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INVESTIGATING CULTURABLE GRAM POSITIVE COCCI FROM THE SURFACE OF MOBILE PHONES WITH DIFFERENT FORM FACTORS

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ABSTRACT A total of 99 mobiles phones were grouped according to their form factor that is flip phone and candy bar designs, and their contact surfaces were swabbed and cultured onto both R2A and SPCA media. We usually obtained bacterial abundance between 0 – 50 cfu cm^{-2}, even though densities up to 490 cfu cm^{-2} on R2A and 212 cfu cm^{-2} on SPCA were also recorded. Our study showed that candy bar phones harbored more bacteria, and served as a more important bacterial reservoir as compared to flip phones. Our results also suggested the importance of using mobile phone covers to reduce bacterial abundance. We also found that the Gram positive cocci isolated were similar to the normal flora present on human skin. In this study, more bacterial colonies were consistently found on R2A. R2A was a more suitable isolation medium and performed better for surface microbes.

ABSTRAK Sejumlah 99 telefon bimbit telefon telah dikumpulkan mengikut faktor reka bentuk iaitu telefon 'flip' dan kandi bar, dan permukaan sentuhan mereka telah dikesat dan dikultur di atas kedua-dua media R2A dan SPCA. Pada kebiasaannya, kepadatan bakteria diperolehi di antara 0 – 50 cfu cm^{-2}, walaupun kepadatan bakteria sehingga 490 cfu cm^{-2} pada R2A dan 212 cfu cm^{-2} pada SPCA juga dicatat. Kajian kami menunjukkan bahawa telefon kandi bar mempunyai lebih bakteria, dan berpotensi sebagai takungan bakteria yang lebih penting berbanding telefon flip. Keputusan kami juga mencadangkan kepentingan menggunakan penutup telefon mudah alih untuk mengurangkan kepadatan bakteria. Kami juga mendapati bahawa Gram positif cocci yang dipencilkan adalah serupa dengan flora normal yang ada pada kulit manusia. Dalam kajian ini, secara konsisten lebih koloni bakteria telah dikultur pada R2A. R2A adalah medium pengasingan yang lebih sesuai dan berprestasi lebih baik untuk mikrob pada habitat permukaan.

(**Keywords**: surface bacteria, mobile phones, different form factors, *Staphylococcus aureus*)

INTRODUCTION

Environmental surfaces such as keyboards, phones, elevator buttons and desks serve as reservoirs for pathogens [1], and can be a potential source for cross transmission and community-acquired infection especially in hospitals [2]. Hospital-acquired or nosocomial infection is a growing problem and for example, the total number of healthcare-associated infections in the United States was more than 1.7 million for 2002 or 4.5 per 100 admissions [3] where the direct medical costs of these healthcare-associated infections range from USD28.4 to 33.8 billion [4].

The usage of mobile phones among medical personnel in hospitals is suggested to have contributed towards the increase in healthcare-associated infections because mobile phones may serve as bacterial reservoir and thus become a vehicle for the spread of nosocomial pathogen [5]. Nosocomial pathogens reported include *Staphylococcus aureus*, Streptococcus sp., *Bacillus cereus*, *Acinetobacter* sp., coagulase negative *Staphylococcus* sp., *Enterococcus* sp., *Pseudomonas aeruginosa*, *Legionella* sp. and members of the *Enterobacteriaceae* family such as *Escherichia coli*, *Proteus mirabilis*, *Salmonella* sp., *Serratia marcescens* and *Klebsiella pneumonia* [6, 7]. However the spectrum of nosocomial pathogen has changed from Gram negative bacilli to Gram positive cocci [8], and at present Methicillin-resistant *S. aureus* (MRSA) has become the most common bacterial nosocomial pathogen [9].

In this study, we studied enumerated the culturable bacteria from mobile phones of different form factors i.e. flip phones and candy bar phones, and characterized the Gram positive cocci to their genera. We found that most