SURE Rapid Response

What strategies can health systems in low income settings employ for infection control?

April 2012

This rapid response was prepared by the Uganda country node of the Regional East African Community Health (REACH) Policy Initiative.

Key messages

Strategies include the following:

- Guidelines
- Education
- Organization and systems changes
- Surveillance
- Continued quality improvement
- Others
    - mandatory public reporting mechanisms for health care associated infections
    - use of benchmarking to identify better and less well performing institutions
    - opinion leaders to motivate and change the practice

Organisation and systems adjustments including changes in policy and governance are crucial for the success of other strategies

Who requested this rapid response?

This document was prepared in response to a specific question from a policy maker in Uganda.

! This rapid response includes:

- Key findings from research
- Considerations about the relevance of this research for health system decisions in Uganda

X Not included:

- Recommendations
- Detailed descriptions

What is SURE Rapid Response?

SURE Rapid Responses address the needs of policymakers and managers for research evidence that has been appraised and contextualised in a matter of hours or days, if it is going to be of value to them. The Responses address questions about arrangements for organising, financing and governing health systems, and strategies for implementing changes.

What is SURE?

SURE – Supporting the Use of Research Evidence (SURE) for policy in African health systems - is a collaborative project that builds on and supports the Evidence-Informed Policy Network (EVIPNet) in Africa and the Regional East African Community Health (REACH) Policy Initiative (see back page). SURE is funded by the European Commission's 7th Framework Programme.
www.evipnet.org/sure

Glossary

of terms used in this report:
www.evipnet.org/sure/rr/glossary

Background

How this Response was prepared

After clarifying the question being asked, we searched for systematic reviews, local or national evidence from Uganda, and other relevant research. The methods used by the SURE Rapid Response Service to find, select and assess research evidence are described here:

www.evipnet.org/sure/rr/methods

Providing care by health professionals or in health facilities is expected to decrease infection rates because of use of better or cleaner practices, for instance, the use of sterile gloves and instruments. Indeed this is the case but when one also reviews history, issues like puerperal sepsis are associated with institutional delivery care when professionals performing invasive procedures introduce infective organisms causing infection. Nasocomial infections are very common; a hospital acquired infection survey carried out in Lacor Hospital, Northern Uganda in 2011 showed high rates with one surgical ward reporting a nosocomial infection prevalence of 98.2% (1). From history, when childbirth in hospitals became more common, maternal mortality proportionally increased, much of which was due to spread of infection between women in labor by the attending health professionals (2), and this was occurring despite the knowledge of how infections are spread. Concern by health managers and decision makers of the infection rates and their introduction in health facilities is important as more and more people are encouraged to use health facilities or even health professionals being used in the community in some community based interventions. Although hand washing is the simplest and most cost-effective way of preventing the transmission of infection and thus reducing the incidence of health-care associated infections, compliance with it is frequently sub-optimal among health care workers. Reasons for this include lack of appropriate equipment; low staff to patient ratios; allergies to hand washing products; insufficient knowledge among staff about risks and procedures; the time required, and casual attitudes among staff towards bio-safety (3).

This paper will summarize some of the strategies health systems in developing countries can take to minimize infection control. It is based on a recent (2011) review of the literature on health system infection control measures in developing countries that target mostly reducing maternal mortality but are not very different from what is generally applicable to the system as a whole (4).

Summary of findings

A number of strategies have been well-documented in the literature, having been proven to be effective in the management and reduction of infection control. Although the studies are from different settings the aggregate findings are applicable to low income settings like Uganda.

Guidelines

Several guidelines and procedures on recommended practices for infection control, in different settings have been issued; for example those on hand hygiene, that is, the Guide to

Summary of the strategies identified as effective multifaceted infection control measures

Strategy/Intervention	*Results from studies*	*Comments*
Guidelines	• All hospitals changed policies, procedures and products after guidelines were introduced. • 90% staff were aware of guidelines • No change in hand hygiene compliance	These are usually very specific Failure for them to change may be attributed to a lack of a comprehensive approach involving various levels within the organization, poor administrative support and absent feedback mechanisms
Education	• Strategy increased hand washing compliance from 23% to 65% • Infection rates decreased from 5 to 3 per 100 patient days	Intervention seen to work in both study and non-study settings
Organization and systems change	• Consumption of alcohol hand rub by volume increased from 4 to 15litres per 1000 patient days • Hand hygiene compliance increased from 48% to 66% • Infection rates decreased from 17% to 10%	This is important for the success of other strategies like guidelines. They include among others, changes in policy or governance
Surveillance	• This guarantees a maximum decrease in infection rates by 32% if all components are implemented • Most hospitals in the studies could only achieve reductions in infection rates of 6% • Different combinations of components were optimally effective for different infections	Effective when combined with other measures which it supports. Activities require an infection control nurse working with specially trained physicians or microbiologists with special interests in infection control for supervision.
Continued quality improvement	• Administration of antibiotic prophylaxis increased from 71% to 95% in one hospital and from 36% to 89% in another • There was a downward trend in surgical site infection rate in both hospitals	It provides a means of audit following a set process to create teamwork, identify problems and solutions and create shared goals using data for decision making.

Adapted from Hussein et al, 2011

the Implementation of the Multimodal Hand Hygiene Improvement Strategy by the World health Organization (WHO) and the Guideline for Hand Hygiene in Health Care Settings from the Centres for Disease Control (5), Standards for infection control and injection safety in resource-poor hospitals by WHO-AFRO, and useful approaches for implementing infection control programs in lower level health facilities by *EngenderHealth* and the Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO) (6-8). In addition, Uganda has several procedural and guideline documents in line with infection control. These include the National Infection Control Guidelines (2005) and the Uganda National Guidelines for Tuberculosis Infection Control in Health Care Facilities, Congregate

Settings and Households (9). Furthermore tools have been developed to assess Infection control paractices and their gaps, with approaches on how to deal with these too. One such tool is the Infection Control Assessment Tool (ICAT) that was designed with the support of the USAID funded Management Sciences for Health (8). The tool is designed to facilitate the identification, control, and prevention of nosocomial infections through an easily-administered and scored instrument that highlights areas of concern and suggests economical improvements within hospitals. The tool may be applied across the hospital as a whole or for specific clinical and administrative areas.
All these guidelines are noted to be very highly specific and they are usually developed using quality assessed evidence from a review of research and other literature. They have also been subjected to evaluations for example one done across 40 hospitals in the USA found that no change in hand hygiene practices were found despite apparent uptake of the guidelines into hospital policies (10). This failure of policies to change practice was attributed to a lack of a comprehensive approach involving various levels within the organization, poor administrative support and absent feedback mechanisms. These are problems that are very common in the developing world too.

Education

Several research results categorize educational interventions as those which improve skills or knowledge through training activities or by providing feedback on performance. Such interventions are similar to the one developed and used in Argentina; an educational strategy combining training sessions and performance feedback was used to improve hand hygiene in an intensive care unit (11). It involved the use of focused but yet frequent education sessions emphasizing the use of guidelines on hand hygiene and also feeding back information to health workers on performance. Over the following 16 months hand washing compliance was observed covertly and infection rates improved markedly. This was the same in other settings in the country and not just the study setting.

Organization and systems change

In the literature, organizational and systems interventions have also been documented as strategies crucial in ensuring infection control. In fact these have been noted to be important for the success of other strategies like guidelines. These interventions may be defined as those that involve administrative, budgetary or management inputs, adjustments to staffing structures and/or roles, and changes in policy or governance. This strategy combined with educational inputs and feedback was evaluated in Switzerland (12). The factors within the organizational intervention included ensuring strong institutional support being developed by gaining involvement of clinical directors, obtaining funding from senior management budgets and ensuring that senior clinicians participated actively at meetings. In addition to this making individual bottles of hand rubs available and improving bedside access to hand hygiene products was enforced. On follow up three years later, there were notable improvements in hand washing compliance and a fall in infection rates.
Additional organizational changes include reviewing health facility staffing and the way in which personnel are organized, along with professional infection control and clinical epidemiological expertise.

Currently studies are on-going to establish the optimal knowledge and skills of infection prevention specialists and of staff-to-bed ratios, so as to establish and draft clear recommendations on effective organization of staff.

Surveillance

The effects of surveillance involving systematic monitoring of events or performance in line with infection, was widely studied following a national epidemic of nosocomial staphylococcal infection in American hospitals in the 1950s and 1960s. A decade later several studies although of inferior research design demonstrated its effectiveness in reducing infection rates. The most significant of studies however is the seminal SENIC (Study on the Efficacy of Nosocomial Infection Control) which identified the extent to which hospitals were conducting surveillance and showed that surveillance, combined with other infection control activities, led to reductions in nosocomial urinary tract infection, surgical wound infection and bacteraemia (5). It showed that one could achieve prevention of up to a third of infections if maximum intensity activities were undertaken. The activities included epidemiological analysis, prioritization of infection during ward rounds, feedback to staff, specialized infection control staff training and adequate staff to bed ratios. However, only a few hospitals managed to implement all components.
These activities also required an infection control nurse working with specially trained physicians or microbiologists with special interests in infection control for supervision. In addition it was important for routine identification of nosocomial infections during clinical ward rounds, analysis of rates of infection using epidemiologic techniques, and periodic use of data generated in decision-making.

Continued quality improvement

The importance of multimodal, high intensity combinations has recently been highlighted. Such interventions include real time reminders, provider audits, feedback and continuous quality improvement. Continuous quality improvement is a means of audit following a set process to create teamwork, identify problems and solutions and create shared goals using data for decision making (4). Such a strategy involving surveillance systems and an infection control committee were set up in Colombia to improve infection rates after Caesarean section. The committees were a multidisciplinary team. Individuals reviewed and summarized literature and discussed findings with team members as part of the educational process. The teams were tasked with identifying and developing realistic solutions to causes of infection relevant to their own context. The study found that prescribing practices for prophylactic antibiotic cover improved and infection rates dropped. The activities were conducted as part of routine clinical duties and therefore cost investment for the intervention was reportedly modest, although specific data on time and monetary costs were not provided.

Other measures (4)

Other measures include mandatory public reporting mechanisms for health care associated infections and the use of benchmarking to identify better and less well performing institutions. In addition the effect of introducing opinion leaders to motivate and change the practice of

clinicians has been assessed in a randomized controlled trial, which found them to be more effective than feedback of information and didactic educational meetings. The systematic review found that this was relevant for improving the quality of maternity care in general, and not specific to infection control.

Cost-effectiveness considerations

The cost of extended hospitalization due to infection is thought to exceed those of improving infection control measures. A study in India showed that care for longer stay, hospital acquired bacteraemia in a cardiac hospital cost US$15,000 more per patient, when compared to patients who did not develop infection while in Mozambique, single dose prophylactic antibiotics at emergency Caesarean section was found to cost less than a tenth of a post-operative, seven day regimen, with no significant difference in infection rates.

Conclusion

Although there is a paucity of evidence on effective infection control measures from low resource settings, the findings summarized here highlight some principal issues related to health systems, infection control and reduction of infections. They show that education, surveillance, organizational change and quality improvement interventions should be introduced, confirming the need for a health systems approach to infection control. They also call for the need to improve managers' understanding of organizational and behavioral change to effectively implement infection control measures. Also important is globalized, targeted health policies or initiatives so as to draw attention to, and catalyze action for infection control as a major health system strategy to reduce mortality and morbidity.

References

1. D. Greco, I. Magombe. Hospital Acquired Infections in a large North Ugandan Hospital. J Prev Med Hyg. 2011;52:55-8.
2. Loudon I. The Tragedy of Childbed Fever. Oxford: University Press; 2000.
3. World Health Organization (WHO). World Report on Knowledge for Better Health: Strengthening Health Systems. Geneva: World Health Organization, 2004.
4. Julia Hussein, Dileep V Mavalankar, Sheetal Sharma, Lucia D'Ambruoso. A review of health system infection control measures in developing countries: what can be learned to reduce maternal mortality. Globalization and Health. 2011;7:14.
5. Haley RW, Quade D, Freeman HE, Bennett JV, the CDC SENIC planning committee. Study on the efficacy of nosocomial infection control (SENIC Project): summary of study design. American Journal of Epidemiology. 1980;111(5):472-85.
6. World Health Organization (WHO). Guide to the implementation of the multimodal hand hygiene improvement strategy 2009 [cited 2012. Available from: www.who.int/gpsc/5may/Guide_to_Implementation.pdf.

SURE collaborators:

REACH
Regional East African Community Health Policy Initiative

The Regional East African Community Health-Policy Initiative (REACH) links health researchers with policy-makers and other vital research-users. It supports, stimulates and harmonizes evidence-informed policymaking processes in East Africa. There are designated Country Nodes within each of the five EAC Partner States.
www.eac.int/health

EVIPNet
EVIDENCE-INFORMED POLICY NETWORK

The Evidence-Informed Policy Network (EVIPNet) promotes the use of health research in policymaking. Focusing on low and middle-income countries, EVIPNet promotes partnerships at the country level between policymakers, researchers and civil society in order to facilitate policy development and implementation through the use of the best scientific evidence available.
www.evipnet.org

7. Centres for Disease Control. Guideline for Hand Hygiene in Health Care Settings: Boyce & Pittet; 2002 [cited 2012. Available from: www.cdc.gov/hicpac/pubs.html.
8. MSH (USAID). Infection Control assessment Tool (ICAT): A Standardized Approach for Improving Hospital Infection Control Practices.2006.
9. Ministry of Health. Uganda National Guidelines for Tuberculosis Infection Control in Health Care Facilities, Congregate Settings and Households.
10. Larson EL, Quiros D, Lin SX. Dissemination of the CDC's Hand Hygiene Guideline and impact on infection rates. American Journal of Infection Control. 2007;35(10):666-75.
11. Rosenthal VD, Guzman S, Safdar N. Reduction in nosocomial infection with improved hand hygiene in intensive care units of a tertiary care hospital in Argentina. American Journal of Infection Control. 2005;33(7):392-7.
12. Pittet D, Hugonnet S, Harbarth S, Mourouga P, Sauvan V, Touveneau S, et al. Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. Lancet. 2000;356(9238):1307-12.

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Conflicts of interest
None known.

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