Portable Medical Equipment Disinfection: How Often Does it Occur?

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Introduction

- Portable Medical Equipment (PME), such as computer-on-wheels (COWs) and vitals machine (VM) are routinely used by healthcare workers (HCWs)[1,2].
- Transmission of healthcare-associated infections (HAI's) has been attributed to PME.
- Common monitoring practices are labor intensive and provide snapshot representations rather than consistency of patterns over time[3].
- Automated tracking of disinfection events by Disinfection Tracking System (DTS) makes routine monitoring possible.
- We implemented the DTS devices on PME to understand HCW disinfection practices and patterns as well as to test the DTS as a routine monitoring system.

Aims

1. Evaluate the functionality of the DTS to continuously gather cleaning-event data for two pieces of PME over an extended period.
2. Describe patterns of cleaning events illustrated by data on two inpatient acute care hospital units.

Disinfected
0 Hours ago
Research Only

Figure 1. DTS Device with "Screen on" display

Methods:

- Data was obtained from DTS devices on PME, from 2 acute care units, over a 25-day period.
- DTS devices record disinfection events as moisture events.
- Device recorded events are stored in a DTS database for monitoring.
- DTS devices were placed on 10 computer-on-wheels (COWs) and 5 vital machines (VMs) on both units.
- One unit received DTS devices with "Screen-on" feedback displaying the time since the last disinfection event, and one unit had no display or "Screen-off".
- The number of recorded events is summed over the 25-day period and binned by time of day, to determine the pattern of recorded events over a typical 24-hour period.
- Minute "0" indicates start of each monitoring period in a 24-hour cycle and corresponds to 12 midnight (Graph 1 and 3).
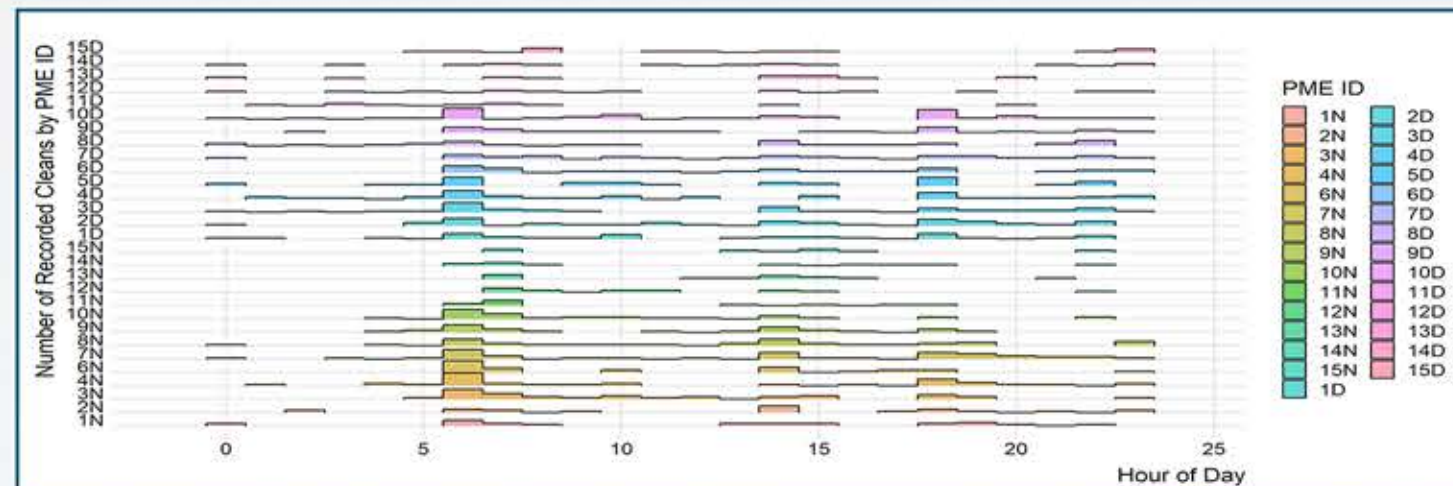- Plots were produced using the 'ggplot2' package in R version 3.5.3.

Figure 2. Plot depicts the number of moisture events divided by hour for each individual PME for the screen-on and screen-off groups. PME ID ending in D are screen-on and those ending in N are screen-off. 1-10 are COWs and 11-15 are VMs.
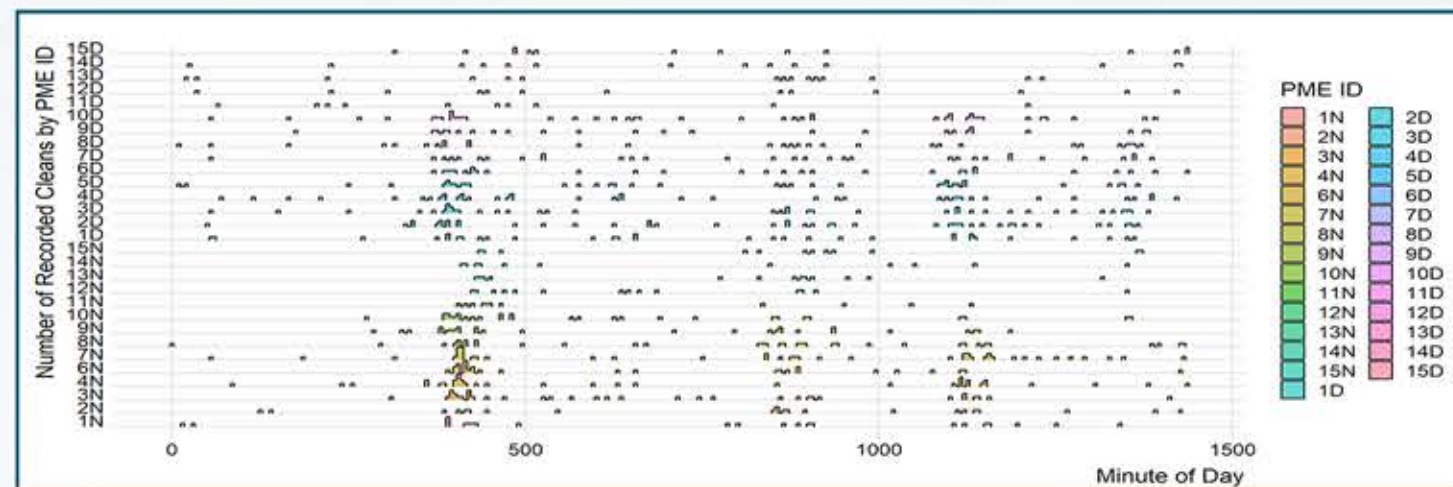

Figure 3. Plot depicts the number of moisture events separated by 5 minute intervals for each individual PME ID. PME ID ending in D are screen-on and those ending in N are screen-off. 1-10 are COWs and 11-15 are VMs.
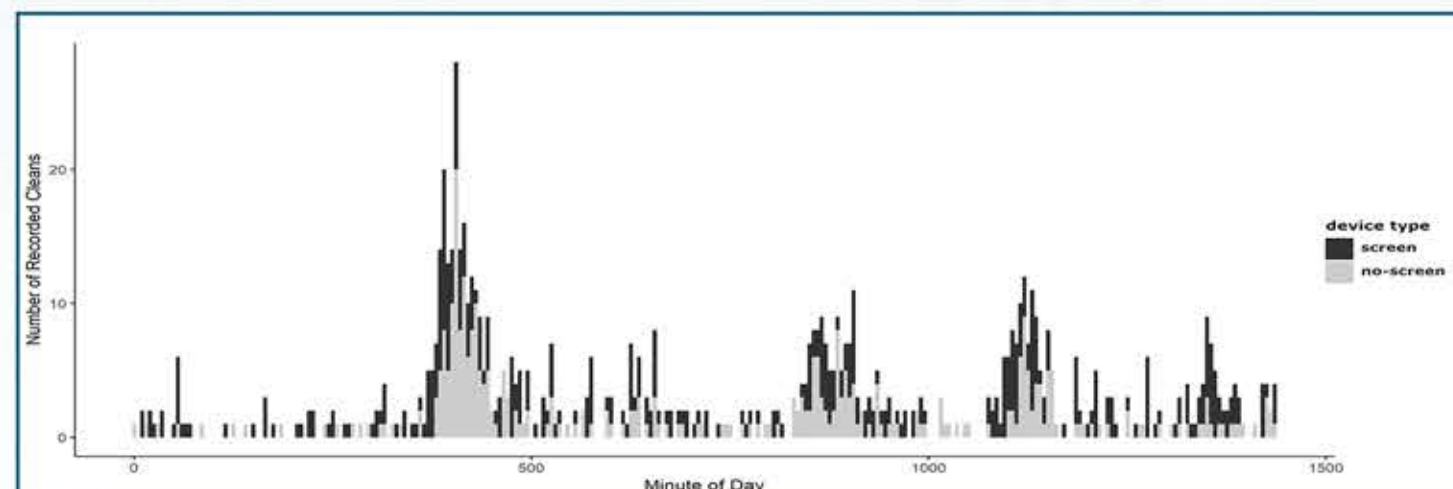

Figure 4. Plot shows the actual number of recorded moisture events (y-axis) by minute of the day (x-axis) binned in 5 min intervals, summed over the entire 4-week period. Each column on the histogram is the sum of the moisture events for that 5 min period of the day for screen-on (black) and screen-off (gray).

Results

- Graphs illustrate cleaning patterns concentrated around shift change.
- During the 25-day implementation period: 421 total moisture events were recorded for "Screen-on" and 345 for "Screen-off"
- Highest number of moisture events occurred between 6 a.m. - 7 a.m.: 69 events for "Screen-on" group and 75 events for "Screen-off" group.
- Between 2 p.m. - 3 p.m.: 37 events recorded for "Screen-on" group and 43 events for "Screen-off" group.
- Between 6 pm-7pm: 52 events recoded for "Screen-on" group and 32 events for "Screen-off" group.

Conclusions

- COWs and VMs are predominantly used by nursing staff.
- The pattern of disinfection events over 24 hours demonstrate that most events repeatedly occurred at certain time points in a day.
- These time points correspond with higher volumes of disinfection happening at shift changes for nursing.
- DTS has the potential to continuously record & report data related to disinfection events on PME in healthcare settings.

Figure 5 - Computer on Wheels with DTS device

Figure 6 & 7 - Vitals Cart Machine with DTS device attached. PME can be a reservoir for pathogens.

References

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