

## The Mobile Phone Microbiome - The True Extent of Contamination

R.Simmonds and E Hayhurst. The University of South Wales, Glyntaff, Rhonda Cynon Taff, UK.

**Introduction** The undisputed versatility of smart phones make them integral to modern day society. Within healthcare, they have enhanced communication, assisted with diagnostics and provided limitless access to resources at point of contact. Despite the benefits, there are concerns regarding their contamination with bacteria associated with hospital-acquired infections (HAI's) and the prospective infection control risk. Bacteria under antimicrobial selective pressure can rapidly acquire resistant mechanisms, leading to the assumption; mobile phones used within clinical environments may harbor a diverse range of bacteria associated with a higher infection mortality rate.

**Aim** Using next generation sequencing technology, this study characterised the true extent of bacterial contamination on mobile phones of hospital staff and establish the presence of multi-drug resistant bacteria associated with hospital acquired infections.

**Method** Swabs were taken from participant's mobile phones, and the DNA extracted. 16S rRNA primers were used to characterise and compare the microbiome on devices from the hospital staff and a control group. Cultured *Staphylococcus aureus* and *Enterococcus faecalis* underwent Kirby Baur disc diffusion to determine the presence of Methicillin resistant *Staphylococcus aureus* (MRSA), Vancomycin resistant *Staphylococcus aureus* (VRSA) and Vancomycin resistant *Enterococcus*.

**Results** The extent of contamination far exceeds anything previously reported. In particular, gram-negative bacteria (including several important potential pathogens) were grossly under detected using traditional methods. In total, 546 bacteria genus were discovered on mobile phones of which 34 were unique to within the hospital group. Those used within clinical environments displayed greater species richness and significantly higher numbers of *Bacillus* species. Differences were also detected between hospital departments. MRSA, VRSA and VRE were only detected within the hospital group.

**Discussion** Our results indicate previously used traditional culture-dependent swabbing methods do not provide an accurate picture of mobile phone contamination. This may also be true in other areas relevant to infection control. Mobile phones within clinical environments could be exposing immunocompromised patients to unknown levels of multi drug resistant bacteria. Decontamination of these devices would complement existing infection prevention and control bundles to help mitigate the transmission of such bacteria between patients and back out to the environment.