

Infection Prevention and Control in the Long-
Term Care (LTC) Setting: Current State,
Challenges, and Opportunities for Improvement.

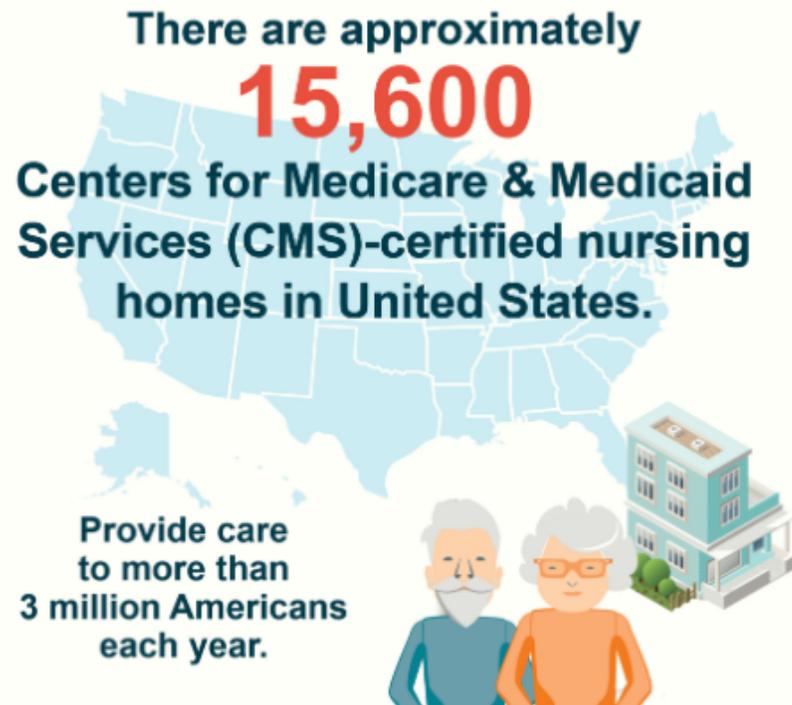
Chris Morgan, MD

Objectives

- Define the current state of the regulations for a LTC infection prevention and control program (IPC) and infrastructure.
- Recognize the challenges of implementing evidence-based practices in LTC.
- Recognize the contribution of respiratory viruses to disease morbidity and antibiotic utilization among LTC residents.
- Understand the approach to early detection of respiratory viruses utilizing rapid diagnostic technology to improve resident safety and reduce infectious outcomes of care.

Background

Resident Safety and Infection



- Enhancing resident safety is a major focus area for >15,000 nursing homes in the U.S.; infection control frequently cited as a top concern.
- Estimated that on any given day, 12% of the 1.5 million U.S. nursing home residents may have an infection.
- One-quarter of the U.S. post-acute population who become nursing home residents are re-admitted to a hospital = > \$4 billion in additional health care costs per year. 2019-reimbursement penalty

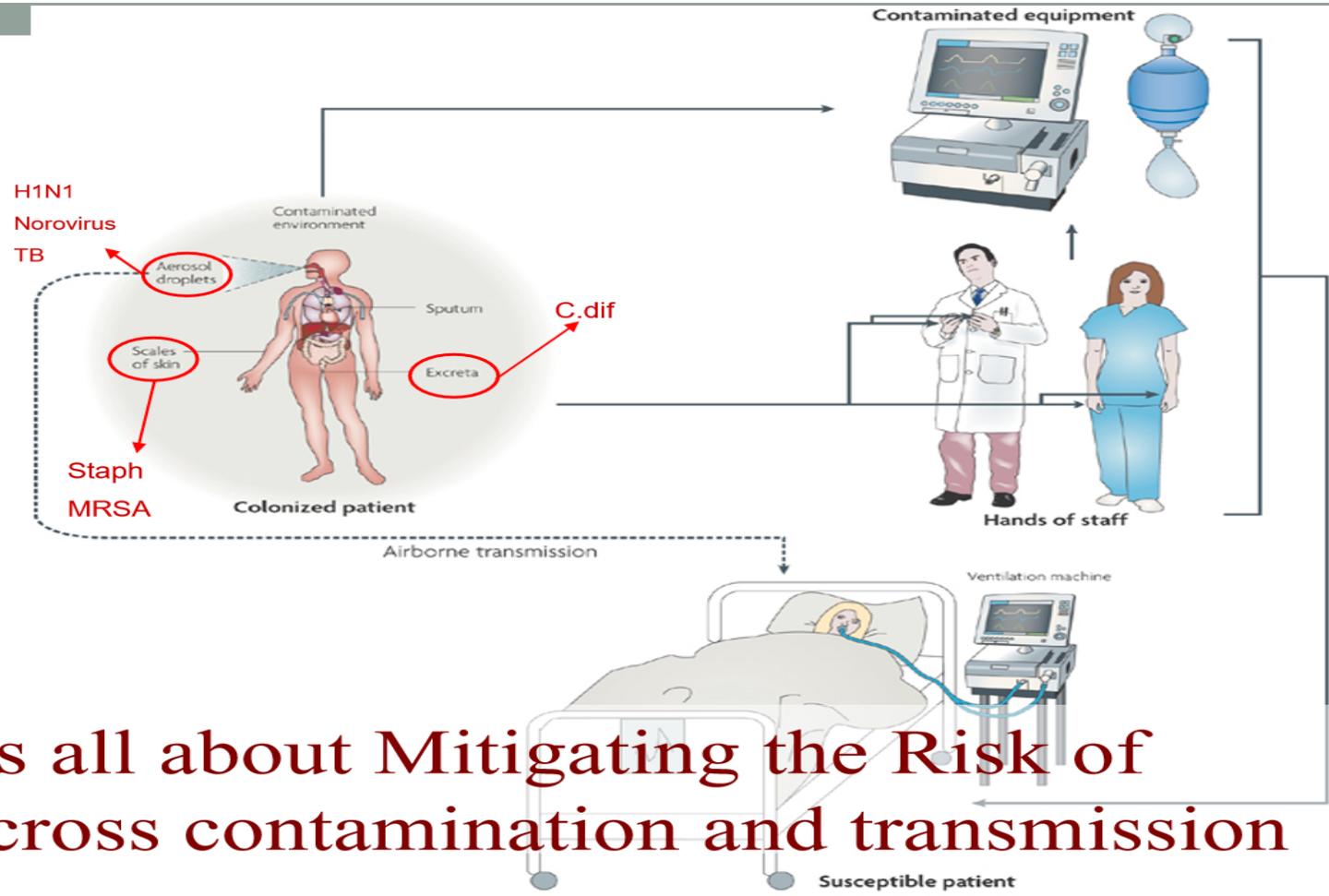
Dwyer, et al. *J Am Geriatr Soc* 2013

Tsan, et al. *Am J Infect Control* 2010

<https://oig.hhs.gov/oei/reports/oei-06-11-00370.pdf>

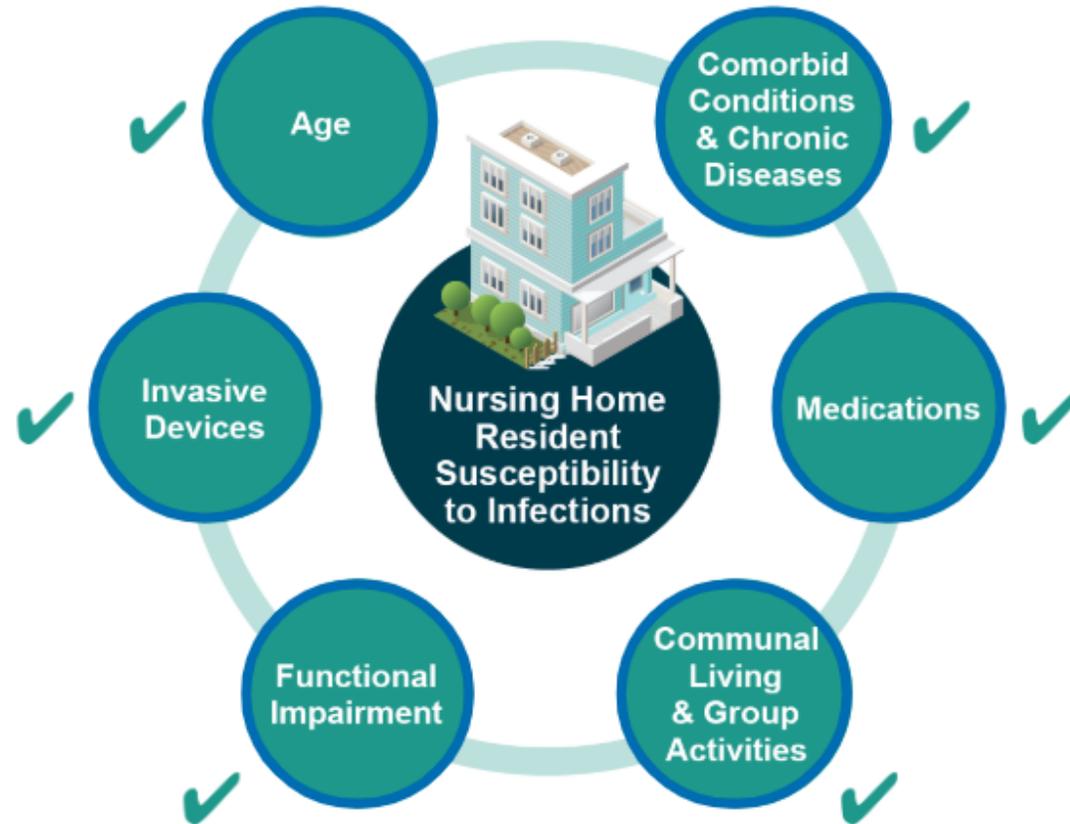
Reservoirs for transmission of pathogens

Infection Prevention



It's all about Mitigating the Risk of cross contamination and transmission

LTC Residents Susceptibility to Infection



Resident Safety and Infection

Most Widespread Nursing Home Health Violations

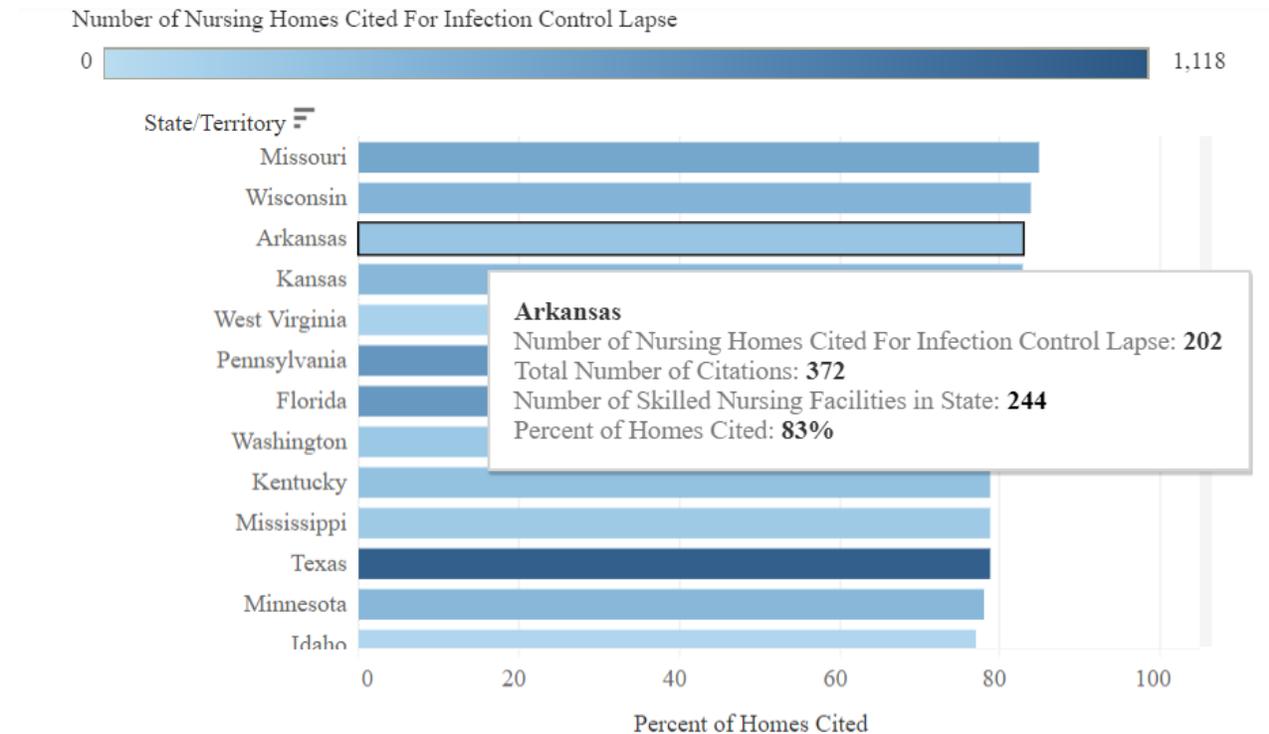
This chart shows the number of nursing homes that have been cited for violating 10 Medicare safety rules. The rules listed are the ones for which the largest numbers of homes have been cited from 2014 to October 2017.

Medicare Rule	Number Of Nursing Homes Cited For Violating Requirement ▲	Percent Of Homes Penalized	Total Number Of Citations
Investigate and control infections and keep them from spreading	12,056	74.10%	23,481
Store, cook and serve food safely and cleanly	11,438	70.3%	20,505
Protect residents from accidental hazards	11,148	68.5%	23,991
Provide necessary care	9,861	60.6%	20,196
Label and track drugs	8,400	51.6%	12,641
Manage residents' medication and avoid unnecessary drugs	8,086	49.7%	12,548



KHN analysis of Medicare's Nursing Home Compare data 2014-October 2017. Includes violations that inspectors said caused harm, had the potential to cause more than minimum harm or put residents in "imminent jeopardy" of injury. Excludes lesser violations that had the potential for "minimal harm." The analysis covers 16,268 nursing homes, including some of which are no longer operating.

Infection Control Citations for AR Nursing Homes



Source: KHN analysis of Medicare's Nursing Home Compare data 2014-October 2017. Includes violations that inspectors said caused harm, had the potential to cause more than minimum harm or put residents in "imminent jeopardy" of injury. Excludes lesser violations that had the potential for "minimal harm." The analysis covers 16,268 nursing homes, including some of which are no longer operating.

CMS Regulations for LTC Infection Prevention and Control

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Medicare & Medicaid Services

42 CFR Parts 405, 431, 447, 482, 483, 485, 488, and 489

[CMS-3260-F]

RIN 0938-AR61

Medicare and Medicaid Programs; Reform of Requirements for Long-Term Care Facilities

AGENCY: Centers for Medicare & Medicaid Services (CMS), HHS.

ACTION: Final rule.

SUMMARY: This final rule will revise the requirements that Long-Term Care facilities must meet to participate in the Medicare and Medicaid programs.

INFECTION CONTROL (§ 483.80)

We are requiring facilities to develop an Infection Prevention and Control (IPC) Program that includes an Antibiotic Stewardship Program and designate at least one Infection Preventionist (IP).

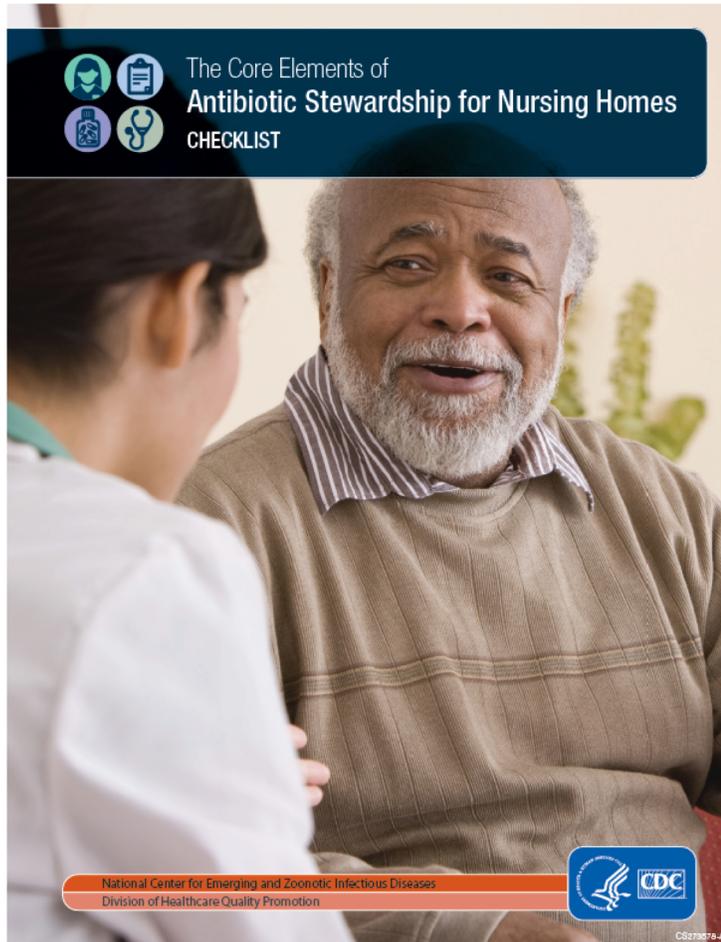
- Phase 1 – IPC program: completed by 11/26/2016
- Phase 2 – IPC facility assessment and antibiotic stewardship: completed by 11/28/2017
- **Phase 3 – Infection control preventionist: complete by 11/28/2019**

IPC Program Activities*



* Denotes slides from CDC IP Training Module

Antibiotic Stewardship for LTC Facilities

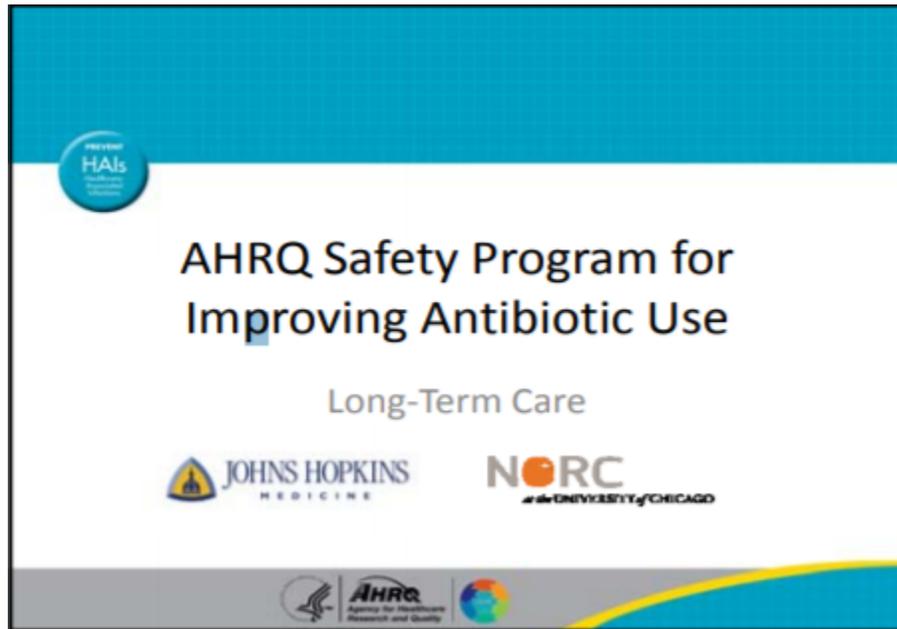


- **Goal:**
 - To ensure that all patients requiring antibiotics receive the right drug at the right dose and for the right duration.
- **Why is AS important?**
 - Up to 75% of antibiotic prescriptions ordered in the long-term care setting are considered unnecessary or inappropriate
 - Driver of multi-drug resistant bacteria (MDRO) prevalence in LTC
 - AS programs just being established in LTC
 - Ambiguity about roles, infection prevention procedures and antibiotic prescribing practices exists

Lim CJ, et al. Reducing inappropriate antibiotic prescribing in the residential care setting: current perspectives. Clin Intervent Aging 2014.

Nicolle LE, et al. Antimicrobial use in long-term care facilities. Infect Control Hosp Epidemiol 2000.

Antibiotic Stewardship for LTC Facilities



- One-year program begins in December 2018
- FREE TO PARTICIPATE
- Facilities with and without existing stewardship programs are welcome to join

Four Moments of Antibiotic Decision Making

The diagram shows a large number '4' composed of four colored segments: a blue top-left segment labeled '1. Does the resident have symptoms...', a white top-right segment labeled '2. What type of infection is it?', a teal bottom-left segment labeled '3. What duration of antibiotic therapy is needed...', and a dark blue bottom-right segment labeled '4. Re-evaluate the resident...'. The number is set against a yellow circular background with the text 'The Four Moments of Antibiotic Decision Making' and 'Long-Term Care'.

1. Does the resident have symptoms that suggest an infection? Can we try symptomatic treatment and active monitoring?
2. What type of infection is it? Have we collected appropriate cultures and diagnostic tests before starting antibiotics? What empiric therapy should we initiate?
3. What duration of antibiotic therapy is needed for the resident's diagnosis?
4. Re-evaluate the resident and review results of diagnostic tests. Can we stop antibiotics? Can we narrow therapy?

Antibiotic Stewardship for LTC Facilities

Expected Outcomes of Participation

- Improved safety culture around antibiotic prescribing
- Enhanced teamwork and communication among health care workers and between health care workers and patients/families
- Reduced unnecessary antibiotic use
- Improved antibiotic decision-making by frontline staff
- Reduced *Clostridium difficile* infection rates
- Improved compliance with CMS regulations



MDRO Prevalence in LTC

American Journal of Infection Control 45 (2017) 512-8



Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

Prevalence of multidrug-resistant gram-negative bacteria among nursing home residents: A systematic review and meta-analysis

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Pooled prevalence for MDR-GNB colonization, representing data from 2,720 NH residents, was 27%. High prevalence emphasizes the need to enhance IPC policies in NHs.



Key Word:
Long-term care

Background: Multidrug-resistant gram-negative bacteria (MDR-GNB) are associated with an increasing proportion of infections among nursing home (NH) residents. The objective of this systematic review and meta-analysis was to critically review evidence of the prevalence of MDR-GNB among NH residents.

MDRO Prevalence in LTC – *C. difficile*

National Nursing Home Quality Improvement *C. difficile* Infection Prevention Assessment Checklists



National Nursing Home
QUALITY IMPROVEMENT CAMPAIGN

[Early Identification and Containment](#)  [PDF - 257 KB] 

[Appropriate Cleaning/Disinfection of Equipment and the Environment](#)  [PDF -84 KB] 

[Hand Hygiene](#)  [PDF - 58 KB] 

[Antibiotic Stewardship](#)  [PDF - 149 KB] 

[More information about the National Nursing Home Quality Improvement Campaign Infections Goal](#) 

IPC Tool for LTC Facilities

Infection Prevention and Control Assessment Tool for Long-term Care Facilities

This tool is intended to assist in the assessment of infection control programs and practices in nursing homes and other long-term care facilities. If feasible, direct observations of infection control practices are encouraged. To facilitate the assessment, health departments are encouraged to share this tool with facilities in advance of their visit.

- Infection Control Domains for Gap Assessment
 - Infection Control Program and Infrastructure
 - Healthcare Personnel and Resident Safety
 - Surveillance and Disease Reporting
 - Hand Hygiene
 - Personal Protective Equipment (PPE)
 - Respiratory/ Cough Etiquette
 - Antibiotic Stewardship
 - Injection safety and Point of Care Testing
 - Environmental Cleaning

<https://www.cdc.gov/infectioncontrol/pdf/icar/lctcf.pdf>

IPC Program Risk Assessment*



IPC Program Risk Assessment*

Infection Event: Probability of Occurrence



INFECTION EVENT



SCORING RANGE:

High = 3
Medium = 2
Low = 1
None = 0



EXAMPLE:

What is the probability of influenza occurring at our facility?

Factors that influence the score:

- Prior occurrence in the facility
- Frequency in community
- Vaccine acceptance in facility (if applicable)

Infection Event: Level of Harm



INFECTION EVENT



SCORING RANGE:

Serious harm = 3
Moderate harm = 2
Temporary harm = 1
None = 0



EXAMPLE:

What is the level of harm of influenza occurring at our facility?

Factors that influence the score:

- Prior morbidity, including hospital transfers
- Prior mortality
- Resident risk factors

IPC Program Risk Assessment*

Infection Event: Impact on Care



INFECTION EVENT



SCORING RANGE:

High = 3
Medium = 2
Low = 1
None = 0



EXAMPLE:

What is the impact on care of influenza occurring at our facility?

Factors that influence the score:

- Need for new treatments
- Changes in level of care or support
- Restrictions on facility access for staff, residents or visitors

Infection Event: Readiness to Prevent



INFECTION EVENT



SCORING RANGE:

Poor = 3
Fair = 2
Good = 1



EXAMPLE:

How ready is the facility to identify and address an infection?

Factors that influence the score:

- Surveillance processes
- Performance monitoring
- IPC policies and procedures
- Staff and resident vaccination rates (if applicable)
- Adherence to sick leave policies

IPC Program Risk Assessment*

Infection Event: Tallying and Interpreting the Score

INFECTION EVENT	PROBABILITY OF OCCURRENCE (How likely is this to occur?)				LEVEL OF HARM FROM EVENT (What would be the most likely?)				IMPACT ON CARE (Will new treatment/care be needed for resident/staff?)				READINESS TO PREVENT (Are processes/resources in place to identify/address this event?)			RISK LEVEL (Scores ≥ 8 are considered highest priority for improvement efforts.)
	High 3	Med. 2	Low 1	None 0	Serious Harm 3	Moderate Harm 2	Temp. Harm 1	None 0	High 3	Med. 2	Low 1	None 0	Poor 3	Fair 2	Good 1	
<i>Facility-onset Infections(s) Outbreak-related</i>																
Influenza*	3					2				2				2		9



Once completed, tally individually scored items to determine the total risk level for the infection event.



Higher score = higher priority in assessing the facility's processes and resources to address.



Score of 8 or higher should be considered an indicator that a facility should prioritize that event for further performance improvement efforts.

IPC Program Evaluation



Implementing a system for infection surveillance to identify and prevent the spread of infections.

Role of the Environment

Transmission of Healthcare-Associated Pathogens (HAP) and Environmental Disinfection Interventions

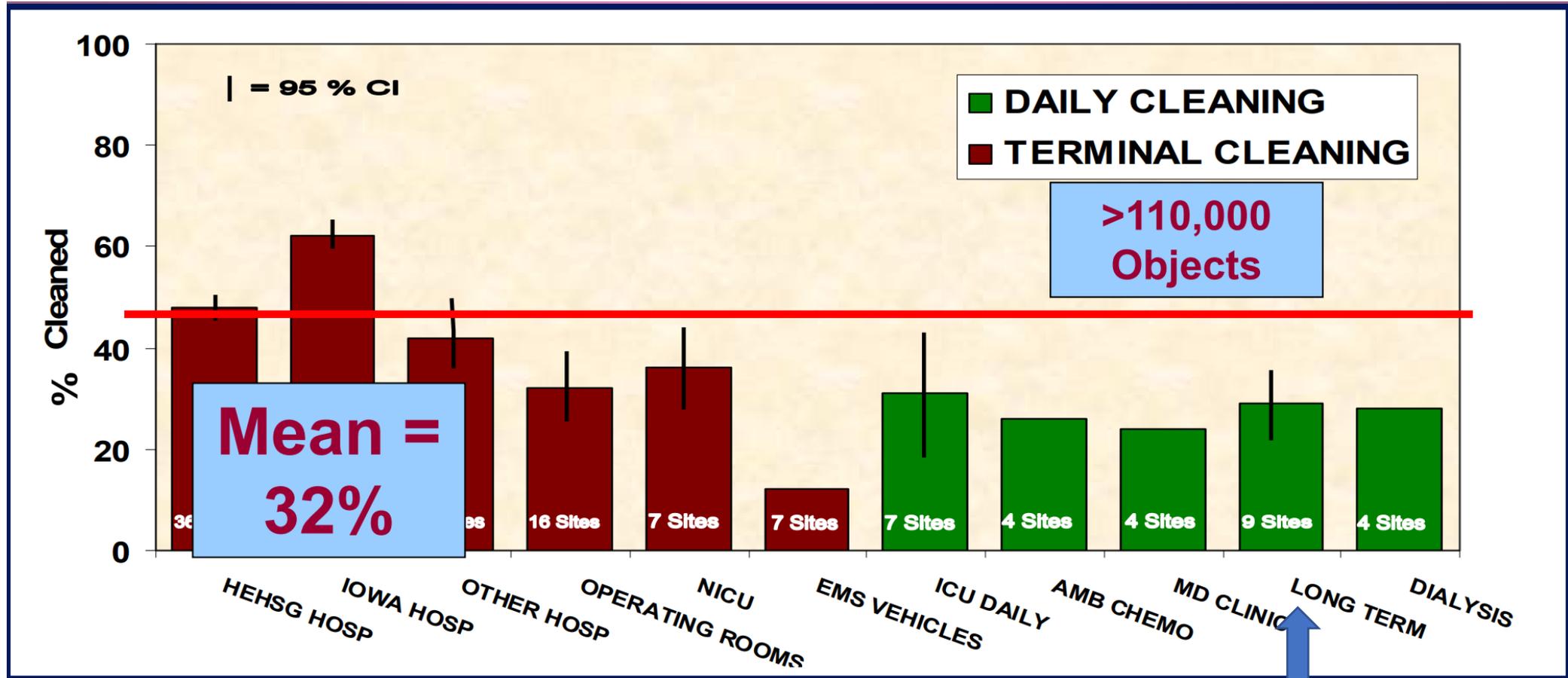
• **Common Transmission Routes**

- Contamination of surfaces in isolation rooms resulting in acquisition risk by the next occupant
- Risk of contamination of care providers hands from contaminated surfaces
- Contamination of reusable patient care equipment
- Contamination of surfaces in rooms of asymptomatic carriers of HAPs

• **Disinfection Strategies**

- Improve discharge cleaning and disinfection of isolation rooms
- Daily disinfection of high-touch surfaces in isolation rooms (analogous to CHG bathing to reduce MRSA/VRE transmission)
- Disinfection between patients or use of disposable equipment
- Improve cleaning and disinfection of all patient rooms

Thoroughness of Cleaning: Needs Improvement



Environmental Contamination from Acute Respiratory Infection in LTC

Bayesian evidence and epidemiological implications of environmental contamination from acute respiratory infection in long-term care facilities

J.D. Diaz-Decaro^{1,2}, B. Launer³, J.A. Mckinnell³, R. Singh⁴, T.D. Dutciuc⁴,
N.M. Green¹, M. Bolaris³, S.S. Huang⁴ and L.G. Miller³

¹Los Angeles County Public Health Laboratories, Downey, CA, USA; ²UCLA Fielding School of Public Health, Los Angeles, CA, USA; ³LA BioMed at Harbor-UCLA Medical Center, Torrance, CA, USA and ⁴University of California, Irvine School of Medicine, Irvine, CA, USA

Epidemiology and Infection 146, 832–838.
<https://doi.org/10.1017/S0950268818000729>

- **Background:** LTCFs house a vulnerable population frequently exposed to respiratory pathogens. To understand the transmission of NH-acquired viral respiratory infections in non-epidemic settings.
- **Methods:** Symptomatic residents in 3 LTCFs screened using multiplex PCR respiratory assay. Environmental surveillance of five high-touch areas performed to assess for possible transmission.
- **Results:** Of symptomatic residents, **19%** had a detectable viral pathogen (parainfluenza-3, rhinovirus/enterovirus, RSV, or influenza B). Environmental contamination found in 20% of total room surface swabs of symptomatic residents

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• Conclusions:

- non-epidemic viral infections are common among LTCF residents exhibiting acute respiratory symptoms.
- environmental contamination may facilitate further spread.
- **emphasize the importance of environmental infection control for viral respiratory pathogens in LTCFs**

CMG: Antimicrobial Stewardship

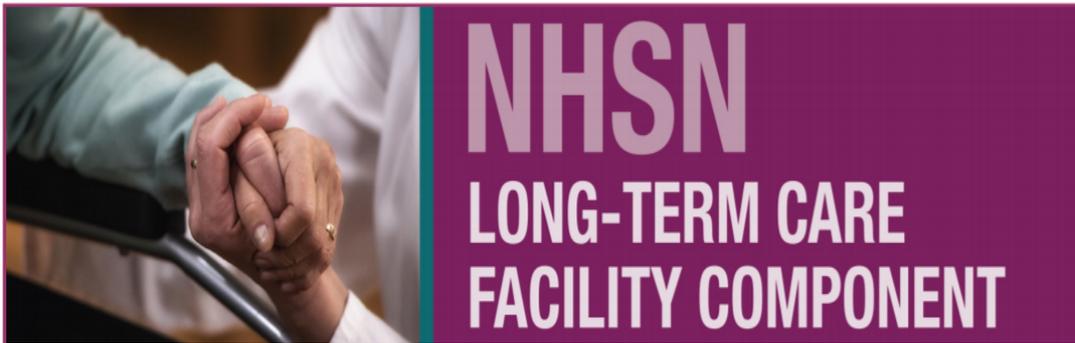
Overarching Goal: Promoting resident safety through the implementation of evidence-based infection prevention and control practices

Scope of Work for CMG Regional IPs**

- In collaboration with the facility IP:
 - Provide consultation on infection control issues in conjunction with facility administration and local/state health departments as required.
 - Assist with development/revision of a facility IPC risk assessment to identify priority areas for program improvement on an annual basis.
 - Complete an annual IPC assessment tool created for LTC by CDC to identify strengths and areas for improvement of the program.
 - Assist with the analysis of quarterly viral respiratory pathogen screening and monthly infection surveillance data based on facility methodology and criteria for an HAI.
 - Assist with quarterly environmental rounds using a standardized tool and monitoring strategy.
 - Provide education on the CMG program and promote education of staff on other infection prevention topics via CMG sponsored webinars.
 - Assist with evaluation of products, devices or equipment related to IPC.

** All CMG regional IPs will be required to complete the CDC training and have knowledge of the NHSN LTC module.

National Healthcare Safety Network (NHSN) LTC Facility Component/IP Training



NHSN
LONG-TERM CARE
FACILITY COMPONENT

MARCH 2019 NEWSLETTER

2019 NHSN LTCF COMPONENT TRAINING

Plan to join us **July 9-11, 2019** for the 2019 National Healthcare Safety Network's (NHSN) Annual Training for Long-term Care Facilities (LTCF). The training will be held on the CDC campus in Atlanta,

Provides LTCFs with standardized surveillance methods and definitions. Launched in 2012 but <20% of LTCs enrolled as of 2016.

<https://www.cdc.gov/nhsn/pdfs/ltc/newsletters/ltc-newsletter-mar2019-H.pdf>
<https://www.cdc.gov/longtermcare/training.html>



NURSING HOME INFECTION
PREVENTIONIST TRAINING COURSE

www.cdc.gov

Free course consisting of 23 modules and sub-modules that can be completed in any order and over multiple sessions. Available CE. Examination and certificates included.

Environmental Hygiene: Product and Process Assessment

IX. Environmental Cleaning	
Elements to be assessed	
A.	The facility has written cleaning/disinfection policies which include routine and terminal cleaning and disinfection of resident rooms.
B.	The facility has written cleaning/disinfection policies which include routine and terminal cleaning and disinfection of rooms of residents on contact precautions (e.g., <i>C. difficile</i>).
C.	The facility has written cleaning/disinfection policies which include cleaning and disinfection of high-touch surfaces in common areas.
D.	The facility cleaning/disinfection policies include handling of equipment shared among residents (e.g., blood pressure cuffs, rehab therapy equipment, etc.).
E.	Facility has policies and procedures to ensure that reusable medical devices (e.g., blood glucose meters, wound care equipment, podiatry equipment, and dental equipment) are cleaned and reprocessed appropriately prior to use on another patient.

[CDC Environmental Checklist for Monitoring Terminal Cleaning¹

Date:	
Unit:	
Room Number:	
Initials of ES staff (optional):²	

Evaluate the following priority sites for each patient room:

High-touch Room Surfaces ³	Cleaned	Not Cleaned	Not Present in Room
Bed rails / controls			
Tray table			
IV pole (grab area)			
Call box / button			
Telephone			
Bedside table handle			
Chair			
Room sink			
Room light switch			
Room inner door knob			

Assessment can be performed with a fluorescent marker and use of a black light to assess thoroughness of cleaning.

Optimizing Treatment of RTIs in LTC: A Nurse-Driven Initiative

Major article

Optimizing treatment of respiratory tract infections in nursing homes:
Nurse-initiated polymerase chain reaction testing

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Kirsty Busing MBBS, MPH, MD^{a,c,d}, N. Deborah Friedman MBS, MPH, MD^{a,f,g}, David C.M. Kong PhD^{a,b,h},
Rhonda L. Stuart MBBS, FRACP, PhD^{a,i,j,*}

<https://doi.org/10.1016/j.ajic.2019.02.001>

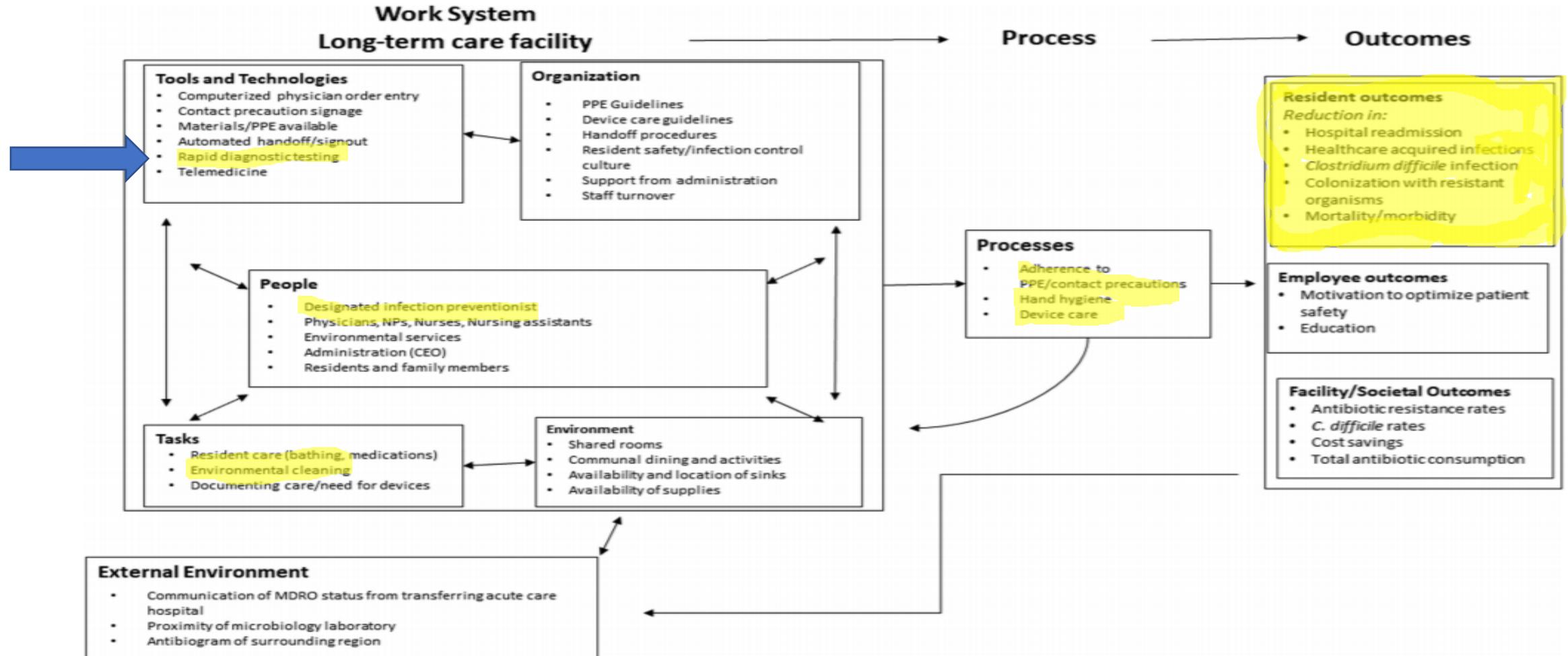
Background: Diagnostic testing using polymerase chain reaction (PCR) is infrequently initiated for diagnosis of respiratory tract infections (RTIs) in nursing homes. The objectives of this study were to determine the feasibility of implementing nurse-initiated PCR testing of respiratory specimens in nursing home settings and to compare antibiotic prescribing prior to and during the implementation.

Methods: This was a pragmatic, historically controlled study in 3 nursing homes (181 total beds) in Melbourne, Australia.

Results: The number of PCR tests of respiratory specimens (over 12 months) increased from 5 to 67 when nurses could initiate the tests. Residents with RTI symptoms had a virus identified by PCR in 50.7% of tests, including 14 positive for influenza. Six outbreaks were identified. When clustering was taken into consideration, incidence rates of antibiotic days of therapy did not change (incidence rate ratio = 0.94, 95% confidence interval, 0.25-3.35, $P = .92$) despite identification of more viral pathogens.

Conclusions: In nursing homes, nurse-initiated PCR testing of respiratory specimens is feasible and useful in terms of identifying the cause of many RTIs and outbreaks, and viruses are common in this context. However, the current study suggests the availability of these test results alone does not impact antibiotic prescribing.

Human Factors Approach to IPC in LTC



Asymptomatic Shedding of Respiratory Virus – Is It Common?

Asymptomatic Shedding of Respiratory Virus among an Ambulatory Population across Seasons

 Ruthie Birger,^a Haruka Morita,^a Devon Comito,^a Ioan Filip,^b Marta Galanti,^a Benjamin Lane,^a Chanel Ligon,^a Daniel Rosenbloom,^b Atinuke Shittu,^a Minhaz Ud-Dean,^a Rob Desalle,^c Paul Planet,^{c,d,e}  Jeffrey Shaman^{a,c}

Birger R, et al. 2018. mSphere 3:e00249-18.
<https://doi.org/10.1128/mSphere.00249-18>.

- Role of asymptomatic infection in respiratory virus transmission is still largely unknown.
 - NP swabs, demographics, and survey information on symptoms, medical history, and recent travel were obtained from 2,685 adults over two seasonal arms.
- Multiplex PCR used: 6.2% (168) tested positive for at least one virus; 50.6% positive for human rhinovirus, 38.7% for coronavirus (CoV), and 10.2% for other viruses (including adenovirus, human metapneumovirus, influenza virus, and parainfluenza virus).
- 65% to 97% of infections were classified as asymptomatic
- Conclusion: high levels of asymptomatic respiratory virus shedding among ambulatory population in NYC

LTC Viral Respiratory Screenings – CMG Pilot data

- **Facility 1**- 100-bed facility in Florence, SC
- Screened 56 residents from 4 wings:
 - Total positivity rate: 16% (9/56)
 - Range of positivity – 18-27%
 - All specimens positive for Human Rhino/Enterovirus; 7 of 9 cases spatially associated on two units – no report of symptoms
 - Rhinovirus represented the most common cause of adult community-acquired viral pneumonia requiring hospitalization (Jain et al. NEJM 2015)
- **Facility 2** – 90 –bed facility in Carlisle, AR
- Screened 73 residents from 3 halls:
 - Total positivity rate: 23% (17/73)
 - Range of positivity – 6% -30%
 - Hall 1 residents – 27% (7/26); two types of coronavirus NL63 (3) and 229E (4).
 - Two of the positive residents developed nasal drainage 7-8 days after positive specimen.
 - Hall 2 residents – 30% (9/30); all specimens positive for coronavirus NL63
 - One resident developed nasal drainage 7 days after positive specimen
 - Although the sharing of rooms was not identified for positive patients, the common areas may have been contaminated.
 - Coronavirus has been shown to persist for days on communal surfaces, allowing for self-inoculation of the eyes, nose or mouth with contaminated hands. (Warnes et al. mbo.asm.org,vol 6 (6) 2015.)