


# HosCom International

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We aim to provide useful information  
to the healthcare professionals involved in Infection Prevention  
and Control to promote the sharing of knowledge  
and experience globally so that we can improve further together.

**SARAYA**



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# World Information

## Excellence in hand hygiene begins where strategy, leadership, and culture come together

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Everyone knows that hand hygiene is vitally important in healthcare, but to date, no one has figured out how to achieve optimal compliance. How does one achieve excellence in hand hygiene? In order to analyze this question one must first understand the nature of “excellence” and its components, as well as the context that makes hand hygiene so deceptively simple and intuitive as an intervention, but so complex and difficult to implement successfully. This paper will look at available tools for improvement and implementation, as well as key case studies and examples that help to illustrate the qualitative aspects of the field.

Healthcare-associated infection is known for being one of the main causes of morbidity and mortality, and the most frequent adverse event in healthcare worldwide.<sup>1</sup> It has been long recognized that improved compliance with hand hygiene drastically reduces healthcare-associated infections.<sup>2</sup> More recently, the pivotal role of preventing healthcare-associated infections in combating antimicrobial resistance has also been receiving increased recognition.<sup>3</sup> If healthcare-associated infections are reduced, then there is less need for prescribing antibiotics to patients, thus lowering their consumption and reducing the spread of resistant organisms. As it is generally recognized that 50-70% of healthcare-associated infections are transmitted by healthcare workers’ hands; hand hygiene with alcohol-based handrub is the



Figure 1. My five moments for Hand Hygiene in Health Care



Figure 2. The Five Components of the WHO multimodal hand hygiene improvement strategy

primary line of defense against such transmission.

There are numerous components that need to be in place for hand hygiene with alcohol-based handrub to be successful within a hospital, and for healthcare workers to be compliant with the World Health Organization (WHO) 5 Moments for hand hygiene (see Figure 1). While some are relatively easy physical measures to implement, others involve influencing the behavior of healthcare workers, and are much more difficult to realize. The WHO developed a guide for implementation as a tool to facilitate hand hygiene adoption in healthcare settings around the world. This guide is constructed around the WHO multimodal strategy, which consists of system change, training and education, evaluation and feedback, reminders in the workplace, and institutional safety climate (see Figure 2).<sup>4</sup>

### The Multimodal Strategy

First and foremost, system change must be implemented by making sure that high quality alcohol-based handrubs are



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available. This means they must have optimal antimicrobial efficacy, an optimal distribution system on hands, and be optimally placed in the healthcare setting at the point of patient care. The second part of the strategy consists of training and educating healthcare workers so that they understand the 5 Moments for when to use hand hygiene, how much alcohol-based handrub to use and how to handrub. In order to make the training part of everyday practice, the WHO recommends evaluating and sharing performance feedback with the healthcare workers on how and when they performed hand hygiene - if the actions were sufficient and if they were performed at the right time in order to foster a more complete understanding of the process. Reminders in the workplace are the fourth part, and involves using tools such as posters or screen savers to keep the idea of performing hand hygiene in the healthcare workers' mind in everyday situations. The last part of the WHO multimodal strategy - "institutional safety climate" - is a bit less precise, as it concerns purely qualitative aspects of healthcare worker behavior and perception. According to the guide, it "refers to creating an environment and the perceptions that facilitate awareness-raising about patient safety issues while guaranteeing consideration of hand hygiene improvement as a high priority at all levels, including active participation at both the institutional and individual levels; awareness of individual and institutional capacity to change and improve (self-efficacy); and partnership with patients and patient organizations."<sup>4</sup>

Unlike the other components that are comparatively straightforward to realize in the sense that there are set processes in place that can be adapted to any hospital, the institutional safety climate remains an intangible, albeit crucial component to hand hygiene compliance.

## The Quest for Excellence

We cannot improve the institutional safety climate without talking about culture change. We cannot talk about culture change without understanding the current culture and without talking about implementation science. We cannot talk about implementation science if we do not take into account how people think and work, and what is important to them. Institutional safety climate is inextricably linked to the notion of excellence, and to the idea that healthcare workers embody their knowledge and feel that they have ownership of the culture of safety in a hospital. But what exactly is excellence, and how can we encourage it in practice?

Excellence in individuals, institutions, and companies is both a commitment and a process, and people need to make it theirs. Beyond the behavior of healthcare workers, hospitals need to help nurture environments that support staff and put patient

safety at the center of the care they provide. Companies can excel by providing the best possible products that they can to the market, and help support the United Nations' sustainable development goals as well as the WHO agenda towards quality universal health coverage. Excellence is a journey, and continuous improvement, innovation, and sustainability are key elements.

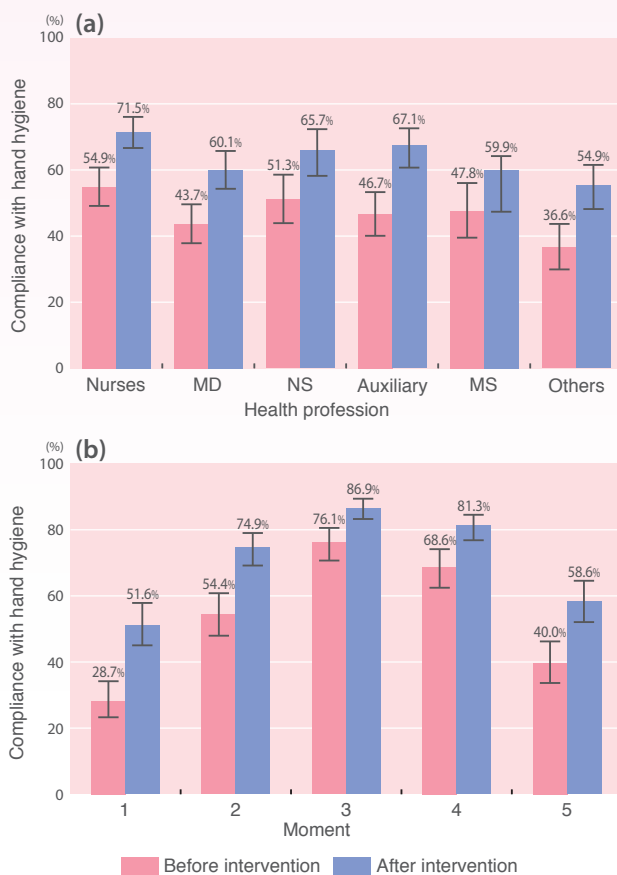
Of course the main framework is and will always be the science, the evidence. Healthcare workers need access to quality alcohol-based handrub, and they need to know how to use it. But practice is not theory, people are not rational and hospitals are hectic and stressful places. A perfect one-size-fits-all solution does not exist because cultures, value systems, resources, working conditions and education vary greatly among healthcare workers populations. By connecting leadership, strategy and culture in a way that makes sense to each individual institution's needs, we can move towards excellence.

## Leadership

Without the involvement of the WHO, hand hygiene could have never become a standard worldwide practice in hospitals this quickly. The story began in the mid-1990s, when researchers at the University of Geneva Hospitals were able to demonstrate that using alcohol-based handrub for hand hygiene was revolutionary in terms of its efficacy and the time that it saved. After being published in *The Lancet* in 2000,<sup>2</sup> the "Geneva Model" for hand hygiene garnered worldwide attention and began to be implemented in institutions around the world.<sup>5,6,7,8</sup>

The WHO launched the World Alliance for Patient Safety in 2004,<sup>9</sup> and soon after incorporated hand hygiene as the central part of its *Clean Care is Safer Care* campaign. They tested the implementation of the multimodal strategy in a quasi-experimental study in six countries with vastly different cultures and resources (Costa Rica, Italy, Mali, Pakistan and Saudi Arabia).<sup>10</sup> The study proved successful worldwide across geographic regions, healthcare worker categories, and levels of development (see Figure 3). This study highlighted the importance of adaptation of the multimodal strategy to local resources and access to alcohol-based handrub, including the feasibility of producing alcohol-based handrub locally.<sup>10,11,12</sup>

In 2009, the updated version of the guidelines for the *WHO Guidelines on Hand Hygiene in Health Care* was published, with particular focus given to the implementation of the multimodal improvement strategy. That same year, WHO started the *SAVE LIVES: Clean Your Hands* campaign, choosing the 5th of May as the international day for hand hygiene (in reference to the 5 moments for hand hygiene and the 5 components of the multimodal strategy).<sup>13,14</sup>



**Figure 3. Effect of the implementation of the World Health Organization multi-modal strategy across (a) healthcare worker categories and (b) moments (indications) for hand hygiene; quasi-experimental study.**

MD : medical doctor, NS : nursing student, MS : medical student  
Reprinted with permission from Allegranzi B et al. *Lancet Infect Dis* 2013;13:843-51.

In 2010, the WHO issued the Hand Hygiene Self-Assessment Framework (HHSAF) as a tool for healthcare facilities to assess their level of success at implementing hand hygiene measures in their institutions.<sup>15,16</sup> This tool looks at specific indicators within each of the components of the multimodal strategy, and allows institutions to score themselves by the number of points obtained. The Hand Hygiene Self-Assessment Framework then directs healthcare facilities to the appropriate WHO tools for improving their scores in specific areas.<sup>15</sup> The institutions with the highest scores globally then have the possibility to apply for the Hand Hygiene Excellence Award (HHEA; [www.hhea.info](http://www.hhea.info)).

To date, over 21,000 healthcare facilities have joined the WHO campaign for hand hygiene, and it is endorsed by national agencies as well as professional societies and private companies around the world.<sup>13,17,18</sup> The global implementation of hand hygiene has become the most successful WHO initiative ever undertaken, and currently most of the world (over 140 countries) have signed the WHO pledge, officially committing to implementing hand hygiene and the WHO Guidelines at a national level.<sup>19,20</sup> Because of the work of

WHO and the ongoing commitment of healthcare facilities worldwide, hand hygiene is now a key indicator of quality of healthcare systems around the world.

Beyond the global leadership of the WHO, it is important to note that leadership is also crucial on national, local, and institutional levels. Wards with a head nurse who is strong in infection prevention and control and champions of hand hygiene in the staff have a very different culture of compliance than those that do not. Each individual, no matter what their function, can be a champion of hand hygiene in their institution, and can make a real difference in patient safety.

### Strategy: Adapt to Adopt

The WHO multimodal strategy, 5 Moments for hand hygiene and their associated tools are all part of the prerequisite strategy that was used for implementing the use of alcohol-based handrub in healthcare facilities worldwide. The tools promoted by the WHO can be adapted to different languages, cultural contexts and available resources. The principle that ministries of health and hospitals can make these tools adapted to their needs is essential to their successful implementation.<sup>21</sup> In Japan, Hello Kitty has been used to teach hand hygiene; in other places, the color, order, language and way of teaching were changed as well in order to adapt to local needs.<sup>21</sup> Some have tested interventions such as useable reminders when the healthcare worker enters or exits an area.<sup>22</sup> What remains most important is that institutions figure out what works for them, and that they do that.

Private companies have become an instrumental ally in helping countries and health facilities “adapt to adopt”. In 2012, the WHO launched the Private Organizations for Patient Safety (POPS), in an effort to encourage corporate social responsibility and harness the strengths of industry to improve the implementation of the WHO guidelines around the world.<sup>18</sup> These companies have the distinct advantage of being in the field on a daily basis and have a unique opportunity to drive excellence at the facility level.

### Culture

The term “culture” is rather broad, yet relevant to each level of analysis. It can refer to a culture of excellence (or carelessness) within a specific institution, societal norms that impact alcohol-based handrub adoption in certain regions of the world, or the way that one can create change on a global scale.

One example of this is the work done in the area of social innovation, by enabling local production of alcohol-based

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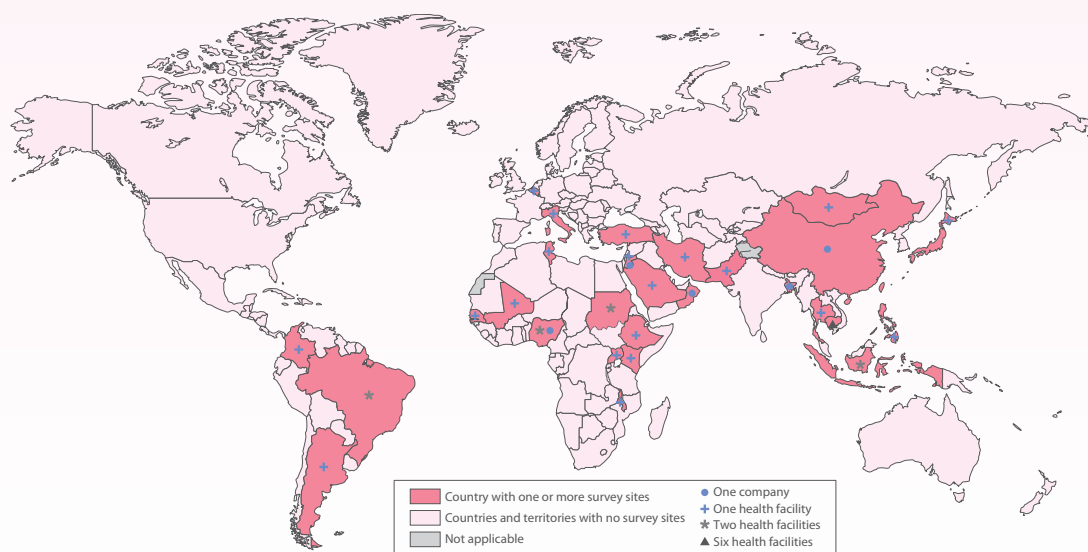


Figure 4. Map showing the locations of sites that responded to survey on the local production of the WHO-recommended alcohol-based handrub formulations, 2011<sup>12</sup>

handrub. This initiative is especially important for low-resource settings, where there is either not enough money or not enough of a robust infrastructure to buy and ship ready-made alcohol-based handrub internationally. Alcohol is easily produced from the byproducts of many of the already existing industries in the developing world such as sugar cane, manioc, rice, potato, wood, or beets (see Figure 4). With the WHO guide to local production, individual companies and healthcare facilities can commit to producing high-quality, effective alcohol-based handrub themselves.<sup>23</sup>

One particular example of a successful local production initiative is the work of Saraya at the Kakira Sugar Works in Jinja, Uganda, which employs over 7,500 people. This social business was founded by Saraya in 2011 and it locally produces highest quality alcohol-based handrub and distributes it to healthcare facilities. The project also aims to solve social issues by creating local jobs and developing itself as a sustainable business. At the beginning of the project there were five Japanese employees from Saraya, and now there is only one Japanese manager left and 15 employees that are of local origin. Currently, the factory can produce up to 1,400L of ethanol per day (See Figure 5). Although the factory is not generating a profit, it is making a huge difference in the lives

of the people living there. Importantly, this model remains quite unique today and deserves to be considered as a model to be reproduced wherever needed.

Ultimately, if our common goal is to save lives by reducing healthcare-associated infections, companies in this field are well-placed to have a high level of social awareness and responsibility. Saving and improving lives extends further that the hospitals that buy their products, and championing social innovation is a way for companies to be more than purely financially-motivated entities. Ultimately, they can be just as successful or even more successful at improving lives by expanding their activities to the communities that need them the most.

## Conclusion

Achieving success and striving for excellence is never a linear exercise. The story of implementing hand hygiene with alcohol-based handrub across the globe is one of immense importance, as well as one of dedication, passion, resilience and adaptability. Although the science and technology is at its core, bringing that science to a human element is incredibly complex, and there is not one universal right answer when it comes to implementation. In order for your own facility to achieve excellence in hand hygiene, it must incorporate elements of leadership, strategy, and culture. These three components encourage innovation and others can benefit from that innovation anywhere in the world, whatever the available resources happen to be. Ultimately, excellence in hand hygiene is developing solutions that are scientifically sound, and implementing them in a way that makes people care.



Figure 5. Saraya alcohol-based handrub production site in Uganda

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## 日本語要約

医療サービスにおいて、手指衛生が非常に重要であることは既知の事実である。しかし、どうすれば最適な手指衛生遵守率を達成できるかについては、まだ詳しくわかっていない。「優れた手指衛生の実践をどうしたら達成できるのか」を考えるためには、まず、優れた手指衛生の実践とは何か、実践する上での困難は何かといった背景を知る必要がある。医療施設における手指衛生を推進するため、WHO（世界保健機構）はその実践ガイドを作成した。このガイドは、システム変更、研修と教育、評価とフィードバック、職場での注意喚起、そして組織の安全文化を含めた「WHO複合的手指衛生改善戦略」をもとに作成されている。

優れた手指衛生の実践を進めるにあたり、科学的根拠に基づいた実践方法は当然重要である。しかし、人々がどのように考え、何を大切と考えているのかを理解し、それを変えない限り、習慣を改善することは難しい。そのためには、個人だけでなく、施設がスタッフをサポートする環境を整えたり、企業が最適な製品を提供したりといったサポートも必要になってくる。

各施設の組織文化は異なっているため、唯一の手指衛生実践の改善方法はない。そこで必要になってくるのがリーダーシップである。医療施設における手指衛生の世界的な広まりは、WHOの働きなくしては決してなげなかつた。1990年代にジュネーブ大学の研究者たちがアルコール手指消毒剤の効果と時間短縮について研究し、その成果をランセットに発表して以来、このジュネーブモデルが世界中の注目を集め、実践され始めた。WHOは2009年に「医療施設における手指衛生のWHOガイドライン」を発行すると、SAVE LIVES: Clean Your Hands キャンペーンを開始し、5月5日を手指衛生の日と定めた。これまでに世界の21,000の医療施設がWHOのキャンペーンに参加し、様々な国際的組織、学会、企業からもこれらのキャンペーンは推奨されている。このようなWHOの働きと各医療施設の継続したコミットメントにより、手指衛生は世界の医療システムにおける質の指標とされるまでに至っている。

WHOの複合的戦略、手指衛生の5つのタイミング、またそれらの関連ツールはすべて医療施設におけるアルコール手指消毒剤の使用を推進するために必要な戦略に含まれている。これらを各国の保健省や病院がニーズに合わせて取り入れていくことが、手指衛生の実践には重要である。一般企業もサポートを始めており、WHOにより立ち上げられたPOPS<sup>(※)</sup>に属する企業は、WHOのガイドライン実践を世界中に広めていくために貢献する努力をしている。

「Culture(文化)」とは広義の意味があり、ある施設における組織文化、世界のある地域でアルコール手指消毒剤を取り入れることに影響を与える社会的規範、または世界的規模で変化を生み出すことができる方法と解釈できる。これに関連した例として挙げられるのが、資金やインフラの面でアルコール手指消毒剤を輸入することが難しい資源の乏しい施設において特に重要な、アルコール手指消毒剤の現地製造である。サラヤがウガンダのKakira Sugar Worksで2011年から製造しているアルコール手指消毒剤は、その成功例である。現在では毎日1,400Lのアルコール手指消毒剤を製造し、利益は大きくはないかもしれないが、ウガンダにおける人々の健康に貢献している。

優れた手指衛生の実践とそのための努力は、決して単一のものではない。世界のアルコール手指消毒剤を用いた手指衛生の実践の歴史はとても重要であり、関わった人々の献身、情熱、失敗を跳ね返す強さの賜物である。

※ Private Organizations for Patient Safety : WHOの呼びかけで結成された企業による協働組織。WHOと連携し、WHOの推奨を普及する教育・啓蒙活動を積極的に行い、世界中で医療関連感染の減少に貢献することを目的としている。



## Why should my hospital use the Hand Hygiene Self-Assessment Framework proposed by the World Health Organization?

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Healthcare-associated infections are the gravest threat to patient safety in hospitals worldwide.<sup>1</sup> By establishing infection prevention and control (IPC) teams and programs, hospitals can decrease healthcare-associated infections by at least 30%,<sup>2</sup> and improving staff hand hygiene compliance can reduce them by half.<sup>3</sup> When it was launched in 2005,<sup>4</sup> the main objective of the World Health Organization (WHO) First Global Patient Safety Challenge : *Clean Care is Safer Care* was to make IPC a global priority in health care, with hand hygiene assessment and improvement as the central component.

In 2019, healthcare facilities and IPC leaders are invited to take part in the WHO 2019 Global Survey and to use validated assessment instruments: the Infection Prevention and Control Assessment Framework (IPCAF) and the Hand Hygiene Self-Assessment Framework (HHSAF).<sup>5</sup> These two simple and systematic diagnostic tools allow healthcare facilities to obtain a situational analysis of IPC and hand hygiene activities, and help identify key issues that require attention in their respective institutions. The IPCAF survey supports the implementation of the WHO Guidelines on core components of IPC programs at the acute healthcare facility level.<sup>6</sup> The HHSAF is divided into five components that reflect the five elements of the WHO Multimodal Hand Hygiene Improvement Strategy.<sup>7</sup> The understanding that hand hygiene practices are a central part of IPC has become recognized globally over the past few decades, but this change cannot be taken for granted. Even the idea of defining an array of diseases as healthcare-associated infections, and addressing healthcare-associated infection as a preventable condition, required a paradigm shift and a new way of thinking.

### A shift in thinking

This shift had its origins in the mid-19<sup>th</sup> century. Ignaz Semmelweis was one of the main pioneers of improved IPC practices and is regarded as the father of hand hygiene. As an obstetrician at the Vienna General Hospital, he proved that scrubbing hands with a chlorinated lime solution before contact with a patient drastically decreased mortality due to puerperal fever among women giving birth in the hospital.<sup>8</sup> He published his discovery, but his ideas unfortunately remained unpopular.<sup>9</sup> A few years later, the French chemist and microbiologist, Louis Pasteur, showed that microorganisms were the cause of some infectious diseases. He also helped confirm that a contaminated environment could be responsible for germ transmission.<sup>10,11</sup> Subsequently, the health community had to wait for more than a century for any new breakthroughs in the fight against healthcare-associated infections. In the 1970s and the 1980s, the United States Centers for Disease Control and Prevention (CDC) recognized handwashing as “the most important procedure in preventing nosocomial infections”, and the first national hand hygiene guidelines were subsequently published in 1983.<sup>12</sup>

### One hospital model disseminated worldwide

In the mid-1990s, researchers at the University of Geneva Hospitals and Faculty of Medicine demonstrated that promoting hand hygiene through the use of alcohol-based handrub at the point of patient care, instead of soap and water handwashing, was revolutionary for decreasing healthcare-associated infections and



reducing methicillin-resistant *Staphylococcus aureus* cross-transmission rates.<sup>3</sup> The ‘Geneva model’ for hand hygiene promotion, published in *The Lancet* in 2000,<sup>3</sup> drew the attention of the entire IPC community, and began to be implemented in healthcare facilities worldwide.<sup>13</sup> This model was the precursor of the WHO Multimodal Hand Hygiene Improvement Strategy, which was published in its current format in 2009.<sup>13</sup> In 2005, in order to create a global momentum for the adoption of hand hygiene worldwide, the WHO integrated hand hygiene as the central part of its *Clean Care is Safer Care* campaign.<sup>14</sup> Since then, many tools and initiatives have been developed by WHO to facilitate the implementation of this patient safety intervention at local and national levels, regardless of IPC expertise or resource setting.

### From scientific evidence to daily practice

To bridge the gap between scientific evidence and daily care practice, WHO and the WHO Collaborating Centre on Patient Safety at the University of Geneva Hospitals and Faculty of Medicine developed *My Five Moments for Hand Hygiene*.<sup>15</sup> This tool designates key moments when hand hygiene is required to avoid pathogen cross-transmission. The concept, described as a time-space framework, provides a solid basis to understand, teach, monitor and report hand hygiene practices. However, the task of cleaning hands at the right times and in the right way is deceptively simple, and remains difficult to implement successfully.<sup>15,16</sup>

The WHO Multimodal Hand Hygiene Improvement Strategy promotes and facilitates optimal hand hygiene implementation. It includes five key components : (1) system change (i.e. the systematic recourse to alcohol-based handrubbing instead of handwashing with soap and water), (2) staff training and education, (3) evaluation and feedback, (4) reminders in the workplace, and (5) promotion of an institutional safety climate.<sup>17</sup> To facilitate system change and make access to alcohol-based handrub universal, the WHO Collaborating Centre for Patient Safety in Geneva developed and tested two alcohol-based handrub formulations suitable for local production in low resource settings.<sup>18</sup> WHO studied the implementation of the multimodal strategy in a quasi-experimental study in six countries worldwide, and proved its feasibility and sustainability across a range of settings with different cultures and economic resources.<sup>13</sup> Based on scientific evidence, an updated version of

the *WHO Guidelines on Hand Hygiene in Health Care* was published in 2009, with a strong focus on the hand hygiene multimodal promotion strategy. That same year, WHO launched the annual *SAVE LIVES : Clean Your Hands* campaign that culminates on World Hand Hygiene Day, on and around May 5<sup>th</sup> of each year. This worldwide initiative promotes a large series of activities and tools, and is currently providing coordination and support to more than 21,000 facilities in 182 countries.<sup>19,20</sup>

### The Hand Hygiene Self-Assessment Framework : a practical tool to lead the fight

The momentum to combat healthcare-associated infections through improved hand hygiene continues in a universal perspective with the WHO 2019 Global Survey<sup>5</sup> and with the third worldwide launch of the HHSAF survey. The major benefit of using such a tool is that it facilitates comparison between facilities and regions, and, when used sequentially over years, allows facilities to assess progress made over time.<sup>21</sup> The framework is aimed at tracking the level of progress of health facilities in the context of implementation, as well as continued improvement. It is divided into five parts related to the five components of the WHO multimodal strategy, and it includes a set of 27 indicators to assess the state of facilities’ hand hygiene promotion programs.<sup>7</sup> The HHSAF has been made available to health facilities since 2010. It quickly proved to be easy to use and useful for assessing the facility level with regard to hand hygiene promotion.<sup>22</sup>

Recent studies have demonstrated the usefulness of the HHSAF in developing a regional or national action plan to improve hand hygiene practices within healthcare facilities. In the USA, a national survey allowed hospitals to assess the level of implementation of the WHO strategy across the country for the first time.<sup>23</sup> In Greece, using a cross-sectional national survey, researchers were able to quantify the impact of IPC nurse staffing levels on the HHSAF score per key element. It also helped facilities benchmark their results against comparable international data.<sup>24</sup> In Italy, regional surveillance in Piedmont revealed critical issues concerning the lack of active involvement in hand hygiene activities by patients, family members and caregivers.<sup>25</sup> Two hand hygiene global surveys were conducted by WHO in 2011 and 2015, showing a snapshot of the current position of hand hygiene implementation and significant improvements

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in participating facilities across all WHO regions.<sup>21</sup> Still, the analysis of regular monitoring and reporting of the WHO multimodal improvement strategy through the use of the HHSAF remains scarce in the literature. The more hospitals take part in completing this self-assessment tool, the more data will be available to compare results, performances and attitudes in different regions. The data provided by this questionnaire is an ideal source to design a regional strategy for hand hygiene promotion ; the tool is freely available at : [https://www.who.int/gpsc/5may/hhsa\\_framework/en/](https://www.who.int/gpsc/5may/hhsa_framework/en/).<sup>7</sup>

## 2019 WHO calls to actions

The WHO 2019 theme for hand hygiene reflects a strong focus on providing clean care equally protecting all patients and healthcare workers from infection and antimicrobial resistance transmission, across all countries, including in low-resource settings : *Clean Care for All - It's In Our Hands!* (Figure 1).

WHO urges ministries of health (Figure 2A), health facility leaders (Figure 2B), IPC leaders (Figure 2C), health workers (Figure 2D), and patient advocacy groups (Figure 2E) to contribute to effective IPC action including hand hygiene as a cornerstone of quality in healthcare (Table 1). WHO invites all healthcare facilities and countries to ask their own representatives and leaders to prepare their own posters using the pre-prepared posters to facilitate implementation (Figure 2F, see also instructions at <http://www.CleanHandsSaveLives.org/>). WHO invites everyone to pledge for “Clean Care for All ; it’s in your hands”. You can participate by sending your photos and selfies made together with your colleagues, collaborators, patients, relatives and friends from all over the world. The 2019 board is shown in Figure 3. Sign your name and ask your friends and colleagues, as well as patients and their relatives to do the same. Please note that the hashtags are : #HandHygiene, #HealthForAll and #InfectionPrevention. You can submit your photos of the board at <http://www.CleanHandsSaveLives.org/>. IPC, including hand hygiene, is critical to achieve universal health coverage, as it is a practical and evidence-based approach with demonstrated impact on quality of care and patient safety across all levels of resources and health systems. Let’s all monitor the capacity of promoting hand hygiene in our institution and participate in the global momentum to improve patient safety. *“Clean Care For All – It’s In Your Hands”!*

**Table 1. May 5, 2019, World Health Organization SAVE LIVES: Clean Your Hands campaign calls to action**

Campaign participants	Call to action
Health workers	“Champion clean care – it’s in your hands.”
IPC* leaders	“Monitor infection prevention and control standards – take action and improve practices.”
Health facility leaders	“Is your facility up to WHO infection control and hand hygiene standards? Take part in the WHO survey 2019 and take action!”
Ministries of health	“Does your country meet infection prevention and control standards? Monitor and act to achieve quality universal health coverage.”
Patient advocacy groups	“Ask for clean care – it’s your right.”

\*IPC, infection prevention and control



Figure 1



Figure 2A



Figure 2B



Figure 2C



Figure 2D



Figure 2E



Figure 2F



Figure 3

## Acknowledgement

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## 日本語要約

医療関連感染は患者安全を脅かす重大な問題であるが、感染対策の推進により30%、手指衛生遵守率の改善で50%、減少することが可能と考えられている。その背景から、WHOが2005年に開始したClean Care is Safer Careプログラムでは、手指衛生を中心とした感染対策を世界の医療機関における優先事項にすることを主な目的としており、毎年5月5日には手指衛生を世界的に推進するキャンペーンも実施している。今年は、Infection Prevention and Control Assessment Framework(感染対策評価フレームワーク)とHand Hygiene Self-Assessment Framework(手指衛生自己評価フレームワーク、以下HHSAF)を用いたグローバルサーベイが実施されており、医療機関や感染対策従事者への参加が呼びかけられている。

《意識改革》 感染対策に関する意識改革は、19世紀半ば、感染対策活動の先駆者で手指衛生の父と称されるIgnaz Semmelweisから始まっている。オーストリアのウィーン総合病院の産婦人科医であった彼は、患者接触前にさらし粉の溶液で手を擦ることが、産褥熱による死亡率を劇的に減少させることを証明した。数年後、フランスの化学者であり微生物学者でもあるLouis Pasteurは、微生物が感染性疾患の原因であることを示し、汚染された環境が微生物の伝播に関連していることも証明した。1970から1980年代にかけては、米国のCDCが手洗いを「感染予防における最も重要な方法」ととらえ、1983年に初めての手指衛生ガイドラインを発行した。

《ある病院の事例が世界に発信される》 90年代半ば、スイスのジュネーブ大学の研究者等は、アルコール消毒剤を用いた手指衛生の推進が革新的に医療関連感染を減少させることを実証し、後のWHO複合的手指衛生改善戦略の礎となった「ジュネーブモデル」を2000年にランセットにて発表した。2005年、WHOはClean Care is Safer Careキャンペーンの中心として手指衛生を取り入れ、それ以降多くのツール開発や取り組みを実施してきた。

《科学的根拠を日々の実践へ》 科学的根拠と日々の実践の乖離を埋めるため、交差感染防止に必要な手指衛生のタイミングを示す「手指衛生の5つのタイミング」が開発された。このツールは手指衛生の実践を理解しやすく、教えやすく、観察しやすく、報告しやすいものにしたが、その実践はまだ難しいままであった。

WHO複合的手指衛生改善戦略は 1)システム変更(手洗いの代わりに手指消毒を推進)、2)研修と教育、3)評価とフィードバック、4)職場での注意喚起、5)組織の安全文化の改善の5つの項目を含んでいる。WHOはこの複合的戦略の実現可能性と実践の継続性を、6つの異なる文化や経済資源を持つ地域で実証し、2009年には、それに重きを置いた「医療における手指衛生WHOガイドライン」を発行した。同年、WHOは5月5日を世界手指衛生の日としたSAVE LIVES: Clean Your Handsキャンペーンを開始した。この世界的取り組みは多くの活動やツールを生み出し、現在182カ国の21,000以上の施設で活用されている。

《HHSAF: 実践ツール》 HHSAFを使用することで、施設間や地域間で現状を比較し、また継続使用することで自施設の進捗を確認することができる。近年の研究では、HHSAFが手指衛生改善計画の作成に役立つことが複数の国で実証されているが、その定期的なモニタリング結果や報告などは今だ蓄積されていない。

《2019年グローバルサーベイ参加の呼びかけ》 2019年のWHO世界手指衛生の日のテーマは、すべての国で清潔なケアを提供し、すべての患者と医療従事者が感染症や薬剤耐性菌の伝播から平等に守られることに焦点を当てており、行政機関、医療機関の経営層、感染対策者、医療従事者、患者会に行動が呼び掛けられている(図1、2)。また、WHOのボード(図3)に名前を記載し、同僚や友人、患者との写真を投稿することも促されている。

手指衛生を含めた感染対策は、医療の質と患者の安全に影響を与える、実践的且つ根拠に基づいたアプローチであり、ユニバーサルヘルスカバレッジの達成に必要である。HHSAFグローバルサーベイといった世界的活動に参加し、医療における感染対策を実践していきましょう!



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## Current situation and challenges of nosocomial infection in Vietnam

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### Background

The current situation of nosocomial infection in Vietnam in general, and Cho Ray Hospital is alarming. Four main healthcare-associated infections (HAIs), namely, ventilator-associated pneumonia (VAP), catheter line-associated bloodstream infection (CLABSI), catheter-associated urinary tract infection (CAUTI) and surgical site infection (SSI), are higher in Vietnam than in other countries. Importantly, four HAIs are dominant, but the VAP incidence rate is the highest in Vietnam and in Cho Ray Hospital. Nosocomial infection results in increasing medical fees, treatment time and mortality for inpatients. Moreover, HAIs related to multidrug resistance organisms (MDROs) are increasing the mortality burden for medical systems in Vietnam and in the world. Jim O'Neill et al.'s study revealed that the deaths attributable to antimicrobial resistance (AMR) every year will be more than the current number of those associated with cancer, by 2050 (1). In Vietnam, there are insufficient detailed reports about the current situation and the infection control challenges for nosocomial infection. Therefore, in this cross descriptive study, we present the current situation and the infection control challenges against HAIs in Cho Ray Hospital and Vietnam. We also provide some orientation of infection control and prevention solutions.

### Purpose

To present an overview of the current situation, challenges and solutions for infection control and prevention of HAI in Vietnam.

### Introduction

The current situation of nosocomial infection in Vietnam is alarming. In 2018, the HAI rate was 5%, but some hospitals had higher HAI rates of nearly 10% (2). In Cho Ray Hospital, the incidence rate of HAI was approximately 3% in 2018. However,

the HAI incidence rates in developed countries were less than 1% (NHSN). There are differences in geology, climate and medical system service between Vietnam and other countries, so there are various etiologies causing nosocomial infection. For developed countries, such as Japan, the microorganism is usually gram-positive, such as *Staphylococcus aureus*. While in Vietnam, the majority of HAI microorganisms are gram-negative, such as *Acinetobacter spp.*, *E.coli*, *Klebsiella* and *Pseudomonas spp.* Many hospitals in Vietnam are facing considerable challenges in infection control and prevention, such as overcrowding of inpatients from referral hospitals, lack of personal protective equipment (PPE) and medical facilities used for the isolation of MDROs and emerging infectious diseases, decreasing quality of medical construction, lack of human resources working in infection control, insufficient funding for infection control and lack of awareness of medical staff about infection control. In addition, increasing antibiotic resistance, especially with the appearances of MDROs in ventilated patients in intensive care units (ICUs), has created new challenges for healthcare workers in Vietnam and Cho Ray Hospital. Although there were plenty of initial benefits, such as decreasing VAP rates, medical fees and mortality rates after applying several interventions including antimicrobial stewardship (AMS), and nosocomial surveillance, the effect of MDROs on hospitalisation time and mortality rate still remains in complicated progression. According to the Cho Ray Hospital in 2017, the percentage of MDROs was still high at 62% of inpatients and particularly higher in ventilated patients. Another report, which was from the University of Medicine and Pharmacy in Ho Chi Minh City in 2017, revealed the percentage of MDRO as 58.6% (3). Magill SS et al. reported that MDROs associated with mechanical ventilators enhance hospitalisation time, medical expenses and mortality rates (4). A research in a university affiliated hospital for 315 inpatients revealed the high mortality rate of 30.8% (97/315) among CAUTI patients (5). Other studies showed that MDRO patients with VAP were associated with gram-negative infections and high mortality rates (6–8). In Vietnam, surveys about the current situation and the challenges of infection

control and prevention and researches assessing the effect of MDROs on HAI have not been conducted in detail. Therefore, this study presents an overview of the current situation and the challenges for infection control and prevention of HAI in Vietnam through analysing recent and detailed infection control data from Vietnam and Cho Ray Hospital.

### Materials and methods

A survey on current situation and challenges for infection control and prevention of nosocomial infection in Vietnam in recent years.

We used a cross descriptive study to search publications on various websites about the infection control of HAI in 2018 and Cho Ray Hospital surveillance data.

### Overcrowding of patients in final referral hospitals

Because of a perceived distinction in specialty degree between referral and local hospitals caused by the belief of patients that the specialty degree of referral hospitals is higher than that of local hospitals, most patients who can receive adequate treatment in local hospitals still wish to be referred to top referral hospitals for diagnosis and therapy. Therefore, referral hospitals, such as Cho Ray Hospital and Bach Mai Hospital, are overcrowded with inpatients and outpatients. Overcrowded patients lead to major challenges for infection control and prevention, such as cross infection of MDROs or other emerging infectious diseases. According to Cho Ray Hospital data, the hospital has 1,800 planned beds, but there are approximately 3,000 inpatients every day. The daily number of outpatients is about 5,000–6,000, with 150 cases needing operations. Therefore, the distance between two beds is excessively narrow at less than 0.5 m. Sometimes, two patients share one bed, thereby easily leading to cross infection in the hospital. To solve this problem, hospitals have been cohorting the patients infected with MDROs or emerging infectious diseases and needing isolation in the same areas, using PPE and applying standard precautions or additional precautions based on the route of transmission.

### High rate of HAIs

Several reports in Vietnam show that the HAI rate is approximately 5–10% (2). Cho Ray Hospital's surveillance data from 2018 revealed that the HAI incidence rate was nearly 3%. There are four types of HAI that occur frequently,

namely, VAP, CLABSI, CAUTI and SSI. By contrast, the HAIs incidence rate in developed countries is less than 1%. A report on HAIs in the USA shows that the CLABSI rate is 0.8/1,000 catheter-day, the VAP rate is 0.9/1,000 mechanical ventilators-day and the CAUTI rate is 1.7/1,000 catheter-day (9). In addition, our research reveals a very high percentage of MDROs in Cho Ray Hospital. We conducted all samples positive culture for the first six months of 2018. According to the results, the percentage of MDROs in the 6,820 positive specimens of the culture was 62%.

### Poor hand hygiene compliance

Hand hygiene is a simple and efficient intervention to reduce the HAI rate. However, recent hand hygiene surveillance data from Vietnam reveals that hand hygiene compliance rate remains low at approximately 50–70% (10). In Cho Ray Hospital, the hand hygiene compliance rate increased to 61% in 2018 from 49% in 2017, but this number is still low compared to the requirement of the Vietnamese Ministry of Health (MOH).

### Lack of PPE and other facilities for isolating MDROs and preventing transmission of emerging infections

The management of isolating MDROs and emerging infectious diseases in Vietnam and Cho Ray Hospital has been facing many difficulties. First, isolation rooms are insufficient for regular isolation, and negative pressure isolation rooms are likewise not enough for cases with airborne diseases, such as tuberculosis, chicken pox, influenza, and Ebola. Second, the supply of PPE, such as aprons and masks, is insufficient for taking care of MDROs. Cho Ray Hospital supplied PPE for outbreak precaution, but for MDROs, the supply is still limited and not equally distributed to departments in the hospital. Therefore, the efficacy of MDRO isolation is still limited.

### Decreasing quality of hospital construction

Most of the public hospitals in Vietnam were built many decades ago, such as Cho Ray Hospital, which is half a century old. Therefore, the quality of hospital construction, patient rooms, facilities and environment has been deteriorating. Plenty of construction has been added onto the hospitals, causing their environments to have narrow spaces and limited airflow. Therefore, current infection control and prevention of HAI have many challenges in improving

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hospital environments and HAI prevention in Vietnam and Cho Ray Hospital.

## Lack of human resources for infection control

During the past decade, the Vietnamese MOH has focused on HAIs by issuing some detailed national rules for infection control and prevention at medical services, such as Circular 18/2009 and Updated Circular 16/2018. The circular defines the detailed roles of the Infection Control Committee, Head of Infection Control and the Infection Control Team. Importantly, the document shows that each person in charge of HAI surveillance has to respond full time for 150 beds. However, hospitals in Vietnam currently lack infection control human resources for daily HAI monitoring. Cho Ray Hospital has approximately 3,000 beds. Therefore, it needs about 20 staff working full time in HAI surveillance. According to WHO, each HAI surveillance staff needs to support only 100 beds full time. However, in practice, the Department of Infection Control has only five persons serving all patients in the hospital. All hospitals in Vietnam have insufficient infection control staff. This is one of the most severe problems for the infection control team in Cho Ray Hospital and Vietnam, thereby affecting the quality of HAI surveillance.

HAI surveillance in Vietnam, except that in Cho Ray Hospital, often uses short-term surveillance. In Cho Ray Hospital, HAI surveillance adopts longitudinal surveillance in all departments. Therefore, the result of HAI surveillance is more accurate and thus valuable for finding solutions for HAI intervention.

## Poor cognition of infection control of healthcare workers

Awareness about HAIs, infection control and prevention and self-awareness regarding HAIs infection control in hospitals are low due to healthcare workers' poor cognition about the importance and benefits of HAIs prevention and control. For example, the hand hygiene compliance rate of healthcare workers in Vietnam is lower than in developed countries worldwide. The hand hygiene compliance rate of Cho Ray Hospital staff was approximately 61% in 2018, and the hand hygiene compliance rate of doctors was lower than that of nurses. Therefore, infection control staff needs to train all staff in the hospital to adopt hand hygiene practices. In addition, maintaining a high hand hygiene compliance rate is also essential and staff need to persist and have passion for infection control.

## Insufficient funding for infection control

Circular 16/2018 of the Vietnamese MOH defines payment for infection control and prevention. However, this document does not define in detail the amount that patients have to pay for infection control. Therefore, there is no standard amount for all hospitals regarding infection control payment, and each hospital has to calculate by itself. Hence, funding for hospitals' infection control is limited by insufficient, incorrect calculations for each patient or lack of influence and interest from managements for infection control. Consequently, the operation of infection control systems has difficulties and reduced efficiency.

## Discussion

HAI is considered as the biggest concern of all countries with regard to improving hospital quality, and an important indicator for comparison and evaluation of different hospital services. Therefore, HAI surveillance has been known and practised worldwide for the past couple of decades. This has led to a decrease in the HAI rate of developed countries to less than 1% (9); reductions in antibiotics consumption, number of MDROs and total medical fees; and enhanced survival rates.

On the contrary, medical systems in developing countries, such as Vietnam, are undergoing gradual completion with many difficulties. The development of specialty and administration rules has not been synchronised between referral and local hospitals. HAI surveillance systems are being completed to serve the high-quality medical service needed by patients. As shown by the current situation, challenges include overcrowding of patients in referral hospitals due to the belief of patients that referral hospitals have higher specialty degrees than local hospitals. Hence, patients wish to transfer to the best hospitals and this is leading overcrowding of patients in these top hospitals. To solve this problem, we need to develop the same infection control systems in both referral and local hospitals and enhance infection control training for local hospital staff, thereby regaining the trust of patients during their treatment in rural hospitals. The HAI rate in Vietnam was as high as 5–10% in 2018, whereas that of Cho Ray Hospital was 3–5%. In particular, the MDRO rate is also high at a warning point of 62% of positive cultures. Some microorganisms have developed resistance to the antibiotics currently being used. To decrease the HAI and MDRO rates, we have been implementing several complete solutions, such as VAP, SSI and MDRO care bundles, in all related



departments. Additionally, medical staff have been training for improved infection control knowledge, enhanced awareness about the benefits of increased hand hygiene compliance rate. Moreover, we need to conduct additional research and evaluation to supply facilities for isolation patients and medical equipment, such as PPE at ICUs for the care of MDRO patients and to monitor isolation compliance when medical staff look after MDRO patients. Furthermore, each hospital in Vietnam has to recruit sufficient infection control staff following MOH's guidelines and enhance the parallel application of Internet technology to improve the efficiency of HAI surveillance and decrease surveillance cost and time consumption. Finally, each hospital has to correctly and sufficiently calculate their medical fees for infection control. Thus, Vietnamese hospitals have to show annual cost for infection control.

In conclusion, according to the discussed current situation and challenges, HAI infection control in Vietnam has many advantages and disadvantages and all of the ministry and the MOH's full attention is required to support infection control in the near future. With the MOH's support for infection control, especially for the targeted decrease in HAIs and MDROs, we will definitely obtain good results.

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## 日本語要約

### ベトナムにおける医療関連感染の現状と課題

ベトナム全体、及びチョーライ病院における医療関連感染(HAI)の状況は深刻である。とりわけ、人工呼吸器関連肺炎(VAP)、中心静脈カテーテル感染(CLABSI)、尿道留置カテーテル感染(CAUTI)、手術部位感染(SSI)の4つが諸外国に比べて高い状況で、中でもVAPの発生率がチョーライ病院及びベトナムにおいて最も高くなっている。HAIは、医療費や治療期間、死亡率の増加等に繋がり、さらに近年世界で問題となっている多剤耐性菌(MDROs)により引き起こされる医療関連感染が、ベトナムの医療現場でも大きな課題となっている。ベトナムではこれまで詳細な調査や研究があまりなされていない為、ここ数年のベトナムとチョーライ病院のデータから現状と課題を調査した。

2018年のベトナムのHAI発生率は5%となっており、チョーライ病院では約3%であった。病院によっては10%近い高い値も記録しており、先進国における1%未満に比べると非常に高いことが分かる。さらにチョーライ病院では、2018年上半年に収集したデータでは、陽性検体6,820サンプルのうち多剤耐性菌が約62%という高い値を示した。調査の結果、感染管理の観点から多くのベトナムの病院が直面している課題として、収容能力を超えた入院患者の過密状態、高いHAI発生率、低い手指衛生遵守率、PPEや隔離施設の不足、施設の老朽化、感染管理の専門人材の不足、感染管理に関する医療従事者の認識不足、感染対策に割く資金の不足等が明らかになった。抗菌薬の適正使用(AMS)や院内感染のサーベイランス実施により、VAP発生率の低下や医療費の減少等の成果も一部見られるものの、多剤耐性菌感染による入院期間や死亡率への影響等については、依然として複雑な経過を辿っているところであり、明確な成果は現在のところ不明である。

収容能力を超えた入院患者の過密状態については、特に各地域のトップに位置する基幹病院で深刻である。というのも、患者の多くに、地方病院よりも基幹病院の方が医療の質が高いという思い込みがあり、地方病院で十分に対応可能な病状であっても、基幹病院への紹介を希望する患者が多いからである。チョーライ病院の例で言うと、1,800床で計画されているところに、3,000人近い入院患者が押し寄せている。さらに、外来患者は1日あたり5,000~6,000人、外来手術件数は150件に上る。その結果として、ベッドの間隔は50cm以下等非常に狭くなり、時に2人の患者が1つのベッドを使用せざるをえないこともある。このような状況は交差感染を容易に引き起こし、感染対策を非常に困難にしている。また、手指衛生の遵守率について、最近のデータでベトナムは約50-70%となっている。チョーライ病院では、2017年に49%、2018年が61%と増加を示しているものの、ベトナム保健省の基準と比較すると、まだ低い値である。また、人材の面でいうと、保健省は150床に1人のHAIサーベイランス担当者を定めており、WHOでは100床に1人となっている。チョーライ病院では3,000床あるので、少なくとも20人のスタッフが必要になるが、実際は感染管理部から対応できるのは5人しかいない。

このようなベトナムの課題を解決する為には、基幹病院と地方病院とで共通の感染管理システムを開発し、地方病院のスタッフへの教育を強化し、患者の信頼を取り戻すことが必要である。さらに、保健省のガイドラインに準じた十分な人数のスタッフを各病院が確保することも重要で、同時に、サーベイランスの負担を減らせるような技術の導入の検討も有用である。さらに、適切な感染対策に必要なPPE等の供給や施設・設備等を検証することも必要と考える。保健省をはじめ関連する各省庁の支援は不可欠であり、ともに感染管理分野の強化に取り組むことで、深刻な多剤耐性菌問題についても成果をあげていきたい。

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