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WORLD ALLIANCE FOR PATIENT SAFETY

**WHO GUIDELINES ON
HAND HYGIENE IN HEALTH CARE
(ADVANCED DRAFT): A SUMMARY**

CLEAN HANDS ARE SAFER HANDS



World Health
Organization

WHO/EIP/SPO/QPS/05.2

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Printed in France

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WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft): A Summary

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Foreword

Health care-associated infections affect hundreds of millions of patients worldwide every year. As an unintended result of seeking care, these infections lead to more serious illness, prolong hospital stays, and induce long-term disability. Not only do they inflict unexpected high costs on patients and their families, they also lead to a massive additional financial burden on the health-care system and — last but not least — contribute to unnecessary patient deaths.

By their very nature, infections have a multifaceted causation related to systems and processes of health-care provision and political and economic constraints on health systems and countries, as well as to human behaviour conditioned by education. Most infections are, however, preventable.

Importantly, there is a large and unfair patient safety gap, with some health-care institutions and systems managing the risks to patients much better than others. The level of development and the resources available are not the only critical issues for success: improvement is reported from both developed and developing countries and is a source of learning among them.

Let us assess the size and nature of the problem of health care-associated infection and create the basis for monitoring the effectiveness of preventive actions worldwide. Surveillance and prevention, relying on evidence-based best practice, is possible. Development of effective solutions to improve patient safety and reduce risk is also possible. Tools are available, but they should be tested, adapted and implemented worldwide with a sense of equity and solidarity.

Hand hygiene is the primary measure to reduce infections. Though the action is simple, the lack of compliance among health-care providers is problematic throughout the world. Following recent understanding of the epidemiology of hand hygiene compliance, new approaches have proven effective. The Global Patient Safety Challenge 2005–2006: “Clean Care is Safer Care” is focusing part of its attention on improving hand hygiene standards and practices in health care and on helping to implement successful interventions.

As part of this approach, *WHO Guidelines for Hand Hygiene in Health Care (Advanced Draft)* prepared with the help of more than 100 international experts, are in the testing and implementation phases in different parts of the world. Pilot sites range from modern, high-technology hospitals in developed countries to remote dispensaries in resource-poor villages. This Challenge is a global reality: no hospital, no clinic, no health-care system, no dispensary, and no health post can currently say that compliance with hand hygiene recommendations is not an issue.

Health literacy is the capacity of individuals to obtain, interpret and understand basic health information and services necessary for appropriate health decision-

making. Health literacy links education with health; it also needs leaders and policy-makers to be aware of the social, economic and environmental determinants of behaviour. “Clean Care is Safer Care” takes these issues into account throughout its Challenge.

Countries are invited to adopt the Challenge for their own health-care systems. Please engage fully the patients and service users as well as health-care providers in action plans for improvement. Please ensure the sustainability of all actions beyond the initial two-year period of the Challenge. While system change is required in most places, sustained change in human behaviour is even more important and this relies on peer support and political backing.

Let us remind ourselves that “Clean Care is Safer Care” is not a choice, but a patient’s basic right to quality care. Clean hands prevent suffering and save lives. Thank you for being part of this Challenge.

Professor Didier Pittet

Director, Infection Control Programme

University of Geneva Hospitals, Switzerland

and

Leader, Global Patient Safety Challenge

World Alliance for Patient Safety

World Health Organization

Geneva, Switzerland

Introduction

Confronted with the important issue of patient safety, the Fifty-fifth World Health Assembly in 2002 adopted a resolution urging countries to pay the closest possible attention to the problem and to strengthen safety and monitoring systems. The resolution requested WHO to take a lead in building global norms and standards and supporting country efforts in developing patient safety policies and practices. In May 2004, the Fifty-seventh World Health Assembly approved the creation of an international alliance to improve patient safety as a global initiative, and the World Alliance for Patient Safety was launched in October 2004. For the first time, heads of agencies, policy-makers and patient groups came together from all corners of the globe to advance the patient safety goal of “First, do no harm” and to reduce the adverse health and social consequences of unsafe health care. The Alliance is focusing its actions on the following areas: the Global Patient Safety Challenge; Patients for Patient Safety; Taxonomy; Research; Solutions for Patient Safety; and Reporting and Learning. Together, the combined efforts of all these components have the potential to save millions of lives and, through the improvement of basic procedures, to halt the diversion of a significant amount of resources from other productive uses.

The Global Patient Safety Challenge, a core element of the Alliance, creates an environment where safety of care brings together the expertise of leading specialists in the fields of hand hygiene and the safety of injections, surgical procedures, blood use, and the care environment. The topic chosen for the first Global Patient Safety Challenge is health care-associated infection. Such infections occur worldwide in both developed, transitional and developing countries and are among the major causes of death and increased morbidity for hospitalized patients; they will be addressed through the *Global Patient Safety Challenge 2005–2006: “Clean Care is Safer Care”*.

A key action within the Challenge is to promote hand hygiene in health care globally as well as at country level through the campaign “Clean Care is Safer Care”. Hand hygiene, a very simple action, reduces infections and enhances patient safety across all settings, from advanced health-care systems in industrialized countries to local dispensaries in developing countries. In order to provide health-care workers, hospital administrators and health authorities with the best scientific evidence and recommendations to improve practices and reduce health care-associated infections, WHO has developed *Guidelines on Hand Hygiene in Health Care (Advanced Draft)*.

The development of the advanced draft *Guidelines* followed the WHO recommended process for guidelines. The process began in autumn 2004 and included two international consultations (in December 2004 and April 2005) attended by experts from all over the world and technical specialists from WHO. A core group

of experts coordinated the work of reviewing the available scientific evidence, writing the document and fostering discussion among authors. It is noteworthy that more than 100 international experts contributed to the document's preparation. At present, pilot tests in each of the six WHO regions are being conducted to help provide local data on the resources required to carry out the recommendations and generate information on the feasibility, validity, reliability and cost-effectiveness of the interventions concerned. This piloting is an essential part of the Challenge.

Development of the WHO Guidelines on Hand Hygiene in Health Care

<i>WHO recommended steps in technical guideline development</i>	<i>Action taken</i>
Define the specific issues to be addressed by the guidelines	Completed
Undertake a systematic search for evidence	Completed
Review the evidence available	Completed
Develop recommendations linked to the strength of the evidence	Completed
Draft guidelines	Completed
Discuss and incorporate, where relevant, comments of external reviewers	Completed
Draft final version of the guidelines	Completed
Make recommendations on dissemination strategy	Completed
Document the process of guideline development	Completed
Test the guidelines through pilot evaluations	Work in progress

The problem: health care-associated infections are a major cause of death and disability worldwide

“Hospitals are intended to heal the sick, but they are also sources of infection. Ironically, advances in medicine are partly responsible for the fact that, today, hospital infections are a leading cause of death in some parts of the world.”

The World Health Report 1996 — Fighting disease, fostering development.

Each year, at least 2 000 000 patients in the USA and over 320 000 patients in the UK acquire one or more health care-associated infections during their stay in hospital.

Every day, 247 people die in the USA as a result of a health care-associated infection.

Worldwide, at least 1 in 4 patients in intensive care will acquire an infection during their stay in hospital. In developing countries, this estimate may be doubled.

Health care-associated infections occur worldwide and affect both developed and resource-poor countries. Infections acquired in health-care settings are among the major causes of death and increased morbidity in hospitalized patients. They represent a significant burden for both the patient and his or her family and for public health. A prevalence survey conducted under the auspices of WHO in 55 hospitals of 14 countries representing four WHO regions (South-East Asia, Europe, the Eastern Mediterranean and the Western Pacific) revealed that, on average, 8.7% of hospital patients suffer nosocomial infections. At any time, over 1.4 million people worldwide suffer from infectious complications associated with health care.

Health care-associated infections rank as major killers of patients of all ages, particularly among the most vulnerable members of the population. The more sick the patient, the higher the risk of acquiring a health care-associated infection and dying from it.

In developed countries, about 5–10% of patients admitted to acute care hospitals acquire an infection that was not present or incubating on admission. Such hospital-acquired infections add to the morbidity, mortality and costs that would be expected from the patient’s underlying disease alone. In the USA, one in 136 hospital patients becomes seriously ill as a result of acquiring an infection in hospital. This is equivalent to 2 000 000 cases a year — about 80 000 deaths annually. In England health care-associated infection causes 5 000 deaths each year

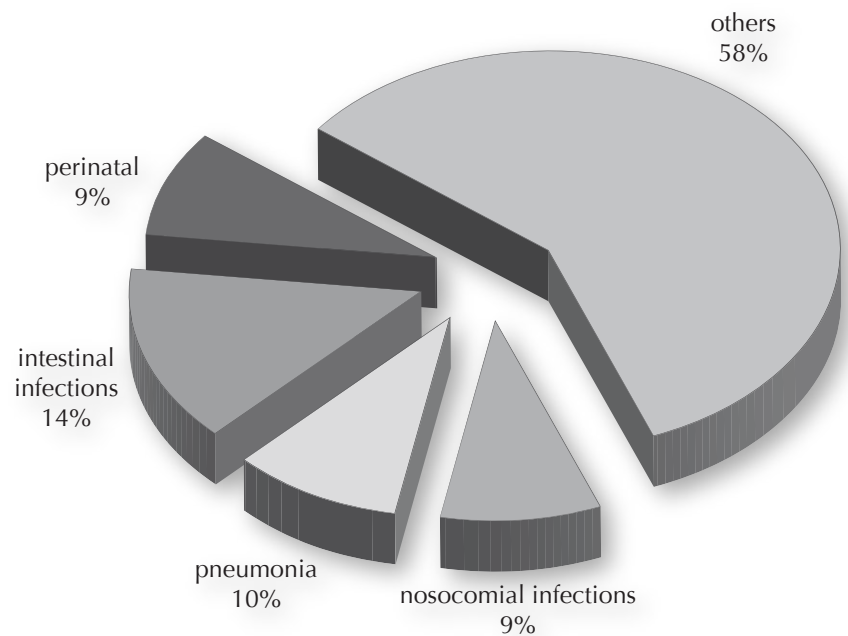
Among the critically ill, even in highly resourced units, at least 25% of patients admitted develop a health care-associated infection. In some countries, this proportion may be much higher; for example, in Trinidad and Tobago as many as two-thirds of patients admitted to intensive care suffer at least one health care-associated infection.

In resource-poor countries, where the health system needs to deliver care to a population with lower health status and to cope with the lack of human and technical resources, the burden of health care-associated infections is even more important. As an example, in Mexico, health care-associated infections are the third most common cause of death for the entire population. Although estimates of preventable health care-associated infections vary, the proportion may be as high as 40% or more in developing countries.

In overcrowded and understaffed health services, the incorrect use of medical technology is commonplace, and increases the risk of infection associated with the process of care. This is a frequent scenario in resource-poor settings, and adds to the health-care gap between developed and developing countries. The impact is larger among the more vulnerable patients. The rate of infections associated with vascular devices among neonates is 3–20 times higher in developing countries than in developed ones. In Brazil and Indonesia, more than half of the neonates admitted to neonatal units acquire a health care-associated infection, with a fatality rate between 12% and 52%. In contrast, in developed countries, the rate of hospital-associated infection among neonates is 12-fold lower.

The last two decades have seen the greatest increase in nosocomial infections in hospitals in developing countries where infectious diseases remain the leading cause of death. Among health care-associated infections, surgical site infections are leading causes of illness and death in certain hospitals in sub-Saharan Africa. This is happening at a time when the arsenal of drugs available to treat infections is being progressively depleted because of increasing resistance of the microbes to antimicrobial drugs. Thus the list of already scarce effective agents is further shortened.

Causes of mortality in Mexico



Source: S. Ponce de Leon. The needs of developing countries and the resources required. *Journal of Hospital Infection*, 1991, 18 (Suppl A):376–381.

4384 children die every day of health care-associated infections in developing countries.

Health care-associated infection during neonatal care is a leading cause of serious illness and death. Prevalence rates for Brazil, European countries and the USA are shown in the map below.

Prevalence of neonatal care-associated infections



The economic burden

Added to the considerable human misery caused by health care-associated infections is their economic impact. In the USA, the risks of acquiring these infections have risen steadily over the last decades with accompanying extra costs estimated at US\$ 4500–5700 million a year. In England, health care-associated infections are estimated to cost £1000 million annually to the National Health Service.

The costs of health care-associated infections vary from country to country, but are substantial everywhere. In Trinidad and Tobago they represent 5% of the annual budget of a country hospital, and in Thailand some hospitals spend 10% of their annual budget on the management of infections. In Mexico, these costs represent 70% of the entire budget of the ministry of health.

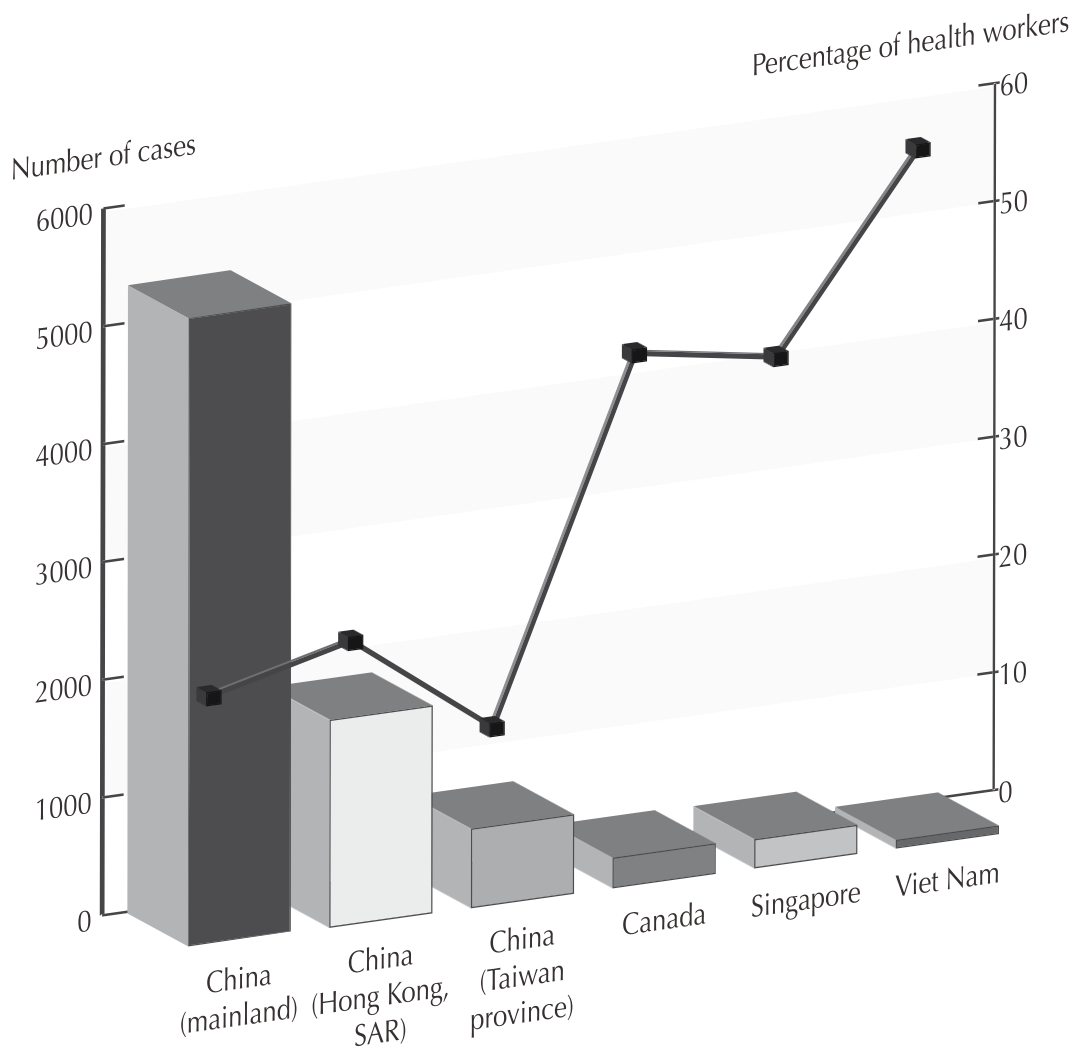
Interventions are available but are not being used

Most patient deaths and suffering attributable to health care-associated infections can be prevented. Low-cost and simple practices already exist to prevent these infections. Hand hygiene, a very simple action, remains the primary measure to reduce health care-associated infection and the spread of antimicrobial resistance, enhancing patient safety across all settings. Yet compliance with hand hygiene is very low throughout the world and governments should ensure that hand hygiene promotion receives enough attention and funding to succeed.

Knowledge of measures to prevent health care-associated infections has been widely available for years. Unfortunately, for a number of reasons, preventive measures are often not being used. Poor training and adherence to proven practices on hand hygiene is one reason.

Failure to apply infection control measures favours the spread of pathogens. This spread may be particularly important during outbreaks, and health-care settings can act as multipliers of disease, with an impact on both hospital and community health. The emergence of life-threatening infections such as severe acute respiratory syndrome (SARS), viral haemorrhagic fevers (Ebola and Marburg viral infections) and the risk of a new influenza pandemic highlight the urgent need for efficient infection control practices in health care. In the recent Marburg viral haemorrhagic fever event in Angola, transmission within health-care settings played a major role in the amplification of the outbreak. Uneven application of policies and practices across countries is another concern, as usage may vary largely between hospitals and countries. This variation was reflected during the SARS pandemic, in which the proportion of health-care workers affected ranged from 20% to 60% of cases worldwide.

Severe acute respiratory syndrome (SARS): total number of cases and percentage of health-care workers affected, four countries.



The solution

Clear, effective and applicable guidance on measures to control the spread of infections is needed. Although hand hygiene is considered the most important measure to prevent and control health care-associated infections, ensuring its improvement is a complex and difficult task. *The WHO Guidelines on Hand Hygiene in Health Care Care (Advanced Draft)* provide health-care workers, hospital administrators and health authorities with a thorough review of different aspects of hand hygiene and in-depth information to overcome potential barriers. These guidelines are intended for use in any situation where health care is delivered.

The guidelines provide a comprehensive review of scientific data on hand hygiene rationale and practices in health-care settings. This extensive review brings together in one document sufficient technical information to support training materials and to help plan implementation strategies. The subjects developed in the review are:

- definition of terms;
- historical perspective on hand hygiene in health care;
- normal bacterial flora on hands;
- physiology of normal skin;
- transmission of pathogens on hands, including the available evidence on the steps of transmission from either patient's skin or inanimate environments to other patients or health-care workers through contaminated hands;
- experimental and mathematical models of hand transmission of microorganisms;
- relation between hand hygiene and acquisition of health care-associated pathogens;
- critical review of methods to evaluate the antimicrobial efficacy of hand rub and handwashing agents and formulations for surgical hand preparation; this review comprises current methods, shortcomings of traditional test methods, and perspectives of coming methods;
- agents used for hand hygiene, including water, non-antimicrobial and antimicrobial soaps, alcohols, chlorhexidine, chloroxylenol, hexachlorophene, iodine and iodophors, quaternary ammonium compounds, and triclosan;
- activity of antiseptic agents against spore-forming bacteria and reduced susceptibility of organisms to antiseptics;

Availability of alcohol-based hand rubs is critical to promote effective hand hygiene practices, in particular in settings without access to running water. Introduction of an alcohol-based hand rub has led to increased hand hygiene compliance among health-care workers and decreased health care-associated infections.

Factors influencing adherence to recommended hand hygiene practices

A. Observed risk factors for poor adherence

- Working in intensive care
- Working during the week (vs. week-end)
- Wearing gowns/gloves
- Automated sink
- Activities with high risk of cross-transmission
- Understaffing or overcrowding
- High number of opportunities for hand hygiene per hour of patient care
- Nursing assistant status (rather than a nurse)
- Physician status (rather than a nurse)

B. Self-reported factors for poor adherence

- Hand-washing agents cause irritations and dryness
- Sinks are inconveniently located or shortage of sinks
- Lack of soap, paper, towel
- Often too busy or insufficient time
- Patient needs take priority
- Hand hygiene interferes with health-care worker–patient relationship
- Low risk of acquiring infection from patients
- Wearing of gloves or belief that glove use obviates the need for hand hygiene
- Lack of knowledge of guidelines and protocols
- Not thinking about it, forgetfulness
- No role model from colleagues or superiors
- Scepticism about the value of hand hygiene
- Disagreement with the recommendations
- Lack of scientific information of definitive impact of improved hand hygiene on health care-associated infection rates

C. Additional perceived barriers to appropriate hand hygiene

- Lack of active participation in hand hygiene promotion at individual or institutional level
- Lack of role model for hand hygiene
- Lack of institutional priority for hand hygiene
- Lack of administrative sanction of non-compliers/rewarding of compliers
- Lack of institutional safety climate

- relative efficacy of plain soap, antimicrobial soap and detergents, and alcohols;
- safety issues related to hand hygiene products;
- a WHO waterless formulation for hand hygiene. To achieve optimal compliance with hand hygiene among health-care workers, products should be easily accessible; the *Guidelines* suggest two formulations for an alcohol-based hand rub, taking logistic, economic and cultural factors into consideration;
- surgical hand preparation, including review of evidence, objectives of product selection for surgical hand preparation, and surgical hand antisepsis using either medicated soap and water or an alcohol-based hand rub;
- frequency and pathophysiology of skin reactions related to hand hygiene, and methods for reducing adverse effects;
- factors to consider when selecting hand hygiene products, and guidance on pilot testing before purchase;
- hand hygiene practices among health-care workers, adherence to recommended measures, and review of factors affecting adherence;
- religious and cultural aspects of hand hygiene;
- behavioural considerations regarding hand hygiene practices and review of the application of behavioural sciences to help promotion strategies;
- organization of education programmes to promote hand hygiene;
- strategies for hand hygiene promotion, with review of components so far applied in promotion strategies, and assistance on developing a strategy for guideline implementation;
- glove-wearing policies worldwide, their impact on hand hygiene, and special concerns regarding glove use in developing countries;
- other policies related to the effectiveness of hand hygiene procedures, such as the care of fingernails and the use of jewellery and artificial nails.

Crucial topics to help design and evaluate implementation strategies are addressed in the *Guidelines*, which include key outcome measurements to assist the evaluation of implementation campaigns. Methods for monitoring hand hygiene performance are reviewed, and quality indicators related to hand hygiene in health care are proposed.

Consensus Recommendations

Ranking system for evidence

It was agreed that the CDC/HICPAC system for categorizing recommendations be adapted as follows:

- *Category 1A.* Strongly recommended for implementation and strongly supported by well designed experimental, clinical, or epidemiological studies.
- *Category 1B.* Strongly recommended for implementation and supported by some experimental, clinical, or epidemiological studies and a strong theoretical rationale.
- *Category 1C.* Required for implementation, as mandated by federal and/or state regulation or standard.
- *Category II.* Suggested for implementation and supported by suggestive clinical or epidemiological studies or a theoretical rationale or a consensus by a panel of experts.

Recommendations

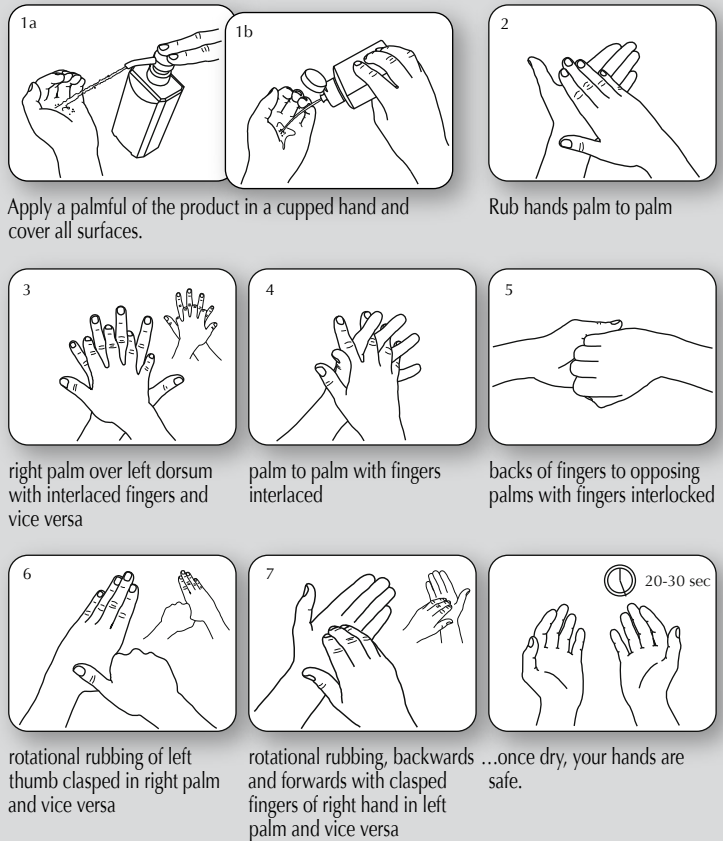
1. Indications for handwashing and hand antisepsis

- A. Wash hands with soap and water when visibly dirty or contaminated with proteinaceous material, or visibly soiled with blood or other body fluids, or if exposure to potential spore-forming organisms is strongly suspected or proven (IB) or after using the restroom (II).
- B. Preferably use an alcohol-based hand rub for routine hand antisepsis in all other clinical situations described in items Ca to Cf listed below if hands are not visibly soiled (IA). Alternatively, wash hands with soap and water (IB).
- C. Perform hand hygiene:
 - a) before and after having direct contact with patients (IB);
 - b) after removing gloves (IB);
 - c) before handling an invasive device (regardless of whether or not gloves are used) for patient care (IB);
 - d) after contact with body fluids or excretions, mucous membranes, non-intact skin, or wound dressings (IA);
 - e) if moving from a contaminated body site to a clean body site during patient care (IB);
 - f) after contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient (IB);
- D. Wash hands with either plain or antimicrobial soap and water or rub hands with an alcohol-based formulation before handling medication and preparing food (IB).
- E. When alcohol-based hand rub is already used, do not use antimicrobial soap concomitantly (II).

2. Hand hygiene technique

- A. Apply a palmful of the product and cover all surfaces of the hands. Rub hands until hands are dry (IB).
- B. When washing hands with soap and water, wet hands with water and apply the amount of product necessary to cover all surfaces. Vigorously perform rotational hand rubbing on both palms and interlace fingers to cover all surfaces. Rinse hands with water and dry thoroughly with a single use towel. Use running and clean water whenever possible. Use towel to turn off faucet (IB).
- C. Make sure hands are dry. Use a method that does not recontaminate hands. Make sure towels are not used multiple times or by multiple people (IB). Avoid using hot water, as repeated exposure to hot water may increase the risk of dermatitis (IB).
- D. Liquid, bar, leaflet or powdered forms of plain soap are acceptable when washing hands with a non-antimicrobial soap and water. When bar soap is used, small bars of soap in racks that facilitate drainage should be used (II).

Hand Hygiene Technique with Alcohol-Based Formulation

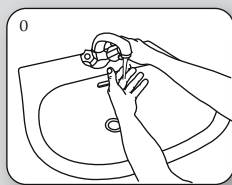


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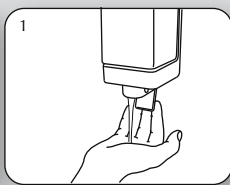
3. Recommendations for surgical hand preparation

- A. If hands are visibly soiled, wash hands with a plain soap before surgical hand preparation (II). Remove debris from underneath fingernails using a nail cleaner, preferably under running water (II).
- B. Sinks should be designed to decrease the risk of splashes (II).
- C. Remove rings, watches, and bracelets before beginning surgical hand preparation (II). Artificial nails are prohibited (IB).
- D. Surgical hand antisepsis should be performed using either an antimicrobial soap or an alcohol-based hand rub, preferably with sustained activity, before donning sterile gloves (IB).

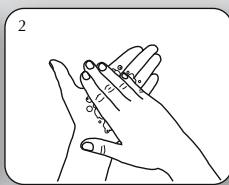
Handwashing Technique with Soap and Water



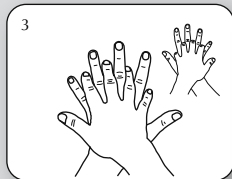
Wet hands with water



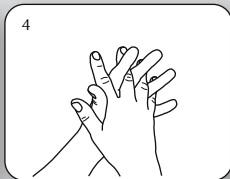
apply enough soap to cover all hand surfaces



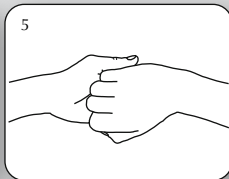
rub hands palm to palm



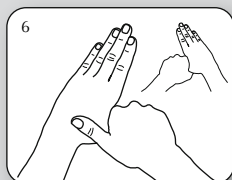
right palm over left dorsum with interlaced fingers and vice versa



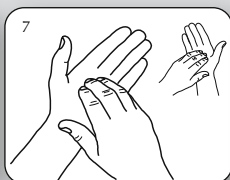
palm to palm with fingers interlaced



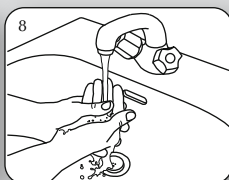
backs of fingers to opposing palms with fingers interlocked



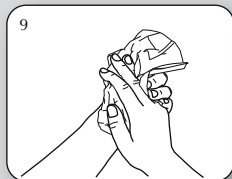
rotational rubbing of left thumb clasped in right palm and vice versa



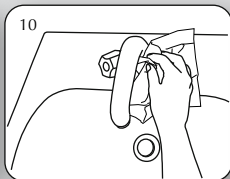
rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa



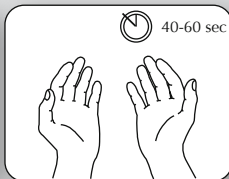
rinse hands with water



dry thoroughly with a single use towel



use towel to turn off faucet



...and your hands are safe.

Modified according to EN1500

- E. If quality of water is not assured in the operating theatre, surgical hand antisepsis using an alcohol-based hand rub is recommended before donning sterile gloves when performing surgical procedures (II).
- F. When performing surgical hand antisepsis using an antimicrobial soap, scrub hands and forearms for the length of time recommended by the manufacturer, 2 to 5 min. Long scrub times (e.g. 10 min) are not necessary (IB).
- G. When using an alcohol-based surgical hand rub product with sustained activity, follow the manufacturer's instructions. Apply the product on dry hands only (IB). Do not combine surgical hand scrub and surgical hand rub with alcohol-based products sequentially (II).
- H. When using an alcohol-based product, use sufficient product to keep hands and forearms wet with the hand rub throughout the procedure (IB).
- I. After application of the alcohol-based product, allow hands and forearms to dry thoroughly before donning sterile gloves (IB).

4. Selection and handling of hand hygiene agents

- A. Provide health-care workers with efficacious hand hygiene products that have low irritancy potential (IB).
 - B. To maximize acceptance of hand hygiene products by health-care workers, solicit their input regarding the feel, fragrance, and skin tolerance of any products under consideration. In some settings, cost may be a primary factor (IB).
 - C. When selecting hand hygiene products:
 - determine any known interactions between products used to clean hands, skin care products, and the types of gloves used in the institution (II);

- solicit information from manufacturers about risk of contamination (pre-marketing and in-use) (IB);
- ensure that dispensers are accessible at the point of care (IB);
- ensure that dispensers function adequately and reliably, and deliver an appropriate volume of the product (II);
- ensure that the dispenser system for alcohol-based formulations is approved for flammable materials (IC);
- solicit information from manufacturers regarding any effects that hand lotions, creams, or alcohol-based hand rubs may have on the effects of antimicrobial soaps being used in the institution (IB).

D. Do not add soap to a partially empty soap dispenser. If soap dispensers are reused, follow recommended procedures for cleansing (IA).

5. Skin care

- A. Include information regarding hand care practices designed to reduce the risk of irritant contact dermatitis and other skin damage in health-care workers education programmes (IB).
 - B. Provide alternative hand hygiene products for health-care workers with allergies or adverse reactions to standard products used in the health-care setting (II).
 - C. When needed to minimize the occurrence of irritant contact dermatitis associated with hand antisepsis or handwashing, provide health-care workers with hand lotions or creams (IA).
-

6. Use of gloves

- A. The use of gloves does not replace the need for hand cleansing by either handrubbing or handwashing (IB).
- B. Wear gloves when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, and non-intact skin will occur (IC).
- C. Remove gloves after caring for a patient. Do not wear the same pair of gloves for the care of more than one patient (IB).

- D. When wearing gloves, change or remove gloves during patient care if moving from a contaminated body site to a clean body site within the same patient or to the environment (II).
 - E. Avoid reuse of gloves (IB). If gloves are re-used, implement reprocessing methods to ensure glove integrity and microbiological decontamination (II).
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7. Other aspects of hand hygiene

- A. Do not wear artificial fingernails or extenders when having direct contact with patients (IA).
 - B. Keep natural nails short (tips less than 0.5 cm long) (II).
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8. Health-care worker educational training and motivational programmes

- A. In hand hygiene promotion programmes for health-care workers, focus specifically on factors currently found to significantly influence behaviour, and not solely on the type of hand hygiene products. The strategy must be multifaceted and multimodal and include education and senior executive support for implementation (IB).
- B. Educate health-care workers about the type of patient-care activities that can result in hand contamination and about the advantages and disadvantages of various methods used to clean hands (II).
- C. Monitor health-care workers' adherence to recommended hand hygiene practices and provide them with performance feedback (IA).
- D. Encourage partnerships between patients, their families and health-care workers to promote hand hygiene in health care (II).

9. Governmental and institutional responsibilities

9.1 For hospital administrators

- A. Provide health-care workers with access to safe continuous water supply at all faucets and access to necessary facilities to perform handwashing (IB).
- B. Provide health-care workers with a readily accessible alcohol-based hand rub at the point of patient care (IA).
- C. Make improved hand hygiene adherence an institutional priority and provide appropriate leadership, administrative support and financial resources (IB).
- D. Assign health-care professionals with dedicated time and training for the institutional infection control activities, including the implementation of a hand hygiene promotional programme (II).
- E. Implement a multidisciplinary, multifaceted and multimodal programme designed to improve adherence of health-care workers to recommended hand hygiene practices (IB).
- F. With regard to hand hygiene, ensure that the water supply within the health-care setting is physically separated from drainage and sewerage, and provide routine system monitoring and management (IB).

9.2 For national governments

- A. Make improved hand hygiene adherence a national priority and consider provision of a funded, coordinated and implemented programme for improvement (II).
- B. Support strengthening of infection control capacities within health-care settings (II).
- C. Promote hand hygiene at the community level to strengthen both self-protection and protection of others (II).

Critical factors for the success of large-scale hand hygiene promotion

- Combined expertise of many professional groups
- Presence of drivers for improvement
- Adaptability of the programme
- Political commitment
- Policies and strategies that enable spread and sustainability
- Availability of finance
- Coalitions and partnerships
- Local ownership
- Presence of external support agencies
- Capacity for rapid dissemination and active learning
- Links to health-care regulation
- Economies of scale that can be achieved through central production
- Capacity for public-private partnership working.

Benefits of improved hand hygiene

Can hand hygiene promotion help to reduce the burden of health care-associated infections?

Convincing evidence demonstrates that improved hand hygiene can reduce the frequency of health care-associated infections. Failure to comply with hand hygiene is considered the leading cause of health care-associated infections, contributes to the spread of multiresistant organisms, and is recognized as a significant contributor to outbreaks of infection.

Improved hand hygiene practices are temporally related to the decreased frequency of health care-associated infections and spread of multiresistant organisms. In addition, reinforcement of hand hygiene practices helps to control epidemics in health-care facilities.

The beneficial effects of hand hygiene promotion on the risk of cross-transmission are also present in schools, day care centres and the community setting. Hand hygiene promotion improves child health as it reduces upper respiratory pulmonary infection, diarrhoea and impetigo among children in the developing world.

Is hand hygiene promotion cost-effective?

The potential benefit of successful hand hygiene promotion outweighs its costs, and widespread promotion should be supported. Multimodal interventions are more likely to be effective and sustainable than single-component interventions; although they are more resource-intensive, they are proved to have greater potential.

The cost saving achieved by reducing the occurrence of health care-associated infections should be considered in the evaluation of the economic impact of hand hygiene promotion programmes. The excess use of hospital resources associated with only four or five health care-associated infections of average severity may equal the entire annual budget for hand hygiene products used in inpatient care areas. A single severe infection of a surgical site, lower respiratory tract, or bloodstream may cost the hospital more than its entire annual budget for antiseptic agents used for hand hygiene. In a neonatal intensive care unit in the Russian Federation, the excess cost of one health care-associated bloodstream infection (US\$ 1100) would cover 3265 patient-days of hand antiseptic use (US\$ 0.34 per patient-day). The alcohol-based hand rub applied for hand hygiene in this unit would be cost-effective if its use prevented only 8.5 pneumonias or 3.5 bloodstream infections each year. Savings achieved by reducing the incidence of multiresistant bacterial infections far exceed the additional cost of promoting the use of hand hygiene products such as alcohol-based hand rubs.

Hand hygiene promotion reduces infections. As a result, it saves lives and reduces morbidity and costs related to health care-associated infections.

The hand hygiene promotion campaign at the University of Geneva Hospitals, Switzerland, constitutes the first reported experience of a sustained improvement in

compliance with hand hygiene, coinciding with a reduction of nosocomial infections and multiresistant *Staphylococcus aureus* cross-transmission. The multimodal strategy that contributed to the success of the promotion campaign included repeated monitoring of compliance and hand hygiene performance feedback, communication and education tools, constant reminders in the work environment, active participation and feedback at both individual and organizational levels, senior management support and involvement of institutional leaders. The promotion of alcohol-based hand rub at the point of care largely contributed to enhanced compliance. Including both direct costs associated with the intervention and indirect costs associated with health-care workers' time, the promotion campaign was cost-effective: the total cost of hand hygiene promotion corresponded to less than 1% of the costs associated with health care-associated infections.

An economic analysis of the United Kingdom's "cleanyourhands" hand hygiene nationwide promotional campaign concluded that the programme would be cost-beneficial even if health care-associated infection rates were decreased by as little as 0.1%.

Interventions designed to improve hand hygiene throughout a country may require significant financial and human resources, particularly for multifaceted campaigns. Despite the fact that some studies strongly suggest a clear benefit of hand hygiene promotion, budget constraints are a reality, particularly in developing countries. Cost-effectiveness analysis might be necessary to identify the most efficient strategies. Given that the burden of health care-associated infections is more significant in developing and transitional countries, the benefits of hand hygiene promotion campaigns may be even greater than those already documented in industrialized countries.

Implementation strategies

The implementation strategies of the Global Patient Safety Challenge and, in particular, the *WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft)* are designed to achieve maximum dissemination of the *Guidelines* and to impact on the burden of disease. The strategies include several steps and components.

The task forces

Task forces of experts have been established to foster ongoing discussion on some key topics included in the *Guidelines* which require further development and practical solutions. The work of these groups is planned to continue until the issue has been completely analysed and practical solutions developed. Key topics for which work is underway include:

- patient involvement in infection prevention, and hand hygiene in particular: theoretical reasons for patient involvement, potential advantages and obstacles, and practical actions for patient involvement;
- water quality for handwashing: characteristics of water needed to ensure a level of quality adequate to guarantee the efficacy of hand washing;
- global implementation of the WHO hand hygiene formulation: production, procurement and distribution issues at country level;
- glove use and re-use: safe practice of glove use and possible re-use in settings with limited resources, including effective and standardized procedures for reprocessing to ensure glove integrity and microbiological decontamination;
- religious, cultural and behavioural aspects of hand hygiene: possible solutions to overcome religious and cultural barriers for the use of alcohol-based hand rubs; understanding behavioural aspects underlying health-care workers' attitudes towards hand hygiene so as to facilitate promotion;
- communication and campaigning: essential elements to build up a global campaign to promote the critical role of hand hygiene in health care worldwide;
- national guidelines on hand hygiene: comparison of currently available guidelines, to evaluate the background of national recommendations and foster uniform standards worldwide;

- frequently asked questions: summary of critical questions that could arise during the practical implementation of the *Guidelines* in the field.

As the implementation phase is an ongoing process, other topics of discussion will be dealt with in additional working groups and expert task forces as they arise.

The launch

The launch of the Global Patient Safety Challenge and the presentation of the *WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft)* at WHO Headquarters in Geneva, Switzerland, on 13 October 2005 are intended to mark the beginning of a new era of awareness and improvement in patient safety in health care.

The launch aims to:

- highlight the critical role of hand hygiene to control and prevent the spread of health care-associated infections and multiresistant pathogens;
- strengthen commitment of interested WHO Member States in the Global Patient Safety Challenge.

On this occasion, ministers of health and major associations of health-care professionals are invited to pledge formally that they will tackle health care-associated infections, give priority to hand hygiene, and share results and knowledge internationally. The pledge includes a signed public statement by the country's minister of health giving priority to reducing health care-associated infections, in particular by:

- considering the adoption of WHO strategies and guidelines;
- developing campaigns at national or sub-national levels for improving hand hygiene among health care providers;
- committing to work with health professional bodies and associations and research and educational institutions in the country to promote the highest standards of practice and behaviour, to foster collaboration and to encourage senior management support and role modeling from key staff.

National or sub-national campaigns to promote hand hygiene among health-care workers are intended to be harmonized with the Global Awareness Raising Campaign and the *Global Patient Safety Challenge 2005–2006: "Clean Care is Safer Care"* spearheaded by the World Alliance for Patient Safety. Visual messages, slogans and press material — such as fact sheets, media advisory and press releases — and other tools are available for the development of the campaign worldwide. The process of advertising the launch of this initiative and the dissemination of the *Guidelines* benefits from the support of numerous societies and institutions constituting a network to link globally.

The pilot testing phase

The procedure to obtain the final innovative *WHO Guidelines on Hand Hygiene in Health Care* includes a last, essential step: the pilot testing phase. This phase consists of implementing simultaneously the different components of the *Global Patient Safety Challenge 2005–2006: “Clean Care is Safer Care”* in pilot sites located within each of the six WHO regions, with a particular emphasis on the *Guidelines*.

The main goals of this phase are to ensure the feasibility of the Challenge overall and to learn practical lessons for the applicability of the *Guidelines* in real field situations.

Pilot sites are representative of the widest range of existing health-care facilities, and the results will be reviewed to assess the practicability of the implementation of the *Guidelines*. The final version of the *WHO Guidelines on Hand Hygiene in Health Care* will take into account and reflect this analysis. The pilot studies are focused on the implementation of the *Guidelines* integrated with some interventions related to other areas of the Challenge: Clean Products: blood safety; Clean Practices: safe clinical procedures; Clean Equipment: injection and immunization safety; Clean Environment: safe water and sanitation in health care.



Conclusion: the way forward

Health care-associated infection is of paramount importance throughout the world; it affects the quality of care and patient safety and adds tremendous and needless costs to health care.

The commitment of the World Alliance for Patient Safety to reduce health care-associated infections, by selecting this topic as the first Global Patient Safety Challenge, is an unprecedented event. The combined efforts within the Challenge have the potential to save millions of lives and to halt the diversion of major resources from other productive use, through improvement of basic procedures and a greater attention to hand hygiene among health-care providers.

Given the importance of this goal, the Alliance has chosen the most rigorous and ambitious process to produce the *WHO Guidelines on Hand Hygiene in Health Care* and to plan and realize a stepwise implementation strategy. For this purpose, the *Guidelines* gathered the expertise of the most renowned experts from around the world; the *Guidelines* are now being tested in a pilot phase to obtain the most reliable and adaptable final strategy to be used worldwide. This work should become the standard for health-care providers determined to put an end to the distress of millions of patients who have suffered from health care-associated infections.

With hand hygiene as the cornerstone to prevent the transmission of pathogens, the objective of reducing health care-acquired infections is strongly tackled by all the actions within the Challenge. Let us all pledge to achieve the *Global Patient Safety Challenge 2005–2006: “Clean Care is Safer Care”*.

Selected references

- Boyce JM, Pittet D. Guideline for hand hygiene in health-care settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Society for Healthcare Epidemiology of America/ Association for Professionals in Infection Control/ Infectious Diseases Society of America. *Morbidity and Mortality Weekly Report Recommendations and Reports*, 2002, 51(RR-16):1–45.
- Brown SM et al. Use of an alcohol-based hand rub and quality improvement interventions to improve hand hygiene in a Russian neonatal intensive care unit. *Infection Control and Hospital Epidemiology*, 2003, 24:172–179.
- Ducel G. *Prevention of hospital-acquired infections: a practical guide*, 2nd ed. Geneva, World Health Organization, 2002.
- Duckro AN et al. Transfer of vancomycin-resistant enterococci via health care worker hands. *Archives of Internal Medicine*, 2005, 165:302–307.
- Gopal Rao G et al. Marketing hand hygiene in hospitals – a case study. *Journal of Hospital Infection*, 2002, 50:42–47.
- Hart CA, Kariuki S. Antimicrobial resistance in developing countries. *British Medical Journal*, 1998, 317:647–650.
- Khan MU. Interruption of shigellosis by handwashing. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1982, 76:164–168.
- Lam BC, Lee J, Lau YL. Hand hygiene practices in a neonatal intensive care unit: a multimodal intervention and impact on nosocomial infection. *Pediatrics*, 2004, 114:565–571.
- Larson EL et al. An organizational climate intervention associated with increased handwashing and decreased nosocomial infections. *International Journal of Behavioral Medicine*, 2000, 26:14–22.
- Luby SP et al. Effect of handwashing on child health: a randomised controlled trial. *The Lancet*, 2005, 366:225–33.
- MacDonald A et al. Performance feedback of hand hygiene, using alcohol gel as the skin decontaminant, reduces the number of inpatients newly affected by MRSA and antibiotic costs. *Journal of Hospital Infection*, 2004, 56:56–63.
- McDonald et al. SARS in healthcare facilities, Toronto and Taiwan. *Emerging Infectious Diseases*, 2004, 10:777–81
- Ng PC et al. Combined use of alcohol hand rub and gloves reduces the incidence of late onset infection in very low birthweight infants. *Archives of Disease in Childhood, Fetal and Neonatal Edition*, 2004, 89:336–340.
- NPSA/PASA Hand Hygiene Project 2004 (<http://www.npsa.nhs.uk/cleanyourhands/resources/documents>)
- Pessoa-Silva CL et al. Healthcare-associated infections among neonates in Brazil. *Infection Control and Hospital Epidemiology*, 2004, 25:772–777.
- Pittet D. Clean hands reduce the burden of disease. *The Lancet*, 2005, 366:185–7.
- Pittet D et al. Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *The Lancet*, 2000, 356:1307–1312.
- Pittet D et al. Hand hygiene among physicians: performance, beliefs, and perceptions. *Annals of Internal Medicine*, 2004, 141:1–8.
- Pittet D. Improving compliance with hand hygiene in hospitals. *Infection Control and Hospital Epidemiology*, 2000, 21:381–386.
- Pittet D. The Lowbury lecture: behaviour in infection control. *Journal of Hospital Infection*, 2004, 58:1–13.
- Plowman R et al. The rate and cost of hospital-acquired infections occurring in patients admitted to selected specialties of a district general hospital in England and the national burden imposed. *Journal of Hospital Infection*, 2001, 47:198–209.
- Raymond J, Aujard Y. Nosocomial infections in pediatric patients: a European, multicenter prospective study. European Study Group. *Infection Control and Hospital Epidemiology*, 2000, 21:260–263.
- Seto WH. Staff compliance with infection control practices: application of behavioural sciences. *Journal of Hospital Infection*, 1995, 30(Suppl):107–115.
- Seto WH et al. Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of severe acute respiratory syndrome (SARS). *The Lancet*, 2003, 361:1519–20.
- Sohn AH et al. Prevalence of nosocomial infections in neonatal intensive care unit patients: results from the first national point-prevalence survey. *Journal of Pediatrics*, 2001, 139:821–827.
- Shahid NS et al. Hand washing with soap reduces diarrhoea and spread of bacterial pathogens in a Bangladesh village. *Journal of Diarrhoeal Disease Research*, 1996, 14:85–89.
- Stanton BF, Clemens JD. An educational intervention for altering water-sanitation behaviors to reduce childhood diarrhea in urban Bangladesh. *American Journal of Epidemiology*, 1987, 125:292–301.
- Starfield B. Is US health really the best in the world? *Journal of the American Medical Association*, 2000, 284:483–485.
- Tikhomirov E. WHO Programme for the Control of Hospital Infections. *Chemioterapia*, 1987, 3:148–151
- Webster J, Faoagali JL, Cartwright D. Elimination of methicillin-resistant *Staphylococcus aureus* from a neonatal intensive care unit after hand washing with triclosan. *Journal of Paediatrics and Child Health*, 1994, 30:59–64.
- Won SP et al. Handwashing program for the prevention of nosocomial infections in a neonatal intensive care unit. *Infection Control and Hospital Epidemiology*, 2004, 25:742–746.
- Zaidi et al. Hospital-acquired neonatal infections in developing countries. *The Lancet*, 2005, 365: 1175–88.

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