Safely driving a BMW: the impact of electronic medical record implementation upon infection risk at a large hospital

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Introduction:

Implementation of an electronic medical record (EMR) necessitates the use of bedside mobile workstations (BMWs) and other hand-held devices to support clinical care, and represents a significant change in workflow. Mobile devices pose a recognised risk for transmission of infections if appropriate hand hygiene (HH) is not practiced and device decontamination is not adequately performed. We report the impact of EMR implementation on infection prevention (IP) practices and an outbreak of Carbapenemase-Producing Enterobacteriaceae (CPE).

Background:

The BMW is a computer on wheels featuring a 24" monitor, retractable trays for the keyboard and mouse, a lockable drawer, and cordless barcode scanner. Alcohol based hand rub (ABHR) and alcohol wipes are bracketed onto the back of the BMW. As part of the tender process, Infection Prevention (IP) consulted with other hospitals regarding the design and use of computers on wheels as we noted a lack of guidance available in the literature or from professional IP bodies. Approximately 500 BMWs were acquired across our organisation for use with the new EMR.

Clinical staff were trained to use the EMR prior to the 'go live' date in October 2018. However, IP workflows and practices related to BMW use were not prioritised in staff training.

Observational audits after October 2018 demonstrated a number of recurring issues related to:

Design

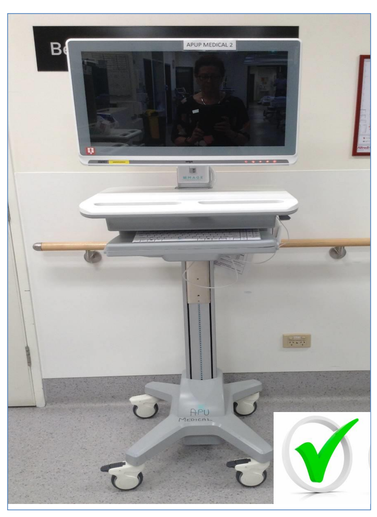
- Staff reported that ABHR and alcohol wipes at the back of the BMW were difficult to reach when needed. Due to the physical design of the cart, the brackets could not be moved to the front or lateral surfaces.
- Mouse function deteriorated over time. This led to staff repurposing worn, non-cleanable fabric mouse pads from office areas for use on BMWs.

Inappropriate use

- The BMWs were consistently observed to be cluttered with medicine cups, paperwork, drinks bottles, coffee cups, and rubbish bags. This hindered the ability of staff to easily clean and disinfect their BMW.
- Staff were keen to use the BMW as a procedural surface, with several departments requesting sharps bins to be mounted onto the BMW. IP did not support this practice due to the risk of contaminating the BMW with blood/body fluids, and the small size of the work surface available.

Workflow changes with implications for standard precautions

- Guidelines for new IP workflows were developed prior to EMR implementation but were found to be unrealistic in practice, leading to multiple revisions.
- New workflows created confusion amongst staff, including HH auditors, about practicing the 5 Moments of HH while using a BMW at the point of care.
- Staff are required to scan the patient's wristband and each box of medication at the bedside. This created challenges for handling, cleaning and storage of medication boxes, particularly in isolation rooms.
- Medical teams were taking their BMWs from ward to ward, rather than using the BMWs provided for visiting medical teams.
- Observational and fluorescent marker audits demonstrated poor compliance with disinfecting BMWs after use at the point of care.



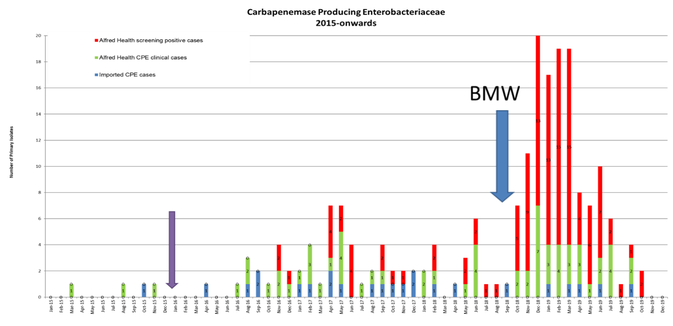
Occupational health and safety risks

- The bulky size of the BMWs led to challenges in their navigation. In one instance, a BMW toppled onto a staff member and the glass monitor shattered. A suitable screen protector was identified after a number of trials and retrofitted to all BMWs.
- When disinfecting the BMW, some staff poured bleach directly onto the batteries, leading to the batteries smoking and created a fire risk.

An outbreak of CPE

Implementation of the BMWs in October 2018 corresponded with an increase in numbers of CPE isolates.

- In the 7 months pre-implementation, a total of 17 cases of CPE identified;
- 9 months post-implementation, a total of 108 cases of CPE were identified.



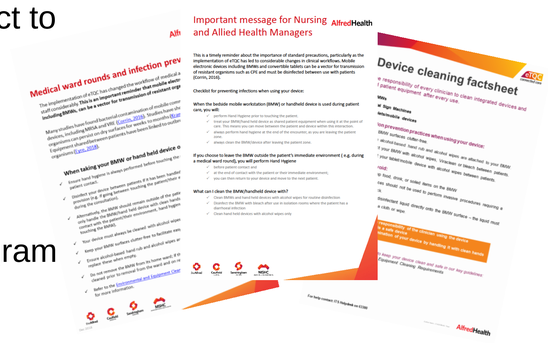
Interventions:

1.0 EFT dedicated for CPE management and coordination:

- Data collection and surveillance
- Screening of patients and the environment, liaison with patients and families
- Communication and education about the CPE outbreak

Within existing resources of the IP team, we dedicated two staff members to a shared patient equipment cleaning project to

- Audit equipment cleaning through visual observations and use of fluorescent markers
- Feedback of audit results to staff
- Roll out of a targeted education program across the organisation



IP updated practice guidelines for HH, aseptic technique (AT), equipment cleaning, Multi Resistant Organisms and medication administration.

We provided education by:

- Hosting an open forum for all staff
- Running sessions for HH and AT auditors to discuss how the new workflows should be applied;
- Providing ongoing CPE, HH and equipment cleaning education sessions
- Providing feedback and support by increasing our presence in clinical areas

Conclusion:

BMWs are a central component of daily workflows with an EMR. However, there is a lack of guidance from governing bodies and within the literature regarding the design and integration of computers on wheels into hospital IP processes. In our organisation, introduction of the BMWs created new workflows and practices that initially compromised adherence to standard precautions and potentially contributed to a significant CPE outbreak. IP need to be involved in both EMR program planning and implementation to provide guidelines, education and support to ensure the design of equipment and workflows will not lead to new or increased risks of infection in the hospital environment.

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1. **What is the aim of your research? (Maximum 1 minute response) Kaye Bellis**
    - We run 10 general HH auditor workshops a year and find it increasingly frustrating to keep saying "on your wards you will be observing this things slightly different"
    - In view that we and many others have already gone paper free we need to include BMWs/COWs as part of our standard education and move away from the end of bed charts
    - This may be an ideal time to review any IP issues like staff wearing lanyards/ID tags and pick up on the bloopers
    - Bare elbow the elbow in clinical areas is another area we should promote as well as Hand health, nails, jewellery etc.
    - How to give feedback is an important component of auditing which we currently do not really include and I think we should, as it is often hard to do.
    - Not so nurse centric
    - Do we consider having two streams one for acute one for non-acute as the scenarios currently are acute focused.
        - Many of our outpatients department are struggling to get their moments
    - New formats not only DVD, currently I have to carry a portable DVD player it often freezes during the session
2. **What methods will be used to meet the aim? (Maximum 1 minute response)**
    - Actually I'm not sure but firstly I want to find out this an issue for any other HH trainers/facilities
    - It must be a united or national approach
    - As always funding is a big issue, having previously approached HHA with no luck and I apologise in advance if the Commission already has this issue in its sights and has plans or maybe they will be able to assist us or have some recommendations but I think it should have end user input
3. **Why is this research important? (Maximum 1 minute response)**
    - One of the main reasons the Australian HH program has been so strong and successful is the structured and standardised training.
    - We want our HH auditors to feel confident in all components of the role and have the most recent and relevant resources available to them, without them we have no program
    - I'm keen to keep this going but with no dollars I'm not sure how we progress this to maintain the strengths of our national program to make it easier to use and more inclusive of all HCWs
    - As HH is core business for all healthcare facilities in Australia we don't want to go back to where the data collected is not robust, we need to ensure consistency ,accuracy and sustainability
4. **Are you looking for any support or involvement from others? (maximum 30 second response)**
    - Yes, are there any other HH coordinators willing to have some input
    - We need to work with the commission
    - My suggestion is to have and off line discussion group to :
        - formulate ideas and updated scenarios
            - e.g. phlebotomist scanning patients IDs
    - Best way forward
    - This is bigger than one hospital alone