

Antibiotic Stewardship in Long-Term Care: Background and Implementation Strategies

Joseph M. Mylotte, MD

Professor Emeritus of Medicine
University at Buffalo

Conflict of Interest

None to Report

Dr. Mylotte's Background

- Full-time faculty, School of Medicine/Biomedical Sciences, University at Buffalo; 30 years
- Internal Medicine; Infectious Diseases
- Nursing home infection control consultant 25 years
- Nursing home attending physician 11 years
- Nursing home medical director 9 years

Objectives

- To understand the importance of antibiotic stewardship in LTC by reviewing the use of antibiotics and their adverse effects in this setting
- To review the CDC core elements of antibiotic stewardship for LTC
- To provide methods to implement the CDC core elements in individual LTC facilities

CMS:

Reform of Requirements for Long-Term Care Facilities

“...Centers for Medicare & Medicaid Services (CMS) issued a final rule to make major changes to improve the care and safety of the nearly 1.5 million residents in the more than 15,000 long-term care facilities that participate in the Medicare and Medicaid programs. The policies in this final rule are targeted at reducing unnecessary hospital readmissions and infections, improving the quality of care,...”

“ Updating the long-term care facility’s infection prevention and control program, including requiring an infection prevention and control officer and an antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.”

Federal Register 9/28/16

<https://www.federalregister.gov/public-inspection/2016/09/28>

LTC Population is Becoming Increasingly Complex

- Post-acute care population increasing
 - Medical complexity and care needs increasing
 - Increased exposure to devices, wounds ,and antibiotics
 - Risk of multidrug- resistant organisms [MRSA, VRE, ESBL] increased
 - **Should not be included or added to LTC infection surveillance information; should be kept separate**
- Dynamic movement across healthcare settings
 - Onset of healthcare-associated infections is impacted

Antibiotic Use in Long-Term Care

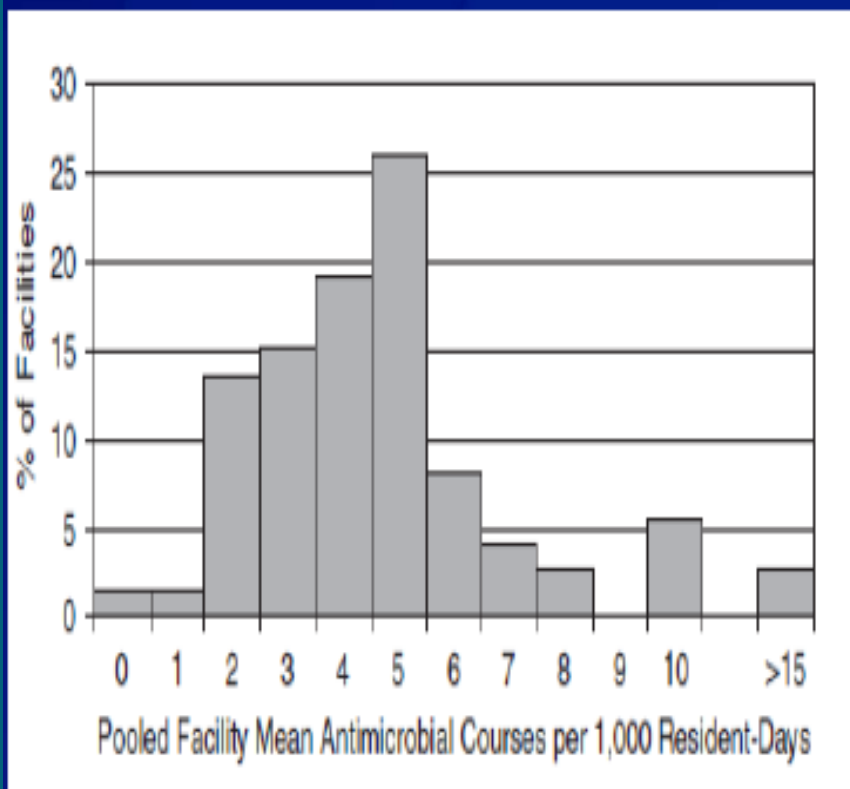
“Party Line” About Antibiotic Use in LTC

- Antibiotics are one of the most frequently prescribed classes of drugs in LTC
- In any given year 50-70% of residents in a facility are prescribed an antibiotic
- 25-75% of antibiotics prescriptions are inappropriate

Benoit et al JAGS 2008
Nicolle et al ICHE 2000

CDC Study of Antimicrobial Use in 73 NHs in 4 States, 2001-2002

[Benoit et al JAGS 2008;56:2039-2044]



- Pooled mean 4.8 courses/1000 RCDs [range 0.4-23.5; $P < .001$]
- Prescription frequency:
 - Quinolones 38%
 - 1st gen cephalosporins 11%
 - Macrolides 10%

Antibiotic Use in NHs in Ontario, Canada, 2009

[Daneman et al J Antimicrob Chemother 2011;66:2856-2863]

- Population-based, point-prevalence survey of abx use in 363 NHs
- 5-fold variation in prevalence of abx prescribing ranging from 2.2%--10.8%
- 63% of treatment courses were at least 10 days in duration
- 21% of courses exceeded 90 days in duration indicating prophylaxis rather than treatment
- Quinolones 28%, nitrofurantoin 15%, T/S 14%, cephalexin 10%

Prolonged Abx Treatment in Long-Term Care: Role of Prescriber

[Daneman et al JAMA Intern Med 2013;173(8):672-682]

- Province-wide, retrospective analysis of abx use in 66,901 residents of 630 LTCFs in Ontario, Canada in 2010
- Treatment duration was evaluated across residents and prescribers
- % of MD courses > 7 days used to classify short-, average-, and long-duration prescribers
- During the study, 77.8% of residents received an incident course of abx

Antibiotic Treatment and Duration

Daneman et al JAMA Intern Med 2013;173(8):672-682

Quinolones, 1st generation cephalosporins, and sulfonamides most commonly prescribed

- 14 % courses < 7 days

Average duration of Rx by category:

- 41% courses = 7 days

Short 7.5 days

- 45% courses > 7 days

Average 9.1 days

Long 11.6 days

Comparison of Prescribers by Rx Category

Daneman et al JAMA Intern Med 2013;173(8):672-682

- Age, sex, specialty, and years in practice similar among 3 categories
- Resident characteristics were also similar among the 3 categories of prescribers suggesting that prescribing preferences were not associated with differences in resident comorbidities or care needs
- After controlling for resident factors, odds of rx > 7 days was 3.84 for 75% prescriber compared to 25% prescriber

Conclusions

[Daneman et al JAMA Intern Med 2013]

- In Ontario, Canada NHs, antibiotic treatment is often prescribed for long durations
- Major factor influencing duration of treatment is prescriber preference more than resident characteristics
- Among long duration prescribers, what is driving this preference is not clear
- Long duration treatment courses are a target for stewardship interventions

Variability in Antibiotic Use and Risk of Antibiotic-Related Adverse Outcomes in Ontario, Canada NHs

[Daneman et al JAMA Intern Med 2015]

- Use varied from 20.4—192.9 antibiotic days per 1000 RCDs in 607 NHs between Jan 2010 and Dec 2011
- Variation in use was similar for urban and rural NHs
- Risk of all adverse events was significantly higher for high-use NHs [13.3%] vs medium-use [12.4%] vs low-use [11.4%] ($P < .001$)

Conclusions from Studies of Antibiotic Use in NHs

- Considerable variability in prescribing of antibiotics in NHs
- **Physician preference** appears to be a major factor in the variation in prescribing and is not explained by differences in resident factors
- **High use or long duration of therapy** places residents at risk for adverse outcomes and is a major target for antibiotic stewardship programs in NHs



Adverse Effects of Antibiotic Therapy

Adverse Effects of Antibiotic Therapy

- **C. difficile infection** — risk is increased 8-fold following treatment of suspected UTI in LTC residents [Drinka JAMDA 2013]
- Allergic reactions
- Development of resistance and transmission of resistant organisms to others in NH or other healthcare facilities

Resistant Organisms of Concern for LTC [CDC]

- Urgent level of concern
 - C. difficile
 - Carbapenem-resistant Enterobacteriaceae [CRE]
- Serious level of concern
 - MRSA
 - VRE
 - ESBL Enterobacteriaceae
 - MDR Acinetobacter, Ps. Aeruginosa

Antibiotic Resistance in NHs Related to 3 Factors

- Transfers from other healthcare facilities colonized with resistant organisms [new admissions or LTC residents returning from hospital]
- Unnecessary or prolonged use of abx in NH residents—resistance often only observed in urine cultures; e.g FQ resistance is common in urinary isolates
- Transmission from resident-to-resident

Actions to Prevent Resistance from Developing or Spreading

- Prevent Infection
- Prevent spread of resistant bacteria
- Track resistant bacteria in residents
- Improve antibiotic prescribing
- Development of new antibiotics
- Development of diagnostic tests to identify etiology of infection

What is the process for
prescribing antibiotics in nursing
homes?

Questions to Address by the Provider Regarding Antibiotic Treatment Decision

- Does the resident's condition require antibiotic therapy?
- What infection is suspected? What is the severity?
- What tests should be ordered?
- Should the resident be hospitalized?
- If not hospitalized, what antibiotic should be prescribed? Duration? Follow-up?

Factors Impacting on Provider Decision Regarding Antibiotic Therapy

- On-site evaluation by provider is uncommon
- Provider is relying on nursing evaluation for decision regarding treatment [variation in skill of evaluation and communication of information]
- Documentation in medical record of the initial assessment resulting in antibiotic rx is limited
- Family, resident preferences

Staff –Provider Communication Issues

- Nursing staff does not have all information necessary leading to multiple provider inquiries during a call and delays in assessment
- Covering providers are unfamiliar with resident that frustrates staff
- Trust between provider and staff
- Providers not responding in a timely fashion

Role of NH Staff in Antibiotic Prescribing Process

- **RN or LPN is the “point person”** for contacting provider re: suspected infection in a resident; **MUST** be educated about information that needs to be collected before calling provider [templates]; information provided impacts decision on testing, and treatment
- Key “player” in monitoring response to therapy; concept of an **“antibiotic timeout”** after 2-3 days of rx relies on staff making contact with provider
- This level of participation in the abx prescribing process should empower staff



Improving Antibiotic Prescribing in Long-Term Care: Stewardship

Rationale for an Antibiotic Stewardship Program in LTC

- Excessive antibiotic use; significant variability in antibiotic prescribing among NHs
- Increasing antibiotic resistance in NHs
- Increasing *C. difficile* infection in NHs

Establishing an Effective Stewardship Program in LTC is Difficult

- Effective ASP can be complex
- Resource intensive
- Requires constructive engagement of a broad group of facility personnel

Questions to Consider Before Developing an Antibiotic Stewardship Program in LTC

- Is there a protocol for staff to use in communicating changes in resident condition to provider?
- What resources are available from the lab and pharmacy to assist in the program?
- Is there a protocol for follow-up of residents started on antibiotic treatment?
- Is there a method for monitoring antibiotic use and providing provider feedback?
- What outcomes need to be monitored?

What Administrators are Asking About Antibiotic Stewardship

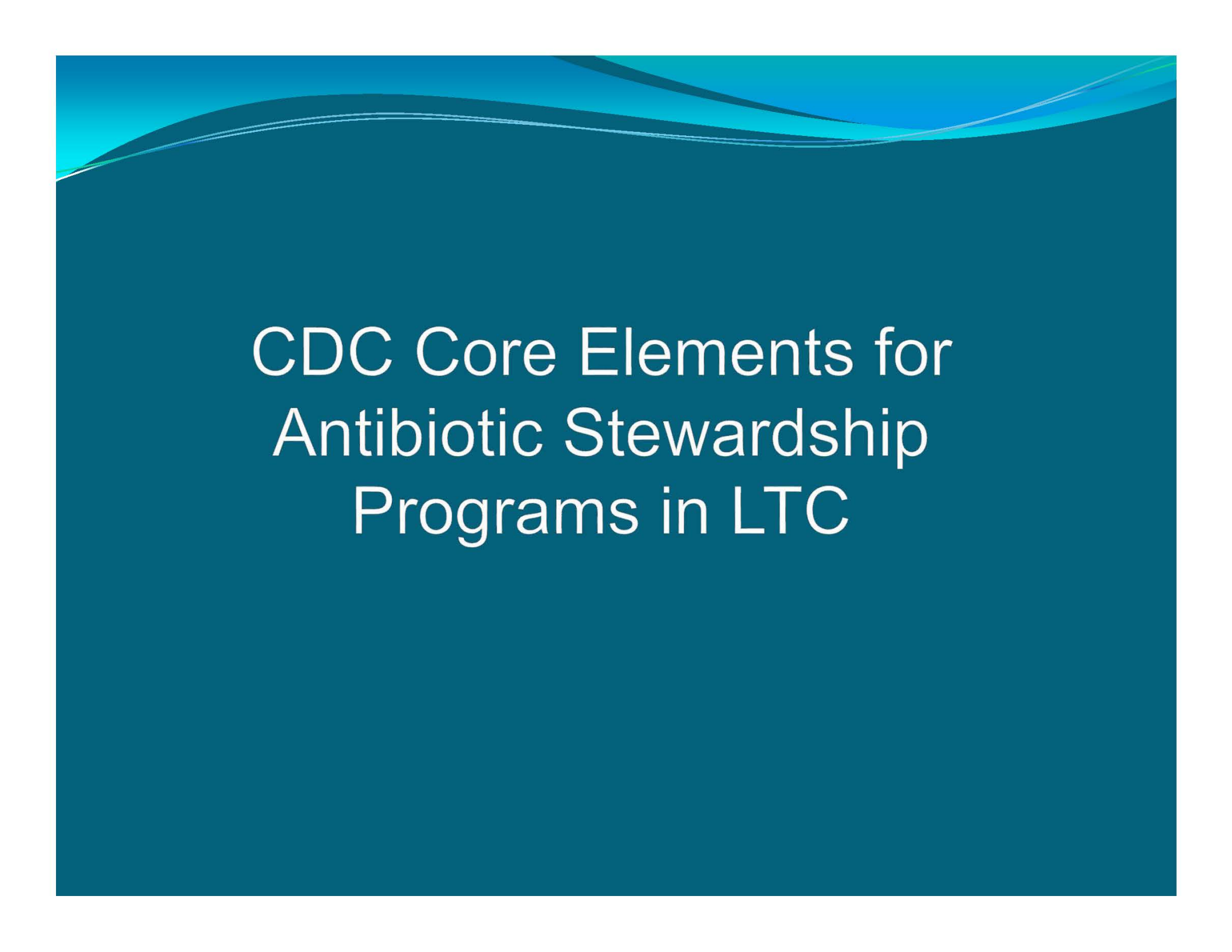
- What is antibiotic stewardship [AS]?
- How is it done?

Goals of Antibiotic Stewardship

- To ensure the timely administration of an effective antibiotic regimen to someone [residents] with a disease process that would benefit from such treatment
- To minimize the intensity and duration of antibiotic treatment consistent with effective care
- Mitigate the unintended consequences of antibiotic therapy: C. difficile infection, development of resistance, adverse reactions

How do you do antibiotic stewardship in LTC?

- Several studies have been published evaluating various methods to perform antibiotic stewardship in LTC; none are practical or sustainable for most facilities [see references for reviews]
- CDC has published core elements for an antibiotic stewardship program in LTC



CDC Core Elements for Antibiotic Stewardship Programs in LTC

CDC Core Elements for Antibiotic Stewardship Programs in LTC

- **Leadership commitment** [written support]
- **Accountability** [define ASP “team”]
- **Drug expertise** [ID physicians and pharmacists]
- **Action** [implement at least one policy or practice to improve use]
- **Tracking** [monitor at least one process and outcome measure]
- **Reporting** [feedback to providers and staff]
- **Education** [provide resources on abx use and resistance to providers, staff, and families]

Initial Steps to Establish an ASP in LTC

- Obtain written administrative support
- Establish an ASP “team”
 - Medical director
 - DON
 - Person responsible for infection control
 - Staff representative
 - Pharmacist [if possible]
- ASP team should establish initial goals
- “Buy-in” by providers is critical to success [communication]

Initial Steps of ASP team

- Identify process measures
 - # antibiotic courses started per 1000 RCDs
- Identify outcome measures for improvement
 - C. difficile infection rate
- Identify resources needed
 - How is information on process measures collected?
- Duties and expectations of team members
- Expectations of staff and providers

Initial Steps of ASP team: Continued

- Develop policy for ordering antibiotics
 - Specify dose and duration of treatment
 - Specify site of infection

- Develop best practices for microbiology testing
 - “Test of cure” testing not recommended after appropriate treatment of *C. difficile* infection or UTI
 - Do not do swab cultures of open wounds/ulcers

Establish Reasonable Initial Goals of the ASP

- Reduce antibiotic use by 20% in the first year of the program
- Minimize courses of antibiotic therapy > 7 days
- Monitor effect of ASP on incidence of C. difficile infection and resistant organism prevalence [outcome measures]
- Educate and empower staff about ASP

Empowering Nursing Staff to Participate in ASP

- Utilize communication tool by nursing staff for residents suspected to have infection
 - Facilitates phone discussions with providers and also can be used for infection surveillance purposes
 - Structured tool assists nursing staff in providing quality information and improves management
- Utilize “Antibiotic Time-out”
 - “Time out” is a formal process designed to prompt reassessment by provider of ongoing need and choice of abx treatment [discontinuing or de-escalating treatment]
 - [e.g., on day 3 of therapy]; initiated by nursing staff; written documentation important

Educate Staff and Providers About Duration of Antibiotic Treatment

- 50% of abx courses were found to be > 1 week with no correlation with resident characteristics or type of infection treated; study of > 600 NHs in the province of Ontario, Canada [Danemen et al JAMA IM 2013]
- Short courses [< 7 days] are effective for common infections in NHs
 - Lutteri et al Cochrane Database Syst Rev 2008
 - Hepburn et al Arch IM 2004
 - El Moussani et al BMJ 2006

Potential Process Measures for ASP in LTC

- # Antibiotic courses started per 1000 RCD per month
 - This can be obtained by nursing staff
- Days of antibiotic therapy per 1000 RCD per month
 - This will require information from pharmacy provider
- Monitoring cost of therapy, e.g., total cost of antibiotics per month/total RCD = cost / RCD
 - Requires information from pharmacy provider

Potential Outcome Measures for ASP in LTC

- Incidence of *C. difficile* infection
- Prevalence of resistant organisms; e.g MRSA and ESBL-producing gram neg bacilli
- Monitor adverse reactions related to antibiotic therapy
- Monitor transfers to hospital after starting antibiotic therapy

Conclusions

- Antibiotic stewardship [AS] is now mandated for all NHs by CMS
- AS is a resource intensive process for NHs and requires close attention to detail and development of a feasible program in its initial stages
- Empowering staff and providers as part of the program is critical to the success of AS
- Start with reasonable expectations and goals and work from there

Thank you!

Questions/Comments?

jmm702@gmail.com