



Fig. 1.

K-fold cross validation, and performance characteristics between the 4 models were compared. **Results:** From 2010 through 2016, prevalence of fluoroquinolone and carbapenem resistance was 32% and 18%, respectively. For fluoroquinolone resistance, the logistic regression algorithm attained a positive predictive value (PPV) of 0.57 and a negative predictive value (NPV) of 0.73 (sensitivity, 0.27; specificity, 0.90) and the decision-tree algorithm attained a PPV of 0.65 and an NPV of 0.72 (sensitivity 0.21, specificity 0.95). For carbapenem resistance, the logistic regression algorithm attained a PPV of 0.53 and a NPV of 0.85 (sensitivity 0.20, specificity 0.96) and the decision-tree algorithm attained a PPV of 0.59 and an NPV of 0.84 (sensitivity 0.22, specificity 0.96). The decision-tree partitioning algorithm identified prior fluoroquinolone resistance, SNF stay, sex, and length-of-stay as variables of greatest importance for fluoroquinolone resistance compared to prior carbapenem resistance, age, and length-of-stay for carbapenem resistance. The highest-performing decision tree for fluoroquinolone resistance is illustrated in Fig. 1. **Conclusions:** Supervised machine-learning techniques may facilitate prediction of *P. aeruginosa* resistance and risk factors driving resistance patterns in hospitalized patients. Such techniques may be applied to readily available clinical information from hospital electronic health records to aid with clinical decision making.

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#### A National Aged Care Infection and Antimicrobial Use Survey: A Three-Year Report

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**Background:** Australia has ~2,700 aged-care homes and 180 multipurpose services. The annual Aged Care National Antimicrobial Prescribing Survey (AC NAPS), first pilot tested in 2015, is a surveillance tool that can be used in these facilities to monitor infections and antimicrobial use. It assists in identifying priorities for local and national infection control and antimicrobial stewardship interventions. **Methods:** Nurses or pharmacists collect point prevalence data using standardized data collection forms: (1) A facility form, completed by each participating facility, includes resident-level data fields (eg, number of residents present on the survey day). (2) An infection form is completed for residents with signs and/or symptoms of infection. (3) An antimicrobial form is completed for residents who are prescribed an antimicrobial. **Results:** Regarding prevalence, for those 31 facilities that participated annually, there was no significant change in either prevalence rate (Table 1). Regarding priority areas for improvement (2018 data only), 64.6% of prescriptions were for residents who did not have signs and/or symptoms of a suspected infection in the week prior to the antimicrobial start date. The most common clinical indications for prescriptions were skin soft-tissue and mucosal infection (18.3%), cystitis (16.0%) and pneumonia (9.4%). Cefalexin (20.3%), clotrimazole (19.0%), and chloramphenicol (7.0%) were the most commonly prescribed antimicrobials. Review or stop dates were not documented for 58.9% of prescriptions. Only 39.2% of antimicrobials were prescribed in the 7 days prior to the survey day; 28.3% were prescribed >6 months prior. Furthermore, 36.3% of all prescriptions were for

**Table 1.**

| On Survey Day                                                          | 2016             |     |          | 2017             |     |         | 2018             |     |          |
|------------------------------------------------------------------------|------------------|-----|----------|------------------|-----|---------|------------------|-----|----------|
|                                                                        | 13,398 Residents |     |          | 12,307 Residents |     |         | 20,030 Residents |     |          |
|                                                                        | 287 Facilities   |     |          | 292 Facilities   |     |         | 407 Facilities   |     |          |
|                                                                        | No.              | %   | 95% CI   | No.              | %   | 95% CI  | No.              | %   | 95% CI   |
| Residents with signs and/or symptoms of at least 1 suspected infection | 417              | 3.1 | 2.8–3.4  | 349              | 2.8 | 2.5–3.1 | 581              | 2.9 | 2.7–3.1  |
| Residents prescribed at least 1 antimicrobial                          | 1,321            | 9.9 | 9.4–10.4 | 1,087            | 8.8 | 8.3–9.3 | 1,988            | 9.9 | 9.5–10.4 |

topical application. In addition, 19.0% of antimicrobials were prescribed for PRN (as needed) administration; most (94.4%) of these were for topical antimicrobials, most commonly clotrimazole (65.4%). **Conclusions:** The AC NAPS has identified infections and consistent patterns of antimicrobial use that may adversely affect the safety of care for Australian aged-care residents. Interventions are now being developed, implemented, and evaluated to address identified 'priority areas for improvement.'

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#### A National Intervention to Reduce Undesirable Urinary Tract Events in Internal Medicine Wards

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**Background:** Catheter-associated urinary tract infection (CAUTI) is considered a preventable healthcare-associated infection. Many local and national interventions using multimodal prevention measures have targeted CAUTI incidence as the primary outcome. Other undesirable events related to urinary catheters and infections such as overuse of urine culturing and antimicrobial prescribing for asymptomatic bacteriuria, are not captured by CAUTI surveillance, and may not be the targets of such interventions. The aim of this study was to assess the impact of expanded national surveillance targeting various aspects of urinary tract infections, culturing and treatment practices, and catheter use in internal medicine wards. **Methods:** The Israeli National Center for Infection Control (NCIC) issued CAUTI prevention guidelines and initiated in 2016 a urinary tract event surveillance system that targets the incidence of CAUTI, urinary catheter utilization ratio, and the proportion of urine cultures sent and patients treated in the absence of symptoms. The surveillance is conducted for 1 month 3 times per year. Hospitals are required to report all positive urine

**Table 1.**

Table: Summary of results

|                                                                        | 2016 | 2017 | 2018 | 2019 | p value for comparison of 2016 to 2019 |
|------------------------------------------------------------------------|------|------|------|------|----------------------------------------|
| CAUTI rate per 1000 catheter-days                                      | 4.7  | 3.6  | 3.5  | 2.9  | <0.001                                 |
| Hospital-acquired SUTI (non-CAUTI) per 1000 patient-days               | 1.0  | 0.9  | 0.8  | 1.0  | 0.79                                   |
| Catheter utilization ratio                                             | 0.25 | 0.25 | 0.24 | 0.23 | <0.001                                 |
| % positive cultures sent for patients without symptoms                 | 44%  | 44%  | 43%  | 42%  | 0.56                                   |
| % ASB treated with antibiotics                                         | 31%  | 25%  | 20%  | 20%  | 0.02                                   |
| Positive cultures sent for asymptomatic patients per 1000 patient-days | 1.5  | 1.2  | 1.1  | 1.1  | <0.01                                  |

ASB asymptomatic bacteriuria; CAUTI- catheter-associated urinary tract infection; SUTI- symptomatic urinary tract infection

cultures (>100,000 CFU) collected in internal medicine wards, along with the following data: admission date, symptoms of infection, dates of urinary catheter use, and antibiotic treatment. These data enable the NCIC to validate hospital classifications of each event. In addition, during each surveillance month, hospitals conduct point-prevalence surveys of compliance with CAUTI prevention measures. An electronic data collection form with built-in algorithms supports the local teams during the surveillance process. **Results:** Between 2016 and 2019, a total of 3,028 positive urine cultures not present on admission were reported by internal medicine wards in 30 hospitals. A significant decrease was observed in the incidence of CAUTI (from 4.7 to 2.9;  $P < .001$ ) and in the proportion of asymptomatic bacteriuria treated with antibiotics (from 31% to 20%;  $P = .02$ ) (Table 1). The catheter utilization ratio decreased from 0.25 to 0.23 ( $P < .001$ ). The rate of cultures sent from asymptomatic patients decreased from 1.5 to 1.1 ( $P < .01$ ). Point-prevalence surveys in internal medicine wards detected a significant increase in the use of closed urinary drainage systems (from 79% to 97% in 2018,  $P < .001$ ) and documentation of a daily nurse assessment of the need for a catheter (from 74% to 81%,  $P < .001$ ). **Conclusions:** National surveillance of undesirable urinary tract events resulted in a significant reduction in CAUTI, antibiotic treatment for ASB, and the rate of cultures sent from asymptomatic patients. A small decrease was observed in catheter utilization ratio. CAUTI surveillance programs should include other undesirable urinary tract events.

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#### A Nosocomial Cluster of *Roseomonas mucosa* Bacteremia Possibly Linked to Contaminated Hospital Environment

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