

infection-related hospitalization was reviewed to ensure it was not hospital acquired. This study, however, was conducted among patients discharged from GDH. This selection bias may affect the generalizability of our results. However, our study results could be applied to similarly frail older adults in geriatric clinics and hospitals.

In conclusion, we found that nursing home residence is an independent risk factor for recurrent infection-related hospitalization in older adults. Enhanced infection control measures should be strengthened to reduce infection and the consequent hospitalization.

## References

1. Charlson ME, Pompei P, Ales KL, et al. A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *J Chronic Dis* 1987;40:373–383.
2. Hinkle JL, McClaran J, Davies J, Ng D. Reliability and validity of the adult alpha functional independence measure instrument in England. *J Neurosci Nurs* 2010;42:12–18.
3. Seiler WO. Clinical pictures of malnutrition in ill elderly subjects. *Nutrition* 2001;17:496–498.
4. Stott DJ, Buttery AK, Bowman A, et al. Comprehensive geriatric assessment and home-based rehabilitation for elderly people with a history of recurrent non-elective hospital admissions. *Age Ageing* 2006;35:487–491.
5. Peterson BL, Fillenbaum GG, Pieper CF, et al. Home or nursing home: Does place of residence affect longevity in patients with Alzheimer's disease? The experience of CERAD patients. *Public Health Nursing* 2008;25:490–497.
6. Stuart RL, Kotsanas D, Webb B, et al. Prevalence of antimicrobial-resistant organisms in residential aged care facilities. *Med J Aust* 2011;195:530–533.
7. Van Buul LW, Van der Steen JT, Veenhuizen RB, et al. Antibiotics use and resistance in long term care facilities. *J Am Med Dir Assoc* 2012;13:568.e1–568.e13.
8. Schweon SJ, Edmonds SL, Kirk J, et al. Effectiveness of a comprehensive hand hygiene program for reduction of infection rates in a long-term care facility. *Am J Infect Control* 2013;41:39–44.
9. Chan TC, Hung IF, Luk JK, et al. Efficacy of dual vaccination of pandemic H1N1 2009 influenza and seasonal influenza on institutionalized elderly: A one-year prospective cohort study. *Vaccine* 2011;29:7773–7778.
10. Chan TC, Hung IF, Luk JK, et al. Prevention of mortality and pneumonia among nursing home older adults by dual pneumococcal and seasonal influenza vaccination during a pandemic caused by novel pandemic influenza A (H1N1). *J Am Med Dir Assoc* 2012;13:698–703.

Tuen-Ching Chan, MBBS, FHKAM  
*Department of Medicine and Geriatrics*  
*Fung Yiu King Hospital*  
*The University of Hong Kong*

*Division of Geriatrics*  
*Department of Medicine, Queen Mary Hospital*  
*Hong Kong SAR, People's Republic of China*

Ivan Fan-Ngai Hung, MD, FHKAM  
*Division of Infectious Disease*  
*Department of Medicine, Queen Mary Hospital*  
*The University of Hong Kong*  
*Hong Kong SAR, People's Republic of China*

Vincent Chi-Chung Cheng, MD, FHKAM  
*Department of Microbiology*  
*Queen Mary Hospital*  
*The University of Hong Kong*  
*Hong Kong SAR, People's Republic of China*

James Ka-Hay Luk, MBBS, FHKAM  
*Department of Medicine and Geriatrics*  
*Fung Yiu King Hospital*  
*Hong Kong SAR, People's Republic of China*

Leung-Wing Chu, MD, FHKAM  
*Division of Geriatrics*  
*Department of Medicine, Queen Mary Hospital*  
*The University of Hong Kong*  
*Hong Kong SAR, People's Republic of China*

Felix Hon-Wai Chan, MB, BCh, FHKAM  
*Department of Medicine and Geriatrics*  
*Fung Yiu King Hospital, Hong Kong SAR*  
*People's Republic of China*

<http://dx.doi.org/10.1016/j.jamda.2013.05.008>

## An Antibiotic Prescription Induces Resistance at the Individual Level More Than the Group Level

*To the Editor:*

An unnecessary antibiotic prescription may be viewed as a time bomb that may detonate in the recipient as a *Clostridium difficile* or antibiotic-resistant infection in subsequent months. Antibiotic utilization selects multidrug-resistant bacteria in both the individual and the facility.<sup>1,2</sup> Many practitioners view an antibiotic prescription as a benefit to the individual at the expense of the group. However, an unnecessary antibiotic prescription hurts the INDIVIDUAL. The intensity of the damage and disruption of bacterial flora may be greater in the individual who received the antibiotic than at the group level, according to data from a hospital ward and Scottish general practice.<sup>3,4</sup> This is an important risk-benefit consideration when contemplating antibiotic therapy for an individual. For example, Rotjanapan et al<sup>5</sup> found that 11 (12%) of 96 residents who received an antibiotic for suspected urinary tract infection (UTI) developed *C difficile* colitis within 3 weeks of treatment. Inpatient quinolone therapy in the preceding 30 days increased the odds that a symptomatic UTI was caused by a quinolone-resistant organism 16 times.<sup>6</sup> Quinolone therapy during the prior 6 months increased the odds that a febrile UTI was caused by a quinolone-resistant organism 17.5 times in outpatients.<sup>7</sup> Trimethoprim/sulfamethoxazole prophylaxis for 1 month in postmenopausal women increased resistant *Escherichia coli* in the stool from approximately 20% to 85%.<sup>8</sup> Of interest, a recent study found that antibiotic treatment of asymptomatic bacteriuria in young women increased the risk of subsequent symptomatic UTI 3 times. Antibiotic treatment in this situation apparently replaced relatively benign colonizers with more virulent bacteria.<sup>9</sup> In each of these studies, the use of antibiotics put patients at risk for adverse outcomes related to resistant microorganisms.

Antibiotic resistance is clearly associated with increased risk of fatal outcomes.<sup>10</sup> This concern is greater in long term care facilities (LTCFs) than in the community because of the severity of underlying illness and increased frailty of LTC residents (which increase the risk of subsequent infectious illness), as well as “colonization pressure,” and serial contact care with the risk of transmission. In addition, antibiotic resistance increases the costs of care for both individuals and facilities.<sup>11,12</sup> The selection of resistant pathogens, subsequent risk of a fatal outcome, and increased health care costs should be considered when determining if empiric therapy for nonspecific indications, such as falls or confusion, is justified, especially in the absence of fever, leukocytosis, or localizing findings pointing to a source of infection.<sup>13</sup> Antibiotic resistance in LTCFs is a huge problem that requires aggressive antibiotic stewardship.<sup>1,2,5,10,12</sup>

## References

1. Drinka PJ, Gauerke C, Le D. Antimicrobial use and methicillin-resistant *Staphylococcus aureus* in a large nursing home. *J Am Med Dir Assoc* 2004; 5:256–258.
2. Drinka P, Faulks JT, Gauerke C, Goodman B. A comparison of previous antibiotic therapy following isolation of MRSA versus MSSA in nursing home residents: A preliminary investigation. *J Am Med Dir Assoc* 2002;3: 356–359.
3. Harbath S, Harris AD, Carmeli Y, et al. Parallel analysis of individual versus aggregated data on antibiotic exposure and resistance in gram-negative bacilli. *Clin Infect Dis* 2001;33:1462–1468.
4. Donnan PT, Wei L, Steinke DT, et al. Presence of bacteriuria caused by trimethoprim resistant bacteria in patients prescribed antibiotics: multi-level model with practice and individual patient data. *BMJ* 2004;328: 1297–1300.
5. Rotjanapan P, Dosa D, Thomas KS. Potentially inappropriate treatment of urinary tract infections in two Rhode Island nursing homes. *Arch Intern Med* 2011;171:438–443.
6. Rattanaumpawan P, Tolomeo P, Bilker WB, et al. Risk factors for fluoroquinolone resistance in gram-negative bacilli causing healthcare-acquired urinary tract infections. *J Hosp Infect* 2010;76:324–327.
7. van der Starre WE, van Nieuwkoop C, Paltansing S, et al. Risk factors for fluoroquinolone-resistant *Escherichia coli* in adults with community-onset febrile urinary tract infection. *J Antimicrob Chemother* 2011;66: 650–656.
8. Beerepoot MAJ, ter Riet G, Nys S, et al. Lactobacilli vs antibiotics to prevent urinary tract infections: A randomized, double-blind, noninferiority trial in postmenopausal women. *Arch Intern Med* 2012;172:704–712.
9. Cai T, Mazzoli S, Mondaini N. The role of asymptomatic bacteriuria in young women with recurrent urinary tract infections: To treat or not to treat? *Clin Infect Dis* 2012;55:771–777.
10. Drinka P, Neiderman M, El-Solh AA, Crnich C. Assessment of risk factors for multidrug resistant organisms to guide empiric antibiotic selection in long term care: A dilemma. *J Am Med Dir Assoc* 2011;12:321–325.
11. Cosgrove SE. The relationship between antimicrobial resistance and patient outcomes: Mortality, length of hospital stay, and health care costs. *Clin Infect Dis* 2006;42:S82–S89.
12. Capitano B, Leshem A, Nightingale CH, et al. Cost effect of managing methicillin-resistant *Staphylococcus aureus* in a long term care facility. *J Am Geriatr Soc* 2003;51:10–16.
13. High KP, Bradley SF, Gravenstein S, et al. Clinical practice guideline for the evaluation of fever and infection in older adult residents of long term care facilities. *Clin Infect Dis* 2009;48:149–171.

Paul J. Drinka, MD, AGSF, FSHEA  
University of Wisconsin, Madison, and  
Medical College of Wisconsin  
Milwaukee, Wisconsin

Christopher J. Crnich, MD, MS, FACP  
Division of Infectious Diseases, University of Wisconsin  
School of Medicine and Public Health  
Madison, Wisconsin

David A. Nace, MD, MPH  
Division of Geriatric Medicine  
University of Pittsburgh  
UPMC Senior Communities  
Pittsburgh, Pennsylvania

<http://dx.doi.org/10.1016/j.jamda.2013.05.007>

## Reductions of Antipsychotic and Hypnotic Medications in Namaste Care

### To the Editor:

The number of persons with Alzheimer's disease and other progressive dementias is increasing rapidly in all countries, fueled by increasing lifespan. A large percentage of these persons

(35%–53%) survive into an advanced stage of dementia.<sup>1</sup> At that stage, persons with dementia are very often institutionalized because their families can no longer provide care for them. In an institution, they are often unable to participate in activities provided for intact and mildly demented residents and end up placed in corridors or isolated in their rooms. A method of care, Namaste Care, was recently developed that provides improved quality of life for these individuals.<sup>2</sup> Limited amount of research evaluating this method showed that residents in Namaste Care had decreased prevalence of symptoms indicating presence of delirium, agitation, and use of antianxiety medications.<sup>3</sup> Recent introduction of Namaste Care in a Scottish nursing home as quality improvement initiative provided opportunity for further demonstration of Namaste Care benefits.

The program was implemented according to description in the book *The End-of-Life Namaste Care Program for People with Dementia*<sup>2</sup> as a part of quality improvement activity. The program consisted of establishing a separate room (Cooie Inn) to which residents with advanced dementia were brought after breakfast and were transferred into comfortable chairs with blankets placed on their knees. The Namaste Care staff worked in the Cooie Inn from 9AM to 4PM every day providing comfort care; the residents had their hands and face washed, and given a hand massage with moisturizer applied to the residents' hands, legs, and face. The men were shaved and also had some after shave lotion applied. When visitors arrived, they were encouraged to provide this care for their loved ones. Staff members sat and talked to the residents, perhaps reading the local paper or just stroking their hand. Drinks were provided throughout the morning: tea, juice, water, or milk. After lunch some of the residents went out for fresh air, even in the rain (that is what umbrellas are for). There is a chicken coop on the premises and the staff often took the residents to feed the chickens. For sensory activities, 2 paddling pools were used, 1 filled with water and the other with sand. Residents could put their hands and feet in the sand and the water. Currently, there are 13 residents in the Namaste Care program with 2 caregivers.

Participants in this study were 8 females and 1 male, who were enrolled in Namaste Care in a Scottish nursing home for at least 6 months. Their average age was  $85.2 \pm 8.7$  years and average duration of institutionalization at the beginning of Namaste Care of  $44.7 \pm 38.3$  months. Three of them had diagnosis of Alzheimer's disease, 2 each diagnoses of vascular dementia and of nonspecified dementia, and 1 each diagnoses of dementia with Lewy bodies and of Parkinson's disease.

Involvement in Namaste Care gradually decreased the use of antipsychotics and hypnotics (Figure 1). At the time of Namaste Care enrollment, 4 residents were receiving antipsychotics; 2 females received quetiapine 25 mg twice a day (one had been on this for 3 years, the other 1 year), 1 female received quetiapine 25 mg in the morning and 50 mg at night (been on this for 4 years). One female received haloperidol 0.5 mg twice a day and has been on this medication for 5 years. Antipsychotic medications were gradually reduced over a 4-month period and eventually discontinued. Families have commented on how their relatives were more content and did not look worried or afraid. They have seen smiles, laughter, and sometimes tears; they could make a connection with their loved one that they thought they had lost, even if the moment was short lived.

Three residents were receiving hypnotics at the beginning of the study: 2 women zopiclone 7.5 mg every night (one had been on it for 2 years, the other for 6 months), 1 woman was receiving zolpidem 5 mg every night (been on it for 6 years). We reduced the hypnotic medications over a 5-month period, until they were discontinued (Figure 1). Before the Namaste program, the residents appeared to sleep the night and day away; we now know that this

Start studying Antibiotic resistance. Learn vocabulary, terms and more with flashcards, games and other study tools. Actual dose level within pt rather than amount prescribed - pharmacokinetics of the drug - infection site (blood supply: drug may not reach) - pharmacodynamics of the drug. Stages of antibiotic resistance. antibiotics. What does an increase in the level and scope of antibiotic resistance mean. A reduction in viable therapeutic options for treatment. Mechanism of antibiotics. more than a threefold difference in prescribing rates between countries, without any good reason to explain the. single out the groups of patients that may benefit from antibiotic prescription. Furthermore. Antibiotic-induced changes in the human gut microbiota for the most commonly prescribed antibiotics in primary care in the UK: a systematic review. Article. Full-text available. Practice-Level Association between Antibiotic Prescribing and Resistance: An Observational Study in Primary Care. by Dylan Batenburg 1, Theo Verheij 1, Annemarie van Veen 2,3 and Alike van der Velden 1,\* 1. This group of practices with their patient populations are a representative sample of the Dutch population [18]. The data contained information of office-hour contacts during weekdays, including diagnoses and prescription data. The answer whether antibiotic use is related to antimicrobial resistance at the level of individual primary care practices seems to depend on the denominator of resistance. Resistance percentages per number of urine cultures were not related to antibiotic prescribing levels. Areas with high levels of antibiotic prescribing also have high levels of resistance. The highest combined general practice, hospital and dentist usage in England in 2014 was in Merseyside at 27.7 DDD per 1,000 inhabitants per day. This encourages Clinical Commissioning Groups (CCGs) to reduce prescribing of antibiotics in primary care settings by at least 1% from 2013 to 2014 levels. CCGs have also been asked to reduce broad-spectrum antibiotic prescribing as a percentage of the total antibiotics prescribed in primary care by 10% from each CCG's 2013 to 2014 levels. The validated total antibiotic prescribing data will be available for each Trust at the end of each financial year on GOV.UK.