THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

Hand hygiene practices at a hospital entrance after the 2009 influenza pandemic: observational study over one year

One of the measures that public health authorities support for the control of pandemic influenza is the promotion of hand washing and respiratory hygiene.[1] There is some evidence for such advice according to a systematic review,[2] which described two studies of hand washing in child care and school settings.[3,4] These studies reported benefits, but both were considered to be at "high risk" of bias in the systematic review.

Another review included eight studies (which were also considered to be of "poor quality"), though the pooled result did indicate benefit i.e. "hand cleansing can cut the risk of respiratory infection by 16% (95%CI: 11–21%)".[5] More recently an intensive hand hygiene campaign in schools was found to reduce laboratory-confirmed influenza (reduced by 50%, $p<0.0001$), along with other infectious diseases in the children.[6]

We have previously reported on the use of a hand sanitiser by the public and hospital staff in a hospital entrance foyer in New Zealand, both during the 2009 influenza pandemic[7] and then four months afterwards.[8] Here we report on the ongoing usage data obtained over four post-2009-pandemic seasons.

Methods—The same method was used as in the previous studies.[7,8] That is, two observers collected data on a standard form on use of the hand sanitiser station in the entrance foyer of the major regional public hospital in New Zealand's capital city (Wellington). The additional data collection occurred in the first month of subsequent seasons on a weekday (Wednesday to Friday, see Table 1).

During this additional data collection period there were no apparent changes to the arrangement of the hand sanitiser station (a table with two dispensers and signage[7]) or its promotion by the hospital authorities. Furthermore, there were no national hygiene promotional campaigns during winter 2010 in New Zealand, although there was some additional media publicity around H1N1 pandemic influenza. Inter-observer variation was not re-assessed as the first study had shown this to be minimal.[7] Ethical approval for this work was obtained through the ethics approval process of the University of Otago.

Results and Discussion—For the four post-pandemic observations, usage of the hand sanitiser remained significantly lower than during the pandemic in August 2009 (Table 1). This finding reinforces the view that the public's hand hygiene behaviour is influenced by perceptions of risk during influenza pandemics (even for the 2009 pandemic with its relatively low case-fatality proportion). Nevertheless, other factors such as declining use with habituation may be relevant, particularly for hospital staff (since the hand sanitiser was first introduced during the height of the 2009 pandemic).

Out of the four post-pandemic seasons, usage was highest in winter 2010. It is possible that this reflects a typical pattern of increased public concern around hygiene each winter. However, it could also partly reflect concern around the second wave of

the H1N1 influenza pandemic. This resurgence resulted in some additional hospitalisations, deaths and media publicity in New Zealand.

It is unclear to us if the routine promotion (outside pandemic periods) of hand sanitiser usage to people entering a hospital is likely to be a cost-effective health sector intervention. Nevertheless, in principle it seems desirable from an infection control perspective and because it may raise public awareness about hygiene in general and of how infections can be spread (both to patients in the hospital from visitors/staff and vice versa). If so, then the current level of usage found in this study (10% for the four post-pandemic seasons) should ideally be raised further. Possibilities for achieving this include: (i) arranging the hand sanitiser station at the entrance/exit of the hospital so that people are funnelled directly past it and there are more prominent visual messages to use it; and (ii) routinely running national-level hygiene campaigns at the start of the winter influenza season (possibly combined with influenza vaccination promotion).

When considering data for the four post-2009-pandemic seasons (Table 2), it appears that usage was significantly higher when entering, as opposed to leaving, the hospital (as we found during the pandemic in August 2009[7]). This is perhaps not surprising as the hand sanitiser positioning and promotional material is clearly targeted only to those entering the hospital. Usage was also significantly higher in the morning, compared to other times of the day (Table 2). These findings collectively would be consistent with greater use of hand sanitiser by staff on their way to work in the hospital in the mornings.

Sanitiser users were also more likely to be female (albeit of borderline significance), and usage was significantly higher among children (though numbers were small). The pattern for children may possibly reflect hygiene education in New Zealand schools since we observed that some of the children went to the sanitiser first and then the adults with them followed them to it.

This follow-up study provides additional evidence that it is feasible to systematically observe hand sanitiser use in a hospital setting. However, the observational nature of the study imposes various limitations as we were not able to accurately determine the age of individuals (or other demographic characteristics such as ethnic affiliation). Also we could not ascertain who were members of the public (probably the majority) or who were staff of the hospital or of the adjoining medical school. The sampling was also limited to a single day in each season and involved only one hospital setting, therefore limiting its generalisability.

A possible priority for future work is to better clarify the effectiveness and cost-effectiveness of hand sanitisers in hospital entrances in reducing infection risk and influencing public/health worker awareness of infection risk. Other work could also explore how different sanitiser positioning and promotional material could be used to enhance uptake in such settings.

Use of other technologies could also improve data collection e.g., automatic counters on sanitiser dispenser devices, counters on entrances/exits and even use of closed-circuit television (although for the latter safeguards would be essential to protect civil liberties). A more in-depth study could interview a sample of sanitiser users and non-

users to obtain demographic and occupational information and explore their knowledge and attitudes towards hand hygiene behaviour.

Table 1. Hand sanitiser usage in the entrance of a regional public hospital during the 2009 influenza pandemic and in the four seasons after the 2009 influenza pandemic in New Zealand

Season / date	Used hand sanitiser (N)	Walked near hand sanitiser station (N)	% Usage (95%CI)	Comment
During the 2009 pandemic – winter (August)	449	2492	18.0 (16.6–19.6)	Data published elsewhere[7]
Summer 2009 (9 December)	61	743	8.2 (6.4–10.4)	Data published elsewhere[8]
Autumn 2010 (5 March)	61	758	8.0 (6.3–10.2)	
Winter 2010 (11 June)	92	632	14.6 (12.0–17.5)	Second wave of H1N1 in NZ (relatively little impact)
Spring 2010 (16 September)	79	749	10.5 (8.5–12.9)	
All 4 post-pandemic observations	293	2882	10.2 (9.1–11.3)	

Table 2. Characteristics of hand sanitiser usage and users in the entrance of a regional public hospital during the four seasons after the 2009 influenza pandemic in New Zealand (see Table 1 for data collection dates)

Characteristics	Used hand sanitiser (N)	Walked near hand sanitiser station (N)	Usage (%)	Risk ratio
All observations	293	2882	10.2	
Direction of movement				
Entering the hospital	160	1405	11.4	1.4 (1.1–1.7)
Leaving the hospital	117	1426	8.2	Reference (1.0)
Unclear "milling around"	16	51	31.4	3.8 (2.5–6.0)
Time of day				
Morning (8.30–9.00 am)	97	757	12.8	1.4 (1.1–1.8)
Midday (12.30–1.00pm)	105	1132	9.3	1.0 (0.8–1.3)
Afternoon (3.50–4.20pm)	91	993	9.2	Reference (1.0)
Sex				
Female	187	1688	11.1	1.2 (1.0–1.6)
Male	106	1194	8.9	Reference (1.0)
Age-group				
Child	11	58	19.0	1.9 (1.1–3.3)
Teenager	2	29	6.9	0.7 (0.2–2.6)
Adult	280	2795	10.0	Reference (1.0)

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Acknowledgements: We thank our co-workers involved in the earlier studies who helped refine the study methods and particularly Crystal Chandler and Yoomi Clarkson who assisted with data collection. This study received no external financial support.

Competing interests: The authors have no competing interests.

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