Investigation into the Cleaning Methods of Smartphones and Wearables from Infectious Contamination in a Patient Care Environment (I-SWIPE)

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Study Objective
To determine if ultraviolet-C (UV-C) disinfection devices are more effective at eliminating bacteria on smartphones and wearable devices when compared to usual care.

Introduction
As technology advances, many healthcare workers are using smartphones and wearable devices on a daily basis. These devices do not have a cleaning standard enforced to prevent the spread of bacteria. To date, there have not been any real-world trials which have examined bacterial elimination on devices such as smartphones and wearable technologies in a hospital setting.

Weearable devices such as smartwatches are not recommended. As per the Island Health Infection Prevention and Control Reference Guide, hand and wrist jewelry, rings or watches should be removed when providing patient care.

Cleaning of smartphone and wearable devices with a disinfecting wipe is mandatory. Island Health implements infection control parameters including a strict hand hygiene policy, regular audits in patient care areas for compliance, and tracking of quarterly infection rates for hospital-acquired infections.

Methods
Prospective, before-and-after study involving clinicians at the Royal Jubilee Hospital (RJH), Victoria General Hospital (VGH), and Campbell River General Hospital (CRG).

CleanSlate UV was selected by Island Health, not by project investigators, for use during this project.

Questionnaires: All clinicians were asked to complete a baseline questionnaire to determine smartphone and wearable device use and cleaning habits.

Swabs: Base swab of devices prior to UV-C deployment
- Participants used the UV-C device by placing their smartphones, smartwatches, Vocera® badges, and iPad Touch® devices (with the Vocera® Collaboration Suite installed) in the machine for 30 seconds at beginning and end of each shift

Inclusion and Exclusion Criteria

Inclusion Criteria:
- Clinicians who use smartphones, smartwatches, Vocera® devices and/or Vocera® Collaboration Suite during work within the hospital

Exclusion Criteria:
- Clinicians who use mobile phones other than smartphones
- Clinicians who worked ≤ 16 hours per week

Results

Table 1: Baseline Characteristics

<table>
<thead>
<tr>
<th>Characteristics (Total Number of Participants; n = 153)</th>
<th>Devices Used</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profession: Pharmacist</td>
<td>56 (36.7)</td>
<td>Smartphone</td>
</tr>
<tr>
<td></td>
<td>27 (17.6)</td>
<td>Hospital/</td>
</tr>
<tr>
<td>Nurse</td>
<td>68 (44.4)</td>
<td>Smartwatch</td>
</tr>
<tr>
<td>PT/OT/RA</td>
<td>2 (1.3)</td>
<td>Vocera® Badge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vocera® Collaboration Suite/ iPad Touch®</td>
</tr>
</tbody>
</table>

Figure 2: Baseline Frequency of Device Cleaning

52% of participants wear rings and watches at work despite hand hygiene policy

Discussion

• We assessed the efficacy of usual care by taking baseline swabs prior to implementing the twice daily UV-C disinfection. The percentage of devices with bacterial growth at baseline was similar to pre UV-C
• The amount of bacteria that grew on each device was lower than anticipated.

Conclusion

• The smartphones and wearable devices tested in our study were relatively clean, with only 16% of smartphones and 23% of smartwatches growing bacteria
• UV-C appears to be more effective at eliminating bacteria on smartphones and wearable devices when compared to usual care

Next Steps

• Recommend updating Island Health policies to support wearing of watches and smartwatches during work within the hospital
• Inform a business case for rollout of UV-C devices in all clinical areas within all hospitals across Vancouver Island

References available on request

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