left on the floor
- Do not mix regular trash with medical waste
- Dispose of needles and sharp objects in sharps containers

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Arizona Medical Waste

- **According to the Definitive Guide to Arizona Medical Waste Disposal.:**
  - **What is medical waste?**

    1. Human blood and blood products (free flowing blood or blood components)
    2. Discarded cultures generated in diagnosis, treatment, or immunization of humans or animals
    3. Human pathologic waste (discarded organs and body parts removed during surgery)
    4. Medical sharps

1. Definitive Guide to Arizona Medical Waste Disposal. www.usbioclean.com

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Train on Specifics (1)

- **What disinfectants to use and when.**
- **Who is responsible for cleaning (EVS or CNA)?**
- **Which areas to clean first.**
- **How long chemicals should remain on surfaces for adequate kill time.**
- **Proper storage of cleaning items**
- **Proper mixing of products like bleach.**
- **Isolation practices**

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Train on Specifics (2)

- **Daily room cleaning**
- **Terminal cleaning process**
- **Intensified Interventions**
  - During utbreaks
  - High Touch surfaces
    - Doorknobs, light switches, overbed table, call light, drawers and closet doors, night stands, phone

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Environmental Cultures

- **Not routinely recommended**
  - Ongoing transmission of MDROs
  - Epidemiologically significant

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Environmental Cultures

- **In studies where cultures were indicated, corrective actions included:**
  - Use of dedicated equipment
  - Assigned dedicated cleaning personnel
  - Increased the cleaning/disinfection of frequently touched surfaces
  - Educational and observational interventions

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Alternative Technologies

- **UV-C Lights**
  - Electromagnetic radiation (ultraviolet light)
  - Germicidal effect on all microorganisms
- **Hydrogen Peroxide Vaporization (HPV) or "Fogging"**
  - Used in UK to eradicate MRSA
  - Effective against many MDRO
- **Hydrogen Peroxide/ Silver Halo System**
  - Delivers mists of H_2O_2 and silver
  - Effective against H1N1, rhinovirus, HIV, MRSA, Salmonella, Pseudomonas

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Summary

- **Education (P & P, training and competency testing)**
  - An ongoing process
- **Provide correct tools to your staff (rags, mops, PPE, cleaning & disinfecting agents)**
  - Continual direct oversight
- **Quality Assurance (follow-up with observations & direct monitoring of effectiveness of cleaning processes)**

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Interdisciplinary Services

- **APIC LTC Guide Chapter 11**
- **Food Service**
  - List five food borne illnesses in LTC
  - Which had the highest % of illness? Which has the highest mortality?
  - What is the holding temperature for hot food? Cold food?

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Prevent food borne illness

- **Time**
- **Temperature**
- **Surface cleaning**
- **Hand washing**
- **Employee Illness**
- **Pest Control**

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Time

- **Preparation time < 1 hour**
- **Cooking log**
  - Used for meals
  - Cooking temperatures recorded
  - Temperature check at 2 hour intervals
  - Must be < 45° F within 4-6 hours

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Temperature

- Use a food thermometer
- Cold foods stored and served at ≤ 40° F
- Cool foods rapidly in shallow pan
- Hot foods stored and served at ≥ 135° F
- Heat foods rapidly; never on steam table

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Potential food hazards

- Cream filled or custard items
- Any cream sauce
- Meat, poultry, and fish
- Sandwiches; ready to eat luncheon meats
- Foods containing meat, milk, or eggs
- Storage acid foods in non-metal container

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Surface cleaning

- Take equipment apart before cleaning
- Insure proper temperature for washing (140 ° F) and sanitizing (180 ° F or chemical)
- Clean work surface before and after use with appropriate disinfectant; rinse, if indicated
- Record dishwasher temperatures and chemical levels (if applicable)
- Allow items air circulation to air dry (do not stack wet)

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Hand washing

- **Requires soap and water; no alcohol hand sanitizer**
- **Do not block hand washing sink; do not use for food preparation**
- **Check for soap, water, and paper towels**

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Interdisciplinary Services

- **Laundry**
  - Which F tag addresses linen?
  - Separate soiled and clean linen handling
  - Do not separate soiled linen
  - Mattresses and pillows must be intact; no holes or tape repairs
- **Mattresses and pillows must be made of a material that can be disinfected between residents or single use only**

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Interdisciplinary Services

- **Rehabilitation**
  - Hand hygiene
  - Equipment disinfection
  - PPE during ambulation
  - Urine catheters during ambulation

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Interdisciplinary Services

- **Laboratory**
  - Specimen collection
  - Microbiology reports and sensitivity testing

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Interdisciplinary Services

- **Pharmacy**
  - Storage and handling (Room temperature, light exposure, refrigeration monitoring)
  - Injection safety
  - Insulin pens

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Emergency and Disaster Preparedness

- APIC LTC Guide Chapter 15

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Objectives

- Discuss the need for disaster planning in long-term care settings
- Review of IP role in disaster planning, response, and recovery
- Discuss disaster planning as an interdisciplinary program aligned with local, state, and federal regulations

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Long-term Care Facility

- Refers to any range of institutions that provide health care to people who are unable to manage independently in their own community or home
- Facilities may provide short and long-term rehabilitative services as well as chronic health care management

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Failing to plan is a recipe for planning to fail!

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Federal Regulation Requirements

- **CFR 483.75 (m) disaster and emergency preparedness**
  - F517 (1) the facility must have detailed written plans and procedures to meet all potential emergencies and disasters, such as fire, severe weather, and missing residents

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Federal Regulation Requirements

- **CFR 483.75 (m) disaster and emergency preparedness**
  - F518 (2) the facility **must train all employees** in emergency procedure when they begin to work in the facility, periodically review the procedures with existing staff, and carry out unannounced staff drills using those procedures

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Types of Disasters (Chapter 15)

- Fire
- Tornado
- Winter Storms
- Flooding (internal or external)
- Electrical Storms
- Earthquake
- Pandemic Influenza
- Bioterrorism
- Chemical Emergencies

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Disaster Challenges for SNF

- SNFs serve the medically fragile, who may be more severely impacted by disasters
- Very little physician presence
- High staff turnover
- Scarce resources for training or equipment
- Typically have not been included in healthcare preparedness community coalitions

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LTCF Disaster Preparedness Needs

- More involvement with local planning efforts
- Stronger facility emergency operation plans, particularly from the "walls out"
- Assistance to prepare as a partner in response

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Nursing Home Disaster Images

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Nursing Homes During Hurricane Katrina

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Nursing Homes During Hurricane Katrina

- All studied Gulf State nursing homes (20) met the federal requirements on their most recent state survey*
- All experienced problems, whether they evacuated or sheltered in place*
- Plans were often missing several planning elements recommended by experts
- Plans were not up to date
- Administrators not always familiar with plans

*Montgomery, J. Nursing homes: Part of the solution in community preparedness. CAHF EM Summit March, 2009

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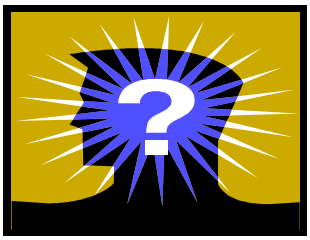
Where Do We Go From Here?



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Pre-Emergency Planning

- **Designate a disaster coordinator with possible alternate staff**
- **Coordinate your plan with local emergency management agencies and their management plans**
  - Have written mutual aid agreements with local healthcare partners
- **Begin with following steps:**
  - Develop organizational chart for disaster response activities
    - FEMA website www.fema.gov provides detailed information and training resources
  - Designate a command center location (should have phone and computer access)

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Additional Steps

- **Determine "code name" for each emergency (i.e., Code Red, Code Black) with scripted announcement to be made during emergency situation**
- **Identify staff who may need child care, transportation, or other special assistance and arrange for these services**
- **Develop an emergency communication plan (two-way radios for communicating and radios to get information)**
- **Develop emergency telephone roster (phone tree)**
- **Develop procedure for testing generators and equipment supported by generators**
  - 7-10 day supply of emergency fuel and an agreement with supplier for delivery of fuel
  - Determine what the generator will power

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Additional Steps

- **Ensure a 7-10 day supply of food and water for residents and staff**
- **During employee orientation and annually, schedule training on emergency operations plan**
  - Post the evacuation routes, alarm, and fire extinguishers location
  - Train staff on proper use of emergency equipment
  - Distribute personal preparedness checklists
  - Conduct unannounced fire drills annually
  - Document findings and corrective actions to be taken

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Preparedness Phase (1)

- **Activate phone tree**
- **Notify local communications center of emergency**
- **Notify staff in charge of emergency operations**
- **If weather related emergency, monitor weather conditions**
- **Notify key agencies of developing situation (fire, police, public health)**
- **Evaluate evacuation routes with staff and residents**
- **Communicate and handle calls to and from family members**
- **Control facility access**

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Preparedness Phase (2)

- **Confirm emergency staff available and facilitate care of their families**
- **Check food and water supplies**
- **Store a supply of flashlights and radios**
- **Secure outdoor furniture (storms, hurricanes)**
- **Determine if any residents can go home to their families that live locally**
- **Confirm transportation agreements with emergency medical service agencies, taxis, or buses**

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Preparedness Phase (3)

- **Determine how residents will be identified during evacuation and ensure following identifying information will be transferred with each resident:**
  - Name, date of birth, photograph (if available)
  - Social security number
  - Medicare/Medicaid or other health insurer numbers
  - Recent H & P
  - Current drug RX and diet regimens
  - Contact information of responsible party/next of kin/power of attorney
  - Isolation information (PPE needs)
  - Determine how this information will be secured, how meds and MR info will be kept with resident and secured (water proof wrist band, water proof pouch around resident's neck, laminated documents)

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Response Phase

- **Disaster coordinator will coordinate the following actions:**
  - Activate the emergency operations plan and open command center
  - Staff the command center with appropriate personnel
  - Coordinate actions and requests for assistance with local emergency services and the community
  - Determine needs for additional resources and continue to update authorities
  - Ensure communication with residents' families, and physicians
  - Ensure prompt transfer of appropriate resident records

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Recovery Phase

- **Immediately after emergency, take the following steps**
  - Coordinate recovery operations with emergency services and health departments to restore normal operations
  - Provide crisis counseling for residents, family members, and staff
  - Compile and provide local authorities with list of displaced, missing, injured, or deceased persons and notify the next of kin
  - Provide information on sanitary precautions for contaminated food or water to staff, volunteers, residents, and families
  - If needed, arrange for alternate housing or facilities

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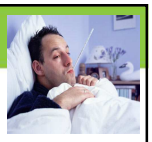
Pandemic Influenza (1)



- **Things to consider:**
  - When pandemic occurs, residents will not be able to be transferred to acute care hospital
  - IP to monitor public health advisories
  - Surveillance for detection of presence of influenza-like symptoms in residents and staff
  - Establish triage area that can be closed off from rest of facility
  - Cohort residents with influenza–like-illness, if private room not available
    - Separate suspected from confirmed cases, when possible

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Pandemic Influenza (2)

- Establish source for vaccine and antiviral medications
- Prepare for admission of hospital overflow of cases
- Discharge residents that are stable and able to go home
- Ensure adequate supply of PPE and hand hygiene supplies
- During pandemic, consider "mandatory vaccination" for HCWs
- Educate residents, families and HCWs on:
  - Hand hygiene
  - PPE
  - Vaccination
  - Respiratory Etiquette
- Develop plan for employee absence (non-punitive sick leave plan)
- Develop plan when affected HCW can return to work

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Dust Storms

- **Most intense and frequent dust storms occur in Arizona during the summer***
- **May impede employees from getting to work**
- **Listen to commercial radio for dust warnings**
- **Facilities should keep doors and windows closed**
- **Keep residents inside during dust storms**
- **Dust particles can lodge deep in bronchial tubes**

*Air Quality. Pinal County. June 30, 2014

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Dust Storms (2)

- **Valley Fever (VF) (Coccidiomycosis)**
  - According to CDC incidents of VF are up 10 fold in US[1]
  - According to Dana Goodyear from the New Yorker "2/3 of all the country's cases occur in Arizona"[2]
  - In 2012, VF was 2nd most reported disease in Arizona[2]
  - Each year 150,000 cases identified
  - Disease caused by inhaling microscopic spores of Coccidioides immitis, a soil dwelling fungus
  - Dust storms carry fungus into the air for desert residents to breathe.
  - Immunocompromised residents in LTCF susceptible to severe disease

1 Hawkins,A. Valley fever takes the southwest by dust storm. Breitbart. January 21, 2014
2 Goodyear, D. The valley fever menace. New Yorker. January 20, 2014. www.newyorker.com

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Bioterrorism

- Deliberate release of agents (i.e., bacteria, viruses etc) to cause illness or death in people animals or plants
- CDC separates these agents into 3 categories:
  - Category A- high priority with high risk to public & national security
    - Anthrax, botulism, plague, smallpox, tularemia, viral hemorrhagic fevers
  - Category B-moderately easy to spread
    - Brucellosis, *Clostridium perfringens,* Ricin, Q fever
  - Category C-emerging pathogens that have potential to be engineered for mass dissemination due to their availability, ease of production and transmission with potential for high morbidity & mortality
    - Hantavirus, MDR TB, pandemic influenza, Yellow fever, Tick-borne-encephalitis viruses, Tick-borne hemorrhagic fever viruses

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Chemical Emergencies

- **Chemical emergency can occur accidentally or as part of a bioterrorism event**
- **Hazardous chemicals can be categorized by type of chemical or by the side effects a chemical would have on exposed people**
  - Biotoxins (comes from plants or animals)
  - Blister agents (agents that blister the eyes, respiratory tract or skin on contact
  - Blood agents (poisons affecting the body by absorption into blood)
  - Caustics, acids (chemicals that burn the skin, eyes and mucous membranes like the lining of nose, mouth, throat, or lungs)

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Role of IP in a Disaster

- **Will vary depending on the type of disaster and magnitude of the event**
- **If no infectious diseases involved IP may have little involvement in a disaster**
- **IP will do:**
  - Surveillance to track conditions of residents
  - Monitor for adequate supplies to prevent spread of infections (PPE, hand hygiene, equipment)
  - Ensure proper handling of trash and medical waste
  - Assess environmental contamination after event
  - Assess for potable water
  - Ensuring isolation precautions are in place when needed
  - Reporting events if disaster updates internally and externally (Public Health, Fire Department, Police, Emergency Operations of the county).

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In Summary

- **Be prepared!**
- **Plan**
- **Educate**
- **Practice**
- **Develop resources**
- **Develop partnerships**
- **Heighten your awareness!**

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Discussion Questions

- Nursing staff failing to follow proper hand washing techniques (turning off the faucet with bare hands)
- Nursing staff touching medications with bare hand during med pass or failing to don gloves when administering injections.
- Nursing staff failing to properly disinfect glucometers between residents.
- Failing to follow contact precautions- This is especially an issue in relation to *C. difficile*

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2002 CDC Hand Hygiene

- When washing hands with soap and water, wet hands first with water, apply an amount of product recommended by the manufacturer to hands, and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water and dry thoroughly with a disposable towel. Use towel to turn off the faucet (IB)

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Injection PPE

- "In general, OSHA agrees with you that gloves are not necessary when giving routine injections as long as hand contact with blood or other potentially infectious material is not anticipated. If bleeding is anticipated and the employee is required to clean the site following injection, then gloves must be worn. Additionally, if the patient's skin is abraded, gloves would be required." Federal OSHA, letter https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=20819
- Check if this is a local requirement

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