

P2655 The interaction between hand hygiene and cohorting

Martin Bootsma*^{1,2}, Marc J. Bonten^{3,4}

¹ Julius Center, Utrecht, Netherlands, ² Science Faculty, Utrecht, Netherlands, ³ Julius Center, Utrecht, Netherlands,

⁴ Department of Medical Microbiology, Utrecht, Netherlands

Background: Both hand hygiene (HH) and cohorting of health care workers (HCWs) and patients are important measures to prevent nosocomial spread of antimicrobial resistant bacteria (AMRB). The interaction between both interventions, however, is not well studied.

Materials/methods: We use a stochastic mathematical model which simulates spread of AMRB in a hospital unit with 8 patients. 69% of patient contact are with nurses (who may be cohorted) and 31% with uncohorting HCWs, e.g., physicians. We consider admission prevalences of AMRB of 1% and 10% and per admission reproduction numbers of 0.5, 1 and 2, reflecting characteristics of different AMRB. Nurses perform HH after 59% of patient contacts, other HCW after 43%. If HCWs acquire hand contamination with AMRB during contact with a colonized patient, they may transmit these AMRB to their next patient contact if HH is not performed between contacts. Importantly, also subsequent patient contacts are at risk if HH isn't performed multiple times; this is neglected in multiple modeling studies. For nurses we consider (1) no cohorting (mass-action assumption); (2) first-order cohorting (each patient has a preferred nurse and, if unavailable, other nurses are equally likely to provide care); and (3) second-order cohorting (first-order cohorting incorporating also cohorting when first assigned nurses are not available) and we allow for cohorting of known colonized patients.

Results: We show that for most AMRB HH is more than 50% more effective than previous modeling studies implied. Still, even imperfect first-order cohorting can be as effective as a 50% increase in HH compliance. Second-order cohorting can further augment effectiveness, but the effect is rather small. The ultimate limiting factor are uncohorting physicians. Cohorting of known colonized patients or targeted HH improvement of 20% between patient contacts in different cohorts can reduce acquisitions with 31% and 28%.

Conclusions: We have developed a flexible, numerically fast, modeling framework. Our results stress the importance of HH compliance even more than previous studies. Given the well-known inverse relationship between workload of HCWs and HH compliance, our findings support more attention for staffing levels and cohorting structures as a measure to interrupt nosocomial transmission of pathogens.

