Subject Category: Environmental Hygiene
Abstract Number: SG-APUSIC1094
Impact of environmental pollution on skin antimicrobial peptide genes expression revealed by transcriptome profiling
Xuelan Gu, Unilever, China; Xiao Cui, Unilever Research and Development Center, Shanghai, China; Hong Zhang, Unilever Research and Development Center, Shanghai, China; Grace Mi, Unilever Research and Development Center, Shanghai, China

Objectives: Pollution exposure is associated with several dermatological conditions including acne, atopic dermatitis, and psoriasis. Antimicrobial peptides (AMPs) are key effectors of innate defense, and some AMPs are involved in inflammatory skin conditions. In this study, we aimed to characterize expression changes of human AMPs under different in-vitro pollution exposures.

Methods: RNA-seq profiling was conducted on normal human primary epidermal keratinocytes (NHEK) treated with either a vehicle control, or benzo[a]pyrene (BaP) and on pigmented living skin equivalent models (pLSLE) treated with either a vehicle control, o-zone, or vehicle exhaust. Differential expressed genes (DEGs) were identified with R scripts. DEGs of PM2.5 were obtained from the literature and the GEO database. Also, 180 human AMP genes were obtained from a UDAMP database. UpSetPlot was used to plot DEGs overlaps. MetaVolcano was used to identify frequently changed AMPs.

Results: We used in-house and published transcriptome profiles to identify AMP genes that displayed altered expression under in-vitro pollution exposure. Of the 180 AMP genes under investigation, 37 showed significant changes in expression in at least 1 of the 5 experiments. Using MetaVolcano, 13 AMP genes were identified to be frequently and consistently changed. Several AMPs associated with inflammation and skin diseases were frequently upregulated, including S100A8, S100A9, LCN2, HBD3, RNASE7, and CXCL1. Only 3 frequently downregulated AMP genes were identified, including CXCL14, which is reported to be a non-inflammatory AMP that is highly expressed in healthy skin and is downregulated in skin diseases.

Conclusions: The data sets suggest that expression of both proinflammatory and homeostatic AMPs can be perturbed by pollution. These findings provide new clues to explain how pollution affects skin innate defense, host–microbe interactions and contributes to abnormal skin conditions. Normalizing aberrant AMP expression may be a potential approach to treat pollution associated skin disorders in the future.

Antimicrobial Stewardship & Healthcare Epidemiology 2023;3(Suppl. S1):s13–s14
doi 10.1017/ash.2023.41

Subject Category: Hand Hygiene
Abstract Number: SG-APUSIC1107
Effectiveness of interventions increasing surgical hand hygiene compliance at Hung Vuong Hospital
Anh Dinh, Obstetrics & Gynecology, Hung Vuong Hospital, Ho Chi Minh, Vietnam; Nga My Nhung, Hung Vuong Hospital, Ho Chi Minh, Vietnam; Tran Thi My Hanh, Hung Vuong Hospital, Ho Chi Minh, Vietnam; Ngo Thi Thanh Tham, Hung Vuong Hospital, Ho Chi Minh, Vietnam; Bui Thi Thu Yen, Hung Vuong Hospital, Ho Chi Minh, Vietnam

Objectives: Surgical handwashing is one of the most important measures to prevent surgical site infection (SSI). We evaluated the effectiveness of the intervention program on surgical handwashing compliance of healthcare workers (HCWs) at Hung Vuong Hospital. Methods: This research was conducted from July 2019 to November 2019 in 3 phases. In the first phase, we determined the surgical handwashing compliance rate before the intervention. In the second phase, we implemented an intervention bundle as follows. We provided reminders of compliance in the form of video screen and automatic timers at surgical handwashing sinks. We provided links and QR codes for online access and live streaming of instructional videos on implementation of the hospital’s surgical hand sanitation procedures in the surgical handwashing area. We conducted direct monitoring of reminder and guide HCWs to follow the procedures in combination with camera surveillance to accurately reflect compliance. Finally, we provided feedback in multiple steps: feedback to individual, feedback to head of department or department heads, cited names in briefings and sent names to the general planning department to suspend surgery privileges. In the third phase, we re-evaluated the surgical handwashing compliance rate after the intervention. Results: The total number of surgical handwashing checklists observed before and after the intervention was 787. The surgical handwashing compliance rate improved significantly from 48.8% to 71.8% (PR, 2.7; 95% CI, 1.98–3.57; P < .01). The compliance rate in camera monitoring also increased from 22.1% to 57.9% (PR, 4.8; KTC 95%, 3.14–7.47; P < .01). The compliance rates of both surgeons and scrub nurses improved significantly after the intervention (P < .01). Conducting the new surgical handwashing procedure increased from 90.2% to 99.5% after this intervention.

Conclusions: This intervention program improved surgical handwashing compliance of HCWs.
Antimicrobial Stewardship & Healthcare Epidemiology 2023;3(Suppl. S1):s13–s14
doi 10.1017/ash.2023.43

Subject Category: Hand Hygiene
Abstract Number: SG-APUSIC1122
Observational study of handwashing sink activities in the inpatient setting
Xiaowei Huan, National Centre for Infectious Diseases, Singapore; Sharifah Farhanah, Infectious Disease Research and Training Office, National Centre for Infectious Diseases, Singapore; Kyaw Zaw Linn, National Public Health & Epidemiology Unit, National Centre for Infectious Diseases, Singapore; Clara Chong Hui Ong, Infectious Disease Research and Training Office, National Centre for Infectious Diseases, Singapore; Liang Hui Loo, Infectious Disease Research and Training Office, National Centre for Infectious Diseases, Singapore; Allie Yin Lim, National Public Health & Epidemiology Unit, National Centre for Infectious Diseases, Singapore; Nur Hafizah Binte Hamad, National Public Health & Epidemiology Unit, National Centre for Infectious Diseases, Singapore; Chu Ying Poon, National Public Health & Epidemiology Unit, National Centre for Infectious Diseases, Singapore; Brenda Sze Peng Ang, Infectious Diseases, Tan Tock Seng Hospital, Singapore; Marimuthu Kalisvar, Infectious Diseases, Tan Tock Seng Hospital, Singapore

Objectives: The use of handwashing sinks for activities other than hand hygiene (HH) is associated with higher rates of β-lactamase–producing
Hand hygiene challenges among the ancillary team during the COVID-19 pandemic

Qinnan Liu, Singapore General Hospital, Singapore; Kamini Devi D/O Magesperan, Singapore General Hospital, Singapore; Ismail Bin Sazali, Singapore General Hospital, Singapore; Tan Kwee Yuen, Singapore General Hospital, Singapore; Shaiful Bahri Maroni, Singapore General Hospital, Singapore; King Richard Jay Ganotisi, Singapore General Hospital, Singapore; Quek Bak Siang, Singapore General Hospital, Singapore; Ling Moy Lin, Singapore General Hospital, Singapore

Objectives: Ancillary staff members perform operational support functions and play an active role in enhancing the patient care experience. Infection prevention practices among ancillary staff play a critical role in preventing transmission of microorganisms, which ensures the safety of patients. Low hand hygiene compliance was found among porters in a cross-institutional hand hygiene audit in 2021. A quality improvement intervention toward reducing the transmission of present and future variants of SARS-CoV-2 and to diminish the chances of becoming infected. It is well established in the scientific literature that surfactants and alcohols are capable of inactivating enveloped viruses such as SARS-CoV-2. However, given the novel nature of the virus, Unilever adopted an evidence-based approach to demonstrate virucidal efficacy of marketed bar soaps, liquid handwashes, and alcohol-based hand sanitizers against the original and selected variants of SARS-CoV-2.

Methods: High titers of clinically isolated and laboratory-propagated SARS-CoV-2 strains were subjected to a range of selected proprietary formulations from Unilever at end-user–relevant dilutions, temperature, and contact duration, and were tested according to the internationally recognized ASTM E-1052 test protocol. Results: All tested personal-care formulations were effective against the parental SARS-CoV-2 strain as well as the β (beta) and δ (delta) variants of concern. More specifically, bar soaps with a varying concentration of total fatty matter content and liquid handwashes with varying levels of total surfactants reduced the viral titer by >99.9% within 20 seconds. Alcohol-based hand sanitizers demonstrated >99.9% reduction of input viral load within 15 seconds of contact with the viral inoculum. Conclusions: In conclusion, we have provided empirical proof that well-designed personal-care formulations that act through generic physicochemical mechanism against the basic structure of the virus particle have high virucidal efficacy against the original and evolved SARS-CoV-2 variants. Furthermore, we argue that due to the broad-spectrum mode of action of these tested formulations, the continued practice of good hand hygiene practices with everyday products holds significant promise as an easily accessible, economic, and effective nontherapeutic public health intervention toward reducing the transmission of present and future variants of SARS-CoV-2 across communities and populations.

Subject Category: Hand Hygiene
Abstract Number: SG-APSIC1050
Personal care formulations prove effective against evolving variants of SARS-CoV-2: Implications for public health and hygiene
Sayandip Mukherjee, Unilever Industries Private Limited, Mumbai, India; Carol K Vincent, Unilever Research & Development, Trumbull, Connecticut, United States; Harshinie W Jayasekera, Unilever Sri Lanka, Colombo, Sri Lanka; Ashish S Yekhe, Hindustan Unilever Limited, Mumbai, India

Objectives: Early in the COVID-19 pandemic, global health authorities identified and emphasized the importance of practicing proper hand hygiene to reduce the transmission of SARS-CoV-2 and to diminish the chances of becoming infected. It is well established in the scientific literature that surfactants and alcohols are capable of inactivating enveloped viruses such as SARS-CoV-2. However, given the novel nature of the virus, Unilever adopted an evidence-based approach to demonstrate virucidal efficacy of marketed bar soaps, liquid handwashes, and alcohol-based hand sanitizers against the original and selected variants of SARS-CoV-2.

Methods: High titers of clinically isolated and laboratory-propagated SARS-CoV-2 strains were subjected to a range of selected proprietary formulations from Unilever at end-user–relevant dilutions, temperature, and contact duration, and were tested according to the internationally recognized ASTM E-1052 test protocol. Results: All tested personal-care formulations were effective against the parental SARS-CoV-2 strain as well as the β (beta) and δ (delta) variants of concern. More specifically, bar soaps with a varying concentration of total fatty matter content and liquid handwashes with varying levels of total surfactants reduced the viral titer by >99.9% within 20 seconds. Alcohol-based hand sanitizers demonstrated >99.9% reduction of input viral load within 15 seconds of contact with the viral inoculum. Conclusions: In conclusion, we have provided empirical proof that well-designed personal-care formulations that act through generic physicochemical mechanism against the basic structure of the virus particle have high virucidal efficacy against the original and evolved SARS-CoV-2 variants. Furthermore, we argue that due to the broad-spectrum mode of action of these tested formulations, the continued practice of good hand hygiene practices with everyday products holds significant promise as an easily accessible, economic, and effective nontherapeutic public health intervention toward reducing the transmission of present and future variants of SARS-CoV-2 across communities and populations.