Exploring Human Behaviour and Technology in NHS Hand Hygiene Auditing

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Introduction: Auditing was introduced to **monitor, measure and feedback** Hand Hygiene performance - yet even the WHO Gold Standard methodology of **direct observation**[1] is resource consuming, and **may affect observed behaviour**[2].

Technology

Hand Hygiene technologies have been developed and introduced into Healthcare[3,4] (e.g. see Figure 1, 2), but there is a lack of literature to support their adoption as a replacement for the current audit process.

Human Behaviour

Research suggests Hand Hygiene is not a homogenous behaviour[5, 6] but consists of 2 separate drivers; Inherent and Elective:

Inherent: Performed when hands appear or feel dirty, or when danger is sensed

Elective: Performed not automatically, but because of learnt practices of care

Figure 1: Here a Healthcare Professional wears a badge which senses location, reminding the wearer of the need to perform Hand Hygiene by glowing RED, changing colour to GREEN once hands have been cleaned using substance containing alcohol, which is sensed as hands are held up to badge. Instant visual feedback provided to peers and Patients, data is stored for analysis.

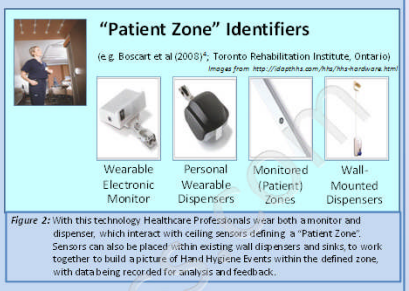

Figure 2: With this technology Healthcare Professionals wear both a monitor and dispenser, which interact with ceiling sensors defining a "Patient Zone". Sensors can also be placed within existing wall dispensers and sinks, to work together to build a picture of Hand Hygiene Events within the defined zone, with data being recorded for analysis and feedback.

This research investigates limitations of current Hand Hygiene technologies, asking whether human behaviour could bridge them.

Methodology: The research is investigating whether technology can support/replace a manual Hand Hygiene auditing process, aiding measurement of Hand Hygiene Compliance at the WHO "5 Moments"[7].

Underpinning the Research Question are 3 studies with their own Objective and Aims (see Figure 3) – all being carried out using a variety of research methods (see Figure 4), within a Case study at an NHS Acute Trust University Hospital.

Study	Methodological Tool Used					
	Literature Review	Participatory Observation	Interview	Focus Group	Online Feedback	Data Analysis
1 – Current State	✓	✓	✓	✓	✓	✓
2 – Potential for Technology?	✓	✓	✓	✓	✓	✓
3 – Inherent Hand Hygiene	✓	✓	X	✓	X	✓

Figure 4: Research Methods being used across the 3 studies within the Case Study

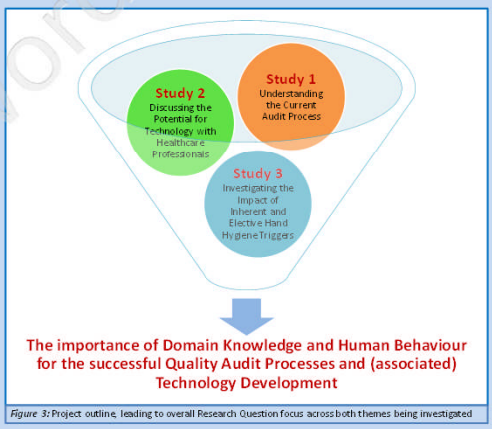

Figure 3: Project outline, leading to overall Research Question focus across both themes being investigated

Two key themes are being investigated:

1. Domain Knowledge: Participatory observation and interviews with the Infection Prevention and Control team (IPCT) are being used to map the Audit process 'Current State'. Interviews with Healthcare Professionals involved in all aspects of the Audit process are being carried out to add context, exploring the potential for technology.

Figure 5: Using a bed pan
Suggested example of Inherent driver, where Hand Hygiene performed due to automatic sense of *need* to decontaminate

Figure 6: Taking a blood pressure
Suggested example of Elective driver, where Hand Hygiene performed due to being *taught* as part of a guideline for care

2. Human Behaviour: A structured series of observations are to be carried out across a variety of ward contexts to monitor Hand Hygiene compliance at activities categorised as either "Inherent" (e.g. see Figure 5) or "Elective" (e.g. see Figure 6).

It is expected that Hand Hygiene compliance rates will remain more constant for Inherent than for Elective activities – as the former should be less vulnerable to contextual interference, due to their automatic element.

Results and Discussion: The Case study research is still on-going, with early findings from Studies 1 and 2 currently being analysed. Study 3 runs from Sept – Oct 2012.

Early Findings

Study 1 – Thematic analysis of the interview transcripts, alongside the data collected from the participatory observations, has revealed key areas of perceived 'weakness' within the current state of Hand Hygiene Auditing. Participants agreed Hand Hygiene is vital, as is ensuring that this behaviour is practiced (i.e. audited). However, a strong understanding of the underlying weakness of using Direct Observation (i.e. Hawthorne Effect) and 'Snap Shot' measurement (i.e. at best, quarterly Audits) was voiced. Key issues raised in relation to process improvement were 'closing the loop' (i.e. addressing Feedback) and clarifying how the tool relates to the training (i.e. ICNA tool vs. WHO 5 Moments).

Study 2 - From a literature review of Hand Hygiene and Technology, 7,870 reports were identified, of which 124 were reviewed in detail. Only 3 were eligible accuracy studies, and no studies showed technology able to accurately detect Hand Hygiene Events at all "5 Moments" –with "2" and "3" proving most problematic to record. When presented to Healthcare Professionals, technology was seen as a potentially positive innovation, however none of the examples shown were deemed suitable as a replacement for the current Audit process or the use of a Human observer – as none could detect all the 5 Moments, nor give 'meaningful' data. However, various aspects of the technologies were seen as 'interesting', and the concept of 'novelty' and 'generating discussion/interest' around Hand Hygiene were seen as strong motivators for the use of technology – not just its main purpose i.e. collecting accurate data.

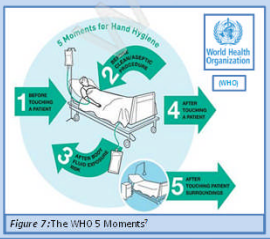

Figure 7: The WHO 5 Moments[7]

Wider Discussion

The broader implication this research is developing is a suggestion that the WHO 5 Moments (see Figure 7) could be split into "Inherent" or "Elective", with the early hypothesis that Moments "2" and "3" be the former, and Moments "1", "4", and "5" the latter. With regard to technology, this suggests that developers could focus on innovations to help improve compliance or aid auditing at Elective moments, where behaviour is more likely to need external cues, as opposed to Inherent moments, where behaviour is more likely to have an automatic element. This differentiation may help increase training efficiency and potentially reduce negative feedback from Doctors regarding "too many" reminders[8]

References:

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8. Early indications from this study, currently being explored further.