



INFECTION CONTROL
ASSOCIATION (SINGAPORE)



8th

**International
Congress**

of **INFECTION CONTROL
ASSOCIATION (SINGAPORE)**

**2-4
NOVEMBER
2023**

> The Future of IPC

• *Venue: Grand Copthorne Waterfront*

E-PROGRAMME BOOKLET

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WELCOME MESSAGE

Dear Friends and Colleagues,

On behalf of the organising committee, it is our utmost pleasure to extend a warm welcome to all attendees of the 8th International Congress of Infection Control Association (Singapore). This year's theme, "The Future of IPC" promises to deliver a captivating and insightful experience in the field of infection prevention and control.

The scientific program has been thoughtfully curated to provide an all-encompassing and dynamic experience for every participant. Over the course of three (3) days, you will have the privilege of engaging in a pre-congress workshop, attending symposia that span a wide spectrum of topics, participating in interactive discussions, and witnessing presentations from esteemed international and local experts.

The success of this conference is the fruit of collaborative efforts from our dedicated organising committee, the remarkable faculty hailing from different corners of the world, and, most importantly, individuals like you, our esteemed delegates. Our primary objective is to offer you an invaluable source of cutting-edge information to enhance your clinical practice or research endeavors. None of this would have been achievable without the generous support of our valued sponsors, whose contributions have been instrumental in making this event a resounding triumph.

Once again, a warm welcome to all participants of 8th International Congress of Infection Control Association (Singapore) and have a fruitful congress.

A/Prof Ling Moi Lin

President

Infection Control Association (Singapore)

Dr Tan Seow Yen

Chairperson

8th ICICAS Organising Committee





ORGANISING COMMITTEE

- ◆ **Chairperson:** Dr Tan Seow Yen

- ◆ **Members:**
 - Ms Chua Gek Hong
 - Ms Amelia Tay
 - Ms Priscilla Chng
 - Mr Ismail Bin Sazali





CONFERENCE INFORMATION

◆ CONFERENCE VENUE

Pre-Congress Workshop: Water Management in Healthcare Facilities 101

Thursday, 2nd November 2023

Riverfront Ballroom II and III, Level 2
Grand Copthorne Waterfront Hotel
392 Havelock Rd, Singapore 169663

Main Congress

3rd - 4th November 2023

Waterfront Ballroom and Riverfront Ballroom II and III, Level 2
Grand Copthorne Waterfront Hotel
392 Havelock Rd, Singapore 169663

◆ CONFERENCE REGISTRATION

2nd November 2023

The Registration Counter is in the Foyer area outside Riverfront Ballroom II and III at Grand Copthorne Waterfront.

3rd - 4th November 2023

The Registration Counter is in the Foyer area outside Waterfront Ballroom at Grand Copthorne Waterfront.

The counter will be open daily from **0800 - 1700 hours**.

◆ CONFERENCE NAME BADGE

Upon completing your registration, you will receive a personalized name badge.

It is mandatory to wear your name badge to all sessions and events throughout the conference. In the event of losing your name badge, please contact the Conference Secretariat for a replacement.

Please note that a replacement fee applies.

◆ EXHIBITION

A state-of-the-art exhibition featuring medical equipment and allied applications will take place in the Riverfront Ballroom Foyer, Level 2, Grand Copthorne Waterfront.

Exhibition Opening Times:

Friday, 3 November 2023 **0800 - 1700 hours**

Saturday, 4 November 2023 **0800 - 1700 hours**



CONFERENCE INFORMATION

◆ CME / CPE ADMINISTRATION

(Applicable to Singapore registered Healthcare Professionals ONLY)

CME/CPE points will be accorded for attending the Scientific Symposium. Delegates are required to register their attendance daily at the conference registration counter twice; at the beginning of the day and during lunch time.

◆ LOST AND FOUND

For any lost and found items, please approach the Conference Registration Counter.

◆ CONFERENCE LANGUAGE

English will be the primary medium of instruction for the conference

◆ LIABILITY

The Organisers are not liable for any personal accidents, illnesses, loss, or damage to private properties of delegates during the conference. Delegates are advised to make their own arrangements with respect to personal insurance.

◆ DISCLAIMER

Whilst every attempt will be made to ensure that all aspects of the Conference will take place as scheduled, the Organising Committee reserves the right to make appropriate changes should the need arises with or without prior notice.

◆ POSTER PRESENTATION

Each presenter will be allocated a poster board (one side only) with an area of 1m x 2m. Each poster board will be marked with a poster panel number. Poster should be set up on Friday, 3 November 2023 between 0800 – 0845 and removed on Friday, 4 November 2023 after 1530 hours.

◆ CONFERENCE SECRETARIAT

For any assistance, kindly reach out to the Conference Secretariat, conveniently located at the Registration Counter.



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Co-Director
WHO Collaborating Centre for Infectious
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The University of Hong Kong

SCIENTIFIC PROGRAMME

Day 1: Thursday, 2 November 2023

Pre-Congress Workshop - Water Management in Healthcare Facilities 101

This one-day workshop is designed to help you develop a basic working water management program for your facility or improve your current program. Using ASHE's Water Management in Health Care Facilities as an outline, the workshop will address creating a water management team, the designing of, maintenance procedures for and monitoring strategies within a water system, and the development of standard operating procedures and emergency responses, and will also provide information on potential pathogens and response methods. This workshop identifies the different uses of water in health care and the related infection risks and standards. It will detail how to develop a water management program to not only meet the applicable standards but to help protect patients, visitors and staff from associated risks.

◆ Target Audience

- Infection prevention professionals
- Healthcare facility managers
- Healthcare maintenance personnel
- Healthcare design professionals
- Contractors working in health care environments
- Construction project managers

◆ Learning Outcomes

- Describe what a water management plan is.
- Identify elements of an effective water management program.
- Identify different types and uses of water in a healthcare facility.
- Identify equipment and water uses that present a risk for infection in health care settings.
- List the different waterborne pathogens and identify mitigation options for each.
- Discuss how to develop and maintain a comprehensive water management program for your facility.

Time	Topic	Speaker
0830 - 0900	Registration	
0900 - 1000	Local Experiences With HO-Legionellosis	<i>Dr Jyoti Somani</i>
1000 - 1030	Starting A Water Management Program	<i>A/Prof Ling Moi Lin</i>
1030 - 1100	Tea Break	
1100 - 1130	Starting A Water Management Program (Cont'd)	<i>A/Prof Ling Moi Lin</i>
1130 - 1200	Q&A	
1200 - 1300	Lunch	
1300 - 1400	Environmental Sampling and Interpretation	<i>Dr Deborah Lai</i>
1400 - 1500	Remedial Actions and Maintenance	<i>Mr Than Htut</i>
1500 - 1530	Tea Break	
1530 - 1630	WMC-ICRA	<i>Ms Lee Lai Chee</i>
1630 - 1730	Polices And Procedures	<i>A/Prof Ling Moi Lin</i>
1730 - 1800	Q&A	
1800	END	

Day 2: Friday, 3 November 2023

0800 - 0845	Registration	
0845 - 0900	Opening Ceremony	
0900 - 1000	<p>Plenary 1: Moving Out from the COVID-19 Pandemic (What Has Changed and What Is In The Horizon) <i>Speaker: Prof Dale Fisher</i> <i>Chairperson: Dr Tan Seow Yen</i></p>	
1000 - 1030	Morning Tea Break	
1030 - 1200	<p>Symposium 1: Global Issues In IPC <i>Chairperson: Ms Chua Gek Hong</i></p>	<p>Symposium 2: Technology and Social Media <i>Chairperson: Mr Ismail Bin Szali</i></p>
1030 - 1100	Emerging and Re-Emerging Infectious Diseases <i>Dr Leong Hoe Nam</i>	Blue Mirror PPE Instructor: The SGH Experience <i>Ms Lee Lai Chee</i>
1100 - 1130	IPC In Low Resource Settings <i>Dr Margaret Soon</i>	Social Media and Infection Prevention <i>Prof Paul Tambyah</i>
1130 - 1200	How Can Good IPC Practices Contribute to the Fight Against Antimicrobial Resistance? <i>Dr Jean Sim</i>	The Role of Modeling Techniques In IPC <i>Mr Venkataraman Narayan</i>
1200 - 1300	Lunch	
1300 - 1430	<p>Symposium 3: Clinical Governance and Quality Improvement <i>Chairperson: Mr Ismail Bin Szali</i></p>	<p>Symposium 4: IPC In The ILTC <i>Chairperson: Ms Priscilla Chng</i></p>
1300 - 1330	Advancing Infection Prevention: Integrating Quality Improvement and Technology for Enhanced Control Practices <i>Prof Tan Ban Hock</i>	MDRO's, Are Standard Precautions Really Enough in the ILTC? <i>Dr Kalaimamani D/O Kanagasabai</i>
1330 - 1400	Modern Approach to Infection Control <i>Dr Tan Seow Yen</i>	Protecting Long Term Care Facilities Residents from Infection. What Can You Do? <i>Ms Christine Eu</i>
1400 - 1430	Update on Specific Strategies to Reduce SSI <i>Dr Asok Kurup</i>	IPC Considerations in The Construction Of A New Community Hospital <i>A/Prof Brenda Ang</i>
1430 - 1500	Afternoon Tea Break	
1500 - 1600	<p>Debate: IPC and Environmental Sustainability <i>Dr Surinder Pada, Dr Jyoti Somani</i> <i>Chairperson: Dr Tan Seow Yen</i></p>	
1600 - 1700	<p>Plenary 2: The Economic Impact of Infection Prevention: Making the Business Case for Increased Infection Prevention Resources <i>Chairperson: Ms Priscilla Chng</i> <i>Speaker: A/Prof Ling Moi Lin</i> <i>Panelists: A/Prof Ling Moi Lin, Mr Roger Leong Yiam Pan, and Ms Foo Meow Ling</i></p>	

Day 3: Saturday, 4 November 2023

0830 - 0900	Registration	
0900 - 1000	Plenary 3: IPC in 2022: The Year in Review <i>Speaker: Dr Kalisvar Marimuthu</i> <i>Chairperson: Dr Tan Seow Yen</i>	
1000 - 1030	Morning Tea Break	
1030 - 1200	Symposium 5: Sterilization and Disinfection <i>CHAIRPERSON: Ms Amelia Tay</i>	Symposium 6: Environmental Hygiene <i>CHAIRPERSON: Ms Cathrine Teo</i>
1030 - 1100	IPC Challenges in Using Automation For Sterile Reprocessing <i>Mr Ole Lundgaard-Mortensen</i> IPC Considerations in Planning of Automation in CSSD <i>Mr Ole Lundgaard-Mortensen</i>	Challenges on Environmental Hygiene Environmental Service perspective <i>Mr Imran Bin Ahmad</i>
1100 - 1130		Roles of Sink in Infection Prevention <i>Ms Lee Lai Chee</i>
1130 - 1200		UVC Usage in Healthcare <i>Ms Foo Meow Ling</i>
1200 - 1300	Lunch	
1300 - 1430	Symposium 7: IPC And Sustainability <i>CHAIRPERSON: Ms Sue Goghari</i>	Symposium 8: MDRO <i>CHAIRPERSON: Ms Lily Lang</i>
1300 - 1330	IPC and Environmental Sustainability <i>Ms Lee Ewe Choon</i>	Antimicrobial Resistance in the Food Chain <i>A/Prof Aung Kyaw Thu</i>
1330 - 1400	Environmental Sustainability and IPC related issues: Perspectives of an Anaesthetist <i>Dr Joanne Yeo</i>	The Costs, Risks and Benefits Of Isolation Precautions In The Setting <i>Dr Kalisvar Marimuthu</i>
1400 - 1430	Environmental Sustainability and IPC related issues: Perspectives of a Surgeon <i>A/Prof Benita Tan</i>	Technology and MDROs - Bane or Boon <i>Prof Paul Tambyah</i>
1430 - 1500	Afternoon Tea Break	
1500 - 1600	Free Paper Presentation	
1600 - 1700	Plenary 4 Infection Prevention and Control: How to Communicate and Find Allies and Friends <i>Speaker: Prof Seto Wing Hong</i> <i>Chairperson: A/Prof Ling Moi Lin</i>	
1700 - 1715	Awards Presentation and Closing Ceremony	



◆ ORGANISER



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ACKNOWLEDGMENT

The 8th ICICAS 2023 Organising Committee would like to thank the following for their kind and generous contributions:

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ABSTRACTS

PRE-CONGRESS WORKSHOP: WATER MANAGEMENT IN HEALTHCARE FACILITIES 101

Environmental Sampling and Interpretation

Dr Deborah Lai

Legionellosis is caused by bacteria of the Legionella genus, with the majority of diagnosed cases linked to Legionella pneumophila. Humans are primarily exposed to Legionella through inhalation of contaminated aerosols. Infected patients can develop pneumonia, which may be fatal in up to 33% of cases. Legionella occur naturally in water but have optimal growth at warm temperatures. They grow in human-made building water systems that support biofilm growth, including building plumbing systems, faucets and showerheads. Monitoring of Legionella bacteria in the environment is fraught with difficulties, including where and when to sample in the environment, what detection methods to use, and how to interpret the data. We share our experience with Legionella sampling and interpretation using a risk assessment framework.

WMC-ICRA

Ms Lee Lai Chee

Water stagnation leads to biofilm formation and growth of gram negative bacilli including Legionella. Water systems left dormant during construction, renovation or repair of water systems could lead to water stagnation and formation of dead legs. The concept of water management construction-infection control risk assessment is used in SGH to prevent biofilm and Legionella growth during constructions and renovations. Participants will get to hear the experience in SGH and two case studies will be shared.



PLENARY 1

Moving Out from the COVID-19 Pandemic

Prof Dale Fisher

The pandemic was a time demanding the rapid acquisition of knowledge for a novel virus as well as reinforcement or crystallisation of what we already knew about outbreak response and in particular IPC.

In IPC, most of us felt that droplet and airborne spread was not binary but a spectrum and we knew that spread from infected people without symptoms is possible especially when the viral load is highest at the onset of illness. We now more comfortably accept that aerosol generating activities include singing and talking, so the significance of ventilation needs to better enter discussions during building design especially healthcare facilities and their modifications after construction.

COVID-19 could amplify quickly in a community yet IPC was poorly practiced in the community in most countries, considering mask wearing, supervised isolation of cases and enforced quarantine. The necessary relationships between IPC practitioners and those they wish to protect is clearer than ever. Non-IPC experts are now more appreciative of our field.

Going forward, IPC as a profession needs better integration. In hospitals, as procedures, equipment immunosuppressives and tools of other disciplines evolve, IPC professionals may not be able to keep up. As there is a shift to outpatient care we need a better understanding of emerging risks. Perhaps patients and staff within teams will need to take more responsibility for IPC. An increasing role in financial management will come from a better understanding of the cost of HAI's. The efforts of IPC need to emerge stronger in all levels of the health care system.

Beyond the hospital and in public health IPC experts should have a bigger role especially with climate change, emerging diseases, human migration and more displaced and vulnerable populations. To do this IPC practitioners will need to develop as leaders to allow IPC integration into high level decisions.

Skill sets of IPC professionals will need to evolve with an increasing value placed on relationships, diplomacy, advocacy, leadership. Training will involve more simulation, e learning, virtual reality and serious games.

Surveillance and data management will need to provide considerable support where IPC practitioners are not at a computer all day rather can be on the wards. Modelling could personalize a patient's risk and support specific preventative measures.

The prominence given to IPC as a result of the pandemic has created an opportunity for IPC leaders to integrate as leaders of health systems and leaders in the community. IPC teams should diversify with epidemiologists, data managers, communications experts. This needs do be done in a cost saving framework with decreasing HAI's and improved systems.

SYMPOSIUM 1: GLOBAL ISSUES IN IPC

IPC in Low Resource Settings

Dr Margaret Soon

Healthcare associated infection (HAI) is a leading cause of morbidity and mortality in the healthcare setting. It poses a significant economic burden to patients and the healthcare system. These impacts are usually worse in low resource settings. According to the World Health Organization's (WHO's) Global Report on Infection Prevention and Control (2022), 15 in 100 patients in low- and middle-income countries will acquire 1 HAI while admitted in acute care hospitals, compared to only 7 in 100 patients in high income countries. Of those with HAI, 1 in 10 will die from their HAI.

Similarly, the COVID-19 pandemic and other recent infectious disease outbreaks have highlighted the importance of infection prevention and control (IPC). During the initial waves of the COVID-19 outbreak, transmission of SARS-CoV-2 in healthcare settings was a major issue according to different studies.

IPC measures prevent the transmission of infections to patients and healthcare workers. Studies have shown that implementation of IPC best practices reduces incidences of HAIs and adverse impacts on patients. However, implementation of such a program has proven to be challenging, more so in low resource settings. In a global survey conducted by WHO in 2019, implementation of the core components of IPC ranged from "inadequate" to "advance", with low resource settings showing suboptimal implementation.

This presentation will highlight some of the challenges of IPC implementation in low resource settings, focusing on leadership, infrastructure issues, resource availability, trained personnel, and surveillance data.



SYMPOSIUM 2: TECHNOLOGY AND SOCIAL MEDIA

Blue Mirror PPE Instructor: The SGH Experience

Ms Lee Lai Chee

Training and providing immediate feedback to staff on appropriate use of personal protective equipment (PPE) are critical component of Infection Prevention but the process is labor-intensive. The purpose of the project is to evaluate the accuracy and feasibility of using an artificial intelligence (AI)-augmented smart mirror (Blue Mirror mobile application) in checking the steps of donning and doffing of PPE, and the feasibility of implementing the solution in local setting. The results showed that Blue Mirror is mostly accurate in detecting correctly or wrongly worn PPE. This solution will most likely be effectively utilized for PPE training among staff.

Social Media and Infection Prevention

Prof Paul Anantharajah Tambyah

Social media has transformed communications in many fields including education, research and even clinical care. While there are many who have used social media to disseminate important public health messages, at the same time, there are a lot of confusing messages that sometimes are disseminated even more widely. In addition, industry often has deep pockets and is able to disseminate attractive messages that may not be the most accurate. The current social media environment has a huge amount of potential for influencing behaviour to improve outcomes and reduce healthcare associated infections. This will however require expertise and perhaps the involvement of many young social media savvy nursing and medical students.

The role of modeling techniques in IPC

Mr Narayan Venkataraman

Covid-19 pandemic spurred healthcare providers to innovate during adversity and one of the Data Science domains explored by scientists and analysts was the use of various Data Modelling techniques for addressing clinical and operational challenges that surfaced during the pandemic. Some of the successful data modelling solutions implemented at Changi General Hospital (CGH), SingHealth, included Innovative algorithm for improving Contact Tracing productivity : novel data mining model, CAPE : AI / Deep Learning based Pneumonia detection model, SmartView Dashboard with Safe Distancing based Clinic Optimisation Model (@SOC) aligned with Infection Control requirements, In-hospital acute Covid-19 cluster monitoring : Modelling and visualisation using Excel and Power BI, Post-pandemic "return to BAU" resource modelling for clinical FTE deployment and allocation. Future smart innovative technologies include the Digital Twin for Infectious Disease Surveillance that was piloted at Singapore General Hospital (SGH) and currently it is being piloted at the CGH Emergency Department (ED) to optimise patient flow and efficiency, thus mitigating any associated risks for ID transmissions in a high density patient care area like ED. Healthcare domain has limitless opportunities to innovate using Artificial Intelligence/Machine Learning/Deep Learning modelling techniques and Singapore healthcare system is gradually deploying clinically validated AI based models in our journey towards smart healthcare.

SYMPOSIUM 3: CLINICAL GOVERNANCE AND QUALITY IMPROVEMENT

Update On Specific Strategies to Reduce SSI

Dr Asok Kurup

Surgical site infections (SSI) can occur in 0.5% to 3% of patients undergoing surgery which can lead to longer hospitalization of about 7 to 11 days than those without SSI. Fortunately, most SSIs can be prevented by following specific strategies. These interventions include avoiding razors for hair removal; decolonization with intranasal antistaphylococcal agents and antistaphylococcal skin antiseptics for high-risk procedures; use of chlorhexidine gluconate and alcohol-based skin preparation; maintaining normothermia with active warming to keep the body temperature warmer than 36°C; perioperative glycemic control; and use of negative pressure wound therapy. The impact of SSI reduction based on a multicenter, cluster randomized study (ChEETAH trial) using routine change of gloves and instruments before wound closure will also be discussed.

SYMPOSIUM 4: IPC IN THE ILTC

Protecting Long Term Care Facilities Residents from Infection, What Can You Do?

Ms Christine Eu

Community Hospitals provide care for older adults who require a short period of continuation of care after their discharge from the acute hospitals, as well as patients who require rehabilitation for functional recovery, and continuation of intermediate level medical and nursing care.

The environment and facilities at the Community Hospitals are developed to help patient in their recovery process. The facilities include rehabilitation gyms, therapy areas, inpatient beds, and mock-up HDB rooms in some community hospital.

Infection prevention and control is important for patient safety and quality care, this not only important for acute hospital, is also equally important for Community Hospital. Infection prevention and control (IPC) programme is needed to manage and plan strategically preventive measures for the community hospital.

"What can we do to protect patients from infection in ILCTC" is an importance area and it involve the collective effort of all healthcare workers in community hospital.



IPC considerations in the construction of a New Community Hospital

A/Prof Brenda Ang

It is well recognized that there is a close relationship between the built environment of hospitals and healthcare associated infections (HAI). As such Infection Prevention and Control measures should be planned from the beginning and "designed in" to new healthcare buildings. It is a fallacy to think that such considerations apply only to acute hospitals. They are important whether we are planning a tertiary facility, an ambulatory centre or a clinic.

Planning for a Community Hospital is no different as we have to consider the types of patients who will be there, assess the risks of HAI's, evaluate the flow of patients, and attempt to influence the design such that risks to patients, staff and the public are minimised.

Community Hospitals being intermediate healthcare facilities for patients requiring continuing convalescent care, may differ from acute facilities in having patients who are not severely ill and not requiring procedures or specialised scans. Types of HAI may be different and the risks may be lower but this may be negated by the considerable longer stays in community hospitals.

Plans should also be in place for adequate isolation rooms and cohorting capacity as community hospitals will not be immune to multi-drug resistant organisms or various outbreaks.

There should also be oversight of building services such as heating, ventilation or water supply systems as they play a key role in infection prevention and control.

SYMPOSIUM 6: ENVIRONMENTAL HYGIENE

Roles of Sink in Infection Prevention

Ms Lee Lai Chee

Understanding the roles of biofilm and sinks is important in the efforts to prevent the transmission of waterborne pathogens such as Gram negative bacilli in healthcare settings. Literature review on some of the latest work in eliminating biofilm from sink systems will be shared.

SYMPOSIUM 7: IPC AND SUSTAINABILITY

IPC and Environmental Sustainability

Ms Lee Ewe Choon

Infection Prevention and Control (IPC) focuses on preventing the spread of diseases among people, particularly within healthcare setting, through measures like hand hygiene, surgical site infections, injection safety, antimicrobial resistance, and isolation. Environmental sustainability is reserve resources like clean air, water, and wildlife for future generation. The United Nations (UN) defines sustainability simply "meeting the needs of the present without compromising the ability of future generations to meet their own needs".

One is about human health (IPC), another is to protect the health of the planet itself (Sustainability), both are crucial concerns, they address different aspect of public health and well-being. However, environmental sustainability and infection prevention and control are interconnected and greatly impact each other in many processes that benefit patients, healthcare workers and community.

The outbreak of the COVID-19 pandemic crisis has raised the demand for and disposal of personal protective equipment. It raises concern of mismanaged PPE in landfill in some countries or high cost for waste incineration has an impact on the environment, economy, and society.

The growing awareness that the health sector is not only at risk from the impacts of climate change but also a major polluter-responsible for 5.2% of global emissions has spurred an international movement for low-carbon healthcare.

Many of health professionals are aware that we owe the population a duty of care now and for future generations. In Singapore, our government has committed to peak our emission around 2030, halve emissions from peak levels by 2030, and achieve net zero emissions as soon as viable in the second half of the century. The public sector will lead the way to pursue sustainable development with the GREENGov.SG. The need for public sector to peak emissions around 2025 and achieve net-zero emissions around 2045. The public sector also set targets to reduce energy and water use by 10% and to reduce the amount of waste disposed by 30% from 2022 levels. Sustainability Infection Prevention and Control: is it possible? A possible option, but it would need further research and investment. For an example: Hand hygiene has been recognised as the most effective method of preventing and controlling healthcare associate infections (HAIs). There are more healthcare workers question on the long-term personal and environmental safety of frequent use of chemicals in health care, it would seem reasonable that more natural option present greater personal, patient, and environmental safety.

By integrating environmental sustainability principle into Infection Prevention and Control practices, healthcare facilities can minimise the impact on the environment, reduce waste, conserve resources, and contribute to a healthier planet.



Environmental Sustainability and IPC related issues: Perspectives of an Anaesthetist

Dr Jo-Anne Yeo

The operating theatre encompassing the nurses, surgical and anaesthesia teams are major consumers and producers of waste in the hospital, often responsible for disproportionate environmental effect within the healthcare system. It has been estimated operating theatres may produce up to 50- 70% of a hospital's waste but that more than 30% of the waste produced is recyclable.

In addition, potentially recyclable waste and general waste is often incorrectly classified as biohazardous waste. Biohazard incineration has significant financial and environmental costs. Some of this is unavoidable for patient, staff and community safety but at times when infection control is quoted as the reason that sustainable measures are not viable, this may not be based on logic or fact.

Environmental Sustainability and IPC related issues: Perspectives of a Surgeon

A/Prof Benita Tan

Sustainability and infection control in surgery are both critical aspects of healthcare. Sustainable practices in surgery aim to reduce the environmental impact of medical procedures, such as minimizing waste and energy consumption. Infection control focuses on preventing the spread of infections within healthcare facilities. Some ways to integrate both include using eco-friendly materials, efficient sterilization methods, and proper waste disposal to maintain a safe and sustainable surgical environment.

SYMPOSIUM 8: MDRO

Antimicrobial Resistance in the Food Chain

A/Prof Aung Kyaw Thu

Antimicrobial resistance (AMR) is a One-Health challenge. Microorganisms carrying resistance can be transmitted between humans, animals and the environment. Like other ecological sectors, antimicrobial resistant microorganisms are monitored and found in the food chain globally as well as in Singapore. The sharing will focus on what are drivers of AMR in the food chain, why AMR is a challenge with some key findings from Singapore's context, and how the Singapore Food Agency (SFA) is working together with local, regional and international One Health partners to address this important challenge.

Technology and MDROs - Bane or Boon

Prof Paul Anantharajah Tambyah

Technology including artificial intelligence and novel devices are increasingly widespread in clinical medicine. While they provide great promise in terms of improving medical outcomes, they also come with additional risks and challenges especially for infection prevention. There are also many gaps which potentially could be exploited by novel technologies in particular in molecular diagnostics which can help in outbreak management as well as in control of endemic healthcare associated infections.

PLENARY 4

Infection Prevention and Control: How to Communicate and Find Allies and Friends

Prof Seto Wing Hong

Infection Prevention and Control (IPC) is now recognized as an established international specialty. Still, its developments in different countries differs and are in differing stages. The ability to communicate is definitely a talent or a gift, although an understanding of the principles for good rhetoric skills will be helpful. A brief outline of these skills will be presented. In terms of finding allies, it is vital that we associate with those who are knowledgeable, able, honest and transparent. This means that firstly, we must ensure that we have the appropriate training in the field and has worked substantially in various aspects of IPC. It will be useful to understand the setup of the different societies and ministries of health. A brief summary of these will be presented. Finally, our associations in IPC should be based a foundation of good evidence. Thus, a brief summary on the WHO Grade System for evidence and the WHO Core Components for IPC will be presented. A discussion will be made on how to use these principles on building allies that are grounded on a mindset of good evidence and how to appropriately apply these principles in our work.





ORAL PRESENTATIONS

Collaboration - Key to Prompt Control of *Serratia marcescens* Outbreak in a Neonatal Unit

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Background/Aim:

Serratia marcescens known to cause infections and outbreaks in healthcare facilities especially amongst immunocompromised or critically ill individuals, such as neonates. This paper describes a cluster of neonates infected or colonised by *S. marcescens* in a neonatal unit at an acute care tertiary hospital in Singapore and the infection control actions that were implemented that led to the successful cessation of the outbreak.

Methods:

Immediate infection control interventions included screening of in-flight patients, environment, and equipment for *S. marcescens* to establish probable sources. Close stakeholder engagement through frequent multidisciplinary huddles were performed to review and improve infection prevention (IP) practices in the unit. Other interventions incorporated prompt case isolation with strict contact precautions, improved equipment and environmental disinfection, use of alcohol-based hand rub (ABHR) as the preferred hand hygiene mode, audits, and immediate feedback on noncompliance. Additionally, whole genome sequencing (WGS) analysis was performed to determine clone-relatedness and possible transmission patterns.

Results:

A cluster of nine neonates was colonised or infected with *S. marcescens*. Conjunctival infections were associated in two index cases. Seven other cases were discovered through contact screening of in-flight patients. Through close stakeholder engagement via frequent huddles, clinical practices, notably milk preparation, eye care, skin care, and equipment hygiene, and parental hygiene and care practices were reviewed to ensure IP principles are in place. WGS analysis revealed cluster was unrelated to the environment, and that neonate-to-neonate transmission was most likely caused by suboptimal IP practices.

Conclusion:

A comprehensive, multipronged infection control strategy that included close stakeholder engagement, frequent microbiological screening of in-flight patients, environment, and equipment, enhanced environmental and equipment cleaning, prompt isolation with strict contact precautions of positive cases, adherence to personal protective equipment, optimisation of hand hygiene using ABHR, and parental education was critical to the timely control of *Serratia marcescens* in this neonatal outbreak.

Risk factors associated with acquiring healthcare-associated vancomycin-resistant Enterococcus (VRE) in a tertiary hospital in Singapore

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Background/Aim:

To determine risk factors associated with healthcare-associated vancomycin-resistant Enterococci (HA-VRE) acquisition in a tertiary hospital in Singapore.

Methods:

A case-control study was conducted over a 12-month period in 2019. Cases were defined as inpatients who initially screened negative for VRE, but from whom VRE was isolated from subsequent screening or clinical specimens, during the same admission. Controls were patients admitted in 2019, who screened negative for VRE and remained VRE negative through their inpatient-stay. Active surveillance (i.e., admission screening test, followed by every 14 days) for VRE was conducted for all patients admitted to hematology, oncology and renal departments and intensive care unit (ICU). Factors such as age, maintenance haemodialysis, admission to ICU, colonization or infection with multi-drug resistant organisms (MDROs), prior surgeries within 3-month, antibiotic use in preceding 3-month, and hospitalization in preceding one-year were analyzed. Mortality within 3 months was the outcome measure studied.

Results:

Ninety-seven cases and 194 controls were included in the study. Five of 97 cases (5%) had VRE central line infections. Mean age was higher in the case-group than control (64 versus 59 years, p-value 0.02). HA-VRE was associated with maintenance haemodialysis (OR 4.6, 95% CI 1.8 – 12.0), ICU admission (OR 6.1, 95% CI 2.8 – 13.2), prior surgeries within 3-month (OR 3.7, 95% CI 1.6 - 8.3), presence of carbapenemase producing carbapenem resistant enterobacteriales (CP-CRE) (OR 7.2, 95% CI 2.0 – 26.0), methicillin resistant Staphylococcus aureus (MRSA) (OR 9.4, 95% CI 1.3 – 66.8), prior use of vancomycin (OR 28.2, 95% CI 5.4 – 146.5) or metronidazole (OR 4.4, 95% CI 1.0 – 19.0). Three-month mortality rate was 23.7% in cases and 3.6% in control group (p-value <0.001).

Conclusions:

HA-VRE was associated with maintenance haemodialysis, ICU admission, surgical procedures, co-carriage of MRSA or CP-CRE, vancomycin and metronidazole use. Targeted infection prevention and antimicrobial-stewardship programs may reduce HA-VRE.



Community Partnership-based Infection Control Trainings in Nursing Homes: Impact on Practices and MRSA Acquisition Reduction

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Background/Aim:

NUHS Infectious Diseases Community Programme (IDCP) is a collaboration between National University Hospital (NUH) and Regional Health System Office, aimed at improving infection control (IC) standards and infectious diseases management in Nursing Homes (NHs). This programme ran from September 2016 to September 2022. A key component of IDCP is the IC training conducted by NUH Infection Prevention Team which aims to enhance NHs' IC capacities by equipping NHs staff with IC knowledge and skills.

Methods:

A 32-hour IC training comprising three components were tailored to different staff levels in NHs. All staff (n=959) from the 20 sign-on NHs attended component 1, a four-hour session providing fundamental theoretical and practical knowledge. The IC liaison nurses (ICLN) and IC leads (n=170) attended component 2, an eight-hour hands-on training focused on operational skills for conducting hand hygiene and bed cleaning audit. Participants are required to pass the competency to qualify as auditors. The IC leads (n=131) attended component 3, a twenty-hour module, which include advanced level training to equip them to set up robust IC programs in their NHs. The outcome measures participants' satisfaction, skill competency, and MRSA acquisition rate comparing pre-training (baseline: 2015-2017) and post-training (2019-2020).

Results:

Twenty NHs completed all three components, with a total of 1260 participants (n=959+170+131). Post-training survey revealed that over 90% of participants reported improved IC knowledge and skills; felt more confident in managing IC conditions; and found the trainings are useful, comprehensive and engaging. Component 2 training saw 100% (170/170) of participants passed the competency. The rate of new MRSA acquisition decreased from 14.3% at baseline to 9.5% in comparative data, indicating a 33.6% reduction (95% CI 20.8-44.2).

Conclusion:

The community partnership-based IC trainings have effectively enhanced NH staff knowledge and skills, resulting in reduced MRSA transmission. The overwhelmingly positive feedback highlights the training's success.

Time is of the essence: Prompt identification and isolation of CP-CRE patients prevent its spread

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Background/Aim:

Carbapenemase - Producing Carbapenem Resistant Enterobacteriaceae (CP-CRE) can cause serious infections and are difficult to treat. Therefore, interventions in healthcare settings are necessary to limit its spread. In addition to existing horizontal infection prevention measures, vertical infection prevention measures to ensure prompt identification of CP-CRE cases and creation of sufficient isolation wards, are crucial to prevent its spread. This paper discussed if the prompt identification and isolation of CP-CRE patients can reduce the incidence of CP-CRE in our hospital.

Methods:

Policy on active surveillance culture (ASC) screening was enhanced to screen all known CP-CRE cases on admission if the last screening was done at least 30 days ago, and all patients with previously known CP-CRE status on admission, in addition to the current policy of screening patients with hospitalization history in the past year, admitted or transferred into high-risk areas. Cohort wards were created for CP-CRE patients to contain CP-CRE patients in the same environment, instead of previously scattered cohort rooms in multiple wards.

Results:

Increased ASC screening had significantly increased the monthly CP-CRE positivity rate from an average of 2.35% to 2.98% ($p=.002$). These identified cases require prompt isolation and were addressed by the creation of CP-CRE cohort wards, which increased the availability of CP-CRE cohort beds by 47%. Although the reduction in acquisition rate after the creation of cohort wards was insignificant ($p=.255$), the number of CP-CRE cases not isolated within 24hrs had significantly reduced from an average of 13.8 to 2.7 cases per day ($p<0.001$) after the creation of CP-CRE wards.

Conclusion:

Prompt identification and isolation of CP-CRE patients, coupled with good horizontal infection prevention measures, can effectively contain the spread of CP-CRE in the hospital.



The Impact of COVID-19 Pandemic on Hand Hygiene Compliance and Sustainability in a Tertiary Hospital in Singapore

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Background/Aim:

Achieving high levels of hand hygiene (HH) compliance among healthcare workers (HCWs) has been an ongoing challenge worldwide. During the COVID-19 pandemic, HH received unprecedented attention and became a central pillar in national COVID-19 prevention strategies. This paper examines the impact of COVID-19 pandemic on HH compliance rates and its sustainability in the post COVID-19 era in an acute tertiary care hospital in Singapore.

Methods:

We evaluated the HH compliance rates pre-, during, and post-COVID-19 pandemic from January 2019 to June 2023. HH compliance rates were measured based on direct observation (internal and external benchmark audit) and monthly alcohol-based handrub (ABHR) consumption (L/1,000 patient-days). The HO-MRSA bacteremia incidence rate was further analysed to correlate with the HH compliance results.

Results:

Internal audit results revealed rates of HH performance increased from 92.5% in 2019 (pre-pandemic) to 100% (during pandemic), with sustained rate of 99.3% (post-pandemic). The external benchmark audit showed a similar trend. ABHR consumption rate increased from 42.4L/1,000 patient-days in 2019 (pre-pandemic) to 55.8L/1,000 patient-days in 2020 (peak of COVID-19). However, ABHR consumption rate down-trended back to pre-COVID-19 baseline subsequently. HO-MRSA bacteremia incidence rates showed a 26.1% increase in incidence rate during pandemic (Jan-20 to Feb-23) as compared to pre-pandemic (Jan-19 to Dec-19) ($p=0.358$). However, there was a 43.7% reduction in HO-MRSA bacteremia incidence rate post-pandemic (Mar-23 to Jun-23) as compared to the pandemic period (Jan-20 to Feb-23) ($p=0.016$). HO-MRSA bacteremia incidence rates were decreased following enhancement in HH practices, along with other infection prevention measures during COVID-19 pandemic.

Conclusion:

Similar with other studies, initial spiked improvements in HH adherence at the beginning of COVID-19 pandemic were not sustained. Hand hygiene should not only be a temporary public health measure in times of crisis, but as a vital routine behaviour that contributes to health resilience and infection prevention.



A trial of a Mobile App for Improving Hand Hygiene Audit Processes in a Healthcare Setting

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Background/Aim:

Hand hygiene (HH) is crucial in reducing health care-associated infection. Current HH compliance audits are conducted manually by using an audit form which is tedious and data collation was time consuming. To improve the process, a trial of an electronic application (App) was conducted to evaluate its usability, functionality, graph generation capability, and man hour saving potential.

Methods:

Nine Infection Control Nurses (ICNs) conducted a 3-day trial in May 2022. They installed the App on their smartphones and performed HH audit by reviewing video simulations of clinical scenarios on Day 1. They utilized both the App and audit forms to compare and check for data loss. Each ICN followed step-by-step instructions specifically designed to evaluate all available functions and usability of the App. On Day 2, ICNs conducted observational HH audits in 46 inpatient wards to integrate the App into the current audit workflow. Meanwhile, two administrative staff evaluated the App's administrative capabilities on account setup, data editing and graph auto-generation. Day 3 involved testing the auditing and administrative process based on the feedback and adjustment made from the previous days. The trial encompassed 3 different smartphone brands with both Android and Apple systems.

Results:

Feedback from ICNs and administrative staff indicated its user-friendliness, met requirements for WHO "5 moments" audits, auto-generation of graph and real-time data capturing despite intermittent WiFi. It was compatible with the 3 smartphone brands and other mobile Apps. The battery usage was 2-6% over 2 hours. Manpower calculation showed that it is cost effective; from 47.5 hours down to 11 hours per month with savings totaling 438 man-hours per year.

Conclusion:

The trial successfully evaluated this App, finding it to be technically robust, user-centered design, compatible with current workflow and cost effective. This evaluation underscores the potential advantages of its implementation.



POSTER PRESENTATIONS

Healthcare workers self-assessment on hand hygiene practice: post-pandemic

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Background/Aim:

Studies have revealed that the pandemic period of 2020 has influenced the evolution of compliance with hand hygiene practices in healthcare professionals. In 2020, there was an increase in adherence to hand hygiene compared to previous years. However, it was also reported that healthcare workers practice reverted to baseline after the pandemic. This study aims to evaluate healthcare workers' hand hygiene practice in the wake of Covid-19 pandemic in the primary care setting. Findings on healthcare workers' immediate post-Covid-19 era hand hygiene practice could determine if the pandemic had triggered changes in their hand hygiene practices.

Methods:

The self-assessment questionnaires were formulated based on WHO guidelines on hand hygiene in healthcare and when Covid-19 is suspected. The pre-post self-assessment exercise was conducted in the primary healthcare clinics during WHO global hand hygiene promotion in the month of May 2023. Participation was voluntary and no identifier was used in data entry.

Results:

A total of 198 healthcare workers participated in the self-assessment exercise. Mean scores for hand hygiene practice based on the 5 moments of hand hygiene ranged from 2.91- 2.97 (SD 0.25-0.35) out of a rating scale of 1 for rarely to 3 for always at post pandemic. There was statistical significance in perception on importance of hand hygiene for scores during pandemic (M=4.11, SD=1.17) to post pandemic (M=4.30, SD=1.23), $t(1970)=2.78$, $p<0.006$ (two tailed). Eta squared statistic (0.07) showed a moderate effect size. Cronbach alpha scores (0.78) on the items in the questionnaires showed there was internal consistency in the measurement.

Conclusion:

This exercise indicated that hand hygiene practice levels differed, with overall practice being higher in favor of the period at post pandemic. This showed that Covid-19 did have a beneficial effect on healthcare workers hand hygiene practice and an improved perception of hand hygiene compliance at the primary care setting.

Trends in carbapenemase genotype proportions across pandemic periods

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Background/Aim:

Several studies have looked at the effect of COVID-19 pandemic on changes in the genotypes of carbapenemase genes detected from isolates. These changes were often linked to altered hospital operation during the pandemic including shifts in patient demographics, prioritisation of specific case types and increased manpower changes. We sought to explore if there was a consistent shift in carbapenemase genotypes proportions detected pre-pandemic, during the pandemic and post-pandemic.

Methods:

Hospital-associated infection (HAI) were positive cultures after day 3 of admission. Carbapenemase-producing Enterobacterales (CPE) data were abstracted from the hospital's Epidemiology unit surveillance database for the study period: pre-pandemic (2012-2019), pandemic (2020-2021) and post-pandemic (2022-June 2023). Duplicate CPE patient records were excluded. The predominant carbapenemase genotypes found in all 3 periods were: NDM-or OXA- or NDM+OXA genes and defined as native to the hospital. The other carbapenemase genes (KPC, IMI, IMP, VIM & combinations) were labelled as "Others". Incidence rate ratios was estimated for each period and $p < 0.05$ indicating significance.

Results:

From 2012 to June 2023, 752 CPE were detected. The native genotypes made up 89%, 79% and 92% during pre-pandemic, pandemic and post-pandemic periods. The "Others" genotypes increased during the pandemic making up 21% and dropped to 8% post-pandemic, resembling pre-pandemic levels. Incidence rate ratios (IRR) indicated a 1.14 times higher native genotype likelihood pre-pandemic compared to pandemic ($p < 0.01$). Conversely, the rate of the native gene detection was 0.86 during pandemic compared to post-pandemic ($p = 0.01$). Pre and post-pandemic IRR was 1 and not significant, implying no differences and genotype proportions returned to pre-pandemic levels.

Conclusion:

There was a change in genotype proportions during the pandemic which was not sustained post-pandemic. This could be attributed to the hospital resuming normal operations whereas during pandemic, the increase patient admissions from external institutions and community treatment facilities as well as staffing changes could have affected the changes.



The analysis of obediency factors in wearing mask on mental disordered patientsin hospitalized rooms at Marzuki Mahdi mental hospital, Bogor.

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Background/Aim:

The research has been conducted as the implementation of infectious preventing and controlling in the caring service of mental disordered patients at national mental health center in Marzuki Mahdi's mental hospital, Bogor. The purpose of the research is to find out and to analyze the influence factors on the patients' obediency in wearing mask while being hospitalized in pandemic condition of Covid 19.

Methods:

The method and research design were quantitative research which used experimental survey design. Population is mental disordered patients who are hospitalized in this hospital. The sampling method is random sample as 89 respondents. The procedure of data collection is by having observations using obediency observation sheet. The correlation analysis is used in this research.

Results:

The result of the research showed that age (p value 0.002), gender (p value 0.001 and psychological complaints (p value 0.000) significantly had influenced on the obediency of wearing mask (p value <0.05) while the factors of education and the types of mask were not significantly influenced on the level of obediency.

Conclusion:

The conclusion of the research showed that the factors of age, gender, and patients' complaints should be taken into special attention toward the obediency of wearing mask

Control of CPE Cross-transmission

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Background/Aim:

Carbapenemase-producing Enterobacterales (CPE) are a group of multi-resistant Gram-negative bacteria that are commonly found in the intestinal flora. CPE infections are associated with high mortality rates. CPE can be spread easily from patient to patient or through indirect transmission (via contaminated surfaces). Routine CPE screening has been carried out in CGH since 2018. A cluster of CPE acquisition was observed in one medical ward in Changi General hospital in November 2022. Immediate control measures were required to control the cross-transmission of CPE in the ward.

Methods:

Working closely with Nursing and Environmental Services, the following infection control measures were implemented since the end of November 2022: 1) Isolation of all CPE cases in designated MDRO ward; 2) Extensive contact screening to identify silent carriers early; 3) Enhanced environmental and equipment cleaning and disinfection were performed, including cleaning of toilets and hand washing sinks twice per day with 1000ppm Chlorine; 4) Physical presence of Infection Prevention and Control Nurses Presence in the ward to observe work practices to provide immediate feedback and identify areas for improvement: workflow on diaper changing has been standardized; 5) Close monitoring of hand hygiene compliance and CPE acquisition.

Results:

The standard workflow on diaper changing process has facilitated staff's adherence to infection prevention practices: appropriate gloves removal and hand hygiene practice after diaper changing and before leaving patient's zone. The hand hygiene compliance rate for diaper changing has improved to 89% from 60%. There were 4 cases of CPE acquisition in November 2022. After implementation of control measures, there were 2 new cases of CPE acquisition in December and January, but no further cases in subsequent months.

Conclusion:

Understanding the challenges faced by front-line nurses and working with them to re-design the work process can achieve better adherence to practices. CPE cross-transmission can be controlled with effective implementation of feasible control measures.



A C.L.E.A.N. approach to standardized cleaning in a Cardiac Ward with prolonged increased Methicillin-resistant Staphylococcus aureus (MRSA) acquisitions

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Background/Aim:

In 2021, MRSA acquisitions rate of 22% in an 8-bed Cardiac ward were high (n=264) which contributed approximately 50% of all acquisitions in National University Hospital (NUH). MRSA isolate from patient has sent for genotyping showed identical genes inferring concerns with possible transmission from MRSA persistence in the ward environment. Ad-hoc terminal cleaning (TC) was a routine Infection Control (IC) measures for 2 epidemiology link cases refer to same time, place and person. The aim of this project is to introduce a standardized disinfection approach to reduce MRSA acquisitions in a cardiac ward.

Methods:

Infection Prevention Team (IPT), environmental services (ES) and nurses developed a new C.L.E.A.N. approach in March 2021. The acronym C.L.E.A.N. refers to Contact ES supervisor, Left all equipment within the cubicle, ES supervisor to ensure IC practices, Activate HPV after completion TC, Notify ICN and NMS. A scheduled TC targeting on 2 cubicles followed by Hydrogen Peroxide Vaporizer (HPV) for all shared equipment at the end of the week. If 2 cases were detected from surveillance after C.L.E.A.N. implementation, enhanced high touch cleaning were carried out on the nursing station, PPE compartments, computer-on-wheels, pat slides and sink tap to complement twice daily until next C.L.E.A.N.

Results:

By introducing C.L.E.A.N., MRSA acquisitions year rate dropped to 15.9% (n=118) compared to 22% in 2021. This approach has improved cleaning consistency with ensure all areas were covered, eliminating ad-hoc TC frequency from 4 to 2 times per weeks which save up to 4 hours of housekeeping time and \$4000 costs on curtain change if compared with the previous method of changing curtain daily for all patient.

Conclusion:

A systematic cleaning approach provides structure, consistency and efficiency. This has resulted in improved cleaning outcomes, time savings, reduced risk of MRSA acquisitions and ultimately improve patient safety.

Comparison Of Antimicrobial Susceptibility Of Candida Albicans Versus Candida Auris To Octenidine- And Chlorhexidine-Based Wash-Mitts Commonly Used In Healthcare

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Background:

Management of outbreaks of the newly emerging pathogen *Candida auris* may include use of antimicrobial wash-mitts for decolonization. However, currently there is little clinical evidence to support the wide adoption of 'whole body decolonization' as part of the protocol to effectively manage *C. auris* outbreaks. In the absence of large-scale clinical trials, the immediate assessment of the efficacy claims for these products can be based on in vitro experimental data that follows the standard protocols established by CEN (European committee for Standardization).

Aim:

In this study, the chemical tolerance of *C. auris* was compared with the surrogate test organism *Candida albicans* as established in the European standards (EN).

Methods:

The study was conducted following the protocol for the quantitative suspension test EN 13624 using *C. albicans* ATCC 10231 in comparison to *C. auris* DSMZ 21092 and *C. auris* DSMZ 105986. Two commercially available washmitts containing chlorhexidine digluconate (CHX) or octenidine dihydrochloride (OCT) were used. Experiments were conducted using the impregnation liquid squeezed from the wash-mitts at a contact time of 30 sec at different concentrations between 0.5% to 97% in the presence of 0.03% bovine serum albumin.

Results:

Yeasticidal efficacy according to EN 13624 was found for the OCT wash-mitts at 30 sec at $\geq 10\%$ concentration with *C. albicans* (≥ 4 log RF). In comparison, for both *C. auris* strains ≥ 4 log RF was found at a much lower concentration of $\geq 1\%$. For the CHX wash-mitts efficacy against *C. albicans* was below 2 log RF at 97% concentration within 30 sec. In contrast efficacy against the two *C. auris* strains was around 3 log RF.

Conclusion:

In conclusion, both *C. auris* strains were found to be significantly more susceptible when compared to *C. albicans* in this study. Moreover, our data also demonstrates that not all antiseptic-impregnated body wipes is equally effective against *C. auris* with OCT having a higher efficacy compared to CHX. Further studies are warranted to determine if this in vitro difference correlates to clinical outcomes when it comes to *C. auris* decolonization.



Association between ABHR use and HAI-MDRO trends in a national hospital

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Background/Aim:

Hand hygiene is a cornerstone in infection prevention where its benefits in reducing risks of hospital associated infections are well-established. The World Health Organization (WHO) recommends alcohol-based handrubs (ABHR) to prevent transmission of pathogens. During COVID, there was a drop in hospital-associated multi-drug resistant organisms (HAI-MDROs) trends which rebounded thereafter. Hand hygiene compliance was approximately 8% higher during the pandemic period compared to pre-pandemic. Thus, we sought to study whether there was a correlation between overall ABHR use and HAI-MDRO rates.

Methods:

ABHR purchase data and patient-days information was abstracted from hospital databases. ABHR usage was calculated by dividing the amount in litre of bottles purchased by patient-days, comparing pre-pandemic (2016-2019), pandemic (2020-2021) and post-pandemic (2022) periods. HAIs was positive cultures after day 3 of admission. HAI carbapenemase-producing Enterobacterales (CPE), vancomycin-resistant Enterococci (VRE), Clostridioides difficile infection (CDI), and methicillin-resistant Staphylococcus aureus (MRSA) bacteremia rates were obtained for the study period from 2016 to 2022. Total HAI rate was aggregated yearly. Linear regression analysis was used to examine any association between overall ABHR use and MDRO rates. p-values <0.05 indicated significance.

Results:

The average use of ABHR increased from 117.23 L per 1000 patient-days pre-pandemic to 135.40 L per 1000 patient-days during the pandemic ($p < 0.05$) and dropping to 96.72 L per patient-days post-pandemic ($p < 0.05$). Significant correlation was found between ABHR use and HAI CPE infections ($p = 0.05$) but no other definitive correlations were observed with other MDRO rates.

Conclusion:

We found that ABHR use increased during the pandemic years and was correlated with a drop in CPE rates, but not other MDROs. Limitations of the study are that purchasing of ABHR may not fully reflect use and instead just ordering of extra stock.

Primary healthcare nurses ' current knowledge, attitude, and self-reported practices when caring for patients with multiple drug resistance organisms (MDRO)

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Background/Aim:

Polyclinic nurses to be aware of their role in prevention of spreading MDROs by practicing infection control guidelines advocated by the organization. The primary aim of this study is to describe the level of knowledge, attitudes, and self-reported practices (KAP) in MDROs among the nurses at NHGP when caring for patients with MDROs.

Methods:

A cross-sectional study using purposive sampling of 131 nurses was conducted in 7 polyclinics. This is a self-administered validated questionnaire. Non-parametric tests would be used due to non-normal distribution.

Results:: Median age of nurses is 36 (IQR=14, range= 22-60). 97.7% of the nurses had at least Diploma in Nursing and 80.2% had more than 5 years of experience in nursing. 83.2% of the nurses had score of 70% and above for knowledge but only 4.6% had a full score. For practice, 87.8% had score of 70% and above and 42% had full score. Median score for attitude was 32.0 (IQR=5.0, range=27-43). Only 36.6% and 32.1% of the nurses correctly answered the question on terminal cleaning and CD spores respectively. 77.9% of the nurses felt that they should not be penalised for non-compliance to infection control measures. Only 38.9% of the nurses felt that they should respond negatively when a colleague is not compliant. There are no significant differences between KAP and age, educational level, and years of experience.

Conclusion:

Knowledge fared slightly lower than practice. Infection control nurses could explore ways to educate nurses on terminal cleaning and CD spores eradication. Supervisors could also explore ways together with the nurses to create positive attitude in practicing infection control.



Reduce Methicillin-resistant Staphylococcus aureus (MRSA) colonization in a 'MRSA free ward': impact of implementing a screening bundle

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Background/Aim:

In 2019, there was a sharp rise in MRSA acquisitions rate from 3% to 13%, in a 47-bedded "MRSA free ward". Despite reinforcement of infection control (IC) measures, the MRSA acquisitions rate continued to increase to 22% in 2021. Nurses routinely screen patient for MRSA at time of admission, thereafter in September 2020, nurses initiated fortnightly screening to long stayers, whom are hospitalized more than 7 days in the ward. Due to increased staff workload, 31 screenings were missed which possibly lead to risks of MRSA transmission within the cubicles. The aim of this project is to use a MRSA screening bundle to screen all the long stayers in the hospital.

Methods:

The MRSA screening bundle included (1) a video on MRSA screening technique, (2) a standardized process to guide the ward Infection Control Liaison Officer (ICLO) to identify patients who met the long stayer criteria and (3) buddy system during specimen collection. The ward staff are required to watched the video, understand the guide, observe the specimen collection process and receive immediate feedback upon return demonstration.

Results:

Sixty-four (100%) nursing staff watched educational video on MRSA screening technique. There was an increase in compliance among nurses to screen the long-stayers from June to September 2020. There were 707 (97.6%) of long-stayers screened after the implementation of the bundle. Missed long stayer screenings was reduced from 7.8% in 2022 compared to 15.2% in 2021, a significant improvement of 7.4% ($p < 0.01$) over 2 years. The buddy system has resulted in consistent specimen collection method with significant detection of MRSA from long stayer.

Conclusion:

The MRSA screening bundle improved screening and techniques may lead to early detection of MRSA colonization, hence reducing the risk of transmission within the ward. ICLOs felt empowered to lead and implement the initiative with consistent screening approach.

Trial-Off-Catheter (TOC) Protocol at Yishun Community Hospital

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Background/Aim:

Early removal of indwelling urinary catheters (IDC) is an effective strategy to prevent catheter-associated urinary tract infection (CAUTI). We hypothesized a standardized Trial-Off-Catheter (TOC) protocol would reduce catheter utilisation and CAUTI rates in a community hospital. We aim to reduce catheter utilisation ratio and CAUTI rate per 1000 catheter days by 10% over a period of three months (post-intervention) in three pilot wards with the highest catheter usage.

Methods:

An IDC review board and a TOC protocol were designed collectively as a team in Yishun Community Hospital based on literature reviews. Roadshows were conducted at the three pilot wards and implemented over 2 months. 2-weekly audit was conducted by Infection Control Nurses on 3 process measures, (1) IDC were reviewed appropriately with IDC review board, (2) Appropriate usage of TOC protocol, (3) Compliance with TOC protocol.

Results:

Within three months' post-intervention, IDC utilisation ratio reduced by 18%, CAUTI rate per 1000 catheter days reduced by 45%, percentage of IDC reviewed appropriately increased to 91%, zero CAUTI event related to the use of protocol and 77% successful catheter removal with TOC protocol.

Conclusion:

CAUTI prevention require continuous effort with multimodal strategies and support from various stakeholders. A standardized TOC protocol can reduce variation in practices among physicians/ nurses with different levels of experience with TOC. A standardardized care process ensures efficient utilization of resources to achieve the desired clinical outcomes for patients.



Setting up a Staff Vaccination Programme in a Community Hospital in Singapore

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Background/Aim:

Healthcare workers are at risk of being infected with communicable diseases due to the nature of their work.

MOH recommends immunization of healthcare workers against vaccine preventable diseases.

The Infection Control team at Ang Mo Kio - Thye Hua Kwan Hospital set up a staff vaccination programme to screen the immune/vaccination status of healthcare workers and administer vaccinations to those who are not immune/vaccinated.

Methods:

All clinical staff joining the hospital would be required to produce documentation showing immunity/prior vaccination against Hepatitis B, Mumps/Measles/Rubella, Varicella, Tdap (Tetanus, Diphtheria and Pertussis).

If there is no documentation, staff will be vaccinated by our infection control nurses. The team is also doing catch-up vaccinations for existing clinical staff who joined prior to the MOH vaccination guidelines¹.

For non-clinical staffs, only MMR (Measles, Mumps and Rubella), Tdap (Tetanus, Diphtheria and Pertussis) & Influenza would be offered.

Influenza is offered to all staff either yearly or twice yearly, depending on MOH's recommendations. Staff will be strongly encouraged to undergo influenza vaccination.

Staff vaccination records are kept by Infection Control team and Human Resource.

Results:

96% of clinical staff are fully vaccinated against Hepatitis B, 4% is due for completion.

89% of clinical staff are fully vaccinated against Varicella.

88.3% of staff are fully vaccinated against Tdap (Tetanus, Diphtheria and Pertussis).

87.2% of staff are fully vaccinated against MMR (Measles, Mumps and Rubella).

60.07% of staff had been vaccinated against the 2023 Southern Hemisphere Influenza vaccine.

Vaccination program is ongoing and results might vary.

Conclusion:

Staff vaccination is important to keep our staff and patients safe.

All organizations should have a work process to encourage and maintain high vaccination rates.

¹ MOH Circular No. 41/2018 Immunization of Healthcare Workers – Latest Recommendation

Reduction of Hospital Onset MRSA Bacteremia

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Background/Aim:

Hospital onset methicillin resistant Staphylococcus aureus (HO-MRSA) bacteremia is associated with significant disease burden and high mortality, which is one of the key performance indicators being monitored in all hospitals in Singapore and mandatorily reportable to the Ministry of Health Singapore. In the early month of 2022, an increase of HO MRSA bacteremia was observed (0.3 vs 0.41). Further data analysis has shown half of the infections were related to peripheral intravenous cannula (PIVC) phlebitis.

Methods:

A safe PIV care program was implemented since September 2022, consisting of 1) PIV care training with 'train the trainer' approach for infection control link nurses. Subsequent collaborative training was carried out by ward link nurses and respective IPCN at individual ward level; (2) Daily PIV maintenance care and monitoring with monthly dashboard for data feedback; (3) Use of extension tubing for all PIVs to minimize risk of phlebitis; (4) Weekly independent audit by IPCNs on unnecessary retention of PIVs to improve timely removal of PIVs which are not clinically indicated; (5) Quarterly point prevalence audit of phlebitis by IPCNs hospital-wide. Ongoing monitoring of HO-MRSA bacteremia and causes.

Results:

HO-MRSA bacteremia has reduced to 0.16 per 10,000 patient days for the period of January-June 2023, a 69% reduction from 2022. With the implementation of this safe PIV care program, phlebitis rate has dropped to 0.4% from 1.9%, and there was zero MRSA bacteremia related to PIV phlebitis since September 2022 till June 2023.

Conclusion:

An effective safe PIV care program with strong staff "buy-in" has demonstrated good impact in the reduction of HO-MRSA bacteremia associated with phlebitis.



Clearing the Air: Ventilation in Inpatient Wards Using Carbon Dioxide Levels as a Surrogate Marker

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Background/Aim:

Since COVID-19, there has been heightened awareness of the role ventilation and building infrastructure plays on transmission of hospital-associated respiratory infections. Given that environmental factors are a major factor in hospital infections, we set out to record baseline levels of our indoor air quality (IAQ) by measuring the following parameters: carbon dioxide (CO₂) levels, air temperature, relative humidity, and respirable suspended particle levels (i.e. Particulate Matter (PM) 2.5 and 10), the main objective of this exercise being to obtain baseline CO₂ levels, a surrogate for IAQ, and to identify inpatient wards that measure above reference levels.

Methods:

All measurements were recorded using IQAir AirVisual Pro (IQAir, Switzerland). The device recorded parameters every 10 seconds, and instructions were given to ward supervisors to keep the power source connected while the device was kept in the ward. The device was kept at least 48 hours continuously in each location. Placement of the device was selected as far as possible to be in the middle of the room at eye level, away from windows or fans, and where there is less likelihood of it being moved or tampered with.

Results:

Measurements were obtained for 26 locations in 2 buildings total (25 inpatient wards and an inpatient dialysis unit). One particular ward with a high turnover of patients had CO₂ levels that consistently recorded incursions out of the reference range above 500-800ppm. All other locations had CO₂ levels with averages ranging from 412ppm to 695ppm.

The average CO₂ levels in naturally ventilated wards were lower than in wards that were air-conditioned or had pre-cooled mechanical ventilation (PCMV). CO₂ levels in air-conditioned wards were generally higher than PCMV or naturally-ventilated wards.

Conclusion:

Improving ventilation in areas of poor IAQ in old buildings remains a priority, and adequate ventilation should be considered in the development of new healthcare premises.

Setting up Dialysis Centre for Covid Positive Patients in a Community Hospital in Singapore

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Aim:

One of the challenges during Covid-19 pandemic was how to provide community dialysis services safely for patients with Covid-19 without causing risk of Covid-19 transmission to other patients as this group of patients are considered high risk/ severely immunosuppressed against Covid-19.

Ang Mo Kio-Thye Hua Kwan Hospital has a community dialysis centre within its premises and wanted to continue to provide dialysis service for its patients who are Covid-19 positive while ensuring the other dialysis patients are safe.

Methods:

Infection Control team worked with Dialysis Centre team to review the entry and exit route for Covid-19 positive patients at the Dialysis Centre to avoid exposure to the public. In addition, we created & designated evening sessions for Covid-19 positive patients in consideration of lesser human traffic. To maximize patient care, special station allocation was arranged, arranging all patients' stations at a corner of the dialysis centre, ensuring adequate distancing between patients. Designated toileting facilities were arranged to prevent any transmission to staffs or public.

All staffs assigned to facilitate the session were ensured to be fully vaccination against Covid-19 and well-versed in Personal Protective Equipment donning and doffing. Personal Protective Equipment requirements were also reviewed regularly based on MOH recommendations & guides. Supplementary trainings and assessments were done regularly to ensure safety of both patients and staffs.

The team also reviewed the cleaning and disinfection of the environment and equipment, as per the National Infection Prevention and Control Guidelines for Outpatient Dialysis Centres 2020.2

If surfaces are able to withstand Bleach solution, Bleach solution would be prepared fresh to wipe down surfaces and left on the surfaces for a contact time of at least 10 minutes.

For surfaces where the use of bleach is not suitable, Alcohol/alcohol-impregnated wipes (e.g. isopropyl 70%, ethyl alcohol 60%) are used for the wipe down of surfaces for up to 15 minutes.

Hemodialysis (HD) machines were also disinfected based on manufacturer's instructions/guidelines.

Results:

We conducted 1628 dialysis sessions for Covid-19 patients with no transmission of infection between patients or staff.

Conclusion:

With good infection prevention and control, we were able to continue to provide essential dialysis service to our patients who developed Covid-19.

2¹ THE NATIONAL INFECTION PREVENTION AND CONTROL GUIDELINES FOR OUTPATIENT DIALYSIS CENTRES 2020



Mitigate the Risk of Infection from Heater Cooler Devices (HCDs) During Open Heart Surgery (OHS)

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Background/Aim:

Microorganisms can reproduce within the HCDs used during cardiopulmonary bypass procedures, leading to the formation of biofilm that can facilitate the colonization of bacteria. Due to the increased vulnerability of patients undergoing OHS to infections, the spread of aerosols from contaminated water through HCDs poses a substantial risk. This study aims to achieve a 0% rate of pre-disinfection water samples from HCDs with a total colony count of more than 500 CFU/ml.

Methods:

In this study, we focused on six units of HCDs in three hospitals in Singapore. Water samples obtained from HCDs were analyzed for total colony count to assess the level of contamination using standard microbiological techniques. A comprehensive mitigation strategy was implemented to reduce the total colony count.

Results:

The implemented approach successfully reduced the risk of infection from HCDs. Weekly water changes and monthly disinfection resulted in a significant decline in total colony count in the HCDs' water samples. For a period of four years (January 2018 to June 2022), no patients who underwent cardiac surgery in three hospitals under IHH SG were reported to experience similar organisms isolated from the water sampling of the HCDs with a total colony count of more than 500 CFU/ml. Importantly, no adverse effects on patient outcomes were observed indicating that water sampling may not be necessary for assessing patient related risks.

Conclusion:

With a comprehensive approach involving regular water changes and monthly disinfection, the risk of infection from HCDs and the subsequent corrosion issues from heightened disinfection frequency was effectively minimized. This study emphasizes the importance of proactive measures in preventing infection by implementing appropriate disinfection protocols and maintenance practices. However, further study is warranted to ensure patient safety in healthcare facilities that utilize HCDs during open heart surgery.

To Reduce And Manage The Number Of Biohazard Waste Usage From Clinical Departments

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Background:

From 2016 to 2020, there was a noticeable rise in the production and disposal of biohazard waste, increasing from 4,400 to 5,700 tons annually. This 5% annual growth attributed to factors such as higher number of patients visiting hospitals, increased medical procedures, and the implementation of infection control measures, particularly during the COVID-19 pandemic.

Parkway East Hospital (PEH) also experienced a rise in biohazard waste output from 2018 to 2022, with the number of bins increasing from 1599 to 1944, averaging 1931 bins annually. Despite waste minimising efforts, it's challenging to entirely avoid, reduce, or recycle disposable medical items without compromising patient safety. This led to improper disposal practices of waste from PEH isolation rooms, regardless of infectious disease classification.

Aim:

To achieve a 20% reduction in biohazard waste disposal within clinical departments over a 6-month period.

Methods:

To attain this goal, initiatives were introduced to promote proper segregation of biohazard and general waste. In February 2023, staff received information via email and presentations about the appropriate handling and disposal of hospital waste, along with the classification of biohazard waste. This included items like used clinical sharps, laboratory culture plates, and materials containing blood or bodily fluids.

Results:

Results showed a significant annual increase in biohazard waste generation from 2018 to 2020, ranging from 8% to 37%, largely influenced by the COVID-19 pandemic. However, the implementation of guidelines allowing certain COVID-19 waste (e.g., Personal Protective Equipment) to be placed into general waste, yielded a reduction in biohazard waste generation from 2021 to 2022, ranging from 1% to 11% annually.

Conclusion:

Whilst the target was not fully achieved, PEH remains committed to reducing biohazard waste. Ongoing efforts include raising awareness among staff and closely monitoring proper disposal practices to ensure the safety of patients and the environment.



Needlestick Injury at the Accident and Emergency (A&E) Department

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Background/Aim:

Needlestick injuries are a significant occupational hazard in healthcare settings, posing risks to healthcare workers' health and well-being. This abstract explores the causes of needlestick injuries at the Accident and Emergency (A&E) department, drawing from findings of Isara et al. and Ng & Hassim. It also discusses a local hospital study that supports these findings and emphasizes the importance of addressing this issue within the local context.

Methods:

Numerous measures have been implemented to tackle needlestick injuries, including the participation of Infection Prevention Liaison Officers (IPLOs) in reminding and reinforcing safe practices among staff members. IPLOs played a crucial role, by actively engaging with staff. They help raise awareness about risks associated with improper handling of sharps and provide guidance on adherence to standard precautions. This direct involvement plays a significant role in reducing the number of needlestick injuries within the department. Collaboration between the Infection Prevention Nurse (IPN) and IPLOs in reviewing each instance of needlestick injury has also played a crucial role in identifying areas for improvement. This collective effort focuses on analyzing the root cause of each needlestick injury, such as potential gaps in training programs or inadequate equipment and developing targeted strategies to mitigate these risks.

Results:

Based on the positive outcomes resulting from the implemented measures, it is recommended that a quality improvement project be undertaken to further reduce sharps events in the A&E department. It has the ability to identify gaps in practices and suggest improvements that will provide staff with necessary knowledge and skills to confidently practice while minimizing the risks associated with needlestick injuries.

Conclusion:

In Summary, implementing measures like involvement and collaborating with IPLOs can significantly reduce the prevalence of needlestick injuries. Promoting awareness, reinforcing safe practices, and continuously improving training programs are vital in creating a safer working environment for healthcare professionals.

Digitalisation Of Staff Health Record System In Mount Alvernia Hospital

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Background/Aim:

The manual compilation of employees' health information and record-keeping can be an arduous and distressing task. Therefore, it is essential to invest time and effort in finding a solution to collect, store, and retrieve data in real-time when required.

Methods:

To address this challenge, the Infection Control Team collaborated with the IT department and relevant HODs to develop an integrated and digitalized record system known as the "Staff Health System." This system can be easily accessed by all employees, supervisors, and the infection control team. The Infection Control (IC) team is responsible for updating and maintaining vaccination records, while HR takes charge of documenting the health records of new employees and monitoring staff health/vaccination in compliance with MOH requirements.

Results:

The implementation of the Staff Health System offers several benefits as: (1) Empowerment of staff: The system grants employees the autonomy to schedule and reschedule vaccination and mask fitting sessions at their convenience; (2) Enhanced accessibility: Staff and other stakeholders can readily access vaccination and mask fitting records, as well as pre-employment lab results through the system; (3) Real-time data: The system can generate up-to-date data that are relevant to stakeholders and management, improving decision-making processes; (4) Resource efficiency: The digitalized system reduces the consumption of resources such as paper, toner, and manpower required for collating, updating, storing, and retrieving data; (5) Data accuracy: With the Staff Health System, data accuracy is ensured, reducing the risk of errors and discrepancies in records.

Conclusion:

Overall, the implementation of this digitalized solution has elevated Mt Alvernia Hospital's service standards by enhancing efficiency and compliance in record-keeping and updating processes.