



# Infection control in aged care facilities

## 3<sup>rd</sup> February 2019

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# Overview

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- The size of the problem: Aging population
- Why infection is such a problem
- Infections in nursing homes
- The infections
  - Outbreaks
  - Influenza
  - Viral gastroenteritis: Norovirus
  - CAUTI (Catheter Associated Urinary Tract Infection)
- Prevention
  - Preventing transmission
  - AMS (Antimicrobial Stewardship)
  - Vaccination
  - Other
- Conclusion
- References

# Aging population



- Population is aging
  - By 2050 21.4% of the population will be over 60 years of age
  - In Australia the number of people aged 85 and over is projected to quadruple from 0.4 to 1.8 million by 2050
- Currently, 31% of people aged 85 years or older reside in aged care
  - Equates to 0.6 million in nursing homes
- Estimated that 6% of the population (over 1.5 million people in Australia) will require nursing home accommodation by 2030

# ***Why are infections such a problem***

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- Inherently vulnerable patients
  - Age
    - Immunosuppressive therapy
  - Other comorbidities
  - Invasive devices
  - Incontinence
  - Poor mobility
  - Cognitive deficits
  - Impaired communication
    - Present late
  - Immune senescence
    - Atypical manifestations of infection
    - Poor response to vaccination
- Require assistance with ADL's
  - Many opportunities for staff exposure and therefore further transmission



# ***Why are infections such a problem***

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- Nursing ratios/Patient numbers
  - Time pressure
    - Low compliance with prevention strategies
- Limited access to medical intervention
  - Inherently difficult to transfer patients to acute facilities
  - Few if any investigations available
  - High rates of empiric therapy
    - Frequent antibiotic exposure
- High frequency of social contacts
  - Opportunities for cross transmission



# *Infections in Nursing Homes*

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- In 2000, estimated 1.6 to 3.8 million infections in 1.5 million US patients in ~17000 NH's every year<sup>1</sup>
- More recently, estimates range from 1.4 to 5.2 infections per 1000 resident care days<sup>2</sup>
- Recent Australian data<sup>3</sup>:
  - Infection prevalence 2.9%
- Less data than acute facilities<sup>4</sup>
  - Less diagnostic testing
  - Multiple laboratory providers
  - Multiple sources of medications



1. Strausbaugh et al. 2000. The burden of infection in long-term care
2. Koch et al. 2009. Severe consequences of healthcare-associated infections among residents of nursing homes: a cohort study
3. Bennett et al. 2018. Prevalence of infections and antimicrobial prescribing in Australian aged care facilities: Evaluation of modifiable and nonmodifiable determinants
4. Stuart et al. 2015. Survey of infection control and antimicrobial stewardship practices in Australian residential aged-care facilities



# *The infections*

- Respiratory
  - Influenza
  - Other respiratory viruses
- Gastrointestinal
  - Norovirus
  - Rotavirus
  - *Clostridium difficile*
- Urinary tract
  - CAUTI
- MRO's
  - VRE, MRSA, MRGNB's



**NOROVIRUS:**  
YOU DON'T WANT IT.



1. Lansbury et al. 2017. Influenza in long term care facilities.
2. Utsumi et al. 2010. Types of infectious outbreaks and their impact in elderly care facilities: a review of the literature.
3. Mody et al. 2015. Enhancing Resident Safety by Preventing Healthcare-Associated Infection: A National Initiative to Reduce Catheter-Associated Urinary Tract Infections in Nursing Homes.

# Outbreaks in nursing homes

Aetiologic agents	No. of reports
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Influenza viruses	49
Noroviruses	25
<i>Salmonella</i> sp.	16
Group A <i>Streptococcus</i>	16
<i>Sarcoptes scabiei</i>	11
<i>Clostridium difficile</i>	8
<i>Escherichia coli</i>	8
<i>Streptococcus pneumoniae</i>	8
Respiratory syncytial virus (RSV)	7
<i>Legionella</i> spp.	6
Parainfluenza viruses	4
<i>Mycobacterium tuberculosis</i>	4
Adenoviruses (epidemic keratoconjunctivitis)	4
Hepatitis B virus	4
<i>Clostridium perfringens</i>	4
Rhinoviruses	3
<i>Chlamydia pneumoniae</i>	3
<i>Shigella</i> sp.	3
Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)	2
Coronaviruses	2
Rotaviruses	2
<i>Campylobacter</i> sp.	2
Trichophyton	2
Others	13
Total	206



# Influenza

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- Environment highly conducive to respiratory virus transmission + highly susceptible residents
- Pathogens introduced by staff, visitors and/or newly transferred residents
- Review of 206 published outbreaks in nursing homes across 19 countries over 40 years<sup>2</sup>
  - 37 different pathogens
  - Respiratory tract was the most common site of infection (45% of outbreaks)
  - Influenza caused the highest number of outbreaks (23%)
  - In 49 outbreaks caused by influenza;
    - Median attack rate was 33% in residents, 23% amongst staff
      - RSV was highest with an attack rate of 40%
    - Median case fatality rate for residents of 6.5%
    - No reduction in attack or case fatality rates over time
- Vaccination rates of NH staff often around 50%
  - Demonstrated effects on reductions of all cause mortality<sup>3</sup>
- Many guidelines now available<sup>4</sup>

1. Lansbury et al. 2017. Influenza in long term care facilities.  
2. Utsumi et al. 2010. Types of infectious outbreaks and their impact in elderly care facilities: a review of the literature.  
3. Lemaitre et al. 2009. Effect of Influenza vaccination of nursing home staff on mortality of residents: a cluster randomized trial.  
4. CDNA 2017; Guidelines for the Prevention, Control and Public Health Management of Influenza Outbreaks in Residential Care Facilities in Australia



# ***Viral gastroenteritis***

- Norovirus is the most common cause of epidemic gastroenteritis<sup>1</sup>
  - Accounts for 90% of viral gastro outbreaks
    - 50% of all-cause outbreaks worldwide
  - Estimated 1.8 million cases/year in Australia
- In same review of 206 outbreaks in nursing homes<sup>2</sup>,
  - GI was the second most commonly affected site at 36%
  - Norovirus was the second most common pathogen (behind influenza)
- Very easy to transmit<sup>1</sup>
  - As few as 18 viral particles sufficient for infection
    - ~5 billion infectious doses in each gram of faeces
  - Environmentally stable
    - Persist on surfaces for up to 2 weeks
    - Resistant to many common disinfectants
- No vaccine or therapy
  - Therefore infection prevention and control are critical<sup>3</sup>

1. Hall. 2012. Noroviruses: The perfect human pathogens.

2. Utsumi et al. 2010. Types of infectious outbreaks and their impact in elderly care facilities: a review of the literature.

3. CDNA 2010; Guidelines for the public health management of gastroenteritis outbreaks due to norovirus or suspected viral agents in Australia

# ***CAUTI in nursing homes***

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- In many studies, urinary tract infection is the most common infection among nursing home residents
    - Rates higher in catheterised residents (more than double)
  - Urinary catheters frequent, prevalence 5% to 22% residents
  - Bundle approach shown to be effective;
    - Including;
      - Assessing necessity: aim for catheter free
      - Insertion and management: aseptic technique, staff training etc.
1. Mody et al. 2015. Enhancing Resident Safety by Preventing Healthcare-Associated Infection: A National Initiative to Reduce Catheter-Associated Urinary Tract Infections in Nursing Homes.
  2. Stuart et al, 2015. Survey of infection control and antimicrobial stewardship practices in Australian residential aged-care facilities

# ***Infection Prevention***

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- Hand Hygiene
- MRO screening
- Isolation/PPE
- Staff training
- Staff exclusion
- Clinical care
  - Wound care
  - Skin care
  - Pressure area care
  - Trauma avoidance
- Environmental cleaning
- Water quality
- CAUTI prevention
- Antimicrobial Stewardship
- ID physician access
- Vaccination
  - Staff
  - Residents



# *Preventing transmission*

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- Multi resistant organisms likely more prevalent in nursing homes than acute care
  - Over 35% residents colonised
    - But less data than in acute facilities
  - New acquisition common
    - Serve as reservoir for the community
    - Common source of spread upon return to acute facilities
  - Many reasons
    - Patient risk
      - Health care exposure, in-dwelling devices, old age itself, overuse of antibiotics etc.
    - Environmental
      - Assistance with ADL's, communal nature, limited resources (ability to screen and isolate, fewer infection control trained staff) etc.
- Some benefit demonstrated for risk stratification of precautions as opposed to screening for MRO's
  - Gowns and gloves for residents with invasive devices or skin breakdown, i.e. identifying high risk patients
  - Precautions for dressing, hygiene cares and toileting, i.e. identifying the high risk activities

# Antimicrobial stewardship

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- Aged Care National Antimicrobial Prescribing Survey (acNAPS)
  - Survey of 292 facilities housing 12 319 residents
    - 352 residents (3%) had  $\geq 1$  possible or confirmed infection
      - Prevalence of antibiotic prescribing was 9%
      - Prescribing outliers less likely to have UTI guidelines
- Antibiotics account for 20% of adverse drug events in nursing homes<sup>2</sup>
  - Up to approximately 50% of antibiotic prescriptions in NH's are unnecessary
  - Most common infection leading to inappropriate antibiotics is UTI
    - 30-56% of antibiotic prescriptions
      - 78% of suspected and treated UTI's did not meet criteria for therapy
    - *C. difficile* risk increases 8 fold following UTI treatment
- AMS in NH's remains challenging
  - Many studies demonstrate that ID/AMS reviews improve prescribing
    - 30 to 50% reduction in antibiotic prescriptions
      - Associated reductions in *C. difficile*
    - Cost implications and limited availability
  - Difficulties establishing firm diagnosis
  - UTI guidelines clearly effective<sup>3</sup>

1. Bennett et al. 2018. Prevalence of infections and antimicrobial prescribing in Australian aged care facilities: Evaluation of modifiable and nonmodifiable determinants.  
2. Katz and Roghmann. 2017. Healthcare-Associated Infections in the Elderly: What's New.  
3. Mody et al. 2015. Enhancing Resident Safety by Preventing Healthcare-Associated Infection: A National Initiative to Reduce Catheter-Associated Urinary Tract Infections in Nursing Homes



# Influenza Vaccination

- While traditional vaccine less effective in the elderly, still good data supporting its use in this population
  - Particularly given one of the highest risk groups and the risk of outbreaks in this setting
    - e.g. people over 65 accounted for 90% of influenza related deaths in 2017
- Despite this, and recommendations for 95% (or ideally 100%) vaccine coverage for staff and residents, vaccination rates in Nursing Homes remain relatively low;
- Survey of larger facilities covering 22, 350 beds in 2013<sup>2</sup>
  - Most facilities offered influenza vaccination to residents
    - >75% in 73% facilities
    - 50-75% in 17% of facilities
    - <50% in 11% of facilities
  - Not so good for staff
    - >75% in 14% facilities
    - 50-75% in 26% of facilities
    - <50% in 60% of facilities



# *Influenza Vaccination cont.*

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- A national survey of 2, 609 nursing homes in 2017
  - Only 3.5% achieved the recommended staff coverage of 95%
  - Only 35.9% had the recommended resident coverage of 95%
  - 43% reported at least one outbreak in the previous year
  - Those providing in house staff vaccination programs had higher coverage than those that relied on an external immunisation provider
- Moves to make provision of influenza vaccine mandatory to staff in residential aged care announced last April



**The Hon Greg Hunt, MP**

Minister for Health  
Member for Flinders

**The Hon Ken Wyatt AM, MP**

Minister for Aged Care  
Minister for Indigenous Health  
Member for Hasluck

**MEDIA RELEASE**

1. CDNA. 2017. Guidelines for the Prevention, Control and Public Health Management of Influenza Outbreaks in Residential Care Facilities in Australia

2. Stuart et al. 2015. Survey of Infection control and antimicrobial stewardship practices in Australian residential aged-care facilities

3. ATAGI. 2013. The Australian Immunisation Handbook

# ***Pneumococcal vaccine***

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- Pneumococcal vaccine (1 dose 23vPPV) also recommended for people aged 65
  - Similar findings to influenza
    - 67% of facilities claimed to be able to provide pneumococcal vaccine to residents
    - Only 20% reported vaccination rates > 75%
    - 45% were unaware of pneumococcal vaccination status



# *Other interventions*

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- Oral care
  - High salivary bacterial counts linked to pneumonia
    - Intensive oral care may be of benefit
- Probiotics
  - Many studies, yet to be proven beneficial
- Topical antisepsis
  - e.g. chlorhexidine rinses/wipes have not demonstrated efficacy in this setting
- Addressing underlying risk
  - Upright feeding, skin integrity and pressure area cares etc all of some benefit.

# ***Conclusion***

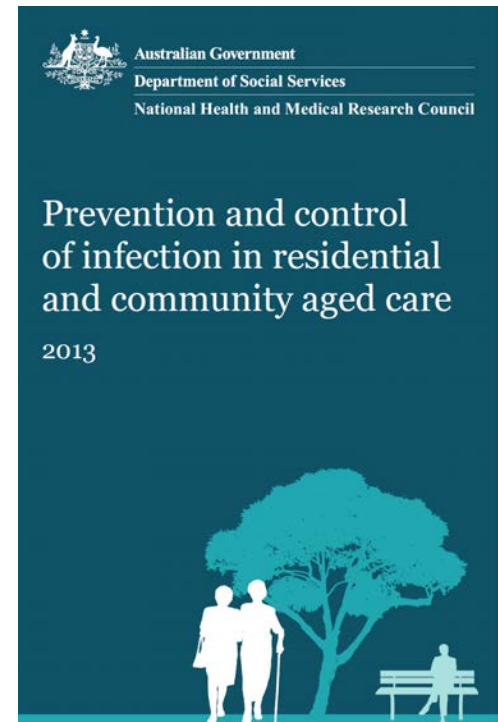
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- Population is aging and therefore the number of nursing home residents is increasing
- Healthcare associated infections in nursing homes are common and increasing
  - Exceeds that of acute facilities
- Infection control in nursing homes is therefore critical, however in many ways more challenging than in acute facilities
- There are many interventions likely to be of benefit but challenges remain
  - Particularly around resource limitations
- Increased vaccination, particularly against influenza, would seem a good place to start

# Resources

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- Centers for Disease Control and Prevention: <http://www.cdc.gov>
- Australian Government National Health and Research Council
  - Infection control in Residential Aged Care: [https://www.nhmrc.gov.au/\\_files\\_nhmrc/publications/attachments/d1034\\_infection\\_control\\_residential\\_aged\\_care\\_140115.pdf](https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/d1034_infection_control_residential_aged_care_140115.pdf)
- Communicable Diseases: <http://www.health.qld.gov.au/communicablediseases>
- Australasian College of Infection Prevention and Control: <https://www.acipc.org.au>
- Hand Hygiene Australia: <http://www.hha.org.au>





# References

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1. Strausbaugh et al, 2000. The burden of infection in long-term care
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8. Lemaitre et al. 2009. Effect of Influenza vaccination of nursing home staff on mortality of residents: a cluster randomized trial.
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