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A genetic history of meningococcal disease in Western Australia

Neisseria meningitidis causes transmissible sepsis and meningitis. Whole genome sequencing (WGS) has identified approximately 11 genetic lineages or clonal complexes of invasive meningococci and numerous separate lineages of non-pathogenic meningococci. Each clonal complex is predominated by a serogroup, A, B, C, Y, W and X, although serogroup switching can occur. In recent years, serogroup switching in clonal complex 11 (cc11) from C to W has resulted in strains causing widespread outbreaks around the world. Preventative vaccines are available for A, C, Y, and W serogroups. A serogroup B vaccine, Bexsero®, was developed based on four antigens: Factor H binding protein (fHbp), Neisserial Heparin Binding Antigen (NHBA), *Neisseria* adhesin A (NadA) and porin A (PorA). WGS has been used successfully to approximate the vaccine coverage of Bexsero® in various jurisdictions which ranges from 66-91%. WGS was used to examine the history of meningococcal disease in Western Australia since 2000 and the potential for Bexsero® vaccine introduction. From 2000-2006, this region had a serogroup B outbreak caused by cc41/44, which has since declined without intervention to national levels. Until 2015, fluctuations in the presence and prevalence of clonal complexes led to an average Bexsero® coverage of 61% (annual range: 33-78%). However, in 2016, 75% of all disease cases in Western Australia were caused by serogroup W cc11 involving two outbreaks necessitating community vaccinations with the quadrivalent A/C/Y/W vaccine. Surveillance using WGS has identified outbreaks of cc11 caused by similar strains in local regions suggesting that there are smaller regional circulation patterns of disease in local communities.

Biography

Charlene Kahler has completed her PhD studies from the University of Queensland and Post-doctoral studies from Emory University and Monash University. She is currently the Deputy Director of the Marshall Center of Infectious Disease at the University of Western Australia. She is an expert in meningococcal and gonococcal diseases, and has published over 40 research papers in these fields.

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