



# MDRO Prevention in Skilled Nursing Facilities

Trying to make sense of it all- well, some of it!

Michael Dolamore, MD, CMD, AGSF

# MDROs and their Toll

- MDROs account for 2 million infections in the US (estimated)
- MDROs account for >93,000 deaths annually in the US (JAMDA Mar 1 2016)
- MDROs cause 23,000 deaths in SNFs in the US annually
- HealthCare Facility-Acquired Infections in general cause 1-3 million serious infections in SNFs in the US

(CDC, antibiotic/antimicrobial resistance at [www.cdc.gov](http://www.cdc.gov))

MDRO numbers and  
Risks, US hospitals  
2017  
CDC Antimicrobial  
Resistance Report  
2019

In order of lethality:

VRE: 54.4K cases, 5.4K deaths (9.9% fatality)

Carbapen.-res. Enterobacter: 13.1K cases, 1.1K deaths  
(8.4% fatality)

MDR-Pseudomonas aer.: 32.6K cases, 2.7K deaths (8.3%  
fatality)

Erythromycin-res. Gp A Strep: 5.4K cases, 450 deaths (8.3%  
fatality)

MDR- TB: 847 cases, 62 deaths (7.3% fatality)

# MDRO lethality slide 2

Clostridium difficile: 223.9K cases, 12.8K deaths (5.7% fatality)

Clindamycin- res. Gp B Strep: 13K cases, 720 deaths (5.5% fatality)

ESBL: 197K cases in US hospitals, 9.1K deaths (4.6% fatality)

MRSA: 323.7K cases, 10.6K deaths (3.3% fatality)

MDR- Strep. Pneumoniae: 900K cases, 3,600 deaths (0.4% fatality)



## MDROs in SNFs slide 1

- From 2016-2017, 28 SNFs were studied for prevalence of MRDO colonization.
- 50 residents from each SNF selected and swabbed.
- 20 objects sampled by swabbing used by those residents too.
- In total, 2,800 swabs from 1400 residents in 28 facilities.
- Results:
- Median prevalence of MDRO in SNF = 50% (24-70% range)
- MRSA 36%, ESBL 16%, VRE 5%, CRE 0%

## MDROs in SNFs, slide 2

- 45% of residents harbored MDRO without an MDRO history
- MDROs were found in residents' rooms in 74% of swabs
- MDROs were found in common areas in the SNF in 93% of swabs
  
- Conclusion: >50% SNFs have MDRO colonization, mostly MRSA and ESBL.
- MDROs are of major clinical and public health significance.
- There's a huge 'submerged portion of the iceberg' in SNFs

(JAMDA, June 16, 2020)





# Let's NOT talk Antibiotics today, instead:

- Reducing HAIs –

## #1 intervention- Hand hygiene

in Acute care settings, >70% compliance is associated with reductions in MRSA and other MDROs

in SNFs, less solid data exists, but multiple small studies and QI projects are strongly associated with reduction in MDROs, especially MRSA, with up to 94% reduction in MDRO, in particular, MRSA

(Improved Hand Hygiene Compliance Reduced the Incidence of Common MDROs in a NF, Bravo et Al, JAMDA 17 (2016) B12-B22)

# The 'MRSA Bundle' (VHA initiative, 2007)

- Initiated in all inpatient non-psychiatric settings, inc. ICU, SNF (CLC) and acute care resulted in significant reduction in MRSA HAIs.
- In the SNF (CLC) environment, this requires:
- Active surveillance for all patients (bilateral ant. nares PCR swabs) for new, or re-admissions, or on a pass > 96 hours and known colonized in the last 12 months
- Enhanced Barrier Precautions for all colonized-infected patients
- Hand hygiene
- Culture change to ensure that infection prevention is everyone's duty

# MRSA Bundle in High Risk areas:

---

- Includes Contact Precautions
- Decontaminating strategies, such as regular chlorhexidine treatment.

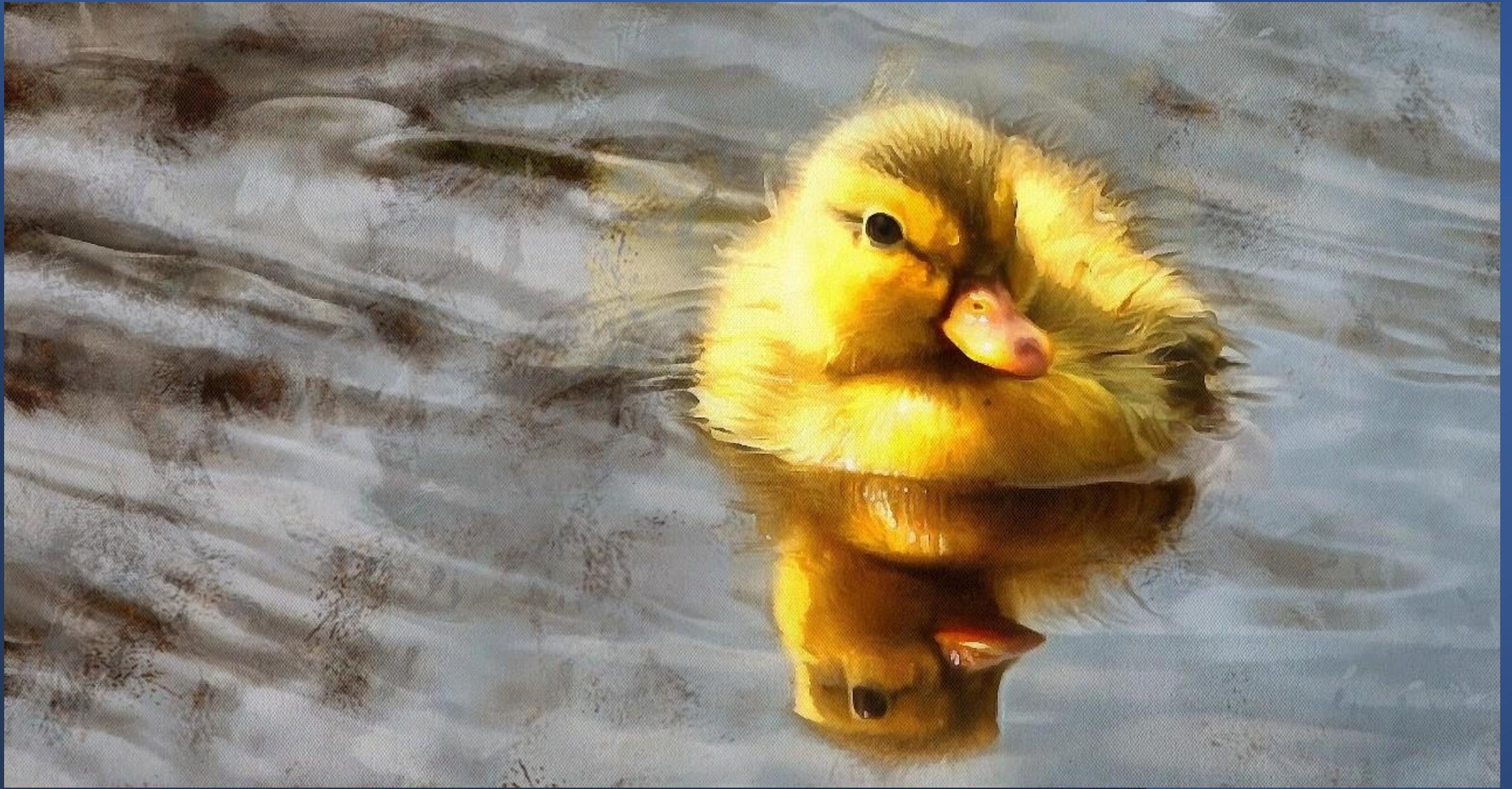
# How effective is the VHA MRSA Bundle?

- Between Oct 2007 and June 2010, implementation of the Bundle resulted in:
- ICU: Decreased MRSA infection by 62%
- Non-ICU: Decreased MRSA infection by 45%

Additionally:

- CDC data show that from 2005-2014, in the US:
- Overall incidence of invasive MRSA decreased 40%
- Incidence of invasive hospital-acquired MRSA decreased 65%

(VA Initiative to Prevent MRSA Infection. Jain et Al, NEJM 2011, April 14: 364:1419-1430)



# Contact Precautions- Colonization, yes or no?

A good study in SNF population, n. 120, reviewed colonization rates with MDROs after cessation of Contact Precautions:

Rates prior to cessation, (Jan-Mar 2012) = 5.52/1000 resident days

Rates after cessation, (Jan-Mar 2013)= 4.73/1000 resident days

Hospitalizations remained stable, (65 prior to, 62 after cessation of CP)

No increase in MRSA noted.

SNF residents were tracked for 10 months; reported less isolation 54%, increased staff interaction 73% and improved mood 73%

Conclusion: limiting CP for MDRO colonized SNF residents positively impacted QOL without increasing infections nor hospitalizations.

(Brooks et AL, JAMDA 15,3. PB19, Mar 2014)

# To use CP or not?

current practice in many nursing homes is to implement Contact Precautions only when residents are **infected** with an MDRO and on treatment.

there is growing evidence that current implementation of CP in nursing homes is not adequate for prevention of MDRO transmission

Because CP require room restriction, they are generally intended to be time limited and, when implemented, should include a plan for discontinuation or de-escalation

CP still preferred for Clostridium difficile, Norovirus and scabies in SNFs

## Enhanced Barrier Precautions, (CDC July 2019)

- Expands the use of PPE beyond situations in which exposure to blood and body fluids is anticipated, refers to the use of gown and gloves during **high-contact resident care** activities that provide opportunities for transfer of MDROs to staff hands and clothing.

Examples include:

- Dressing
- Bathing/showering
- Transferring
- Providing hygiene
- Changing linens
- Changing briefs or assisting with toileting
- Device care or use: central line, urinary catheter, feeding tube, tracheostomy/ventilator
- Wound care: any skin opening requiring a dressing

# Enhanced Barrier Precautions Apply to:

- Infection or colonization with a **novel or targeted MDRO** \*when Contact Precautions do not apply.
- Wounds and/or indwelling ,medical devices (e.g., central line, urinary catheter, feeding tube, tracheostomy/ventilator) regardless of MDRO colonization status who reside on a unit or wing where a resident known to be infected or colonized with a novel or targeted MDRO resides.
- Novel or Targeting MDROs\* are:  
pan-resistant organisms, Carbapenemase-producing Enterobacter, carbapenemase-producing Pseudomonas sp., carbapenemase-producing Acinetobacter sp. And Candida auris.

# Implementation of EBP:

- Staff awareness is critical- what EBP is, what the facility's policy is and its expectations
- To accomplish this: Post clear signage outside of resident's room indicating type of precautions and required PPE. Signage to state what high-contact resident care activities are that require EBP
- Have readily available PPE for staff
- Have antiseptic/alcohol-based gel in every room, just inside and outside the room.
- Position a trash can inside the room near the exit for discarding PPE before moving on to the next patient.
- Incorporate periodic monitoring, (audits, tracers, etc), to assess adherence
- Regular Education of residents, staff and visitors (be in a state of 'continuous survey readiness')

(CDC, Implementation of PPE in NH, July 29, 2019)

# PPE cabinet outside resident's room





Now, on to old  
'friends' and  
other issues!

---



TB- latest  
guidelines  
for screening  
for HCP,  
Risk  
assessment  
based upon:

- Temporary or permanent residence of 1 month or more in a country with high TB rates. (Any other than US, Canada, Australia, NZ, Northern or Western Europe.)
- Current or planned immunosuppression (HIV, organ transplant recipient, Rx with TNF-alpha antagonist (eg. Infliximab, etanercept), chronic steroid use (equivalent to prednisone >15mg/daily for > 1 month, or other immunosuppressive treatment.
- Close contact with someone who has had infectious TB since the last TB test

(CDC MMWR Morbidity and Mort. Wkly. Rep 2019; 68:439-443)

# CDC-TB HCP Testing and Treatment, changes since 2019

Individual baseline TB risk assessment

Annual TB screening no longer routinely recommended unless occupational risk or ongoing exposure

Treatment encouraged for all HCP with untreated latent TB illness

Shorter course (3-4 mo) recommended over prior recommendations due to improved completion and compliance rates

Annual education should include info about TB risk factors, Signs and symptoms of TB and TB infection control policies and procedures

# What has gone away in TB recommendations for HCP?

Screening for all HCO pre-placement/upon hire

Referral to determine whether latent TB treatment is indicated

Recommendation for annual TB education (non-specific)

But no changes for those HCP when an exposure is recognized;  
ie. TST or IG RA (Interferon-gamma release assay).

If that test is negative, repeat in 8-10 weeks

## TB screening recommendations for SNF residents

The question is whether the resident is likely or unlikely to be infected?

If unlikely- Testing for latent TB is not recommended.

If likely- IG-RA preferred over TST

Routine TB screening is not applicable for *asymptomatic or low risk* SNF residents

(IDSA Guideline from Jan 15, 2017 CID 2017:64, Lewisohn et al)



# Carbapenemase-Resistant Enterococci (CDC Guidelines)

Carbapenemase genes readily transmitted across species of enteric organisms:

E.coli, Klebsiella, Proteus, Morganella, Providencia sp.

As with other MDROs, high risk patients most susceptible; Frail elderly, ICU, ventilator care, immunocompromised, especially those who have been on broad-spectrum antibiotics.

Mainly found in acute care settings, but becoming more common in SNFs.

For those at high risk, mortality <50%

# CRE prevention

Transmission: hands, medical equipment, but sinks and drains increasingly recognized as a source of CRE/HAls

Prevention- as with most organisms, #1: Hand Hygiene, soap or gel.

Private rooms/bathrooms.

Contact or Enhanced Barrier Precautions

Timely notification of the entire health care team of CRE status.

Removal of 'tubes and tethers' ASAP if possible.

Positivity can remain for months. Usually 2 negative tests needed to remove CP/EBPs

# VRE/ ESBL

As with CRE:

Hand hygiene, soap or gel.

PPE/gloves

Timely communication with the health care team of MDRO status.

Private room/bathroom or cohorting.

Two negative cultures needed for release from CP/EBPs

# Clostridium Difficile Associated Diarrhea

- Prevention: APIC guidelines-
- Contact Precautions- immediately institute for patients with diarrhea!
- Inform health care team- early assessment and testing
- Hand Hygiene with Soap and Water, not antiseptic gel.
- PPE readily available on unit
- Have dedicated thermometers, commode and other equipment
- Patient placement: private rooms/bathrooms, cohorting

# CDAD and Probiotics: To use or not to use? that is the question!

- Meta-analysis of 30 studies reviewed:
- For short term use when given with broad-spectrum antibiotics, there was a 60% reduction in CDAD compared to placebo + antibiotics without an increase in adverse events, including abdominal cramping and nausea, antibiotic associated diarrhea (AAD)
- Overall NNT to prevent one infection: 40
- However, for those who are most at risk, there was a 70% reduction in CDAD, NNT to prevent one infection: 12

(Goldenberg, J et Al, Probiotics for the prevention of CDAD in adults and children. Cochrane Data Base Syst Rev. 2017, Dec 19; 12 (12)



# Emerging issues with CDAD: (Prevention of CDAD. Rubin et Al, CIDR 20: 32, 2018)

- Asymptomatic C. diff 'shedders' increasingly identified
- Under study currently: Vaccines for those at risk.
  - Manipulation of intestinal microbiome.
  - Screening for C. diff carriers.
  - Supplemental cleaning strategies for all areas using bleach.
- Premorbid medication review: D/C PPIs, systemic steroids, certain antibiotics: fluoroquinolones, Augmentin and clindamycin. Antibiotic stewardship, (of course!)



# UTI, Asymptomatic Bacteriuria and CAUTI

UTIs account for 40% of all infections annually in US hospitals.

However- the Big issue in health care:

Asymptomatic bacteriuria or UTI? UTI differentiated from ASB as ASB is without symptoms localizing to the urinary tract, but still has a positive UC and UA, with or without pyuria.

In SNFs, >50% of females and 40% males have ASB

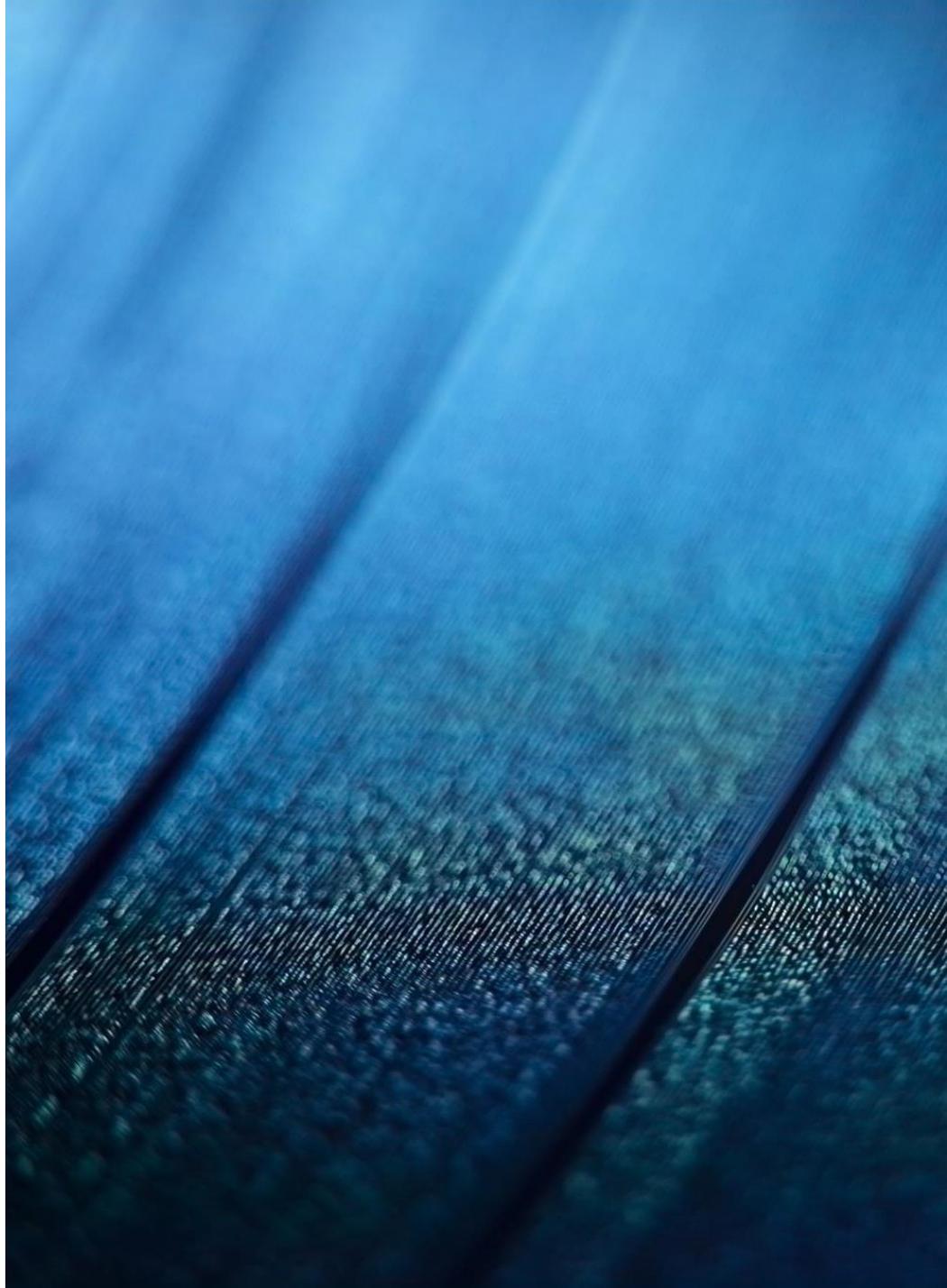
>50% of antibiotics used in urinary infections are inappropriate in SNFs

# So what?

Reduction of unnecessary or inappropriate antibiotics lowers the risks of MDROs in SNFs

For infection preventionists, it is unnecessary antibiotic usage that is the greatest source of MDROs.

What to do about it? Antibiotic stewardship, antibiograms, frequent education, and more education!



# What constitutes a UTI?

- UTI requires the presence of clinical signs and symptoms that localize to the urinary tract.
  - **This does not include:** dark or foul urine, which is more a reflection of dehydration, diet or medications
  - **This does not include:** falls, changes in cognition, agitation, decreased appetite, especially when genitourinary signs are absent.
- 
- But, this can be challenging for those who are frail or demented

# What can be used to diagnose a UTI?

## 1. The Loeb Minimum Criteria

This describes the minimum criteria for the diagnosis of urinary tract infections in SNF, with (CAUTI) or without (UTI) an indwelling catheter.

For residents without an indwelling Foley:

Acute dysuria alone or fever >100F (or 2.4F over baseline) PLUS at least one of the following: frequency, gross hematuria, SP tenderness, CVA tenderness, new or worsening incontinence or urgency

# Loeb Minimum Criteria, cont.

For residents with an indwelling Foley: CAUTI diagnosis requires the presence of at least one of the following:

fever (as on prior slide), new CVA tenderness, rigors

or new onset of delirium

Urinary studies don't diagnose a UTI.

## 2. Agency for HealthCare Research and Quality

(AHRQ Criteria for CAUTI)

These criteria include one of the following:

acute back or flank pain,

new-onset mental status changes,

hypotension,

fever of 100F or 99F on two + occasions or

>2F over baseline

Urine studies alone cannot diagnose a UTI

AHRQ criteria have reduced antibiotic use >30% for 'UTIs'



# What's wrong with urine studies?

- Nothing, so long as the symptoms and clinical signs fit UTI criteria
- UA with positive leuk esterase and/or nitrates has a low positive predictive value for predicting UTI: 45% ie. Non-confirmatory
- UA without leuk esterase or nitrites has a 100% negative predictive value in predicting UTI
- UA with pyuria (>10 WBC/hpf) is found in <90% of SNF residents

(Diagnosis ,treatment and prevention of UTI in PALTC settings: a consensus statement from AMDA's infection advisory subcommittee (JAMDA 21, 1 P12-24, E2, Jan 1 2020)

# Indwelling Urinary Catheters

Don't collect a urine specimen from a catheter that has been indwelling for >14 days, but replace and collect, or discontinue and collect due to Biofilms in the catheter lumen walls.

Catheters increase the pH of the urine due to urease from the bacteria, which promote crystalluria and encrustation of the lumen.

Long term antibiotics demonstrate no benefits for patients with long term indwelling catheters

# CAUTI prevention

Silver-coated Foley catheters: benefits relatively minor, not all are alike. Many studies exist, limited by methodological quality.

Silver alloy catheters > silver oxide catheters in prevention of CAUTI

Long term use has controversial data, data for short term insufficient

Best data using silver coated Foley catheters: 57% reduction in CAUTI

(Rupp et al, AJIC 32(8) 445-450, 2004)

# CAUTI prevention, cont.

Nitrofurazone- impregnated catheters: minimal benefit over standard catheters in low-quality studies up to 1 week.

Hydrophillic catheters: no reasonable evidence for benefit v. standard

Preconnected, sealed catheters: low quality evidence for benefit

Urinary antiseptics: eg. methanamine, may have benefit, but evidence is poor quality and few studies

Bladder irrigation: low quality evidence does not support benefit

Periurethral care- antiseptic meatal cleaning pre or post, during catheterization reveals no benefit.

# Best practice for CAUTI prevention

Hand hygiene and  
sterile insertion

Use smallest gauge  
catheter possible

Frequent review of  
necessity for an  
indwelling catheter

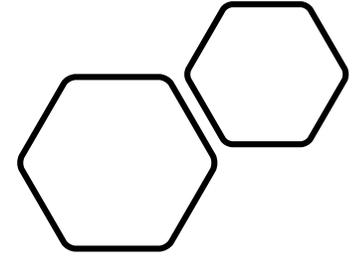
Don't change  
indwelling catheters  
routinely

Replace catheters  
only if problems  
arise or prior to Rx  
CAUTI

Leg bags are best  
option for drainage,  
(compared to belly  
bags)

Limit catheter use,  
remove ASAP

(CAUTI, Lindsay, EN,  
Antimicrobial Resist  
Infect Control,  
2014:3:23 July 2014)



A scenic sunset over a body of water, with the sun low on the horizon. The sky is filled with orange and yellow clouds. In the foreground, there are silhouettes of trees and a house with a gabled roof. The word "Questions?" is written in white text in the center of the image.

Questions?