ANNUAL REPORT ON
SENTINEL AND SERIOUS UNTOWARD EVENTS

October 2015 – September 2016

HOSPITAL AUTHORITY
HONG KONG

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醫院管理局
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ACKNOWLEDGEMENT

This ninth Annual Report on Sentinel and Serious Untoward Events signifies Hospital Authority's nine years of effort in improving the safety and quality of healthcare by reporting through Advance Incident Reporting System (AIRS), analysing the root cause of incidents, formulating measures to improve clinical service and supporting information and technology systems, monitoring the implementation and effect of improvement measures as well as promulgating and sharing lessons learnt with colleagues to prevent reoccurrence of similar events. With the support and dedication of our colleagues, Hospital Authority remained one of the safest healthcare providers in the world.

Our heartfelt appreciation to all colleagues who have contributed to building a patient safety and patient-centered culture in our organisation.

"Serving & supporting with

responsibility, kindness and respect."

Patient Safety and Risk Management Department

Quality and Safety Division

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EXECUTIVE SUMMARY

This annual report summarised all Sentinel Events (SE) and Serious Untoward Events (SUE), comprising 32 SE and 86 SUE, reported between October 2015 and September 2016. Compared with the last reporting period, there was a further decrease in SE from 39 to 32 and an increase in SUE from 68 to 86.

Sentinel Events

2. The 32 reported SE represented an incident rate of 1.5 per 1,000,000 episodes of patient attendances / discharges and deaths. Of these SE, 25 occurred in acute general hospitals with 24-hour accident and emergency (A&E) services.

3. The top two categories of SE were *retained instruments or other material after surgery / interventional procedure* (13 cases) and *death of an inpatient from suicide (including home leave)* (12 cases).

4. Other reported SE were *intravascular gas embolism resulting in death or neurological damage* (2 cases), *maternal death or serious morbidity associated with labour or delivery* (2 cases), *other adverse events resulting in permanent loss of function or death (excluding complications)* (2 cases) and *surgery / interventional procedure involving the wrong patient or body part* (1 case).

5. Among the 32 SE, 16 resulted in mortality, comprising 12 cases of *death of an inpatient from suicide (including home leave)*; 2 cases of *intravascular gas embolism resulting in death or neurological damage*; 1 case of *maternal death or serious morbidity associated with labour or delivery* and 1 case of *other adverse events resulting in permanent loss of function or death (excluding complications)* involving ventilator not switched back from standby mode.

6. Of the remaining SE, 2 had extreme consequence, 3 had major / moderate consequence and 11 had minor / insignificant consequence.

7. Of the 13 *retained instruments or other material after surgery / interventional procedure* cases, 3 involved guide wire (decreased from 5 in 4Q14 - 3Q15).

8. The 12 reported cases of *death of an inpatient from suicide (including home leave)* represented a suicide rate of 1.1 per 100,000 inpatient admissions. In comparison, the reported estimated inpatient suicide rates in general hospitals of the United States ranged from 5 to 15 per 100,000 admissions.[6]

9. Of the 12 *death of an inpatient from suicide (including home leave)* cases, 4 were inpatients, 6 were patients on home leave and 2 were missing patients.

10. The overall assessment and management of the 12 SE of *death of an inpatient from suicide (including home leave)* was generally considered to be appropriate.

11. The major contributing factors of SE were grouped into communication, knowledge / skills, work environment / scheduling, use of equipment and policies / procedures / guidelines. Recommendations were made to address these factors.

Serious Untoward Events

12. Of the 86 SUE, 73 were *medication error which could have led to death or permanent harm* and 13 were *patient misidentification which could have led to death or permanent harm*.

13. The three most common *medication error which could have led to death or permanent harm* were *known drug allergen* (32 cases), *dangerous drug* (11 cases) and *anticoagulant* (7 cases). Of all the *known drug allergen* cases, 13 were related to Penicillin group which was the most commonly involved drug.

14. Of the 86 SUE, 70 had minor / insignificant consequence, 11 had moderate consequence and 5 had temporary major consequence.

INTRODUCTION

15. The Sentinel and Serious Untoward Event Policy (SE & SUE Policy) was implemented in 2010 and updated in July 2015 (Annex I). The updates included a supplementary note on definitions and qualification criteria of SE as well as new Chinese translations of SE and SUE.

16. SE & SUE Policy dictates hospitals to report Sentinel Events (SE) and Serious Untoward Events (SUE) and set up root cause analysis (RCA) panels. The RCA panels are tasked to review and identify the root cause(s) and to make recommendations for hospital and Hospital Authority Head Office (HAHO) management to improve patient safety.

17. This ninth annual report summarised and analysed the SE and SUE reported via the Advance Incident Reporting System (AIRS) between October 2015 and September 2016 (4Q15 - 3Q16). The aim of publishing this Annual Report is to share the lessons learnt from SE and SUE with a view to improving quality patient-centered care through teamwork.

18. To facilitate understanding on the scope and definition of SE and SUE, the following abbreviated captions for various SE and SUE categories, highlighted in purple, will be used in this report:

Sentinel Events (9 Categories)

Category 1 – Surgery / interventional procedure involving the wrong patient or body part
[Wrong patient / part]

Category 2 – Retained instruments or other material after surgery / interventional procedure
[Retained instruments / material]

Category 3 – ABO incompatibility blood transfusion
[Blood incompatibility]

Category 4 – Medication error resulting in major permanent loss of function or death
[Medication error]

Category 5 – Intravascular gas embolism resulting in death or neurological damage
[Gas embolism]

Category 6 – Death of an inpatient from suicide (including home leave)
[Inpatient suicide]

Category 7 – Maternal death or serious morbidity associated with labour or delivery
[Maternal morbidity]

Category 8 – Infant discharged to wrong family or infant abduction
[Wrong infant / abduction]

Category 9 – Other adverse events resulting in permanent loss of function or death (excluding complications)
[Others]

Serious Untoward Events (2 Categories)

Category 1 – Medication error which could have led to death or permanent harm
[Medication error]

Category 2 – Patient misidentification which could have led to death or permanent harm
[Patient misidentification]

SENTINEL EVENTS STATISTICS

Yearly Trend

19. Since the implementation of SE Policy in October 2007, there were 341 SE reported to date. Figure 1 shows the yearly distribution of SE by category, with the total number of cases for each year and for the top three / two categories of the year indicated.

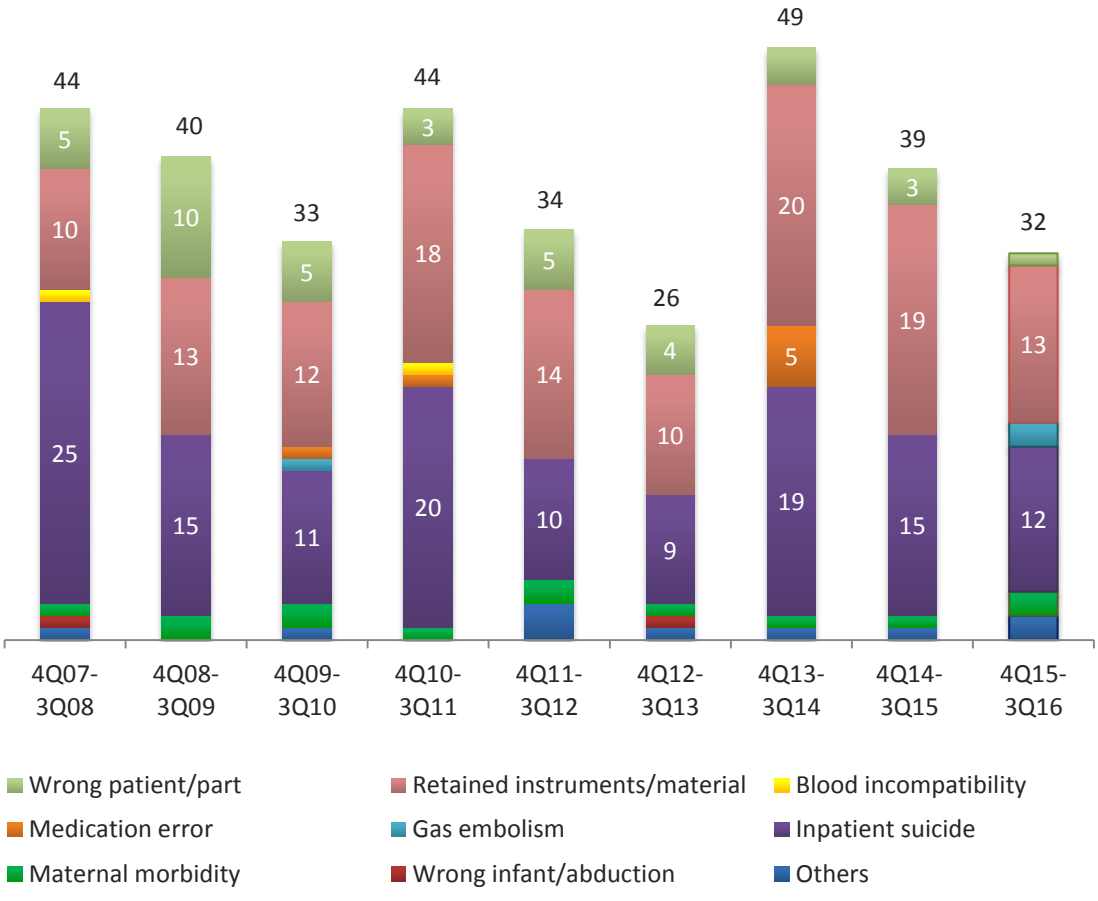


Figure 1: Yearly distribution of SE by category

20. From 2007 to 2016, the annual number of episodes of patient attendances / discharges and deaths had increased from approximately 16 million to 21 million. With a decrease in the number of SE in the current reporting period, the SE incident rate per 1,000,000 episodes of patient attendances / discharges and deaths had dropped to 1.5 (Figure 2). When compared to other countries (see International Sentinel Event Reporting, p. 16), the SE incident rates in HA were relatively low.

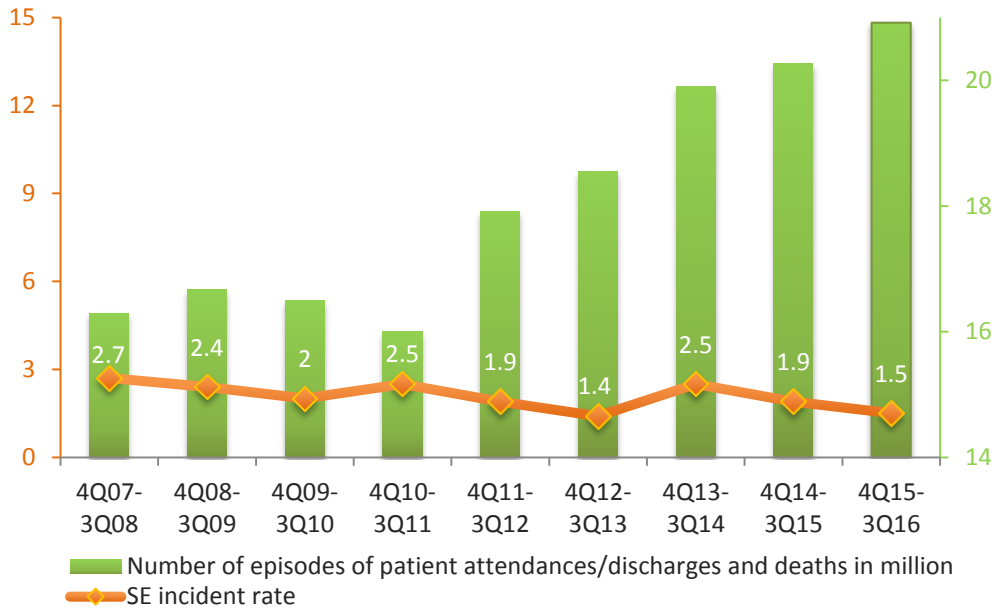


Figure 2: Yearly SE incident rates per million episodes of patient attendances/ discharges and deaths

21. The yearly trend of top three SE and their accumulated figures are depicted in Figure 3 and Table 1 respectively. *Inpatient suicide* (136 cases), *retained instruments / material* (129 cases) and *wrong patient / part* (39 cases) constituted most of the SE reported.

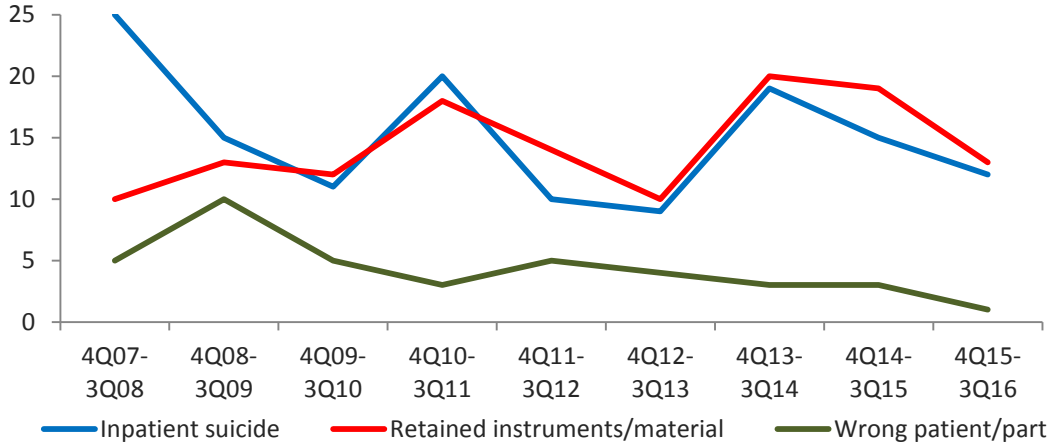


Figure 3: Yearly trend of top three SE

Category	4Q07-3Q08	4Q08-3Q09	4Q09-3Q10	4Q10-3Q11	4Q11-3Q12	4Q12-3Q13	4Q13-3Q14	4Q14-3Q15	4Q15-3Q16	Total
Inpatient suicide	25	15	11	20	10	9	19	15	12	**136**
Retained instruments/ material	10	13	12	18	14	10	20	19	13	**129**
Wrong patient/part	5	10	5	3	5	4	3	3	1	**39**
Maternal morbidity	1	2	2	1	2	1	1	1	2	**13**
Medication error	0	0	1	1	0	0	5	0	0	**7**
Gas embolism	0	0	1	0	0	0	0	0	2	**3**
Wrong infant/ abduction	1	0	0	0	0	1	0	0	0	**2**
Blood incompatibility	1	0	0	1	0	0	0	0	0	**2**
Others	1	0	1	0	3	1	1	1	2	**10**
Total	**44**	**40**	**33**	**44**	**34**	**26**	**49**	**39**	**32**	**341**

Table 1: Number of SE by category

22. Throughout the years, *inpatient suicide* (including home leave) had remained one of the top three most frequently reported SE. According to the SE & SUE Policy, incidents of home leave patients committed suicide are classified as SE.

23. Since October 2010, there was a total of 85 *inpatient suicide* SE cases of which 44 (51.8%) were home leave patients. While *inpatient suicide* within hospital compound showed a general reduction trend, home leave suicide cases remained unchanged over the period.

24. Of all 341 SE reported since October 2007, 112 cases had minor or insignificant consequence (i.e. no injury sustained / minor injury), 62 sustained major / moderate consequence (i.e. temporary / significant morbidity) and 167 led to extreme consequence (i.e. major permanent loss of function / disability or death) (Figure 4). Out of the 167 cases leading to extreme consequence, 136 were due to *inpatient suicide*. A description of the consequences is illustrated at Annex II.

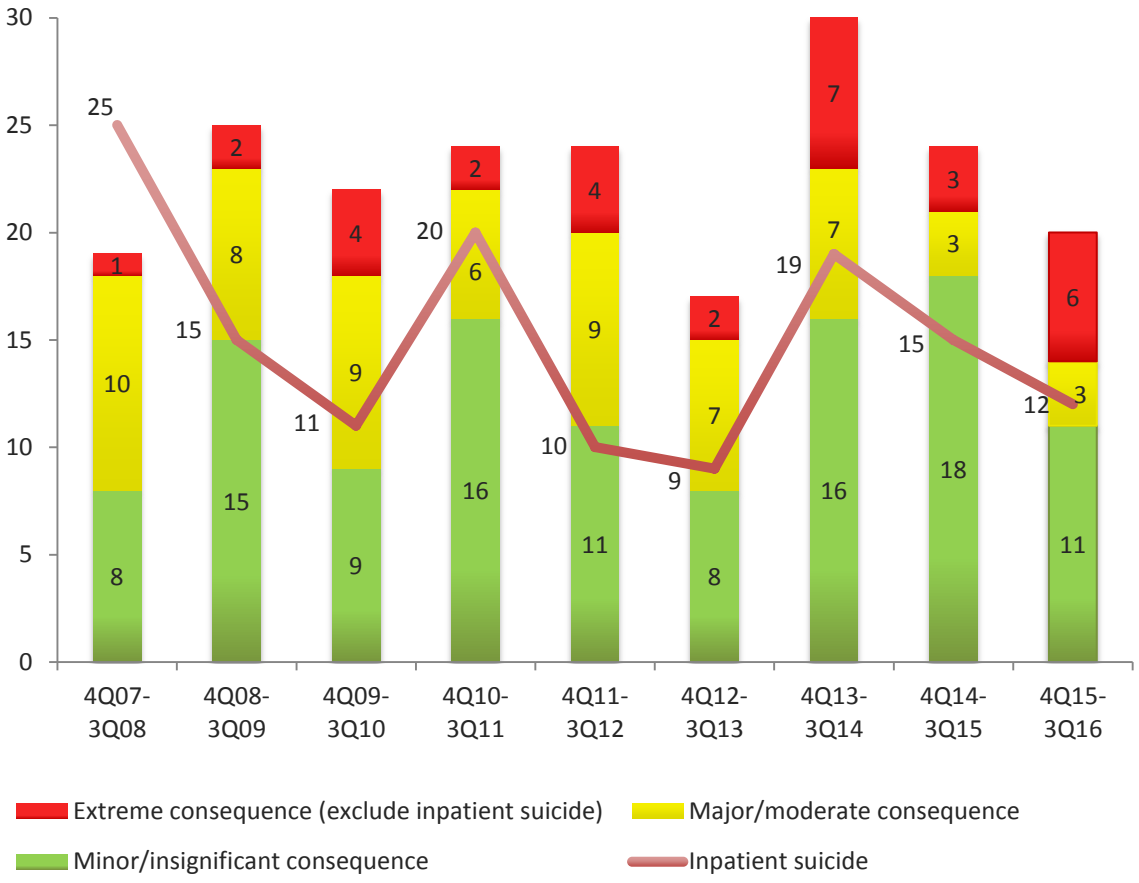


Figure 4: Yearly outcome of SE

SE Reported in 4Q15 – 3Q16

25. The distribution of the 32 reported SE in 4Q15 – 3Q16 by category is shown in Figure 5. The two most commonly reported categories were *retained instruments / material* (13 cases) and *inpatient suicide* (12 cases).

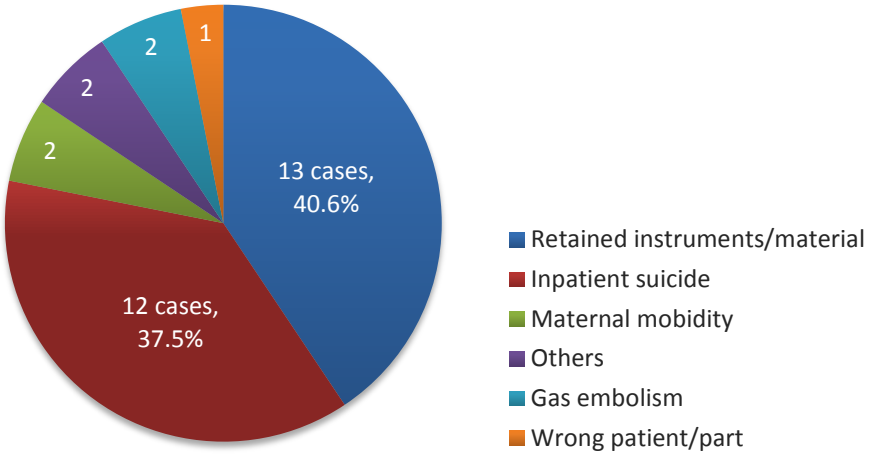


Figure 5: Distribution of SE by category

26. Their quarterly distribution is illustrated in Figure 6. There was no substantial variation in the number of SE between the 4 quarters in the reporting period.

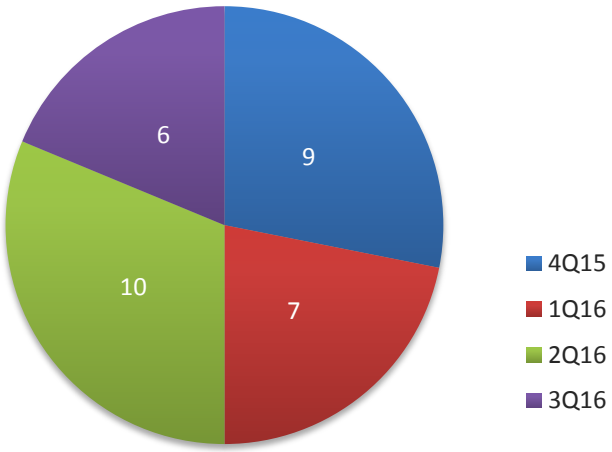


Figure 6: Quarterly distribution of SE

27. The following table shows the distribution of SE in different hospital settings:

Hospital Setting	Number of SE	Percentage
Acute general hospitals with 24-hour accident and emergency (A&E) services	25	78.1%
Hospitals with a mix of acute and non-acute services	3	9.4%
Hospitals with a mix of acute and non-acute services and psychiatric service	3	9.4%
Psychiatric hospitals	1	3.1%

Table 2: Distribution of SE by hospital setting

28. Among the 32 SE cases, 16 (comprising 12 *inpatient suicide*, 2 *gas embolism*, 1 *maternal morbidity* and 1 *others*) had resulted in mortality. For the remaining SE cases, 2 had extreme consequence, 3 had major / moderate consequence and 11 had minor / insignificant consequence (Figure 7).

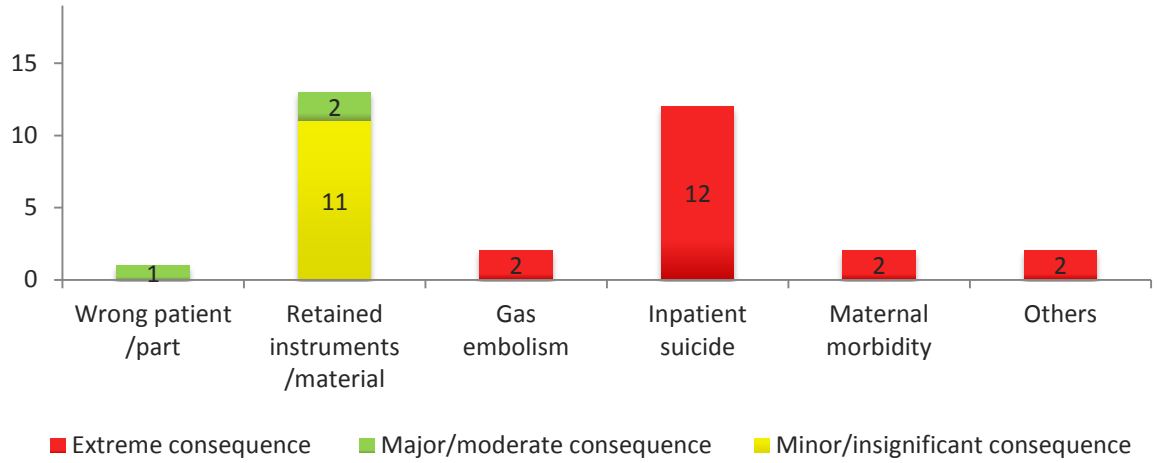


Figure 7: Outcome of SE by category

Retained instruments / material

29. Out of the 13 SE cases of *retained instruments / material*, 3 involved guide wire (decreased from 5 in 4Q14 – 3Q15). Their quarterly distribution is shown in Figure 8.

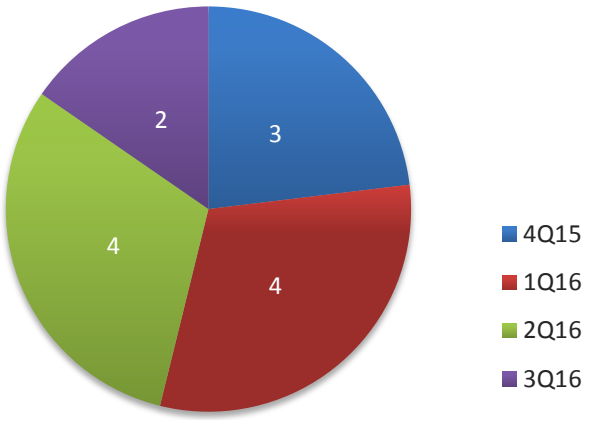


Figure 8: Quarterly distribution of retained instruments/material

Inpatient suicide

30. Figures 9 - 13 show the distribution of the 12 *inpatient suicide* cases by different categories during the reporting period.

31. Of the 12 *inpatient suicide* cases, half were home leave cases (Figure 9) and four were admitted for psychiatric illness. The 4 inpatients committed suicide either by hanging, suffocation or jumping from height. The other 8 patients, who were either on home leave or missing, committed suicide by jumping from height, stabbing, hanging or poisoning. The inpatient suicide incident rate for the reporting period was 1.1 per 100,000 inpatient admissions.

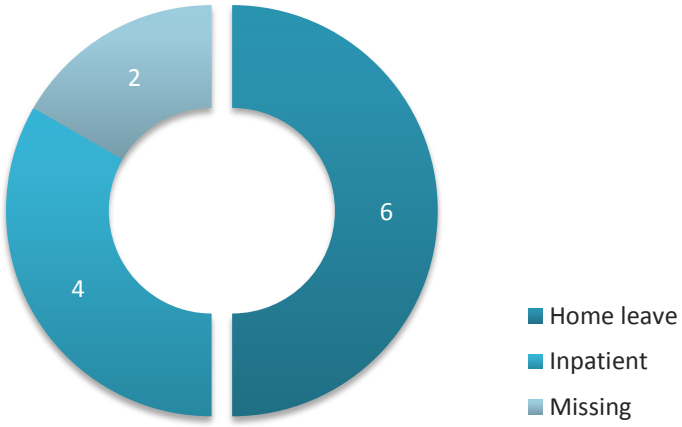


Figure 9: Location

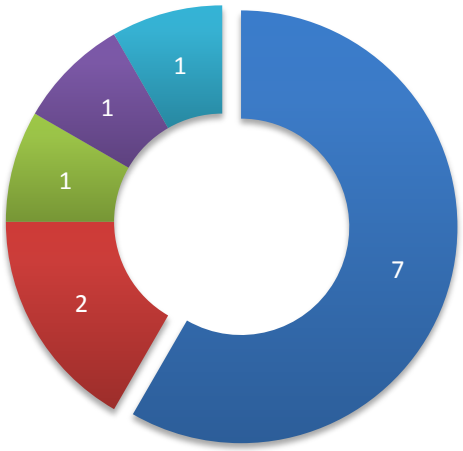


Figure 10: Method

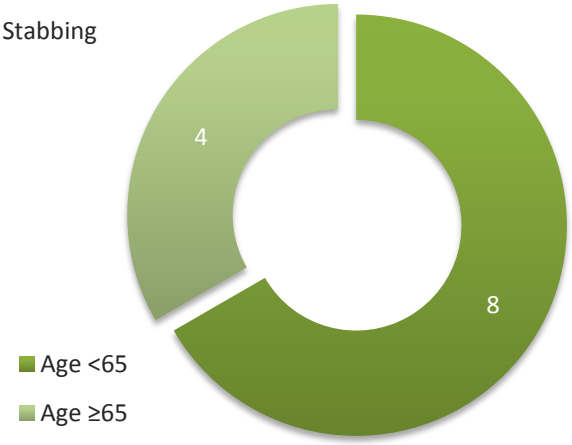


Figure 11: Age

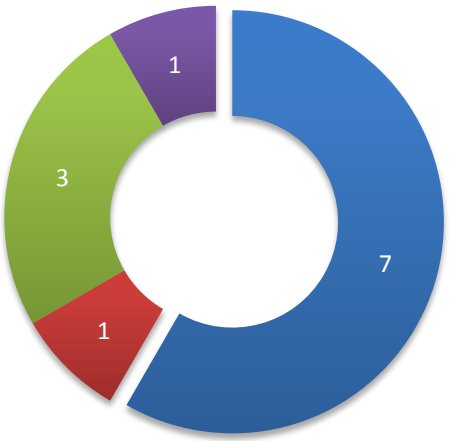


Figure 12: Hospital setting

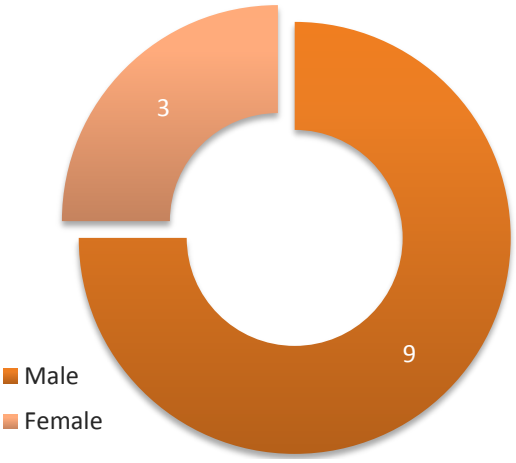


Figure 13: Gender

International Sentinel Event Reporting

32. In the United States, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) reviewed 936 SE cases in 2015 and 439 from January to June 2016.[1] The high number might be due to its much broader definition of SE. Australia, on the other hand, adopted a very similar definition of SE as HA. The number of reported sentinel events recorded by the Department of Health, State Government of Western Australia (DH Western Australia) was 12 in 2014 – 2015 and Victoria, Australia (DH Victoria) was 34 in 2012 – 2013.[2,3] Notwithstanding their low figures, the relative SE incident rates in DH Victoria and DH Western Australia were 23.0 and 22.3 per 1,000,000 inpatient episodes of care respectively.[4,5]

33. Compared with the Australian data, HA had a relatively low SE incident rate of 1.5 per 1,000,000 episodes of patient attendances / discharges and deaths (Table 3).

	HA, Hong Kong (4Q15 – 3Q16)	DH Western Australia, Australia (3Q14 – 2Q15)[5]	DH Victoria, Australia (3Q12 – 2Q13)[4]
Number of SE / 1,000,000 patient episodes	1.5	22.3	23.0

Table 3: SE incident rates in HA, DH Western Australia and DH Victoria

[1] The US Joint Commission, Summary Data of Sentinel Events Reviewed by The Joint Commission: as of July 5, 2016.

[2] Supporting Patient Safety – Sentinel Event Program Annual Report 2011-12 and 2012-13. Department of Health, State Government of Victoria, Australia.

[3] Your Safety in our Hands in Hospital - An Integrated Approach to Patient Safety Surveillance in WA Hospitals, Health Services and the Community: 2014. Department of Health, State Government of Western Australia, Australia.

[4] Department of Health, State Government of Victoria, Australia recorded 1.477 million admissions in 2012-13 (Supporting Patient Safety – Sentinel Event Program Annual Report 2011-12 and 2012-13).

[5] Department of Health, State Government of Western Australia, Australia recorded 537,780 hospital separations in 2014-15 (Your Safety in our Hands in Hospital - An Integrated Approach to Patient Safety Surveillance in WA Hospitals, Health Services and the Community: 2015).

34. Table 4 lists the most common types of SE reported in HA as compared with DH Victoria and DH Western Australia. Similar to HA, "inpatient suicide" and "retained instruments / material" were two of the most commonly reported SE in Australia.

HA, Hong Kong (4Q15 – 3Q16)	DH Western Australia, Australia (3Q14 – 2Q15)	DH Victoria, Australia (3Q12 – 2Q13)
Retained instruments / material after surgery / interventional procedure (13 cases, 41%)	Suicide of a patient in an inpatient unit (or whilst on leave) (5 cases, 41%)	Suicide in an inpatient unit (9 cases, 26%)
Death of an inpatient from suicide (including home leave) (12 cases, 38%)	Haemolytic blood transfusion reaction resulting from ABO incompatibility (3 cases, 25%)	Retained instruments or material (6 cases, 18%)
	Medication error resulting in death of a patient (2 cases, 17%)	
	Retained instruments or other material after surgery requiring re-opening or further surgical procedure (2 cases, 17%)	

Table 4: The most common types of SE reported in HA, DH Western Australia and DH Victoria

35. Inpatient suicide rates varied substantially worldwide and depended on the type of hospital and estimation methods. Different studies estimated the range to be 5 – 15 per 100,000 admissions in general hospitals in the United States.[6] The HA inpatient suicide rate (0.9 – 2.8) was lower than that of general hospitals in the United States.

[6] S. Shapiro, H. Waltzer. Successful suicides and serious attempts in a general hospital over a 15-year period. General Hospital Psychiatry, 2 (1980), pp. 118–126.

SERIOUS UNTOWARD EVENTS STATISTICS

Yearly Trend

36. A total of 86 SUE were reported in 4Q15 – 3Q16, making up an accumulated total of 632 SUE reported to date. The yearly distribution of SUE by category since 2010 is depicted in Figure 14, with the total number of cases each year shown at the top of each bar.

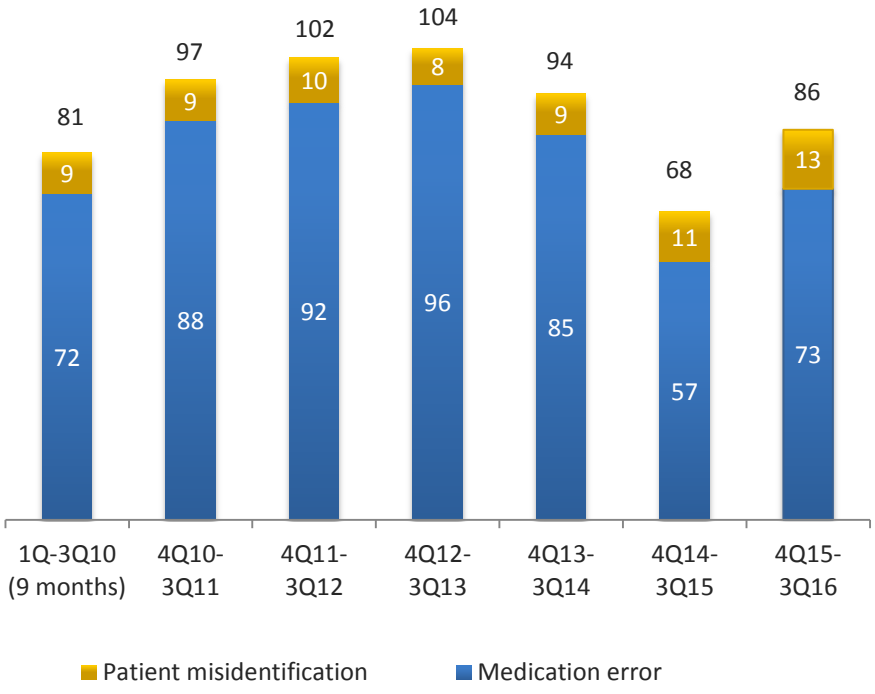


Figure 14: Yearly distribution of SUE by category

37. The yearly trend of the top three common drugs involved in *medication error* is depicted in Figure 15. Other common drugs involved are insulin, inotrope, oral hypoglycaemic agent etc.

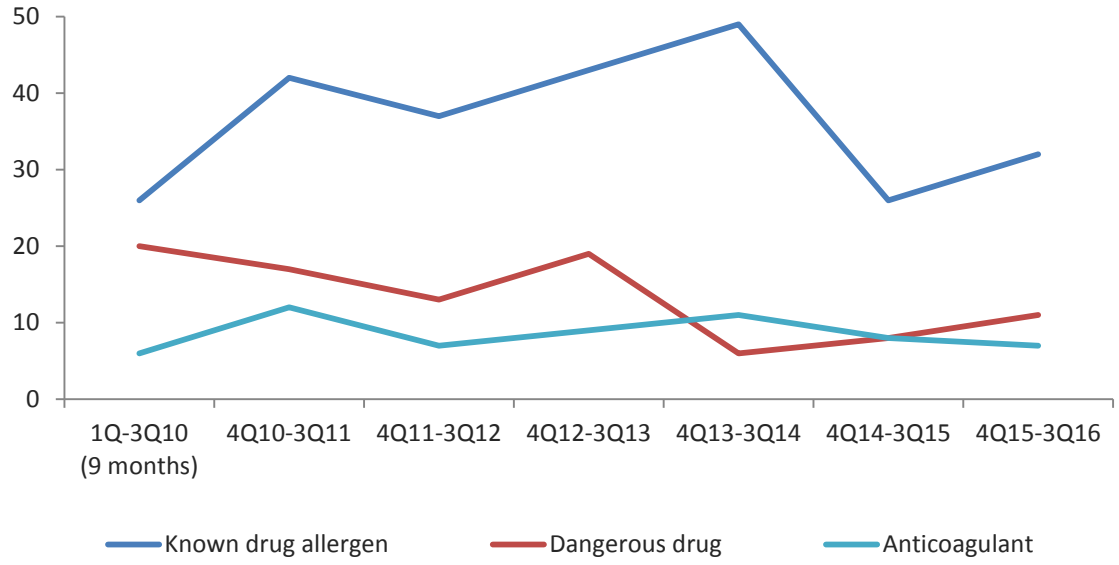


Figure 15: Yearly trend of top three common drugs involved in medication incidents

38. Up to now, 513 (81%) SUE cases had minor or insignificant consequence, 101 (16%) cases had moderate consequence and 18 (3%) cases had temporary major consequence (Figure 16).

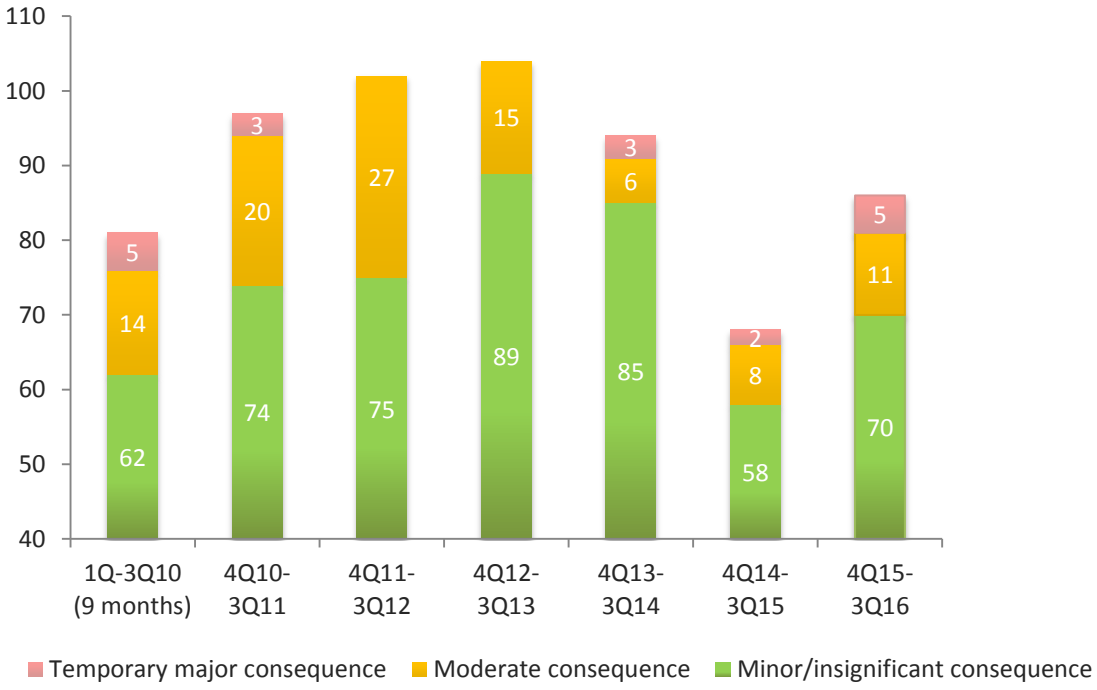


Figure 16: Yearly outcome of SUE

SUE Reported in 4Q15 – 3Q16

39. The quarterly distribution of SUE reported is illustrated in Figure 17.

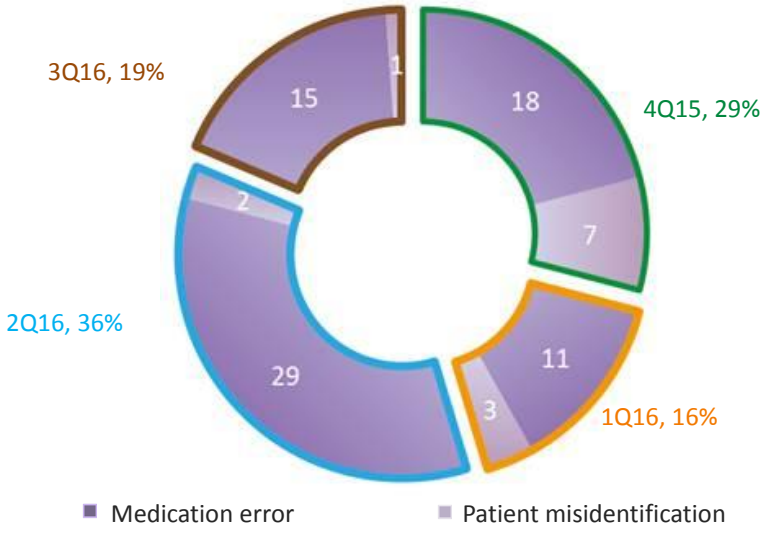


Figure 17: Quarterly distribution of SUE by category

40. Of the 86 SUE cases, 70 had minor / insignificant consequence, 11 had moderate consequence and 5 had temporary major consequence (Figure 18).

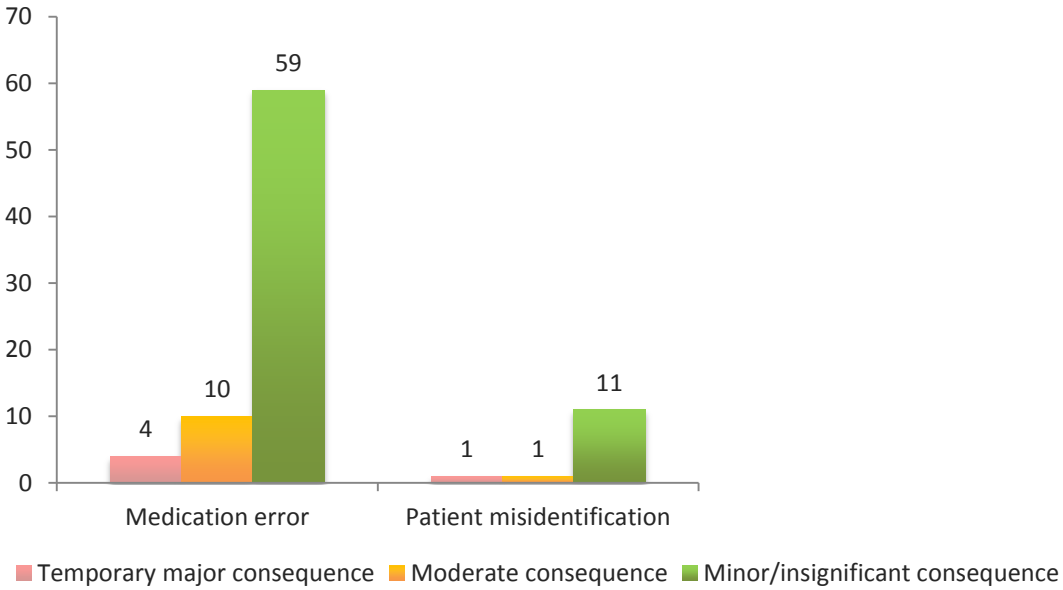


Figure 18: Outcome of SUE by category

Medication error

41. The three most common *medication error* were *known drug allergen* (32 cases), *dangerous drug* (11 cases) and *anticoagulant* (7 cases). The distribution of drugs is shown in Figure 19. Drugs such as vancomycin and steroid were grouped under *other medications.*

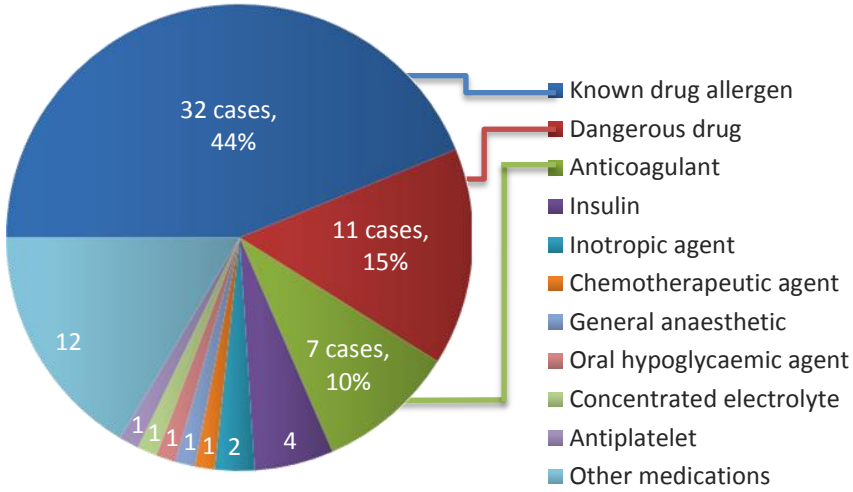


Figure 19: Distribution of medication error

42. Of the 32 *medication error* related to *known drug allergen*, the three most commonly involved drugs were penicillin group (13 cases), non-steroidal anti-inflammatory drug (NSAID) (6 cases) and paracetamol (5 cases). These three drug groups constituted 76% of the total *known drug allergen* incidents. Their distribution is shown in Figure 20.

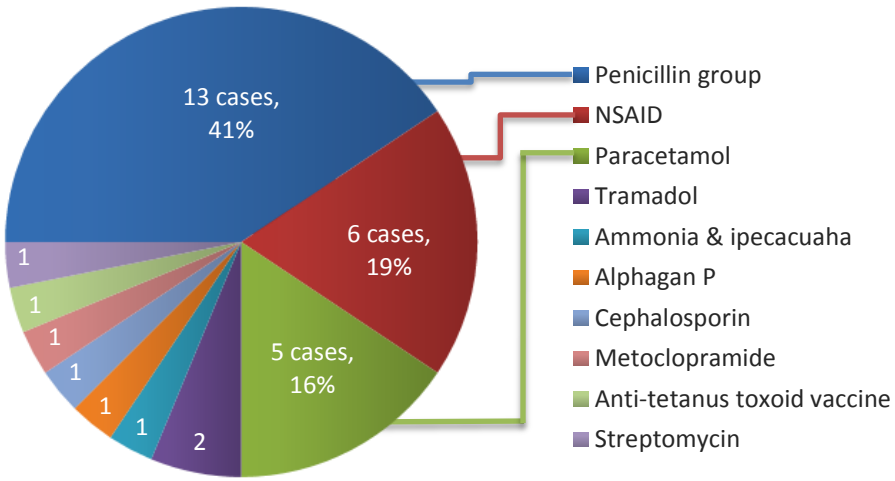


Figure 20: Distribution of drugs related to known drug allergen

43. Of the 32 *known drug allergen* cases, 30 patients had minor / insignificant consequence (Figure 21). One patient each had moderate and temporary major consequences and the drugs involved were NSAID and penicillin respectively.

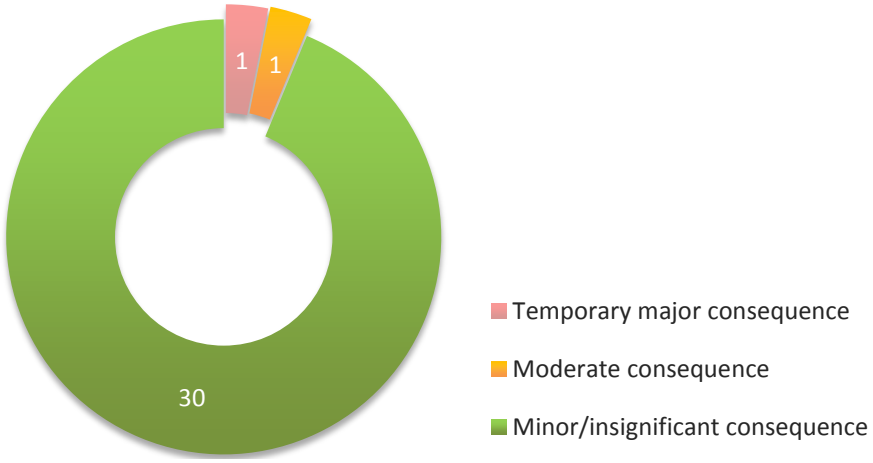


Figure 21: Outcome of known drug allergen

Patient misidentification

44. There were 13 SUE reported which were due to *patient misidentification*. These included 6 cases of *patient misidentification* during drug administration, 2 during drug prescription and 2 during drug dispensing. Their quarterly distribution is summarised in Table 5.

Patient misidentification scenarios	4Q15	1Q16	2Q16	3Q16
During drug prescription	1	1	0	0
During drug dispensing	1	1	0	0
During drug administration	3	1	1	1
Upon pathology reporting	1	0	0	0
For radiological investigation	1	0	0	0
Upon specimen collection	0	0	1	0
Total	**7**	**3**	**2**	**1**

Table 5: Quarterly distribution of patient misidentification by scenarios

45. Of the 13 *patient misidentification* cases, all except 2 patients had minor / insignificant consequence (Table 6). The patients having moderate consequence and temporary major consequence had bradycardia and dizziness respectively.

Patient misidentification scenarios	Minor/ Insignificant Consequence	Moderate Consequence	Temporary Major Consequence
During drug prescription	2	0	0
During drug dispensing	2	0	0
During drug administration	4	1	1
Upon pathology reporting	1	0	0
For radiological investigation	1	0	0
Upon specimen collection	1	0	0
Total	**11**	**1**	**1**

Table 6: Consequences of patient misidentification

ANALYSIS OF SENTINEL EVENTS

46. In this chapter, the common contributing factors and recommendations revealed by the RCA panels (including recommendations which had been implemented or were being followed up by clusters / hospitals to prevent further recurrence) for each category of SE reported in 4Q15 – 3Q16 are analysed. They are classified into communication, knowledge / skills, work environment / scheduling, equipment and policies / procedures / guidelines. HAHO would continue to work with clusters and hospitals to improve and redesign systems or work processes at the corporate level to enhance patient safety. A brief description of individual SE can be found at Annex III.

Factors	Common Contributing Factors	Recommendations
Retained instruments / material – broken (7 cases)		
Communication	Ineffective team communication	Delineate roles and responsibilities of team members in managing broken instrument during intraoperative period
Equipment	Unfamiliar with the instrument	Suspend the use of Catalano intubation set
Knowledge / skills	Non-setting of cement before drain placement	Ensure the cement is set before drain placement and confirm the mobility of drain before wound closure
	Failure to recognise that the drain was likely broken given that the drain was cut at side hole level and difficulty was encountered on drain removal	Promulgate the safe practice of drain management
	Unable to detect the presence of foreign body on intraoperative imaging	Enhance alertness on retained foreign body while reviewing intraoperative imaging
	Low alertness on potential risk of retained cement / broken instrument	Enhance staff alertness on potential risk of retained cement in similar orthopaedic procedures Remind orthopaedic surgeons to examine the broken instrument

Factors	Common Contributing Factors	Recommendations
Knowledge / skills *(con't)*	Failure to check for completeness of used accountable items / instrument	Perform intraoperative imaging if there are doubts of retained accountable items Enhance staff awareness on checking for completeness of used instruments
	Unaware of the safe practice of covering K-wire end with gauze before cutting	Promulgate the good practice of covering the K-wire end with gauze before cutting
Policies / procedures / guidelines	No documentation on checking completeness of removed nasogastric (NG) tube as required by cluster policy	Develop a system to document integrity of NG tube on removal
	No explicit procedure to confirm retention of any broken part of instrument during intraoperative period	Formulate standardised procedure on performing intraoperative imaging for all incidents of broken / suspected broken instruments

Retained instruments / material – incorrect counting (6 cases)

Communication	Ineffective handover between clinical staff	Standardise the structure and framework of handover to ensure effective communication of important information between clinical staff
	Lack of communication between the surgeon and scrub nurse	Build and reinforce the speak up culture
	Unclear role and accountability of staff on central venous catheter (CVC) insertion procedure	Define clearly the role and responsibility of staff on CVC insertion procedure
Knowledge / skills	Lack of awareness on the potential risk of retained gauze associated with speculum examination	Share the incident to raise staff awareness on the risk
	Inexperienced staff in CVC insertion procedure and its aftercare	Organise training programmes to doctors and nurses on CVC insertion procedure and its aftercare
	Distraction by patient's clinical condition and no surgical site inspection before end of operation was performed	Reinforce importance of routine surgical site inspection before the end of procedure

Factors	Common Contributing Factors	Recommendations
Knowledge / skills *(con't)*	Wrong assumption that the labelled specimen bottle contained the specimen without visual verification	Mandate visual confirmation of specimen by two staff
	Use of two CVC sets simultaneously which might cause confusion	Reinforce the practice of using only one CVC set at a time
	Unaware of the safeguard method to cut wire tips	Remind surgeons to adopt a safeguard method to prevent wire tip from dropping into the surgical field Count cut wire tips immediately when returning them to scrub nurse
	Inadequate training on CVC insertion	Strengthen training on CVC insertion
Policies / procedures / guidelines	No counting of guide wires / gauze / sponge before and after the end of procedure	Incorporate a critical checking step before and after interventional procedures / end of procedure to ensure counting and checking of guide wire / gauze / sponge
	Non-inclusion of endobag as a surgical counting item	Count all accountable items likely to be retained in patient
	Non-compliance with CVC insertion guideline on guide wire removal	Reinforce strict compliance with CVC insertion guideline
	No critical checking steps to ensure removal of guide wire	Incorporate a critical checking step in verifying guide wire removal before ending the procedure
	Unfitness of *Bedside Procedure Safety Checklist* with the CVC insertion workflow	Revise the design of *Bedside Procedure Safety Checklist*
Inpatient suicide (12 cases)		
Equipment	Defects in the design of emergency exit gate in preventing access to the roof	Consider installing a security lock at exit gate to keep access closed except in emergency situations
	Failure of the emergency exit's audio alarm system	Repair / upgrade the security alarm system and ensure regular preventive maintenance is in place
Policies / procedures / guidelines	Inadequate and nonspecific current observation mode for patient with high suicidal risk	Standardise practice and enhance training on intensive observation for patients with suicidal risk

Factors	Common Contributing Factors	Recommendations
Communication	Sudden change of patient's mental state in the community leading to unpredictable suicidal impulse	Transfer patient's relevant clinical records to receiving community unit timely Explore the possibility of transferring stable patients back to parent hospital for better continuation of care
Work environment / scheduling	Presence of high risk facilities in premises	Consider installing ceiling mount curtain rails where applicable, e.g. single rooms, isolation rooms and side rooms Perform environmental scanning on suicidal risk
	Inadequate height of fence rail at the roof	Restrict access to the roof via the passenger lift
Gas embolism (1 of the 2 cases)		
Knowledge / skills	Unaware of the risks of intravascular air embolism associated with CVC removal	Promulgate the safe practice of CVC removal by placing the patient in a supine or head down position unless contraindicated Advocate the safe practice of removing CVC at end inspiratory phase
Policies / procedures / guidelines	Failure to follow the standard practice of CVC removal	Review the content of orientation programme and reinforce clinical coaching Evaluate the model for continuous assessment of staff performance and knowledge in care delivery
Wrong patient / part (1 case)		
Policies / procedures / guidelines	Failure to verify procedure site with chest X-ray before procedure	Revise the design of the *Safety Procedure Checklist* by adding a checkbox for reminding staff to verify procedure side with appropriate imaging before procedure
	Failure to use the *Safety Procedure Checklist* for the procedure	Conduct regular audit to monitor compliance with the *Safety Procedure Checklist*

47. There were 2 SE cases under the *others* category reported. One involved suprachoroidal haemorrhage during cataract extraction. The key contributing factors and recommendations were:

Key Contributing Factors:

a. Suboptimal system on handling of blood results.

b. Clinical teams solely focused on their specialised care.

Recommendations:

a. Improve system of handling investigation result.

b. Share the incident to enhance awareness on handling of laboratory result.

48. The second *others* case involved ventilator being switched to standby mode for 1 minute. The key contributing factors and recommendations for this case were:

Key Contributing Factors:

a. Non-compliance with guidelines when adjusting connection in ventilator.

b. Absence of audio alarm warning signal for standby mode to alert staff.

Recommendations:

a. Reinforce the training of Intensive Care Unit (ICU) nurses in adjusting connection in ventilator.

b. Enhance *Guideline on Management of Patient on Intermittent Positive Pressure Ventilation*.

c. Conduct regular audit on staff's compliance with the guideline.

49. In the second gas embolism case where gas bubbles were noted in extracorporeal membrane oxygenation (ECMO) circuit, RCA panel members acknowledged the following:

a. The healthcare team providing ECMO care was appropriately trained.

b. Department guidelines for circuit priming and crisis management of ECMO therapy were being followed.

c. Changing the venous and arterial cannulae and circuit during crisis management of ECMO therapy in a totally ECMO-dependent patient was a difficult and major decision.

50. The RCA panel members made the following recommendations on critical points of operation:

a. Staff should be vigilant on and respond swiftly to patient's changing condition.

b. Simulation training and sharing should be conducted to enhance staff awareness in recognising and managing both air in ECMO circuit and air embolism in ECMO patient.

c. Staff training on ECMO circuit priming should be reinforced. Competency of individual nurses on ECMO circuit priming should be assessed before they were allowed for independent practice.

d. Timely incident reporting and quarantine of involved equipment / instrument / consumable should be enforced to enable subsequent investigation.

ANALYSIS OF SERIOUS UNTOWARD EVENTS

51. Since *known drug allergen* constituted nearly half (44%) of all the SUE reported in 4Q15 – 3Q16, their common contributing factors and recommendations taken to prevent further recurrence are summarised below. Similar to SE, SUE are also evaluated from the perspective of knowledge / skills, system and policies / procedures / guidelines.

Factors	Common Contributing Factors	Recommendations
Medication error – known drug allergen		
Knowledge / skills	Knowledge deficit / gap of cross sensitivity drugs e.g. - Ketorolac (Toradol) and Arcoxia are NSAID - Augmentin and Unasyn are Penicillin	Enhance awareness and training on medication safety and drug allergy Facilitate staff to make reference to *cross allergy reference table*
	No cross checking for drug allergy on patient bearing pseudo ID	Enhance staff knowledge on handling of patient with pseudo ID
System	Inpatient Medication Order Entry (IPMOE) cannot perform cross checking if allergy history was entered as free text	Convert free text into structure entry Enhance features of Clinical Management System (CMS) allergy input screen to avoid free text entry
Policies / procedures / guidelines	Non-compliance with *Guidelines on Safe Medication Management* and *Guideline on Known Drug Allergy Checking*	Reinforce compliance with 5 rights principle during drug administration
	Drug administration before verification by pharmacy	Fax medication administration record (MAR) to pharmacy for vetting before drug administration
	Use of leftover / ward stock / pre-packed drugs such as oral antibiotic	Eliminate ward stock of oral antibiotic and left over drugs Never prescribe or dispense pre-packed medications during pharmacy operation hours

52. *Dangerous drug* constituted the second most common SUE. In one of the cases, two infusion lines of intravenous fluid and morphine infusion (30mg morphine in 100mL 5% dextrose) at 3.3mL/hour were set up on a drip pole at patient's bed. After changing a new infusion bag, the morphine infusion pump rate was inadvertently adjusted from 3.3mL/hour to 83.3mL/hour.

Learning Point:

Always trace all infusion / device lines back to their origins before connecting or disconnecting any devices or infusions.

53. The third most common SUE was *anticoagulant*. In one of the cases, a nurse prepared a syringe filled with 9mL unfractionated heparin (1000 units/mL) for haemodialysis (HD). The syringe was improperly fitted into the heparin pump of the HD machine. The heparin syringe was found empty shortly after the start of HD.

Key Contributing Factors:

a. Non-compliance with the dialysis guidelines.

b. Unfamiliar with the handling of heparin pump.

Recommendations:

a. Enhance training and supervision of renal nurses.

b. Place a reminder near the HD machine to alert staff on the correct way of handling heparin pump.

c. Alert staff on this potential risk.

54. In one of the SUE cases involving *other medications*, vancomycin was administered as bolus to a patient. Patient developed mild red man syndrome which subsided spontaneously.

Learning Point:

Vancomycin must be diluted (at least 500mg/100mL) and administered by slow intravenous infusion (no more than 10mg/minute).

55. In one *patient misidentification* case, Patient A had computed tomography (CT) guided biopsy of lung lesion in radiology department. Patient's tissue was put into a new specimen bottle. Patient developed cardiac arrest and was transferred to ICU, escorted by Nurse C. Nurse C put the specimen bottle on the CT suite bench. The CT suite was cleared up for preparation of next procedure. Nurse D took out a "new" specimen bottle from the drawer of the bench (which had Patient A's tissue in it). Doctor performed CT guided lung biopsy for Patient B. Doctor put the biopsy needle into the "new" specimen bottle and believed sufficient tissue sample was collected. The specimen bottle was affixed with the label of Patient B. Nurse C returned from ICU but could not locate Patient A's specimen bottle. Only Patient B's specimen bottle was received by the laboratory. DNA testing confirmed only Patient A's DNA was found inside Patient B's specimen bottle.

Key Contributing Factors:

a. Workflow for specimen and specimen bottle handling was suboptimal.

b. Role delineation and responsibilities during emergency situation were not clearly defined.

c. The specimen bottle was not tamper proof sealed.

Recommendations:

a. Review workflow to ensure uniformity of specimen and specimen bottle handling.

b. Handle specimens by radiographer during emergency situation.

c. Adopt tamper proof seal on specimen bottles.

Keep Watch at the Tree

There is a very old Chinese idiom「守株待兔」 (literally "keep watch at the tree awaiting a rabbit") about a silly farmer who gave up his hard work and waited by the tree every day. It happened that he had witnessed a panic-stricken rabbit crash into the tree, killing itself. He had a 'free lunch' and expected more to come his way.

It is not surprising that the idiom originated from a story in the book Han Fei-zi (韓非子, ca. 281 – 233 B.C.). Han was one of the early legalist philosophers (法家) in China. This school of philosophy believes in rules, active controls, and system of clear rewards and penalties. A capable ruler must govern his people actively – it would not do simply to educate or cultivate them, nor is it a good idea to leave people alone getting on with their daily lives.

I recently read a poem of the same title 〈守株待兔〉 by a contemporary Hong Kong poet 飲江 (1949 –), in which the lesson of the fable is turned upside down. Yes, this was a silly farmer keeping watch at the tree, but he was not waiting for another rabbit to come along and crash to die. In fact, quite the opposite – he was sitting there to alert and warn every rabbit coming this way. "Watch out! Danger! Be careful! You will break your neck running into this tree!" He shouted and shouted.

Being a silly farmer, he didn't really know the nature of rabbits too well. A few rabbits got the message and swiftly avoided the danger. Many other rabbits, scared by the very loud (and incomprehensible) shouting, simply panicked and dashed away to random directions, crashing into other trees and died anyway.

The tree is a common metaphor for an organization such as a hospital. Keeping watch is a noble mission, but shouting at the fast-running rabbit will not get us good outcome.

Dr Derrick Au
Former Director (Quality and Safety)
Extracted from 42nd Issue of HA Risk Alert

Knowledge Enhancement

In 4Q15 – 3Q16, HAHO had conducted 14 staff forums for about 2,100 colleagues to educate them on SE & SUE. Forum participants included hospital leaders, patient safety managers, doctors, nurses and other colleagues.

The SE & SUE incidents were also shared in different Coordinating Committees (COC), Central Committees (CC), Speciality Advisory Groups (SAG), Safety Committees (SC) and other working groups. Altogether, 23 sessions had been conducted in the year.

To strengthen and enhance staff awareness on surgical safety, various concise and easy-to-remember surgical safety messages were promulgated via HA Risk Alerts (Annex IV), SE & SUE sharing forums and the Patient Safety and Risk Management webpage in the year.

THE WAY FORWARD

Inpatient Suicide (including Home Leave)

According to the SE & SUE Policy, incidents of home leave patients committed suicide are classified as SE and they remained one of the top three most frequently reported SE. Since October 2010, there was a total of 85 *inpatient suicide* SE cases of which 44 (51.8%) were home leave patients.

Throughout the years, HA has tried various measures to reduce the risk of *inpatient suicide*, such as controlling the environment within hospital compound by reducing high risk facilities and by implementing the *Facility-related Provisions for Prevention of In-patient Suicide in Non-Psychiatric Ward Setting*; conducting regular safety round; adopting multi-disciplinary approach in identifying and handling patients with suicidal behavior; and providing home leave patient with information leaflet to raise awareness on suicide prevention. While *inpatient suicide* within hospital compound showed a general reduction trend, home leave suicide cases remained unchanged over the period.

It is understandable that a brief period of home leave is unavoidable in some occasions (e.g. home leave for a few hours to have dinner with family during festive season). However, we should take note of the risk of patients committing suicide during home leave. We should also recognise that following up on patients' emotional status and their inclination to commit suicide during home leave is difficult, especially when there is a change of environment like moving to half-way hostel after a period of hospitalization, which could incur significant stress to the patients.

As a way forward, in addition to the current measures, more focus would be put to raise staff awareness on the risk of suicide in home leave patients, and remind healthcare providers to balance the risks and benefits when considering home leave arrangement for a patient.

Surgical Safety

Besides implementation of checklists and promulgation of surgical safety messages, clinical experts and relevant stakeholders are exploring various effective measures, such as making use of critical check / control point(s), to further reduce surgical risks.

Handover of Important Investigation Results

There are various practices to ensure important investigation results are acknowledged and handled by responsible clinical teams in a timely manner. A late or missed investigation result notification (e.g. pathology reports with new diagnosis of malignancy, unread radiology images, etc.) could lead to delayed and / or inappropriate treatment for the patient which would adversely affect the public's confidence towards HA.

Following its ground work in the year, HAHO Quality and Safety Division would continually work with cluster quality and safety teams, HAHO Information Technology and Health Informatics Division and other stakeholders to explore and develop efficient and effective mechanisms (e.g. use of information technology platform) for the handover of important investigation results.

ANNEXES

ANNEX I

HA SENTINEL AND SERIOUS UNTOWARD EVENT POLICY (July 2015)

1. Purpose

The Sentinel and Serious Untoward Event Policy defines the process for identification, reporting, investigation and management of Sentinel Events (SE)「醫療風險警示事件」and Serious Untoward Events (SUE)「重要風險事件」in the Hospital Authority.

2. Scope

This Policy applies to sentinel and serious untoward events related to care procedures.

3. Objectives

- To increase staff's awareness to SE and SUE.
- To learn from SE and SUE through Root Cause Analysis (RCA), with a view to understand the underlying causes and make changes to the organization's systems and processes to reduce the probability of such an event in the future.
- To have positive impact on patient care and services.
- To maintain the confidence of the public and regulatory / accreditation bodies.

4. Definition of Mandatory Reporting Events

4.1 Sentinel Events

1. Surgery / interventional procedure involving the wrong patient or body part.
2. Retained instruments or other material after surgery / interventional procedure.
3. ABO incompatibility blood transfusion.
4. Medication error resulting in major permanent loss of function or death.
5. Intravascular gas embolism resulting in death or neurological damage.
6. Death of an inpatient from suicide (including home leave).
7. Maternal death or serious morbidity associated with labour or delivery.
8. Infant discharged to wrong family or infant abduction.
9. Other adverse events resulting in permanent loss of function or death (excluding complications).

4.2 Serious Untoward Events

1. Medication error which could have led to death or permanent harm.
2. Patient misidentification which could have led to death or permanent harm.

5. Management of SE and SUE

5.1 Immediate response upon identification of a SE or SUE

5.1.1 Clinical Management Team shall assess patient condition and provide care to minimize harm to patient.

5.1.2 Attending staff shall notify senior staff of Department without delay (even outside office hours). Hospitals should establish and promulgate a clear line of communication for SE and SUE to all staff.

5.1.3 Department and hospital management shall work out an immediate response plan, including

- Disclosure to patient / relatives;
- When to notify HAHO;
- Public relation issues and media handling, (making reference to HAHO Corporate Communication Section's protocol / advice); and
- Appropriate support / counseling of staff.

5.2 Reporting (within 24 hours)

5.2.1 Hospitals must report SE and SUE through the Advance Incident Report System (AIRS) within 24 hours of their identification, to

- Provide an initial factual account; and
- Mark the case as "SE" or "SUE" in AIRS accordingly.

5.2.2 Hospitals shall consider additional reporting requirements as indicated, for example, to Coroner in accordance to statutory requirement.

5.3 Investigations

5.3.1 Within 48 hours

5.3.1.1 For SE, HAHO shall appoint an RCA Panel, composing of members from hospital RCA team, respective COCs, external senior clinicians, HAHO coordinator and / or lay persons from Hospital Governing Committee, to evaluate the event reported.

5.3.1.2 For SUE, the RCA Panel shall be formed by respective hospital.

5.3.2 Hospitals shall submit a detailed factual account to HAHO in 2 weeks.

5.3.3 The RCA Panel shall submit an investigation report to the Hospital Chief Executive in 6 weeks.

5.3.4 Hospital shall submit the final investigation report to HAHO in 8 weeks.

5.4 Follow-up (post 8 weeks)

5.4.1 Implicated departments shall implement the action plan as agreed in the RCA report, and risk management team / personnel shall monitor compliance and effectiveness of the measures in due course.

5.4.2 The panel at HAHO shall review RCA reports to identify needs for HA-wide changes, and to share the lessons learned through Safety Alert, HA Risk Alert (HARA), Patient Safety Forum, SE and SUE Report (to public) and follow-up visits.

5.4.3 The HAHO would visit respective hospitals for the implementation of improvement measures.

Supplementary Notes to Sentinel Event

If an incident involves a criminal act, a deliberately unsafe act, substance abuse, or deliberate patient harm or abuse, the incident should not be scrutinized by the Sentinel Event Policy.

Definition of common terms of Sentinel Event

1. Surgery / interventional procedure

Any procedures, regardless of setting in which it is performed, that involves any of the following:

- Creation of surgical wound on skin or mucous membranes.
- Making a cut or a hole to gain access to the inside of a patient's body.
- Inserting an instrument or object into a body orifice.
- Use of electromagnetic radiation for treatment.

It includes fine needle aspiration, biopsy, excision and cryotherapy for lesions, radiology interventional procedures, anaesthetic block and vaginal birth or Caesarean delivery.

2. Permanent loss of function

It means sensory, motor, physiologic, or intellectual impairment not present on admission requiring continued treatment or lifestyle change. When "permanent loss of function" cannot be immediately determined, applicability of the policy is not established until either the patient is discharged with continued major loss of function, or two weeks have elapsed with persistent major loss of function, whichever occurs first.

Reportable Sentinel Event

1. Surgery / interventional procedure involving the wrong patient or body part

Any surgery/interventional procedure performed on an unintended patient or unintended body part.

The event can be detected at any time after the surgery / interventional procedure begins which is the point of surgical incision, tissue puncture or the insertion of instrument into tissue, cavities or organs.

Not to be included

- Unsuccessful procedure as a result of unknown/unexpected anatomy of the patient.
- Changes in plan during surgery with discovery of pathology in close proximity to the intended place where risk of a second surgery or procedure outweighs benefit of patient consultation or unusual physical configuration (e.g. adhesion, spine level/extra vertebrae).
- Blood taking, parenteral administration of drug, and use of otoscope without any intervention.

2. Retained instruments or other material after surgery / interventional procedure

Unintended retention of a foreign object in a patient after a surgical / invasive procedure ends. It also includes items were inserted into patient's body during a surgery / interventional procedure and not removed as planned. The size of the retained foreign object and the potential for harm from the retained foreign object, or whether the object is removed after discovery is irrelevant to its designation as a Sentinel Event.

'Instrument or other material' includes any items (such as swabs, needles, wound packing material, sponges, catheters, instruments and guide wires) left unintended.

'Surgery / interventional procedure' ends after all incisions have been closed in their entirety, and / or all devices, such as probes or instruments, that are not intended to be left in the body have been removed, even if the patient is still in the operation theatre or interventional suite under anesthesia.

Not to be included

- Objects that are intentionally (i.e. by conscious decision) left in place during the surgery / interventional procedure.
- Objects are known to be missing prior to the completion of the surgery or interventional procedure and may be within the patient (e.g. screw fragments, drill bits) but where further action to locate and / or retrieve would be impossible or carry greater risk than retention.

3. ABO incompatibility blood transfusion

Administration of blood or blood product(s) having ABO incompatibilities, regardless of whether it results in transfusion reaction or other complications.

Not to be included

- Clinically indicated transfusion of ABO incompatible blood or blood product.

4. **Medication error resulting in major permanent loss of function or death**

Medication error includes error in the prescribing, dispensing, or administration of a medicine resulting in permanent loss of function or death. It includes, but not limited to, an error involving the wrong drug, the wrong dose, the wrong patient, the wrong time, the wrong rate, the wrong preparation, or the wrong route of administration.

Not to be included

- Death or permanent loss of function associated with allergies that could not be reasonably known or discerned in advance of the event.
- Variance in clinical practice on drug selection, dose and route of administration agreed by professional.

5. **Intravascular gas embolism resulting in death or neurological damage**

Death or neurological damage as a result of intravascular air embolism introduced during intravascular infusion / bolus administration or through a haemodialysis circuit.

Not to be included

- The introduction of air emboli: via surgical site (particularly Ear, Nose and Throat surgery and neurosurgery), during foam sclerotherapy and during the insertion of a central venous catheter.
- Where the introduction of the air embolism is deliberately by the patient.

6. **Death of an in-patient from suicide (including home leave)**

Death from suicide of in-patient committed any time after in-patient admission and before discharge, including home leave.

Not to be included

- Deaths resulting from self-inflicted injuries that committed before admission.
- Deaths from suicide committed while waiting for admission to the hospital.
- Suicidal death of a patient attending an out-patient service (such as Out-patient Department, Accident and Emergency Department).
- Unsuccessful suicide attempts.

7. **Maternal death or serious morbidity associated with labor or delivery**

It includes death or serious morbidity of a woman during or following childbirth from any cause related to or aggravated by labour, delivery or its management. It also includes obstetric complications resulting in death or serious morbidity. Serious morbidity means permanent loss of function.

'Associated with' means that it is reasonable to initially consider that the incident was related to the course of care. Further investigation and / or root cause analysis of the event may be needed to confirm or refute the presumed relationship but this should not delay reporting of event.

8. **Infant discharged to wrong family or infant abduction**

An in-patient aged 12 months or below is discharged to a wrong family or taken away from the hospital ward without prior notice to the hospital.

9. **Other adverse events resulting in permanent loss of function or death**

An injury related to medical management, in contrast to the natural course of patient's illness or underlying condition or known complications of treatment, resulting to permanent loss of function and death.

Medical management includes all aspects of care including diagnosis and treatment, and the systems and equipment used to deliver care.

Not to be included

- Event relating to the natural course of the individual's illness or underlying condition or to known complications of treatment.
- A death or loss of function following a discharge against medical advice (DAMA).
- Hospital-acquired infection(s).

Final decision-making around individual events is for HAHO consultation with cluster SDs.

ANNEX II

DESCRIPTION OF CONSEQUENCES

Sentinel Events

Category of Consequence	Severity Index of Incident	Description
Minor/ Insignificant	1	Incident occurred (reached patient) but no injury sustained Monitoring may be required No investigation or treatment required
	2	Minor injury Monitoring, investigation or minor treatment required No change in vital signs
Major/ Moderate	3	Temporary morbidity Monitoring, investigation or simple treatment required Some changes in vital signs
	4	Significant morbidity Transfer to a higher care level, emergency treatment, surgical intervention or antidote required Significant changes in vital signs
Extreme	5	Major permanent loss of function or disability
	6	Death

Serious Untoward Events

Category of Consequence	Severity Index of Incident	Description
Minor/ Insignificant	1	Incident occurred (reached patient) but no injury sustained Monitoring may be required No investigation or treatment required
	2	Minor injury Monitoring, investigation or minor treatment required No change in vital signs
Moderate	3	Temporary morbidity Monitoring, investigation or simple treatment required Some changes in vital signs
Temporary Major	4	Significant morbidity Transfer to a higher care level, emergency treatment, surgical intervention or antidote required Significant changes in vital signs

ANNEX III

INDIVIDUAL SENTINEL EVENTS

Category 1: Surgery / interventional procedure involving the wrong patient or body part

Wrong side chest tapping

A patient had lung cancer was presented with progressive dyspnoea. Chest X-ray showed that there was increased RIGHT pleural effusion. However, both clinical notes and consent form were marked LEFT chest tapping. LEFT chest tapping was attempted twice but failed (dry tap). Post X-ray reviewed a thin rim of LEFT pneumothorax.

Key Contributing Factors:

1. Procedure site was not verified with chest X-ray before procedure.
2. *Safety Procedure Checklist* was not used for the procedure.

Recommendations:

1. Revise the design of the *Safety Procedure Checklist* by adding a checkbox for reminding staff to verify procedure side with appropriate imaging before procedure.
2. Conduct regular audit to monitor compliance with the use of safety checklist.

Category 2: Retained instruments or other material after surgery / interventional procedure

Broken Instruments / Material

Case 1: A segment of nasogastric tube (NG) tube

A patient was admitted for acute stroke requiring long term NG tube feeding. NG tube was repeatedly pulled out by the patient during hospitalization. Three months after admission, a chest X-ray revealed 2 radiopaque lines of NG tubes. An 18cm NG tube fragment was retrieved from the stomach by oesophageal-gastro-duodenoscopy (OGD).

Key Contributing Factor:

No documentation on checking completeness of removed NG tube as required by cluster policy.

Recommendation:

Develop a system to document integrity of NG tube on removal.

Case 2: A small metallic foreign body

A patient underwent operation for reduction and fixation of wrist fracture in May 2015. 6 months after first operation, surgeon performed arthroscopic removal of implant and ulnar styloid repair. Procedure was uneventful and patient was discharged on the next day. Follow up X-ray 2 weeks later detected a tiny metallic foreign body on ulnar side of patient's wrist. Patient preferred observation to intervention.

Key Contributing Factor:

Failure to check the completeness of used accountable items.

Recommendation:

Perform intraoperative imaging if there are doubts of retained accountable items.

Case 3: A segment of redivac drain

Cemented surgery was performed on right foot for a patient with traumatic fracture. A redivac drain was inserted. Two days after operation, the surgeon decided to remove the drain. Nurses removed the drain at bedside but encountered resistance. During checking, the drain end was found cut at side hole level. Nurses presumed the drain was trimmed intentionally during operation. Two weeks later, a doctor detected a segment of drain retained in patient's right foot while reviewing X-ray. The drain was removed during the next operation and was found adhered tightly to the cement.

Key Contributing Factors:

1. The cement was not set before drain placement.
2. The nurse was not aware of the increased risk of broken drain when encountering difficulty on drain removal.
3. The nurse did not recognise the drain was likely broken given that the drain was cut at side hole level.

Recommendations:

1. Ensure the cement is set before drain placement and confirm the mobility of drain before wound closure.
2. Promulgate the safe practice on drain management.

Case 4: Broken tip of silicone tube metal introducer

A patient underwent endoscopic surgery for management of nasolacrimal duct obstruction. Surgeon failed to intubate the lacrimal canaliculi of left eye by using a single-used silicone tube. The procedure was successfully reattempted after using a more rigid metal introducer inside the Catalano intubation set. During reprocessing, the end of metal introducer was found broken. X-ray confirmed a 4mm metallic foreign body retained in the region of superior canaliculi.

Key Contributing Factors:

1. Unfamiliar with the instrument.
2. Failure to check the completeness of instrument.

Recommendations:

1. Suspend the use of Catalano intubation set.
2. Enhance staff awareness on checking the completeness of used instruments.

Case 5: A Kirschner wire (K-wire) tip

K-wires were used for fixation of a patient's patellar fracture. The surgeon cut the K-wire tip without covering the end with gauze to prevent cut end from bouncing off. Intraoperative X-ray was performed to confirm the alignment of K-wire. No foreign body was detected. Post-operative X-ray showed a 0.5mm metallic foreign body outside joint space of the patient's knee. The patient preferred no further operation.

Key Contributing Factors:

1. The surgeon was not aware of the safe practice of covering K-wire end with gauze before cutting.
2. The surgeon could not detect the presence of foreign body on intraoperative imaging.

Recommendations:

1. Promulgate the good practice of covering the K-wire end with gauze before cutting.
2. Enhance alertness of surgeons on retained foreign body while reviewing intraoperative imaging.
3. Explore the possibility of providing routine intraoperative X-ray screening before wound closure.

Case 6: A piece of bone cement

A patient underwent left unipolar hip arthroplasty for fractured neck of femur. Surgeons packed the acetabulum with gauze to prevent cement leakage. Inspection and palpation of the acetabulum were performed prior to reduction. After reduction, the passive range of movement was also satisfactory. Post-operative X-ray 2 days later showed a foreign body inside the acetabulum. Subsequent computed tomography scan revealed suspected retention of a small piece of cement. Clinical team decided not to remove the cement.

Key Contributing Factor:

Low alertness of staff on potential risk of retained cement.

Recommendations:

1. Perform intraoperative imaging if there are doubts of loosened bone cement.
2. Enhance staff alertness on potential risk of retained cement in similar orthopaedic procedures.

Case 7: Coil wire fragments

A patient underwent LEFT hip arthroplasty for osteoarthritis (OA) hip. While inserting the second screw, surgeon discovered that the detachable flexible drill shaft was bent. Nurse checked the instrument and suspected the outer coil wire of the drill shaft was broken. However, both surgeon and staff from supplier believed that the drill shaft was structurally intact. Surgeon performed a visual inspection of surgical field but could not find any broken fragment. Surgeon decided not to do X-ray examination due to concern of infection risk. There was no written documentation on the broken detachable flexible drill shaft in the operation record. Post-operative X-ray revealed 3 pieces of coil wire fragments in patient's proximal femur.

Key Contributing Factors:

1. No explicit procedure to confirm retention of any broken part of instrument during intraoperative period.
2. Low awareness on potential risk of broken instrument.

Recommendations:

1. Formulate a standard procedure on performing intraoperative imaging for all suspected broken instruments.
2. Delineate the roles and responsibilities of team members in managing broken instrument during intraoperative period.
3. Remind orthopaedic surgeons to reinforce the practice of examining broken instruments with due diligence instead of only performing visual checking on surgical field.

Incorrect Counting of Instruments / Material

Case 8: Guide wire

A patient was diagnosed with acute pancreatitis and shock. Doctor decided to insert a central venous catheter (CVC). While opening the first CVC set, the guide wire accidentally dropped onto the floor. Nurse therefore opened another set of CVC. Two CVC sets were used simultaneously during the procedure. No counting of guide wire was performed before the end of procedure. Resistance encountered during flushing of main CVC lumen. Backflow of blood could not be detected from main lumen. The drip was therefore connected to the side CVC lumen which was patent. Post procedure X-ray confirmed retained guide wire which was retrieved at bedside uneventfully.

Key Contributing Factors:

1. Guide wires were not counted before the end of procedure.
2. Two CVC sets were used simultaneously which might cause confusion.
3. The doctor and nurses were inexperienced in CVC insertion procedure and its aftercare.

Recommendations:

1. Incorporate a critical checking step before end of procedure to ensure counting and checking of guide wire.
2. Revise the *Safety Procedure Checklist* to remind staff to count guide wire used.
3. Reinforce the practice of using only one CVC set at a time.
4. Organise training programmes to doctors and nurses on CVC insertion procedure and its aftercare.

Case 9: Plain gauze

A pregnant patient was admitted for per-vaginal bleeding at 33 weeks of gestation. Doctor performed speculum examination. A bleeding endocervical polyp was avulsed. A few pieces of non-woven plain gauze were used during the procedure. Five weeks later, she underwent elective caesarean section. Two days after operation, two pieces of plain gauze were passed spontaneously from vagina. The condition of both the mother and newborn were stable and they did not show any signs of infection.

Key Contributing Factors:

1. No surgical counting of gauze before and after the end of procedure.
2. Lack of awareness on the potential risk of retained gauze associated with speculum examination.

Recommendations:

1. Include surgical counting of gauze and sponge before and after interventional procedures.
2. Share the incident to raise awareness on the risk.

Case 10: Tip of a wire

A patient underwent total hip replacement surgery. Following insertion of orthopaedic implant, fracture of proximal femur was found. Surgeons used several wire loops for fracture fixation. After completion of fixation, the wires were tightened and tips were cut. Scrub nurse presumed surgeon would perform counting on the number of cut wire tips. Post-operative X-ray found a 2mm wire tip above the greater trochanter. Surgeon decided not to do operation after discussion with patient.

Key Contributing Factors:

1. Surgeon was not aware of the safeguard method to cut wire tips.
2. Lack of communication between the surgeon and scrub nurse during handover of cut wire tips.

Recommendations:

1. Remind surgeons to adopt a safeguard method to prevent wire tip from dropping into the surgical field.
2. Count cut wire tips immediately when returning them to scrub nurse.
3. Build and reinforce the speak up culture.

Case 11: Guide wire

Doctor decided to insert a CVC for inotrope infusion. *Bedside Procedure Safety Checklist* was not used. Nurse did not attend the whole procedure but only returned after doctor had completed the procedure. Chest X-ray confirmed a retained guide wire. Retrieval of guide wire in cardiac center was required. Patient's clinical condition remained stable.

Key Contributing Factors:

1. No critical checking steps to ensure removal of guide wire.
2. Inadequate training on CVC insertion.
3. The design of *Bedside Procedure Safety Checklist* cannot fit into the CVC insertion workflow.

Recommendations:

1. Incorporate a critical checking step in verifying guide wire removal before ending the procedure.
2. Strengthen training on CVC insertion.
3. Revise the design of *Bedside Procedure Safety Checklist*.

Case 12: Surgical specimen inside an endobag

Emergency laparoscopic appendectomy was performed for a patient with ruptured acute appendicitis. During the operation, both the circulating nurse and scrub nurse had shift change. The patient's appendix was resected and put into an endobag. Surgeon planned to remove the endobag with specimen before the end of operation. Distracted by sudden bleeding in the operating field, surgeon forgot to remove the endobag and to perform surgical site inspection before wound closure. Circulating nurse assumed the labelled specimen bottle contained the surgical specimen without direct visual checking. During handover in recovery room, nurse found that the specimen container was empty. Laparoscopic removal of the endobag with specimen was performed immediately. Patient was discharged one week later uneventfully.

Key Contributing Factors:

1. Endobag was not included as a surgical counting item.
2. Ineffective handover between clinical staff.
3. Nurse assumed the labelled specimen bottle contained the specimen without visual verification.
4. Doctor was distracted by patient's clinical condition and did not perform surgical site inspection before end of the operation.

Recommendations:

1. Count all accountable items with the likelihood to be retained in patient's body.
2. Standardise the structure and framework of handover to ensure effective communication of important information between clinical staff.
3. Mandate visual confirmation of specimen by two staff.
4. Reinforce importance of routine surgical site inspection before the end of procedure.

Case 13: Guide wire

Doctor A inserted a CVC in the operating theatre under the supervision of Doctor B. Doctor B was distracted by patient's changing condition. Resistance was encountered during blood aspiration and flushing the main CVC lumen. No counting of guide wire was performed at the end of procedure. Doctor B and nurses assumed the guide wire was removed by Doctor A. Doctor B documented "guide wire removed intact" in the computer system. The retained guide wire was discovered on post-operative chest X-ray. The guide wire was removed under fluoroscopic guidance.

Key Contributing Factors:

1. Non-compliance with CVC insertion guideline on guide wire removal.
2. Unclear role and accountability of staff on CVC insertion procedure.

Recommendations:

1. Reinforce strict compliance with CVC insertion guideline.
2. Define clearly the role and responsibility of staff on CVC insertion procedure.
3. Check the removal of guide wire timely and sign on the checklist by designated staff.

Case 1: Air embolism after removal of CVC

A patient had fracture of right femur and operation was performed. Post-operative course was complicated by myocardial infarction and a haemodialysis catheter was inserted into the patient for renal replacement therapy in the Intensive Care Unit (ICU). The patient's clinical condition subsequently improved and the care team decided to remove the catheter. The CVC was removed by a nurse when the patient was sitting upright on an armchair. About 10 minutes later, the patient developed intra-cardiac air embolism requiring resuscitation. The patient's spontaneous circulation resumed in 4 minutes. The patient's condition further deteriorated after another episode of myocardial infarction. He succumbed 3 days later.

Key Contributing Factors:

1. The nurse was not aware of the risks of intravascular air embolism associated with CVC removal.
2. The nurse did not follow the standard practice of catheter removal.

Recommendations:

1. Promulgate the safe practice of CVC removal by placing the patient in a supine or head down position unless contraindicated.
2. Advocate the safe practice of removing CVC at end inspiratory phase.
3. Review the content of orientation programme, reinforce clinical coaching and evaluate the model for continuous assessment on staff performance and knowledge in care delivery.

Case 2: Gas bubbles in extracorporeal membrane oxygenation (ECMO) circuit

Patient was admitted to Cardiac Care Unit (CCU) for severe acute myocardial infarction (AMI). In cardiac catheterization laboratory, patient had cardiac arrest and was resuscitated. ECMO support was initiated. Percutaneous coronary intervention (PCI) revealed LEFT main artery stenosis. Three drug-eluting stents were inserted. In ICU, there were 3 episodes of low ECMO flow with line chattering. The healthcare team repeatedly conducted systematic checking to look for possible causes. After being supported by ECMO for 3 hours, patient developed hypotension. Drop in ECMO flow was noted. Doctor suspected pump failure and switched to hand-cranking. Gas bubbles were noted in the ECMO system. The venous and arterial cannulae were clamped immediately. Patient's condition was managed as a case of gas embolism crisis. New ECMO system was set up with new venous and arterial cannulae inserted. The ECMO flow resumed satisfactory afterwards. However, patient's condition deteriorated and patient was certified death the same day.

The RCA panel members acknowledged the following:

1. The healthcare team providing ECMO care was appropriately trained.
2. Department guidelines for circuit priming and crisis management of ECMO therapy were being followed.
3. Changing the venous and arterial cannulae and circuit during crisis management of ECMO therapy in a totally ECMO-dependent patient was a difficult and major decision.

Recommendations on critical points of operation:

1. Staff should be vigilant on and respond swiftly to patient's changing condition.
2. Simulation training and sharing should be conducted to enhance staff awareness in recognising and managing both air in ECMO circuit and air embolism in ECMO patient.
3. Staff training on ECMO circuit priming should be reinforced. Competency of individual nurses on ECMO circuit priming should be assessed before they were allowed for independent practice.
4. Timely incident reporting and quarantine of involved equipment / instrument / consumable should be enforced to enable subsequent investigation.

Five of the 12 *inpatient suicide* cases are highlighted below:

Home Leave

Case 1

A patient with metastatic stomach cancer was admitted for symptom control. Suicidal risk was assessed as low on admission. Two weeks later, home leave was granted for patient to settle personal matters. The patient jumped from height on the same evening.

Inpatient

Case 2

A patient was admitted for suspected recurrence of stomach cancer. Eight days after admission, patient committed suicide in ward by hanging with a torn bed sheet over bedside curtain rail.

Case 3

A patient was admitted to a psychiatric hospital for management of recurrent depression. Patient was assessed as having suicidal risk and was put on suicidal observation. In early morning of the next day, patient was found having committed suicide by suffocation.

Case 4

A schizophrenic patient was admitted to a general ward for decreased general condition. Clinical condition improved after treatment and the patient was transferred to a convalescent hospital for arranging hostel placement. The patient was assessed by psychiatrist and was found to be mentally stable with no suicidal risk identified. Two months later, the patient was planned for discharge. The patient's discharge was withheld due to medical reason. On the same night, the patient entered the roof top of the hospital building through an emergency exit and jumped from height.

Missing

Case 5

A patient had pancreatic cancer and alcohol dependence was admitted to Hospital A for abdominal pain and persecutory auditory hallucination. After psychiatric consultation, patient was transferred to psychiatric Hospital B for further management. On arrival to Hospital B, patient developed fever and abdominal pain. Hence, patient was transferred and admitted into Hospital C (an acute hospital). Intravenous antibiotic was started and ultrasonography of abdomen was arranged. One day after admission, patient was found missing. Searching in hospital was in vain. Patient was found fallen from height outside hospital.

Common Key Contributing Factors:

1. Presence of high risk facilities in premises.
2. The current observation mode for patient with high suicidal risk was not adequate and specific.
3. Defects in the design of emergency exit gate in preventing access to the roof.
4. Failure of the emergency exit's audio alarm system.
5. Inadequate height of fence rail at the roof.

Common Recommendations:

1. Consider ceiling mount curtain rails where applicable, e.g. single rooms, isolation rooms and side rooms.
2. Standardise practice and enhance training on intensive observation for patients with suicidal risk.
3. Transfer relevant patient's clinical records to receiving units timely.
4. Explore the possibility of transferring stable patients back to parent hospital for better continuation of care.
5. Consider installing a security lock at exit gate to keep access closed except in emergency situations.
6. Restrict access to the roof via the passenger lift.
7. Repair / upgrade the security alarm system and ensure regular preventive maintenance is in place.
8. Perform environmental scanning on suicidal risk.

Category 7: Maternal death or serious morbidity associated with labour or delivery

Two cases of maternal death were reported in the year:

- Severe postpartum haemorrhage secondary to uterine atony; and
- Severe endometritis secondary to septic abortion.

Category 9: Other adverse events resulting in permanent loss of function or death (excluding complications)

Case 1: Suprachoroidal haemorrhage during cataract extraction

A patient had known history of pemphigoid was admitted to Hospital A for management of lip bleeding and anaemia. Patient was cared for by multiple clinical teams. The result of prolonged Activated Partial Thromboplastin Time (APTT), which indicated bleeding tendency, was not attended to by all clinical teams. Bleeding stopped after medical treatment. Four months later, patient underwent elective cataract surgery in Hospital B. Surgeon initially planned for phacoemulsification but converted to extra-capsular extraction due to surgical difficulties. The operation was complicated by posterior capsule rupture and suprachoroidal haemorrhage. Patient was transferred to Hospital A for management. The result of abnormal APTT was noticed. Patient was subsequently diagnosed to have acquired Factor VIII inhibitors. Patient had permanent visual loss over one eye.

Key Contributing Factors:

1. Suboptimal system on handling of blood results.
2. Clinical teams solely focused on their specialised care.

Recommendations:

1. Improve system of handling investigation result.
2. Share the incident to enhance awareness on handling of laboratory result.

Case 2: A ventilator was switched to standby mode for 1 minute

A patient was transferred to ICU for management of severe sepsis. Patient required ventilator support, high dose inotropes and renal replacement therapy. To adjust the connection of the ventilator, a nurse switched the ventilator to standby mode, but did not switch it back to normal operating mode afterwards. After approximately one minute, the patient developed cardiac arrest. Patient regained circulation after resuscitation and had a brief period of improved consciousness. Subsequently, patient deteriorated again and passed away later on the same day.

Key Contributing Factors:

1. Non-compliance with guidelines when adjusting connection in ventilator.
2. Absence of audio alarm warning signal for standby mode to alert staff.

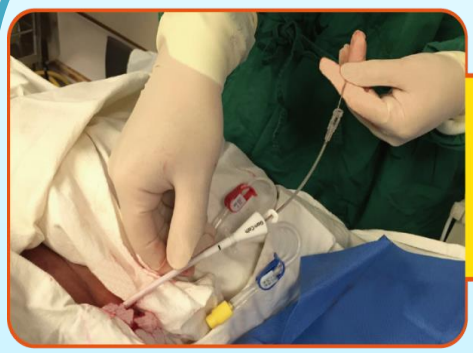
Recommendations:

1. Reinforce the training of ICU nurses in adjusting connection in ventilator.
2. Enhance *Guideline on Management of Patient on Intermittent Positive Pressure Ventilation*.
3. Conduct regular audit on staff's compliance with the guideline.

ANNEX IV

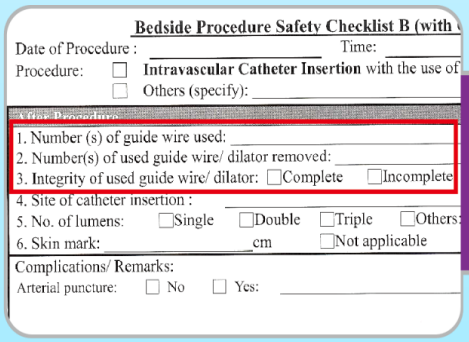
RISK MITIGATION STRATEGIES

1. Guide Wire Retention



CONTROL the guide wire end and ensure it is always VISIBLE while advancing the catheter.

CONFIRM removal of the guide wire before connecting to infusion line.



Bedside Procedure Safety Checklist B (with

Date of Procedure : _____ Time: _____

Procedure: ☐ **Intravascular Catheter Insertion** with the use of

☐ Others (specify): _____

1. Number (s) of guide wire used: _____
2. Number(s) of used guide wire/ dilator removed: _____
3. Integrity of used guide wire/ dilator: ☐Complete ☐Incomplete
4. Site of catheter insertion : _____
5. No. of lumens: ☐Single ☐Double ☐Triple ☐Others:
6. Skin mark: _____ cm ☐Not applicable

Complications/ Remarks:

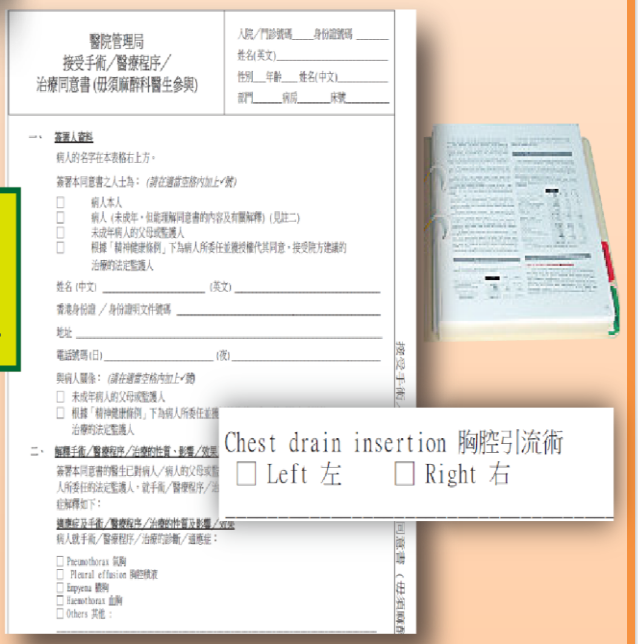
Arterial puncture: ☐ No ☐ Yes: _____

COUNT the used guide wire before ending the procedure.

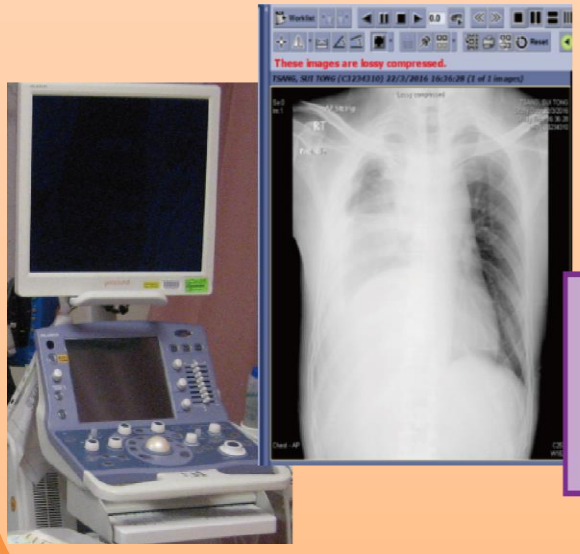
2. *Surgical Safety*

Correct patient, Correct procedure, Correct site

Correct Patient
Ask patient to state identity.
Verify identity against wristband.



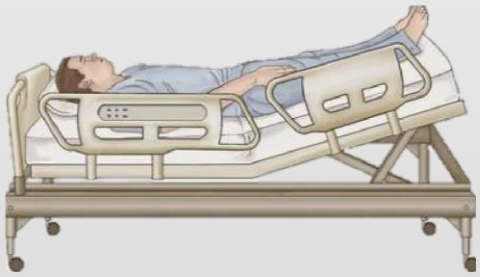
Correct Procedure
Check the procedure as stated in the informed consent and medical records.



Correct Site
Confirm site of procedure through various tools and methods, e.g. checklist, site marking, and/or imaging.

3. *Central Venous Catheter Removal*

Position patient in supine or Trendelenburg position (10-30 degrees head down tilt)



This position elevates the venous pressure above atmospheric pressure, thereby reducing the risk of air embolism.

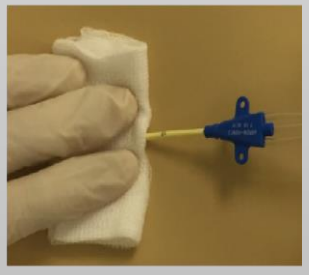
Valsalva maneuver (forced expiration with mouth closed) or on exhalation during catheter

On expiration, jugular venous pressure is greater than atmospheric pressure.

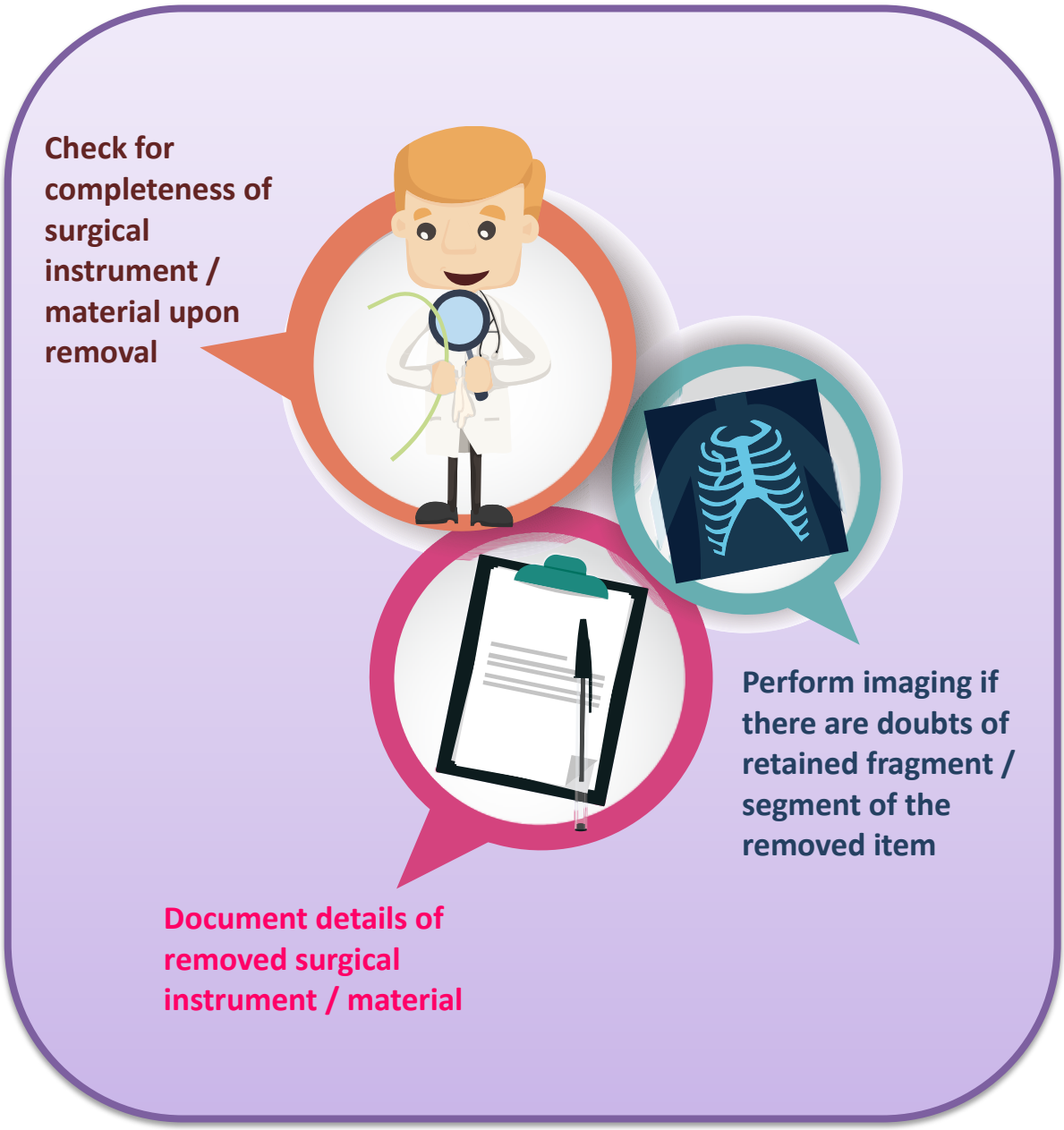
Maintain manual pressure at the cannulation site for at least 5 minutes

Maintain manual pressure at the cannulation site for at least 5 minutes until haemostasis is achieved.

Cover the wound with air tight dressing.



4. Surgical Instrument / Material Removal



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