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# Perceptions of hand hygiene practices in China

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**Summary** Hand hygiene is considered one of the most important infection control measures for preventing healthcare-associated infections. However, compliance rates with recommended hand hygiene practices in hospitals remain low. Previous literature on ways to improve hand hygiene practices has focused on the USA and Europe, whereas studies from developing countries are less common. In this study, we sought to identify common issues and potential strategies for improving hand hygiene practices in hospitals in China. We used a qualitative survey design based on in-depth interviews with 25 key hospital and public health staff in eight hospitals selected by the Chinese Ministry of Health. We found that hospital workers viewed hand hygiene as paramount to effective infection control and had adequate knowledge about proper hand hygiene practices. Despite these positive attitudes and adequate knowledge, critical challenges to improving rates of proper hand hygiene practices were identified. These included lack of needed resources, limited organisational authority of hospital infection control departments, and ineffective use of data monitoring and feedback to motivate improvements. Our study suggests that a pivotal issue for improving hand hygiene practice in China is providing infection control departments adequate attention, priority, and influence within the hospital, with a clear line of authority to senior management. Elevating the place of infection control on the hospital organisational chart and changing the paradigm of surveillance to continuous monitoring and effective data feedback are central to achieving improved hand hygiene practices and quality of care.

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## Introduction

Healthcare-associated infections (HAIs) are a significant cause of morbidity and mortality among

hospitalised patients, affecting more than 1.4 million people worldwide at any time.<sup>1</sup> Although hand hygiene (i.e. hand washing with soap and water or the use of a waterless, alcohol-based hand rub) has long been considered one of the most important infection control measures for preventing HCAs, compliance rates by healthcare workers with recommended hand hygiene procedures generally fall below 50%.<sup>2</sup>

Poor adherence to recommended hand hygiene procedures by healthcare workers has been shown to be related to system constraints as well as to individual, group and community behaviour.<sup>3–5</sup> Experts in quality improvement have suggested that a multidisciplinary strategy is necessary to improve hand hygiene, including improved training, protocols, engineering controls and equipment, and routine observation and feedback.<sup>6,7</sup> Despite the extensive discussion in the literature about potential interventions to improve hand hygiene in the USA and Europe, research from developing countries is less common. Given the limited resources available in many hospital settings in developing countries, improving hand hygiene, while critical to reducing hospital-acquired infection rates, may be particularly challenging.<sup>8</sup> Specific barriers and hence potential strategies to change healthcare workers' behaviour regarding hand hygiene in resource-poor settings remain unclear.

Therefore we undertook the current study to identify common issues and potential strategies for improving hand hygiene practices in hospitals in China as an example of a developing country. Improving hand hygiene practices globally is a priority of the World Health Organization, which recently highlighted the worldwide problem of insufficient hand hygiene practices in hospitals and the need for implementation of guidelines.<sup>1</sup> As a developing country, improving hand hygiene in China may be particularly challenging due to resource constraints. By conducting in-depth interviews of infection control directors and key staff, we sought to describe issues of adherence to current People's Republic of China's hand hygiene guidelines. We also aimed to describe potential ways of improving hand hygiene practices in the hospital from the perspectives of staff who had been involved with improvement efforts in infection control.

## Methods

### Study design and sample

We used a qualitative study design based on in-depth interviews with key hospital and public

health staff. We chose a qualitative study design because it is well-suited to exploratory studies when there is limited previous literature, and to studies seeking to describe in detail causal factors in human behaviour and organisational change that are central to improving hand hygiene in the hospital setting.<sup>9,10</sup>

We conducted in-depth interviews and site visits with a purposeful sample of eight hospitals identified by the Chinese Ministry of Health (MoH) as having extensive experience with improvement efforts aimed at infection control and hand hygiene. The interviewees were identified by directors of infection control as having been involved with improvement efforts. We selected hospitals and staff with experience in improvement efforts as 'information rich' sites and individuals who had adequate experience and personal knowledge of the barriers and challenges to improving hand hygiene practices, as recommended by experts in in-depth interviewing.<sup>9</sup> The hospitals were located in Beijing ( $N=2$ ), Shanghai ( $N=3$ ), and Guangdong ( $N=3$ ). A total of 25 healthcare workers of various disciplines were interviewed, including 17 formal, in-depth interviews and eight less formal discussions with physicians and nurses on patient care units.

### Data collection

As recommended by experts in qualitative research, in-depth interviews were conducted using a standardised discussion guide consisting of open-ended questions and probes to encourage greater detail or clarity.<sup>9,11,12</sup> Examples of questions included: 'How would you characterise hand hygiene practices among the nurses and patient care assistants here at the hospital?'; 'What about among the physicians?'; 'What have you found to be the biggest challenges in improving hand hygiene here at the hospital?'; 'How have you addressed those challenges?'. The interviews were conducted on-site by a single person who was fluent in both Mandarin and English. Interviews lasted between 120 and 180 min and were transcribed, translated, and then typed to facilitate formal analysis by the research team.

### Data analysis

We employed the constant comparative method of qualitative data analysis to summarise key themes that emerged from the interview and site visit data.<sup>13,14</sup> Data from the transcribed interviews were reviewed line-by-line by all members of the research team and coded into key concepts. All

transcripts were coded by two or more researchers, first independently and then jointly, with differences resolved through negotiated consensus. The code structure was developed iteratively and was reviewed three times by the full research team to ensure its breadth and comprehensibility.

## Results

### Hospital staff viewed proper hand hygiene as important for quality and safety

Both hospital and government officials stated that infection control practices were of primary importance to the quality of their hospital care. Furthermore, all participants recognised the fundamental role of hand hygiene in infection prevention. Hospital workers noted that hand hygiene was important for their own safety as well as the patients' well-being. As one hospital president reflected:

Hands are a major link to transmission of antibiotic-resistant microorganisms, which then cause difficulty in clinical treatment, and also waste medication and money. Therefore, infection control management is very important.

Hospital staff also viewed the process of improving hand hygiene as having ancillary benefits, stating that the systems and strategies for improving hand hygiene could have positive 'spillover' effects for other infection control practices. These staff suggested that hand hygiene might bring about greater focus on additional behaviour changes such as use of personal protective equipment and more regular and thorough equipment decontamination practices by healthcare workers.

### Hospital workers were knowledgeable about hand hygiene practices

Participants were generally well-informed about recommended hand hygiene practices, and several officials described that this knowledge had improved substantially since the severe acute respiratory syndrome (SARS) outbreak. As one hospital infection control director commented:

During the SARS outbreak and avian flu prevention period, we had dedicated orientations for educating healthcare workers about hand hygiene. Since SARS, there are many more hand hygiene training sessions, and people's consciousness in this area has increased.

Although there was some variation among healthcare workers in their knowledge and

practices regarding hand hygiene, in general, interviewees suggested that compliance had improved substantially in the previous few years since the SARS outbreak. Some suggested that the knowledge of hand hygiene guidelines was greater among young hospital staff or among the more educated public.

### Resource gaps limited improvements in hand hygiene practices

Whereas healthcare workers both appreciated the importance of hand hygiene and understood the recommended practices, many reported that proper practices often did not occur due to limited equipment to support hand hygiene efforts. Staff remarked on inadequate budgets for the infection control department, which was viewed as a source of cost rather than as a source of revenue generation. Equipment gaps included running water and soap, clean towels, and gloves. The issue of inadequate equipment and resources was highlighted by this hospital infection control director who said:

Even if healthcare workers' sense to do hand hygiene is strong, facilities and equipment need to improve, like having paper towels for instance. No one is willing to use publicly shared towels. They all wipe their hands on their lab coats.

### Lack of organisational authority of infection control departments and personnel in hospitals limited improvements in hand hygiene

A primary issue that healthcare workers reported as hindering improvements in hand hygiene practices was inadequate organisational authority vested in hospital infection control departments. Limited numbers and qualification of hospital infection control staff was also cited as a challenge, but the lack of organisational influence of the departments and their staff were most problematic. Typically, infection control departments were managed by nurses or junior physicians, who were viewed as 'outside' the more powerful spheres of senior physicians and hospital management. Despite the participants' acknowledgement of the importance of having links to senior management, in many hospitals infection control directors did not report organisationally to hospital administration. Like hospital staff interviewed, several government officials also stated that infection control staff needed to have the authority to monitor and then follow up on problems with other staff in order to be effective. Without adequate senior level commitment to these goals, infection control

functions were unlikely to be able to make any substantial improvements in practices. As one city quality control association representative said:

Infection control personnel do not have power to enforce infection control guidelines: no funding, no administrative power, and no financial budgeting power.

In addition to statements about infection control having inadequate access to senior management, participants also highlighted the importance of having physicians, not just nurses, represented in hospital infection control departments. Participants noted the importance of physician-to-physician communication about hand hygiene in order to change behaviour. They indicated that having nurses, who may be informed about infection control, talk with physicians was unsuccessful in influencing changes in physician hand hygiene practices due to the power differentials between physicians and nurses. The physician perspective was described as important for all aspects of infection control: developing hospital policies about hand hygiene, monitoring staff adherence with policies, and providing surveillance data about hand hygiene performance to physicians. For example, one hospital infection control director commented:

Most infection control personnel are nurses. The hierarchical gap between physicians and nurses is important. Physicians would not follow nurses' suggestions, and don't even mention their criticism.

Despite the obvious need for physicians in infection control departments, physician participants stated that they were not eager to work in or with infection control departments due to the lack of respect afforded to infection control clinicians by other physicians and the lower pay in such positions.

An added challenge for infection control departments was their lack of autonomy from other clinical departments in the hospital. Although the MoH guidelines were described as recommending that the infection control departments should be independent from hospital clinical departments, many infection control staff were housed within other clinical departments and hence faced some conflicts of interest in monitoring and reporting non-adherence to hand hygiene guidelines by colleagues. One hospital infection control director made this conflict clear:

We have an independent infection control department now, but soon it will be allocated to another department. It will be difficult to manage surveillance and criticism of this other department because they pay our salary and our bonus.

### **Inadequate quality improvement data for monitoring and feedback**

Although all hospitals had surveillance systems for monitoring hand hygiene, no system was designed to enhance adherence to recommended hand hygiene practices. Several aspects of both the MoH and hospital internal surveillance approaches were problematic. First, surveillance focused on outcomes such as infection rates and bacteria counts, rather than on the process of proper hand hygiene. Some participants noted that data on adherence to recommended hand hygiene processes which were known to improve outcomes (reduced HCAs) would provide concrete targets for improvement. However, participants also said that monitoring of hand hygiene practices was not done routinely in any hospital. The focus was on bacterial counts on sampled hands of workers. Second, data were rarely actionable as they were produced from random checks and reported in unidentified ways months after the measurement. Subsequently, while the data could show trends in infection rates at the hospital, they were too generalised to foster quality improvement efforts on particular patient care units. As a Chinese Center for Disease Control and Prevention (CDC) representative commented:

The surveillance system is primordial. The outcomes are not very sensitive to result-based surveillance of disinfection agents and sample of hands. It is more useful to get results from process-based surveillance, but it is difficult to implement in hospitals.

Participants also said that individual hospitals would be unlikely and perhaps unable to initiate improved data monitoring unless directed by the government, citing that there was limited understanding of quality improvement and data feedback techniques in their hospitals. Participants suggested that a government mandate to do increased surveillance at the hospital level would be the best strategy to change behaviour. As one hospital infection control director noted:

In China, the government's mandate is the most powerful tool. If anything has to be promoted or implemented fast, you must obtain government's administrative order first.

A small minority of participants supported the development of a hospital accreditation system that might include surveillance of infection control practices, although details of how this might dovetail with existing governmental monitoring by MoH or by increased government mandates were not discussed.

## Discussion

Findings from this study suggest that the primary challenges in improving hand hygiene in China are the limited authority of infection control departments in hospitals, the lack of essential resources, and the ineffective use of data monitoring and feedback to hospital staff. These insights are important as previous studies have attributed poor hand hygiene practices to individuals' knowledge and attitudes, and typical strategies to improve hand hygiene involve staff training.<sup>15,16</sup> Based on our study, the reasons for inadequate hand hygiene are more complicated, and strategies to address this behaviour require greater understanding of the organisational culture and systems of accountability that exist in hospitals in China.

A major decision is where the hospital infection control department is on the organisational chart. In our study hospitals, infection control staff often reported within general medicine and not to senior administration. This was problematic for two reasons.

First, access to senior management, who set overall goals for the hospital and who determined the allocation of resources in part, was limited or non-existent. The infection control budget was typically under the departmental level. As department heads were evaluated in part by their financial outcomes, they were less willing to allocate budget to infection control since it did not generate revenue. As a result, infection control was not included in the strategic or financial discussions of priorities in the hospital, and the infection control department director was unable to discuss directly with senior management in order to request resources for the department.

Second, as a result of its reporting to the same department that it was monitoring, often general medicine, some infection control directors had conflicts of interest in performing surveillance on peers within the same department, especially when in some cases they depended on the head of general medicine for their departmental budget. While this could be effective in integrating infection control in a clinical department, given that many infection control staff were nurses, their ability to influence physician behaviour was limited. Based on our findings, having the infection control director report to senior management and allowing the department some independence from medicine might provide the context in which the necessary resources and organisational attention

could be directed at improving hand hygiene practices.

In addition to building greater management support for infection control, more modern methods of hand hygiene surveillance were needed. Data monitoring and feedback is central to quality improvement techniques and has been shown to be effective in a number of clinical areas including hand hygiene.<sup>17–19</sup> Previous studies on hand hygiene adherence have shown that, with respect to processes that staff can control, consistent and timely data feedback provide for greater accountability and improvements in the monitored process.<sup>20–23</sup> However, the participants in this study indicated that surveillance for hand hygiene was focused on bacterial counts on hand samples, which were randomly checked in the hospital. Monitoring of observed hand hygiene practices was not generally conducted, limiting the ability to provide timely data on the action needing improvement. Instruments exist to facilitate a simple process of observation and data feedback to staff on hand hygiene.<sup>24</sup> Using the principles of quality improvement, hospitals could set targets for hand hygiene practices, implement observation-based data monitoring, and provide feedback to staff about performance. Although such monitoring does require resources and attention, it can be far more effective than random checks of hand bacteria. If done in a non-punitive, learning environment, such data feedback can drive substantial and sustained improvements in healthcare worker practices.

These findings should be interpreted in light of the study limitations. This was a qualitative, exploratory study in which we sought to understand in depth the reasons for inadequate hand hygiene practices in China. Interviews and observations were conducted at hospitals that had had previous experience in improvement efforts directed at infection control practices and therefore may not represent the experiences in other hospitals. In addition, although we ensured that the interviewer was fluent in Mandarin and was embedded in the hospitals to reduce misunderstandings and mistrust, participants may have withheld information. Given the types of responses received and the guaranteed anonymity, however, we believe that participants were forthcoming. Furthermore, the sample was relatively small, which is common with qualitative studies.<sup>9</sup> We did achieve theoretical saturation, suggesting that we obtained a comprehensive view of the issues.<sup>9,13</sup> However, a broader sample with more diverse participants may have generated additional themes. Finally,



this was a hypothesis-generated study about the possible causes of inadequate hand hygiene in hospitals. We did nonetheless employ several strategies recommended by experts to enhance the rigor and validity of qualitative studies, including the consistent use of a discussion guide, use of researchers from diverse disciplines to conduct the analysis, and sampling until the point of theoretical saturation.<sup>9–14</sup> Future research should test whether changes in these factors result in significant improvements in hand hygiene practices.

As we strive to improve quality of hospital care, resource-poor settings present particular challenges. China, with all its economic growth, is on the verge of enormous expansion and the quality of hospital care will be a critical factor in supporting a healthy and productive population. Infection control practices are of critical importance to overall quality of care and safety of healthcare workers and their patients, as well as the communities we share. Despite international engagement in improving hand hygiene, all countries struggle to sustain proper hand hygiene practices in healthcare.<sup>1</sup> Our study suggests that the core issues are about the degree to which the infection control department and its staff are given adequate attention, priority and influence within the hospital with a clear line of authority to senior management. Elevating the place of infection control on the hospital organisational chart and changing the paradigm of surveillance to continuous monitoring and effective data feedback are central to achieving improved hand hygiene practices and quality of care.

#### Conflict of interest statement

None declared.

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