RESEARCH ON INFECTION PREVENTION MEASURES IN NURSING HOMES

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Aims

1. Qualitatively explore the phenomenon of infection prevention and control in nursing homes

2. Describe the incidence of healthcare associated infections (HAIs) in nursing homes across the country

3. Describe infection prevention and control processes occurring in nursing homes

Research Team

Principal Investigators:
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Patricia Stone, PhD, FAAN

Co- Investigators:
John Engberg, PhD
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Research Personnel
Catherine Crawford, RN
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Advisory Board

Claire Fagin, PhD, FAAN, RN
Steve Schweon, CIC, RN
Philip Smith, MD
Nimalie Stone, MD

Expert Consultants

Janice Morse, DNSc, MPH
Jack Zwanzinger, PhD

Methods

Structured, open-ended interviews

National survey of nursing homes

Linked national data sets

- Minimum Data Set (MDS)
  - Resident clinical assessments
- Certification and Survey Provider Enhanced Reporting (CASPER)
  - Facility characteristics
- Medicare Claims

Qualitative Results

10 nursing homes

73 employees

Five Themes

Residents' Needs: Tension exists between the facility being the residents' home and the need for effective infection prevention and control procedures.

Roles and Training: Many employees involved in infection control program had multiple other responsibilities and frequently lacked formal training in infection prevention and control.

Using Infection Data: Infection data were used to improve care despite variations in surveillance methods/definitions.

External Resources: External resources were a source of information and support.

Focus on Hand Hygiene: All infection prevention programs focused on hand hygiene. Monitoring staff compliance with hand hygiene policies was often informal.

Stone PW, Herzig CT, Pogorzelska-Maziarz, Carter E, Bjarnadottir RI, Semeraro PK, Scohen CC, Travers J, Schweon S 2015

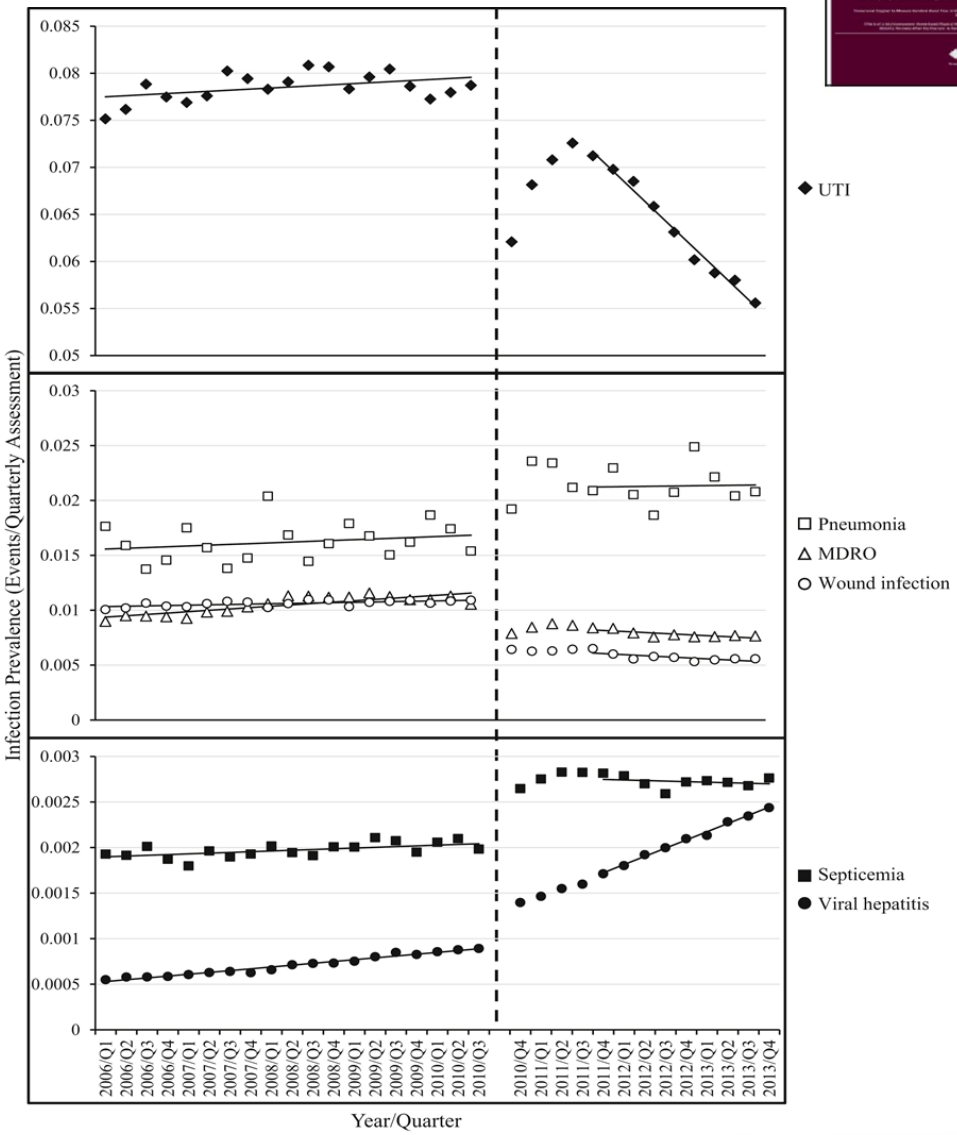
Trends in Infection Prevalence

2006 – 2010 (MDS 2.0)

- Prevalence of all infection types **increased** (p-values <.01)

2011 – 2013 (MDS 3.0)

- Prevalence of UTI, MDRO, and wound infections **decreased** (p-values <.0001)
- Prevalence of viral hepatitis **increased** (p-value <0.0001)



Herzig CTA, Dick AW, Sobero M, Pogorzelska-Maziarz, Cohen CC, Larson EL, Stone PW 2017

Infection Prevalence in Minimum Data Set Versions 2.0 and 3.0 in Quarter 4, 2006-2013

Year, Quarter	Number of NHs	Number of Residents	Number of Assessments	% of Assessments With Diagnosis*					
				UTI	Pneumonia	MDRO	Wound Infection	Septicemia	Viral Hepatitis
MDS 2.0									
2006 Q4	15,185	916,688	968,086	7.75	1.46	0.94	1.04	0.19	0.06
2007 Q4	15,169	903,980	957,141	7.94	1.48	1.03	1.07	0.19	0.06
2008 Q4	15,145	886,705	947,551	8.07	1.61	1.12	1.09	0.20	0.07
2009 Q4	15,149	875,927	940,696	7.86	1.62	1.10	1.09	0.19	0.08
MDS 3.0									
2010 Q4	15,168	930,111	987,659	6.21	1.92	0.79	0.64	0.28	0.14
2011 Q4	15,205	928,533	1,000,527	7.12	2.09	0.84	0.65	0.27	0.17
2012 Q4	15,202	919,951	996,952	6.31	2.07	0.78	0.57	0.27	0.21
2013 Q4	15,210	908,985	990,519	5.56	2.08	0.77	0.56	0.27	0.24

NH, nursing home; UTI, urinary tract infection; MDRO, multidrug-resistant organism infection; MDS, Minimum Data Set; Q, quarter.
*Estimates are the 7-day prevalence for each infection type except for UTI, which are the 30-day prevalence.

- UTI and pneumonia were the most commonly reported infections
- Based on the 2013 data, we estimated there 1.13 to 2.68 million HAIs occurring in nursing home residents annually

Hospital Transfers Caused By or With Infection

Infection Type	Transfer Classification	Year 2011	2012	2013	2014	2015	2016	2017
Respiratory:	Caused By	11.9%	11.7%	11.5%	10.6%	10.1%	9.1%	8.9%
	With	21.1%	22.2%	23.0%	22.2%	22.9%	21.9%	22.9%
Sepsis:	Caused By	12.1%	13.8%	15.0%	16.6%			
	With	14.6%	16.3%	17.6%	19.4%			
UTI:	Caused By	9.1%	8.7%	8.4%	8.3%	7.8%	7.4%	5.8%
	With	32.1%	32.8%	32.4%	32.6%	32.6%	31.5%	29.7%
All Infections:	Caused By	**35.8%**	**37.3%**	**38.1%**	**38.8%**	**40.1%**	**39.3%**	**40.1%**
	With	**57.1%**	**58.9%**	**59.8%**	**60.0%**	**61.0%**	**60.3%**	**61.3%**
NH Residents (Millions)		3.75	3.80	3.86	3.92			
Hospital Transfers / Resident		0.373	0.387	0.372	0.365	0.366	0.349	0.379

Note: Caused by defined as infection was the primary diagnosis present on admission.
Transfers classified as with infection include all those with any infection diagnosis present on admission and therefore include transfers that were caused by infection.

First Survey of Nursing Homes

- A random sample
- Conducted 2014
- 990 surveys returned (39% response rate)
- Survey linked to Certified and Survey Enhanced Reporting CASPER (CASPER) data

Infection Prevention and Control Programs in US Nursing Homes: Results of a National Survey

Carolyn T.A. Herzig PhD[a,*], Patricia W. Stone PhD[a,*], Nicholas Castle PhD[b], Monika Pogorzelska-Maziarz PhD[c], Elaine L. Larson PhD[a], Andrew W. Dick PhD[d]

- Person in charge of infection prevention had multiple hats
- Citations in infection control were related to experience of Infection Preventionist (IP)
- Less than 3% of IPs were certified

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Nursing Home Infection Control Program Characteristics, CMS Citations, and Implementation of Antibiotic Stewardship Policies: A National Study

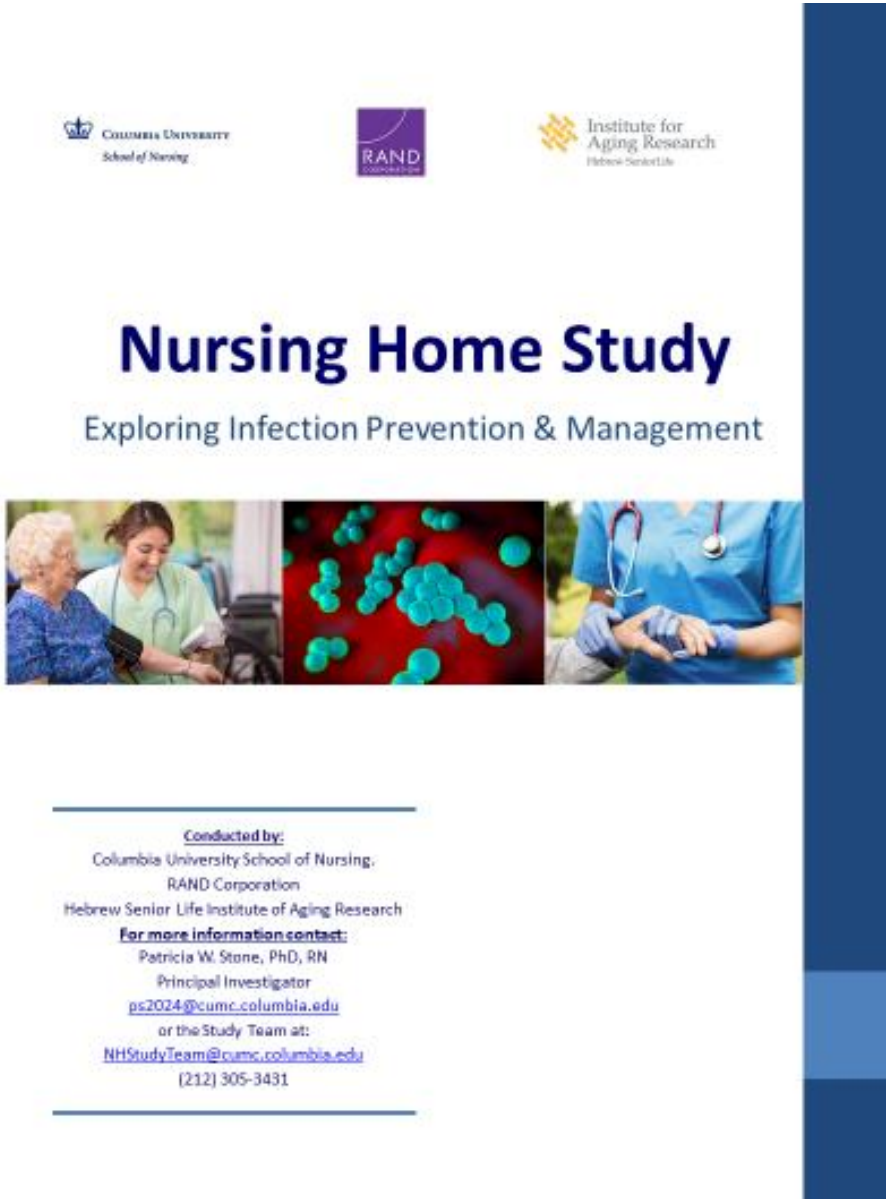
Patricia W. Stone, PhD, RN[1], Carolyn T. A. Herzig, PhD, MS[1], Mansi Agarwal, PhD, MPH[1], Monika Pogorzelska-Maziarz, PhD, MPH and Andrew W. Dick, PhD[1]

- Comprehensive antibiotic stewardship policies were rare
- IP training was related to having comprehensive antibiotic stewardship

Second Survey

(n = 892, 50% response rate)

- Characteristics of the infection control program in the facility
- Training of the person in charge of the program (i.e., the IP)
- Palliative care processes
- Infection management processes
- Integration of palliative care and infection management



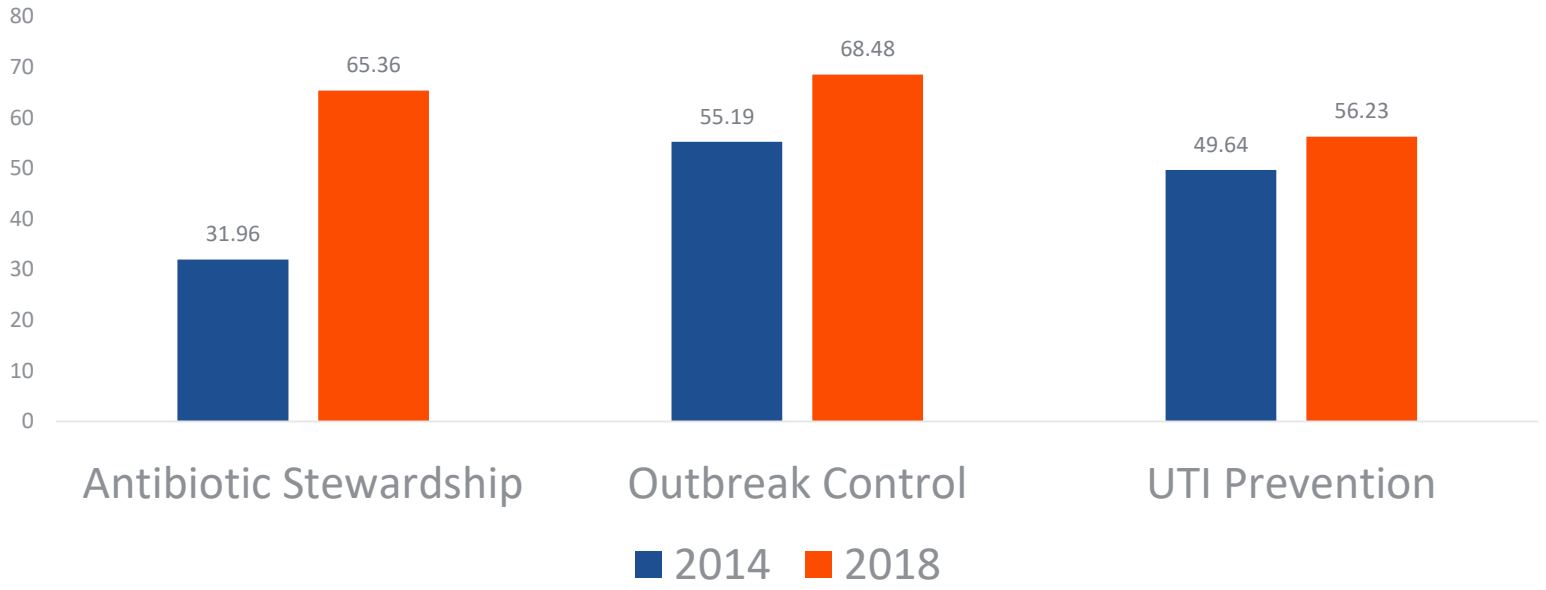
Change in Infection Control Programs Over Time

- Questions on ICP program
  - Antibiotic Stewardship (5 policies)
  - Outbreak Control (7 policies)
  - UTI Prevention (7 policies)
  - Infection Preventionist Education & Training
- Calculated standardized intensity indices for the 3 policy groups

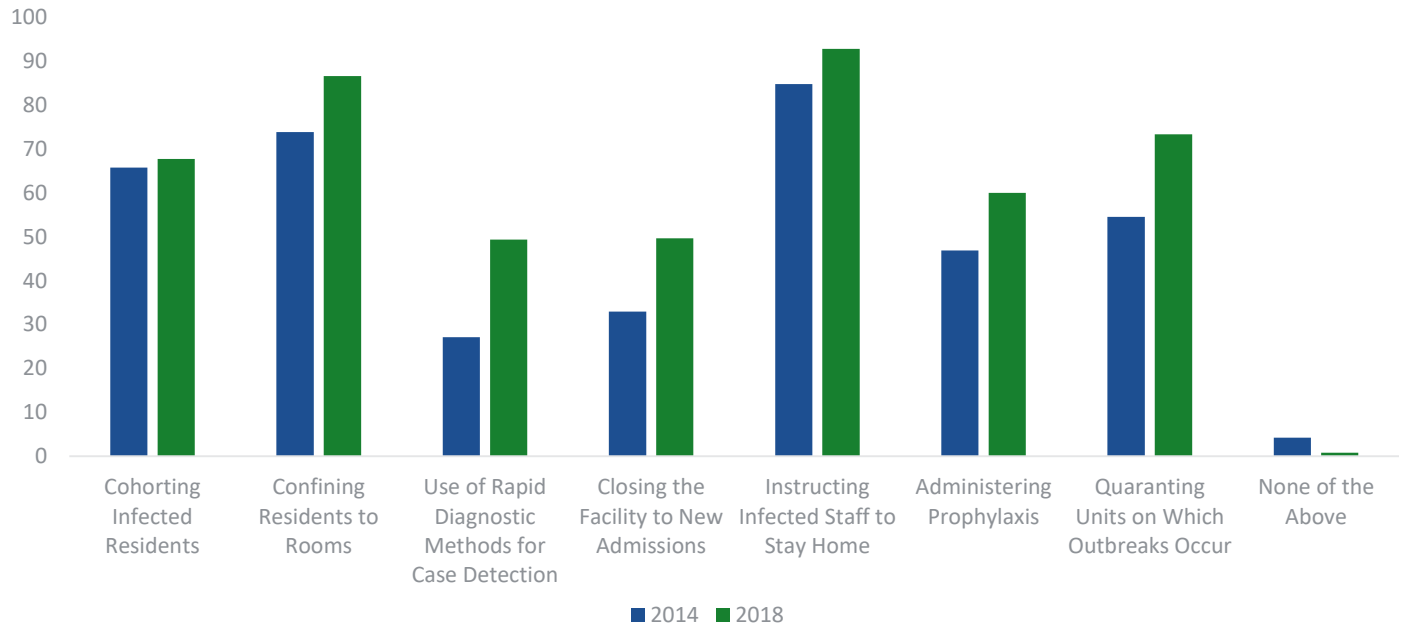
Agarwal M, Dick AW, Sobero M, Mody L, Stone PW 2020

Change in Infection Programs Over Time

- Significant increased in policies in all categories ($p < 0.001$)

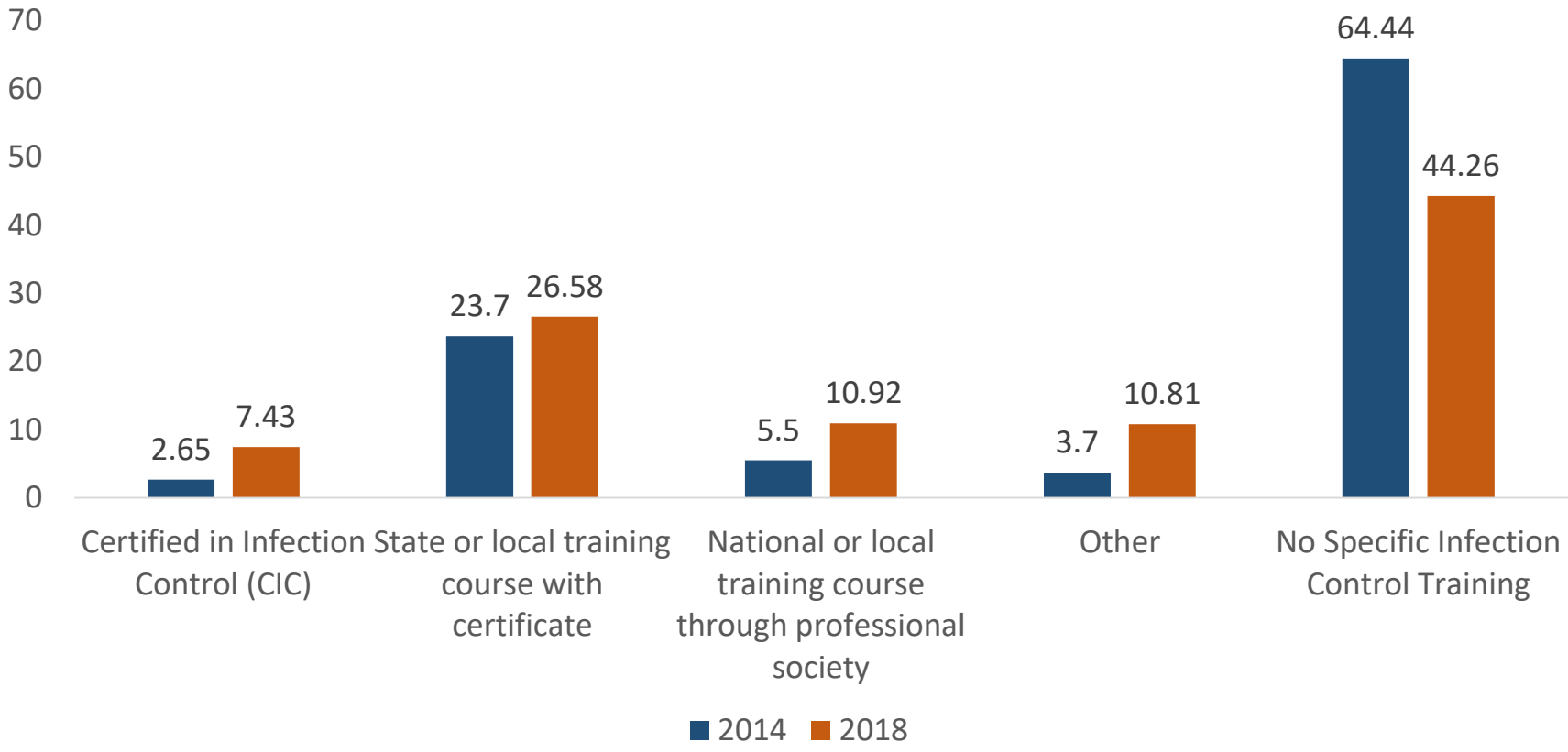


Improvements in outbreak control policies



All but cohorting significantly improved (all p values < 0.01)

Change in Infection Preventionist (IP) Training Over Time



Significant difference in all categories ($p < 0.01$)

Integration of Infection Management and Palliative Care in NHs

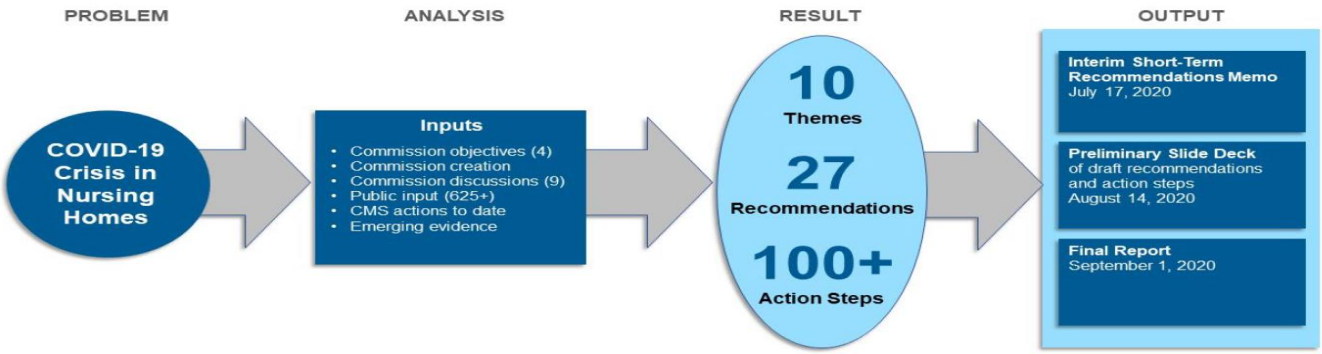
N = 892 (50% response rate)	Weighted %
Involvement α = 0.70, μ = 73.2, SE = 1.57	
Consider goals of care in managing suspected infections near the end-of-life	70.81
Include residents and resident proxies in treatment decisions for suspected infections near the end-of-life.	76.01
Advance Care Planning α = 0.72, μ = 34.1, SE = 1.05	
Ms. Davis would already have a "Do Not Resuscitate" order	57.35
Ms. Davis would already have a "Do Not Hospitalize" order	23.98
Ms. Davis would already have a "Do Not Administer Antimicrobials" order	7.14
Ms. Davis would already have an order reflecting "Palliative/Comfort Measures"	26.85
A proxy for Ms. Davis would be asked how to manage the suspected infection	55.91
Routine Practices α = 0.68, μ = 31.4, SE = 1.48	
A straight catheter would be used to collect a urine sample	30.77
Ms. Davis would be treated with antimicrobials	32.89
Notes: α = Cronbach alpha, μ = population mean, SE = standard error	

- All integration scales small positive correlations with infection management and palliative care (r = 0.11 to 0.25, p values < .01)
- Few associations between regional, state or nursing home characteristics and integration

Stone PW, Agarwal M, Ye F, Sorbero M, Miller SC, Dick AW. (2019). Integration of Palliative Care and Infection Management at End-of-Life in US Nursing Homes.

Policy Impact

- Many of the 27 Commission recommendations are about improving infection prevention and control including having full time trained infection preventionist.
  - Palliative care and integration (i.e., providing comfort care in the NH for infections) are not mentioned.
- In a review of 21 COVID-19 NH guidance documents around the world, its been reported that the focus has been on infection prevention and control and only a few sentences on palliative care.



Discussion

- Even before COVID-19, infections were occurring frequently in NH residents
- Infection prevention and control in NHs is evolving (quickly with COVID-19)
- Infection management is suboptimal and treatments are often burdensome and inconsistent with palliative care goals
- It is still unclear how best to implement and coordinate infection prevention, palliative care and integration
- Strong, evidence based recommendations are needed

Thank You NINR

Thanks to a fabulous interdisciplinary team, and all the nurses who have participated in our research!