

compliance to preutilization cleaning of computers. **Methods:** We conducted a pilot study to determine the median relative light unit (RLU) value reflective of preutilization cleaning of the computers. We identified values of <250, 250–500, and >500 RLU to reflect cleaned, probably cleaned, and not cleaned computers, respectively. Subsequently, we conducted a cross-sectional study of the computers in the inpatient wards in Tan Tock Seng Hospital and National Centre for Infectious Diseases. Using 3M Clean-Trace ATP swabs, we tested 5 computers in each ward: 2 computers on wheels, 2 from the nursing station, and 1 at the patients' room entrance. All analyses were conducted using STATA version 15 software. **Results:** Between October 4 and 10, 2021, we collected 219 samples from 219 computers. Among them, 44 (20.1%) were cleaned, 49 (22.4%) were probably cleaned, and 126 (57.5%) computers were not cleaned. Higher compliance to computer cleaning was observed in COVID-19 wards [85 ATP samples; cleaned, 37 (43.5%); probably cleaned, 26 (30.6%); not cleaned, 22 (25.9%)] compared with non-COVID-19 wards [134 ATP samples; cleaned, 7 (5.2%); probably cleaned, 23 (17.2%); not cleaned, 104 (77.6%)] ($P < .01$). No significant difference was observed in compliance with cleaning computers between the ICU [30 ATP samples; cleaned, 7 (23.3%); probably cleaned, 4 (13.3%); not cleaned, 19 (63.3%)] and general wards [189 ATP samples; cleaned, 37 (19.6%); probably cleaned, 45 (23.8%); not cleaned, 107 (56.6%)] ($P = .47$). **Conclusions:** ATP swab tests can be used as a surrogate marker to assess compliance to pre-utilization cleaning of computers. Enhanced awareness of environmental hygiene may explain the higher compliance to computer cleaning observed in COVID-19 wards.

Antimicrobial Stewardship & Healthcare Epidemiology 2023;3(Suppl. S1):s12–s13
doi:10.1017/ash.2023.38

Subject Category: Environmental Hygiene

Abstract Number: SG-APSIC1085

Microbiological analysis concerning antimicrobial effect of atomized ionless hypochlorous acid water in a hospital environment

Miho Miura, Kurume University Hospital, Kurume, Japan; Hideki Katayama, Kurume University Hospital, Kurume, Japan; Atsushi Miyake, Kurume University Hospital, Kurume, Japan; Toru Sakamoto, Kurume University Hospital, Kurume, Japan; Tetsuya Naitou, Kurume University Hospital, Kurume, Japan; Yoshiro Sakai, Kurume University Hospital, Kurume, Japan; Chiyoko Tanamachi, Kurume University Hospital, Kurume, Japan; Kenji Goto, Kurume University Hospital, Kurume, Japan; Hiroshi Watanabe, Kurume University Hospital, Kurume, Japan

Objectives: We evaluated the disinfecting efficacy of atomized ionless hypochlorous acid water (CLFine) against pathogenic microorganisms in an isolation room. **Methods:** The study was conducted in an isolation room of Kurume University Hospital. CLFine with available chlorine concentrations of 40 ppm and 300 ppm as test substances and purified water as control were atomized with an ultrasonic atomizer (CLmistL). The 40 ppm and 300 ppm of CLFine were atomized at the atmospheric available chlorine concentrations of ~0.03 ppm and 0.1~0.2 ppm, respectively, and purified water was atomized in the same manner as CLFine. Petri dishes with *Staphylococcus aureus*, *Bacillus cereus* spores, *Bacillus subtilis* spores and *Aspergillus ruber* were allocated in the room, then CLFine or purified water was atomized. Sampling was performed at 3 and 5 hours after the start of atomization, and the bacterial counts were measured. The study was carried out either with air conditioning turned “on” or “off” because atmospherically available chlorine concentration is affected by ventilation. **Results:** When the air conditioning was turned on, purified water showed a slight reduction of bacterial counts by 0.9 log or less at 5 hours after the atomization. When CLFine was used, 40 ppm greatly reduced the counts of *Staphylococcus aureus* by 5.1~5.4 logs reduction at 5 hours after the atomization, but no distinctive efficacy was observed against other microorganisms. On the other hand, 300 ppm caused a significant reduction of the bacterial counts for all the microorganisms at 5 hours after the atomization ($P < .001$ vs purified water). The same results were observed in the environment with the air conditioning turned off. **Conclusions:** Our data suggest that CLFine effectively disinfects pathogenic microorganisms and

can contribute to maintaining the hygienic environment of hospital rooms. This study was funded as contracted research by NIPRO Corporation with the approval of the ethics committee (study no. 21229).

Antimicrobial Stewardship & Healthcare Epidemiology 2023;3(Suppl. S1):s13
doi:10.1017/ash.2023.39

Subject Category: Environmental Hygiene

Abstract Number: SG-APSIC1023

Contamination of the geriatric medicine outpatient rehabilitation gym environment and the effectiveness of our current disinfection methods with patient hand hygiene practices

Sabrina Toh, Khoo Teck Puat Hospital, Singapore; Foo Meow Ling, Singapore, Khoo Teck Puat Hospital, Singapore; Li Dun Li, Singapore, Khoo Teck Puat Hospital, Singapore; Calvin Loh, Khoo Teck Puat Hospital, Singapore; Toylyn Lee, Khoo Teck Puat Hospital, Singapore; Angeline Seah, Khoo Teck Puat Hospital, Singapore

Objectives: To quantify the microorganism burden of rehabilitation gym equipment surfaces as well as to assess the effectiveness of patient's practice of hand hygiene and our current disinfection methods to reduce burden and transmission of microorganisms during rehabilitation sessions.

Methods: A prospective study of environmental contamination using microbiology culture in Khoo Teck Puat Hospital Geriatric Medicine Outpatient Rehabilitation Gym. **Results:** For both the control and intervention group, the total aerobic bacterial count on the gym equipment after patient use is significant and increase up to 360 CFU per swab. In the control and intervention groups, the total aerobic bacterial counts on the gym equipment before patients' use were negligible (<10 CFU per swab). The total aerobic bacterial count of the equipment remained negligible (<10 CFU per swab) after patient use and immediate disinfection. We detected discrepancies between the results of the total aerobic bacterial count after patient use between the control and intervention groups. **Conclusions:** Outpatient rehabilitation gyms are potential reservoirs of microorganisms, which may further contribute to the transmission of healthcare-associated pathogens. In this study, an intervention in which cleaning equipment was wiped with alcohol wipes was effective in reducing microorganism transmission in the rehabilitation gym environment and should be considered as part of our infection control strategy. The additional step of involving our patients in using hand rub before the start of their therapy sessions can provide additional benefit in reducing microorganism transmission only if patients adhere to the World Health Organization (WHO) recommended 7 steps of proper hand rub. Good patient education on hand hygiene is equally as important as that for healthcare professionals to control environmental contamination.

Antimicrobial Stewardship & Healthcare Epidemiology 2023;3(Suppl. S1):s13
doi:10.1017/ash.2023.40

Subject Category: Environmental Hygiene

Abstract Number: SG-APSIC1087

Transcriptome meta-analysis revealed concordant molecular signatures between acne skin and PM2.5-treated in vitro skin models

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: Cohort and epidemiology studies have previously revealed potential associations between air pollution exposure and acne vulgaris. However, the molecular mechanisms that drive these associations are not currently well understood. In this study, we compared the molecular signatures of acne and PM2.5-exposed skin to infer whether common underlying biological mechanisms exist. **Methods:** Acne microarray data sets were downloaded from GEO. RMAExpress was used for microarray normalization, and TMeV was used to identify differential expressed genes (DEGs). A random-effects model in MetaVolcanoR was used to determine fold changes and P values. DEGs of PM2.5-exposed skin-cell models were obtained from the literature. DEGs were compared using GeneOverlap and

a custom R script. Analyses of pathways, upstream regulators, and causal networks were conducted using ingenuity pathway analysis (IPA). **Results:** The molecular signatures of acne skin and the effect of PM2.5 on skin in vitro were compared at 3 levels: (1) gene expression, (2) pathway activity, and (3) upstream regulators. Significant concordant overlaps of both upregulated ($P < 3e-23$) and downregulated DEGs ($P < .005$) were observed in acne skin and PM2.5-exposed keratinocytes. However, for the PM2.5-exposed 3D skin model, significant overlap with acne skin was only observed for upregulated DEGs ($P < 8e-14$). Fold changes of DEGs in both acne and PM2.5-exposed data sets showed significant correlation (Pearson correlation coefficient > 0.6 ; $P < .001$). An IPA analysis identified 13 pathways commonly enriched in acne and PM2.5 data sets, including IL17, IL6, Toll receptor PPAR, LXR-RXR, and acute-phase response pathways. Common upstream regulators were further identified including TNF α , NF κ B, CAMP, AhR, and IL17A. Finally, causal network analysis revealed several potential hub regulators shared in acne pathogenesis and PM2.5-exposed skin, including HIF1 α , TNF, IL1 α , and CCL5. **Conclusions:** Our analysis revealed significant concordant molecular signatures between acne and PM2.5-exposed skin. Biological insights from this study offer clues that build the causal links between air pollution and acne pathogenesis.

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

Subject Category: Environmental Hygiene

Abstract Number: SG-APSC1094

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 (pLSE) treated with either a vehicle control, ozone, 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):s14
doi:10.1017/ash.2023.42

Subject Category: Hand Hygiene

Abstract Number: SG-APSC1107

Effectiveness of interventions increasing surgical hand hygiene compliance at Hung Vuong Hospital

Anh Dinh, Obstetrics and Gynecology, Hung Vuong Hospital, Ho Chi Minh, Vietnam; Ngo 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 Thuy Tien, 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 to remind 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 compliances 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):s14
doi:10.1017/ash.2023.43

Subject Category: Hand Hygiene

Abstract Number: SG-APSC1122

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; Hui Ru Tan, National Public Health & Epidemiology Unit, National Centre for Infectious Diseases, Singapore; Ying Wei Tang, 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