INFECTION CONTROL ASSOCIATION (SINGAPORE)

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Sessions attended:

1. Pushing forward to reach zero tolerance, Robert W. Haley
2. The power of positive deviance: change from the inside out, Jerry Sternmin
3. Infection prevention systems approach – relationships are everything, Carla J. Alvarodo.
4. AORN recommended practices: another tool for preventing HAI, Joan Blanchard
5. Boomers, Genxers, and Millennials – how to use what we know about generational differences to communicate with staff, Marguerite Jackson
6. Infection Control in alternate settings, Teresa Garrison
7. Risk analysis of disinfection and sterilization failures, William A Rutala
8. Infection prevention in patients with cancer: putting it all together, Cheryl A. Perego
9. The IHI 5 Million Lives Campaign: reducing MRSA, Francis A. Griffin
10. Risk management: truth or consequences (to disclose or not), Tammy S. Lundstrom
11. HICPAC's latest: Management of multi-drug resistant organisms in health settings and isolation guidelines, Mike Bell
12. Implementation of the APIC guidelines for elimination of MRSA transmission
13. WHO Global Patient Safety Challenge, Prof Didier Pittet
14. Sterilization and disinfection, William A. Rutala

1. Pushing forward to reach zero tolerance, Robert W. Haley

Zero tolerance is defined as reducing selected healthcare acquired infection rates to zero or to an irreducible minimum. The types of healthcare acquired infections that may be reduced to zero are 1) Central-line associated blood stream infections (CLA-BSI); 2) VAP in CCUs; 3) healthcare acquired MRSA in small community hospitals; 4) healthcare acquired influenza. Those that can possibly be reduced only to an irreducible minimum are 1) CA-BSI; 2) VAP in SICUs, post-op pneumonia; 3) healthcare acquired MRSA in university affiliated hospitals; 3) healthcare acquired TB in high endemic countries; 4) *Clostridium difficile* in both endemic communities.

How will zero tolerance actually reduce healthcare acquired infection? USA is using the IHI/SCIP marketing campaign to enlist all hospital personnel to do their part to reduce healthcare acquired infection. Infection Control Professionals and Infection Control Committees are taking leadership to meet the campaign objectives e.g. gathering feedback on the infection rates of all healthcare acquired infection problems to be reduced, changing the hospital culture.

2. The power of Positive Deviance: Change from the inside out, Jerry Sternmin.

In every community or organization there are certain individuals or groups (the "Positive Deviants") whose uncommon practices or behaviours enable them to find better solutions to problems than their colleagues who have access to the same resources. Positive Deviance is a culturally appropriate development approach that is tailored to the specified community, where the focus is on practice rather than knowledge. The four D's of Positive Deviance Design are:

i. Defining the problem and the desired outcome.
ii. Determine any individuals or entities in the community who already exhibit desired behaviour or status.
iii. Discover uncommon behaviours or strategies enabling the positive deviances to find better solutions to the problem.
iv. Develop Positive Deviance and implement local initiatives to practice new behaviours and create new solutions.

Case study 1: Positive Deviance and MRSA Prevention in hospital settings. "Getting to zero!"
VA Pittsburgh Healthcare System MRSA Prevention Initiative:

The Positive Deviance Initiative has been used in the Methicillin Resistant *Staphylococcus aureus* (MRSA) eradication and prevention in hospital settings since mid-2005. The experimental phase started with the VA Pittsburgh hospital and has grown to include some 40 hospitals in the US. The project aims to combine the lessons learned in controlling MRSA infection from use of the Toyota Production System model with the use of the Positive Deviance approach to promote cultural or behavioral change to combat the prevalence of MRSA infections at the VA Pittsburgh Healthcare System (an organizational commitment to reducing hospital acquired infections). Program components of the VA Pittsburgh MRSA bundle include:

i. An aggressive hand hygiene implementation program
ii. MRSA surveillance cultures on admission and discharge and active surveillance of MRSA-positive patients
iii. Contact precautions
iv. Cultural transformation with staff and leadership engagement through the use of the Positive Deviance approach
v. Ongoing monitoring of process and outcome measures

The results showed that VA Pittsburgh has been able to create and implement a staff-owned and operated MRSA Prevention Program that is efficient, measurable and sustainable. The Positive Deviance approach was incorporated to help foster hospital wide cultural change via staff engagement and leadership support required for a sustainable and successful MRSA prevention Program. It became evident that previous barriers to success were not due to knowledge deficit on the healthcare acquired disease, its transmission and precautions to take but rather how best to implement these strategies throughout the hospital.

In summary, the Positive Deviance approach may be applied to problems that require behavioural or/and social change or seemingly "intractable" problems. It will require the presence of Positive Deviants, leadership commitment to address issue; and skilled facilitation.

3. Infection prevention systems approach – Relationships are everything, Carla J. Alvarodo

Prevention System Approach understands the relationship between system and factors that hinders system or process effectiveness. It involves analyzing the system to understand or identify the reason for every step or process in a system, and thus helps to identify "Shadow System" created by users that hinders or contradicts the effective functioning of a system/machine/process etc.

The Prevention System Approach enables Infection Control to redesign the system/machine/process etc such as through training and education to remind and create awareness for users.

4. AORN Recommended Practices: Another tool for preventing HAI, Joan Blanchard

AORN and APIC collaborative effort is important in encouraging perioperative personnel interaction with the Infection Prevention and Control Practitioners and vice versa. Variations in Practice Settings may limit the degree to which recommended practices may be implemented, these

include: 1) Inpatient perioperative department; 2) Outpatient surgery centre-hospital based and freestanding; 3) Interventional radiology; 4) Office based-surgery.

AORN recommended the following practices based on principles of microbiology, scientific literature, and research and expert opinion:

I) Surgical Hand Antisepsis

Surgical hand antisepsis is recommended 1) before and after patient contact, after removing gloves, before and after eating, contact with blood or body fluids and after restroom us; 2) fingernails should be short and clean; 3) no rings allowed and other jewelry should be tucked in the OR uniform; 4) Scent anionic based lotions would negate the positive effect on antiseptic such as chlorhexidine.

II) Attire

Attire should be of approved low-lint, clean disposable or reusable and should be changed daily. Facemasks should not be worn around the neck. AORN does not recommend home laundering of scrub attire.

III) Maintaining a sterile field

Impervious drapes and gowns should be used to prevent passage of pathogens. Gown and gloves should be don away from sterile back table; gloves should be re-inspected for integrity after donning and gloves that become contaminated should be changed as soon as possible. Ensure sterile drapes comply with the AAMI PB 70 guideline. Sterile drapes should cover areas that will be part of the surgical field, patient, furniture and equipment. Once the drapes are positioned, they should not be moved, as sterility of surgical site would be compromised.

It is recommended that when handling items in the sterile field, rigid containers should be opened on a separate surface; wrapper edges should be secured when presenting sterile supplies to the field. Solutions should be dispense slowly, any remaining contents should be discarded. Medications should also be dispensed using sterile transfer devices.

Sterile field should be prepared at location of use and as close to the time of use as possible. Sterile supplies should be opened for one patient at a time and should be constantly observed.

IV) Sterilization in the perioperative setting

Sterilization is affected by 1) the number of instruments and weight; 2) the type of instruments; 3) the resistance of pathogens; 4) the presence of biofilm, soil matter, debris, oil or any other materials on items to be sterilized that may interfere the effectiveness of the sterilant.

V) Traffic patterns in the perioperative setting

Traffic patterns are segregated into 3 sections; 1) Unrestricted areas (for movement of supplies); 2) the semi-restricted areas such as the post anesthesia area; and 3) the restricted areas, which are for, restricted personnel.

VI) Infection prevention and control

- Implementation of aseptic techniques.
- Classification of surgical wound.
- Signs and symptoms of infection.
- Protection from cross contamination.
- Monitoring of body temperature.
- Antibiotic prophylaxis.
- Hair removal using clippers.

5. Boomers, Genxers, and Millennials – How to use what we know about generational differences to communicate with staff, Marguerite Jackson

The key question to ask is not how old are people now, but when were they young. Putnam, R (2000).

To educate today's multi-generational workforce, one needs to understand the characteristics, in the different generations so that appropriate training tools can be adopted and ensure an effective training programme for the company. For example, PowerPoint/classroom teaching may not be what the young ones ("Millenials") like. This information can be used when implementing educational and training programmes. The topic defines the 4 different generations, called "Pre-Boomers", "Baby Boomers", "Generation Xers" and the "Millenials (Gen Ys)".

The challenges for educators would be to 1) adapt and invent educational products that will be interesting to all groups; 2) measure effectiveness of these educational products in improving knowledge, skills, and abilities. Recommendations and considerations for educators are to evaluate your population of learners and to consider changes to your teaching strategies. The 4 different generations are the "Pre-Boomers", "Baby Boomers", "Generation Xers" and the "Millenials (Gen Ys)".

Generations	Pre-Boomers	Baby Boomers	Generation Xers	Milllenials (Gen Ys)
Descriptions	Born before 1946.	Born between 1946 and 1964. Between ages 43 and 60+.	Children of the "Baby Boomers" and "Pre-Boomers". Born 1946 – 1964. Between age 27 and 42. Also defined as the first generation of latchkey kids.	Children of "Generation Xers". Born 1981 to present.

Generations	Pre-Boomers	Baby Boomers	Generation Xers	Milllenials (Gen Ys)
Characteristics	Matures and traditionalists.	Nice, well-liked, cooperative. Care deeply what others think. Recognition means a great deal. Want acceptance, popularity, and group identity.	Do not like to participate, attend meetings or need to hear others' opinion. Little patience. Care little about what others think. Blunt style (just do it or just tell me what you want and I'll do it). Recognition may not work as well and isn't nearly as important as "Boomers". Frequent and varied rewards may help. Low corporate loyalties. Technology, speed, continuous changes are key. Much less impressed with formality. Significantly more individualistic than older counterparts. Look for opportunities for training and outside education.	Heavily influenced by peers and media. Feel crunched for time and always in a hurry. Technically advanced. Computer savvy.

6. Infection Control in alternate settings, Teresa Garrison

Knowledge management is about the conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve organizational performance. Managing knowledge and transferring best practices, however is difficult in execution.

The hurdles to knowledge transfer are:

- Ignorance.
- No absorptive capacity (no support. E.g. in time or resources)
- Lack of preexisting relationships.
- Lack of motivation.

To implement knowledge enablers for infection prevention are:

- Culture (example hand hygiene embedded in organizational behaviour or infection prevention and control a staff competency).
- Technology (example online teaching/learning).
- Infrastructure (examples meetings and in-service events, interventions and improvements).

- Measures (surveillance).

A traditional organization is tight and structured, limited ways (often a one way) for ideas to enter. It is important to drive positive turbulence and innovation. The 4 elements to drive positive turbulence and innovation are:

- Open boundaries to allow information to flow in all directions, from various sources and people.
- Embrace changes.
- Avoid the trap of success – "we always do it this way".
- Seek continuous renewal, as without new information, there is a lack of new ideas and innovative actions.

7. Risk Analysis of disinfection and sterilization failures, William A Rutala

Achieving disinfection and sterilization through the use of disinfection and sterilization practices is essential for ensuring that medical and surgical instruments do not transmit pathogens to patients.

Deficiencies leading to infection have occurred when there has been failure to follow disinfection and sterilization principles. These failures resulted from human error, equipment failures or system problems. Influencing factors on the efficacy of disinfection and sterilization are:

- Cleaning of the object.
- Organic and inorganic load present.
- Type and level of microbial contamination.
- Concentration of and exposure time to disinfectant/sterilant.
- Nature of the object.
- Temperature and relative humidity.

Disinfection / sterilization failure could result in patient exposure to an infectious agent. The following 14-step provides a general outline when failure to follow disinfection or sterilization principles occurs. Training of staff and access processes / practices are important to minimize recurrence, however, it is to also note that the goal is to assess failure and protect patients rather than assessing blame.

Step 1 – **Confirm failure** by reviewing the circumstances of the reported failure including the time and date of possible failure; type of disinfection/sterilization method; and evidence of process parameters (printout) and results of physical, chemical and/or biological indicators.

Step 2 – **Embargo improperly disinfected / sterilized items**. Retrieving all items may require visiting all areas where the medical/surgical items may be stored or used including Ors, storerooms.

Step 3 – **Do not use questionable disinfected / sterilized items.** The incriminated disinfected / sterilized items should be immediately placed off line. And not used until its proper function can be assured.

Step 4 – **Inform key stakeholders** of the problem for risk management, units involved and personnel involved.

Step 5 – **Investigate the cause of the disinfection / sterilization problem** including dates and results of all process measures (temperature, time, sterilant, High-level Disinfectant concentration) and physical, chemical and biological indicators obtained in the recent past to assess the time/date of the first possible malfunction.

Step 6 – **Line listing of exposed patients** who may have been exposed to possibly contaminated medical/surgical devices (patient name, identification number, date(s) of exposure,

contaminate device used, underlying risk factors for infection, development of Healthcare Acquired Infections and other potentially adverse events).

Step 7 – **Does the disinfection / sterilization failure increase patient risk for infection?** It is crucial to determine whether in fact the failure could result in an adverse patient event. Assessing risk should always include on a review of scientific literature and national guidelines.

Step 8 – **Inform expanded list of stakeholders.**

Step 9 – **Develop hypothesis for disinfection / sterilization failure** and initiate corrective actions to correct deficiencies in reprocessing.

Step 10 – **Assess adverse patients events** by initiating a more detailed study, if necessary, of possible adverse outcomes in patients. This may require medical records and / or examining patients for infections, chemical reactions, or other adverse events. Specific laboratory tests may be necessary such as testing of source patients and exposed persons for blood borne pathogens such as HIV, HBV and HCV.

Step 11 – In conjunction with the legal department, notify state and federal authorities if required by regulation or law.

Step 12 – **Consider patient notification on the disinfection / sterilization failures.** If it is determined the failure could result in adverse patient events, then patients should be notified. Ensure all patients received the same information.

Step 13 – **Develop long-term follow up plan** such as long term surveillance, changes in current policies or procedures, development of new policies or procedures, evaluation of current equipment, etc.

Step 14 – **Perform after action report.**

8. Infection prevention in patients with cancer: Putting it all together, Cheryl A. Perego

Cancer patients are at higher risk for infection. Treatment of infection is difficult. Prevention is key by breaking the chain of infection e.g.

a. Hand Hygiene. Ready availability of hand hygiene products.
b. Standard precautions. Treat all patients (and their environments) as potentially infectious.
c. Transmission based precautions (Isolation). Use of personal protective equipment to reduce the spread of communicable diseases and epidemiological important microorganisms.
d. Implement contact precautions of multi-drug resistant organisms.
e. Screening for multi-drug resistant organisms for admission cases so as to institute contact isolation.
f. Antibiotic stewardship program.
g. Other “special” precautions – Protective environment such as HEPA filter rooms, positive pressure.
h. Infection Control Risk Assessment in place for construction and renovation activities.
i. Patient education on infection control practices for example hand hygiene.

9. The IHI 5 millions lives campaign: reducing MRSA, Francis A. Griffin

The objectives of the “Protect 5 Million Lives Campaign” are to; 1) avoid 5 million incidents of harm over the next 24 months; 2) enroll more than 4,000 hospitals and their communities at work; 3) strengthen the campaign’s national infrastructure for change and transform it into a national asset; raise the profile of the problem – and hospitals’ proactive response – with a larger, public audience.

Six interventions from the Save 100,000 Lives Campaign	New interventions targeted at harm
Deploy rapid response team.	Prevent pressure ulcers.
Deliver reliable, evidence-based care for acute myocardial infarction.	Reduce Methicillin-Resistant *Staphylococcus aureus* (MRSA).
Prevent adverse drug events.	Prevent harm from high-alert medications.
Prevent central line infections.	Reduce surgical complications.
Reduce surgical site infections.	Deliver reliable, evidence-based care for congestive heart failure.
Prevent ventilator-associated pneumonia.	Gets boards on board (Defining and spreading the best-known leveraged processes for hospitals Boards of Directors, so that they can become far more effective in accelerating organizational progress towards safe care.

The 5 key interventions are 1) hand hygiene; 2) decontamination of the environment and equipment; 3) active surveillance cultures; 4) Contact precautions for infected and colonized patients; 5) compliance with central venous catheter and ventilator bundles.

10. Risk Management: Truth or consequences (to disclose or not), Tammy S. Lundstrom

The unintended consequences of public reporting can be either positive or negative:

Positive	Negative
Selection of high quality providers by patients/referring physicians/purchasers.	Induce physicians to deny care/procedures to sicker patients.
Induce physicians/providers to improve quality (by improving rates).	Induce inappropriate utilization of care.
Enhance accountability.	

The CDC/HICPAC: Guidance on public reporting of HAI states that there in insufficient evidence on the merits and limitations of an HAI public reporting systems to make recommendations for or against mandatory reporting.

In conclusion, transparency is here to stay. Disclosure can involve either public reporting or disclosure to an individual patient; however the consequences of either public reporting or private disclosure need further study.

11. HICPAC's latest: Management of multi-drug resistant organisms in health settings and isolation guidelines, Mike Bell

I) <u>New pathogens of concern</u>

Included the new pathogens of concern such as *Clostridium difficile* and SARs and the new diseases and the amplification in the healthcare setting. Pandemic and Avian Influenza are not included due to the constant changes.

II) <u>Standard precautions</u>

- Constant use of hand hygiene and gowns and gloves (to be removed after every task)
- Respiratory hygiene and cough etiquette

- The use of mask during special lumbar puncture procedure
- Added attention to safe injection practices

III) Definition of transmission: to cause a transmission, a pathogenic microorganisms must leave original host, survive in transit, be deliver to a susceptible host and escape the host defenses to multiply and cause issue damage.

IV) Protective equipment.
- Current research agenda on aerobiology and protective equipment for healthcare personnel.
- Characteristics of ideal respiratory protective equipment for healthcare personnel.
- Protective equipment in the ambulatory setting (hand hygiene and gloves and contact precaution on a case by case basis).

V) Multi-drug resistant microorganisms.
- Adherence such as admin involvement, system implementation and culture change.
- MDRO guideline 2006 which include intensified MDRO control measures, such as education, administrative support, antibiotic stewardship, environmental measures and decolonization.
- The negative effects of isolation such as depression and anxiety on patients.

12. Implementation of the APIC guidelines for elimination of MRSA transmission

The APIC guide to the elimination of MRSA transmission in hospital settings cover the following agenda:

- Risk assessment.
  Options on: 1) active surveillance testing on all admissions and transfers; 2) high risk only; 3) no active surveillance (clinical testing only):

Active surveillance testing	High risk only	No active surveillance testing
Search and destroy.	Fewer tested.	Clinical cultures only.
Identify every patient colonized or infected with MRSA.	Fewer patients isolated.	Tip of the iceberg.
Isolate to prevent transmission.	May miss some MRSA, CA-MRSA.	Will miss many positives.
Increased use of supplies.	Fewer use of supplies.	Cheaper for supplies.
Enables private rooms or cohorting.	The question “Is transmission occurring?”	The question “Is transmission occurring?”

- Screening / repeat testing.
  - Swabbing of anterior nares.
  - Regular culture.
  - Insert 1, rotate 5x clockwise, 5x counter clockwise and remove. Place in other naris and repeat.
  - Send to lab for MRSA screen.
  - Routine culture on every 3 days.
  - Flag record of patients with MRSA.
  - Repeat surveillance testing to determine rate of acquisition and to determine clearance of MRSA.

- Isolation
  Institute contact precautions. Isolation of patients depends on level of risk, availability if private rooms, type of test (rapid vs. culture) and the level of care required by the patient.

Patient who requires isolation can be isolated in private rooms, or cohort MRSA patients together, or pair with low-risk patient with no lines or tubes, no pre-op or short length of stay for example.

- Hand hygiene / disinfection
  Hand hygiene before and after patient contact and monitoring of compliance.

- Decolonization
  Decolonize patient using antiseptic showers, antibiotic to anterior nares and possibly systemic antibiotics.

- Antibiotic stewardship
  - Eliminate unnecessary use.
  - Shortest duration recommended.
  - Correct drugs for condition.

- Panel discussion

13. WHO Global Patient Safety Challenge, Prof Didier Pittet.

The WHO Global Patient Safety Challenge cover the following areas in patient safety:

- Blood safety.
- Waste management.
- Hand hygiene.
- Immunization.

A multi-modal strategy to improve hand hygiene includes training, system measurement, observation and feedback.

Training and education include posters and geographical conceptualize of the risk of transmission: The 5 moments of hand hygiene (before patient contact, after patient contact, before aseptic task, after body fluid exposure risk and after contact with patient surroundings).

Ref: http://www.who.int/patientsafety/events/05/HH_en.pdf

14. Sterilization and Disinfection, William A. Rutala

Current issues:

I) Norovirus.
This causes acute gastroenteritis in humans: fecal-oral transmission primarily, although droplet and fomite transmission may facilitate spread. The infective dose is as low as 10-100 particles.

Inactivation of Murine and Human Norovirus (Rutala WA, et al, 2007):

Disinfectant, 1 minute	MNV Log10 Reduction	HNV Log10 Reduction
2% Glutaraldehyde	>4	0.9-1.6
Chlorine (1840ppm)	>3	3.8
70% Ethanol	>4 (3.3 at 15 sec)	2
65% Ethanol + QUAT	>2	3.6
Chlorine (5000ppm)	4	3
70% Isoproyl alcohol	4.2	2.2
0.5% Accel H_2O_2	3.9	2.8
79% Ethanol + Quat	3.4	3.6
QUAT	2.1	0.4
Phenolic, Ag, 3% H_2O_2	$\leq$1	$\leq$1

Qarternary ammonium compounds and Phenolics have minimal activity to Murine and Human Norovirus. The recommended use is Chlorine.

Containment measures for norovirus as follow:

- Containment of infectious person.
- Symptomatic staff instructed to remain home for 48 hours after symptoms resolve.
- Rigorous environmental cleaning procedures.
- Implement of strict contact precautions.
- Soap and water for hand hygiene should be considered rather than alcohol-based hand rubs as uncertain on the efficacy of alcohol hand rubs on the virus.
- Twice daily cleaning, surfaces should be disinfected with an agent shown to have efficacy (e.g., hypochlorite, 5000ppm; 70% ethanol, ethanol with QUAT).
- Treat entire ward as isolation

II) Endocavitary probes.

Sterile transvaginal probe covers had a very high rate of perforations before use. Guideline recommends that a new condom/probe cover should be used to cover the probe for each patient and since covers may fail, high-level disinfectant should be performed.

III) Infrared coagulation (IRC).

Concern on the sterilization or disinfection for the Infrared coagulation is that the device cannot be immersed. Since the lightguide cannot be immersed, an alternative procedure is recommended:

- Wipe the probe for 2 minutes with 1:10 bleach (5,000ppm).
- Wipe the probe with sterile water and let air-dry.

Wiping the non-immersible IRC probe for 2 minutes with 5000ppm chlorine was effective in removing/inactivating microorganisms from the instruments.

IV) Computers.

At present the recommendation for keyboard disinfection is daily (for 5 seconds) and when visibly soiled.

V) Microfiber Mop.

- The Microfiber system demonstrated superior microbial removal compared to cotton string mops when used with a detergent cleaner.
- The use of a disinfectant did not improve the microbial elimination demonstrated by the Microfiber system.
- Use of a disinfectant did significantly improve microbial removal when a cotton string mop was used.

VI) Vapotherm.

Ralstonia species contamination and corrective actions associated with Vapotherm Respiratory Gas Humidifier (MMWR 2007:56:173):

Potential source of contamination	Corrective action
Contamination of machine interior during initial calibration with unfiltered water.	All devices in distribution were recalled and disinfected with 1000ppm chlorine dioxide for 1 hour.
Contamination of vapor-transfer cartridge, a component of the device, during manufacture.	Manufacture of new devices uses filtered water and drying. Vapor-transfer cartridge now ETO sterilized.

Potential source of contamination	Corrective action
Contamination of the device, vapor transfer cartridge, or both during use.	A new, closed system was developed and only sterile water is used for humidification. Vapor-transfer cartridge, previously multiuse, is for single patient and discarded after 30 days.
Failure to remove bacteria during routine decontamination.	Disinfect (PA/HP or QUAT) for 10 minutes) between patients or after every 30 days in a single patient.

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