

Methods & Materials: We conducted a longitudinal cohort study, testing for susceptibility to chlorhexidine in all MRSA isolates obtained from exit screening of inpatients of a 100-bed extended-care facility in Singapore, from June 2015 to Oct 2016. Minimum inhibitory concentrations (MICs) of chlorhexidine were determined by the modified Clinical and Laboratory Standards Institute (CLSI) method, with microbroth dilution susceptibility testing for a range of 0.125–8 µg/ml. There is no defined MIC breakpoint for antiseptics by CLSI. Multivariable logistic regression models were constructed to assess for independent factors associated with high CHG MIC levels.

Results: A total of 55 MRSA isolates were included: 33 (60%) were sequence type (ST) 22, and the remaining ST45. The majority (87.3%) had CHG MIC = 4 µg/ml, with 10.9% MIC = 2 and 1.8% MIC = 1. Almost all (97.0%) ST22 isolates had MIC = 4, compared to 72.4% in ST45 ($P = 0.008$). There was no difference in age (mean 66.0 years [SD 14.1] vs. 63.2 [16.3], $P = 0.638$) and gender (81.3% vs. 85.7% male, $P = 0.775$) between patients with MRSA isolates with MIC = 4 and MIC < 4. The proportion of isolates with MIC = 4 in the first 9 months (Jun 2015–Feb 2016) (43.8%) was similar to the subsequent 8 months (Mar–Oct 2016) (56.3%) ($P = 0.965$). After adjusting for age, gender, period of screening (Mar–Oct 2016 vs. Jun 2015–Feb 2016), and days of exposure to CHG baths, ST22 was 18 times (OR 18.34, 95% CI 1.61–208.84, $P = 0.019$) as likely as ST45 to be associated with a higher CHG MIC = 4.

Conclusion: CHG susceptibility in MRSA isolated from inpatients of an extended-care facility exposed to daily CHG baths did not change over a period of 17 months. MRSA sequence type ST22 was the only factor associated with a higher CHG MIC = 4.

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UMP. 436

A Nurse-Driven Testing Protocol to Identify Community-Onset *Clostridium difficile* Infections in Hospitalized Patients



E. Godbout, N. Masroor, S. Knowlson, M. Fleming, A. Patrick, K. Cooper, M. Doll*, M.P. Stevens, G. Bearman

VCU Health System, Richmond, United States

Background: *Clostridium difficile* is a major cause of infectious diarrhea in hospitalized patients. In 2015, all hospital-onset (HO) *C. difficile* infections (CDI) were reviewed at a single academic tertiary care center. 17% of HO CDI had symptoms prior to admission that met criteria for community-onset (CO) infection. A nurse-driven *C. difficile* testing protocol was implemented to improve detection of CO CDI and to initiate isolation precautions sooner in an effort to prevent hospital transmission. Here, we assessed the effectiveness and fidelity of a nurse driven protocol (NDP) to identify CO CDI in hospitalized patients at an academic tertiary care center.

Methods & Materials: A NDP for CDI testing was created and included the following criteria for testing: 3 or more watery stools within the past 24 hours, no laxative use within the last 24 hours, no alternative explanation for diarrhea and no *C. difficile* result within the last 7 days. The NDP was implemented hospital wide from January – September 2017, which enabled nursing staff to use an electronic order set for *C. difficile* testing. Nursing staff received intensive education with a nurse liaison prior to implementation and at several intervals of the study period. Data were collected on the number of *C. difficile* tests ordered by nursing staff, as well as the result and fidelity of testing.

tive test results, 9/20 (45%) followed the NDP appropriately, 14/20 (70%) met HO criteria, and 8/14 (57%) of the HO cases did not follow the NDP.

Conclusion: A *C. difficile* NDP to identify CO CDI in hospitalized patients at an academic tertiary care center was not as effective as intended. Furthermore, protocol fidelity was low, raising the concern that the protocol may be expanding the problems of over-testing and detection of *C. difficile* colonization, rather than infection. Further revisions to the protocol are planned to prevent deviations from the ordering criteria.

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UMP. 437

Are nurses uniforms a reservoir for Methicillin-resistant *Staphylococcus aureus*? Lessons to be learned from Portugal



E. Fernandes¹, P. Costa¹, J. Graveto², C. Santos¹, N. Osório³, S. Alarico⁴, H. Albano⁵, V. Oliveira³, S. Ferreira^{6,*}

¹ Nursing School of Coimbra, Coimbra, Portugal

² Nursing School of Coimbra, Fundamental Nursing, Coimbra, Portugal

³ Coimbra Health School, Coimbra, Portugal

⁴ University of Coimbra, Molecular Mycobacteriology & Microbiome Group, Coimbra, Portugal

⁵ Universidade Católica do Porto, Centro de Biotecnologia e Química Fina, Porto, Portugal

⁶ AWISHE, Mamarrosa, Portugal

Background: Portugal has one of the highest rates of resistance to *Staphylococcus aureus* in Europe. A significant contamination rate of nurses uniforms used during direct patient care was identified in four medical wards in a large public tertiary hospital. We described the degree of contamination and investigate associated risk factors.

Methods & Materials: Descriptive-correlational and cross-sectional study. The target population corresponds to all nurses who provide direct patient care in the referred settings. Nurses uniforms were swabbed in their abdominal and pocket areas, later cultured in Mannitol salt agar (MSA). The obtained isolates were subjected to the latex agglutination test in order to investigate the presence of *Staph. aureus*. Additional information regarding uniform management by nurses was collected by individual questionnaire. Data were analyzed with IBM SPSS 20.

Results: Fifty clinical uniforms were tested. We identified *Staphylococcus* spp. in 17 samples from the pocket areas (29.4% were *Staph. aureus*) and 19 from the abdominal area (31.6% were *Staph. aureus*). Regarding this specific bacteria, resistance to methicillin was found in both pocket (23.5%) and abdominal area samples (26.3%). As for the remaining *Staphylococcus* spp. species, the same resistance was found in 41.2% of the pocket samples and 31.6% of the abdominal area samples. Nurses in these medical wards change their uniforms every two (56%) or three shifts (28%). In addition, 14% clean and disinfect their uniform at home and 62% reported using it in several intra/inter-institutional contexts.

Conclusion: Underprovided training, lack of accessible institutional guidelines and failures in the systems of provisioning, reprocessing and distribution of hospital uniforms emerge as barriers to their use and management in accordance with existing norms

and should be a concern for managers and health professionals who wear them during patient care such as nurses.

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UMP. 438

Strategies for blocking measles outbreak with immunobiological coverage in municipalities of Ceara, Northeast of Brazil

J.R. Pinto¹, G. Silva Junior^{2,*}, D.C. Nascimento de Moura³, P. Martins³

¹ Centro Universitário UNINTA and University of Fortaleza, Sobral, Brazil

² Federal Institute of Education, Science and Technology of Ceara and University of Fortaleza, Fortaleza, Brazil

³ Centro Universitário UNINTA, Sobral, Brazil

Background: In Brazil, vaccines have been used for disease prevention for more than two centuries, representing cost-effective measures in primary prevention, contributing to the reduction of morbidity and mortality from infectious diseases in children. This research analyzed the association between measles outbreak and the immunobiological coverage in municipalities in Ceara, North-east of Brazil.

Methods & Materials: The study was conducted in two stages: Step 1 - Documentary study, based on secondary data sources; Step 2 - A quantitative cross-sectional study, based on the data from the 11th Health Region of Sobral, Ceara, Brazil, which includes 24 cities in the North region of the state. Thirty-five professionals working in the immunization sector of the municipalities were interviewed, of which 31 responded to the survey. The information was collected in the months of September and October 2016 through an online form provided by Google Forms. In the documentary study, a total of 766 cases of measles were investigated in the period from 2013 to 2015.

Results: Among the 766 cases investigated, 451 were discarded, 65 were inconclusive and 217 were confirmed as measles. It was possible to identify that vaccination coverage prior to the outbreak was below the levels recommended by the Brazilian Ministry of Health. The most exposed population was children aged <5 years (38.7% of those surveyed registered this data). It was noted the difficulty of controlling the outbreak due to the lack of professional qualification before the appearance of these cases (14.3% affirmed this difficulty). After several vaccination strategies carried out in the region, targeted on susceptible population, reorientation and systematization of blocking disease transmission and sweeping actions, the outbreak was discontinued.

Conclusion: The difficulty identified by health professionals in blocking measles outbreak, mainly due to lack of logistical and updated scientific knowledge, professional support had a huge importance. The analysis of these difficulties should be a subsidy for the containment of new outbreaks of immunopreventable infectious diseases. As measles is included in the regular vaccine calendar in Brazil, it is also important to achieve the coverage levels recommended by the Ministry of Health, so outbreaks risk is minimized.

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UMP. 441

Similarities and Differences in Risk Factors for Vancomycin-resistant Enterococcus Colonization between an Acute Hospital and its affiliated Intermediate- and Long-term care facilities

D. Tan^{1,*}, J.-W. Lim², P.-Y. Hon², A. Chow²

¹ Lee Kong Chian School of Medicine, Singapore, Singapore

² Tan Tock Seng Hospital, Singapore, Singapore

Background: Vancomycin-resistant *Enterococci* (VRE) infections in acute hospitals (AHs) are increasing, but little is known in intermediate- and long-term care facilities (ILTCs). Patients often transfer between AHs and ILTCs. We sought to compare risk factors for VRE colonization between an AH and ILTCs in a healthcare network.

Methods & Materials: Two cross-sectional studies were conducted in a 1600-bed tertiary-care AH and its six affiliated ILTCs in June-July 2014 and June-July 2015. Rectal swabs or stool were cultured for VRE. Clinical data were obtained from medical records and associations with colonization made. To control for confounding, multivariable logistic regression models were constructed.

Results: Of 3469 patients screened, 11.4% were colonized with VRE. VRE prevalence was higher in the AH(16.9%) than ILTCs(4.4%)(OR 2.75, 95%CI 1.96-3.86, $P < 0.001$). After adjusting for age, gender, screening year, and co-morbidities, risk factors for VRE colonization in the AH included length of stay(LOS) >14 days(OR 1.67, 95%CI 1.27-2.21, $P < 0.001$), number of beds in hospital room(OR 1.08 95%CI 1.02-1.15, $P = 0.009$), presence of wounds(OR 1.82 95%CI 1.39-2.39, $P < 0.001$), as well as prior admission to the AH(OR 1.42, 95%CI 1.07-1.88, $P = 0.014$), prior VRE carriage(OR 4.92 95%CI 2.74-8.83, $P < 0.001$), and prior antibiotics exposure in the preceding 12 months(OR 4.51, 95%CI 2.15-9.44, $P < 0.001$). For ILTCs, prior admission to AHs(OR 6.73, 95%CI 1.58-28.71, $P = 0.010$) and prior antibiotics exposure(OR 5.53, 95%CI 1.66-18.40, $P = 0.005$), presence of indwelling urinary catheter(OR 1.97, 95%CI 1.14-3.40, $P = 0.014$), and LOS >14 days(OR 0.47, 95%CI 0.26-0.83, $P = 0.010$) were associated with VRE colonization.

Conclusion: Antibiotics exposure and hospitalization in an AH in the preceding 12 months were common risk factors for VRE colonization in the AH and ILTCs. Prior VRE carriage and LOS >14 days increased the risk of colonization in the AH. Presence of indwelling urinary catheter increased but LOS >14 days decreased the risk in ILTCs. Pre-emptive contact precautions and targeted screening could be implemented for these high-risk patients at AHs and ILTCs.

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