



Health Service Executive

Critical Care & Healthcare Associated Infection Clinical Programmes

**Survey of Hygiene & Healthcare Associated Infection Prevention Practices in
Irish Critical Care Services**

Report

Version 2: February 2013

Table of Contents

1.0	Introduction.....	4
2.0	Methods.....	4
3.0	Results.....	5
3.1	Critical Care Unit Demographics & Case mix.....	5
3.2	Critical Care Unit Infrastructure & Activity.....	6
3.3	Critical Care Unit Policies, Procedures and Environment to Support IPC.....	8
3.4	Critical Care Unit Audit Schedule.....	14
3.5	Active Surveillance for Multi-drug Resistant Organisms.....	14
3.6	HCAI Surveillance.....	15
3.7	HCAI Prevention Education.....	16
3.8	HCAI Prevention.....	18
3.9	Seasonal Influenza Vaccine Uptake.....	20
3.10	Antimicrobial Stewardship.....	20
4.0	Discussion.....	22
5.0	Conclusions.....	24
6.0	Recommendations & Implementation Proposals.....	26
7.0	Acknowledgements.....	26
8.0	References.....	27

List of Tables

Table 1: Classification of participating critical care units.....	5
Table 2: Last reconfiguration of patient accommodation within the critical care unit.....	6
Table 3: Critical care bed capacity and 2011 admissions.....	6
Table 4: Unit occupancy and acuity of clinical care.....	7
Table 5: Prevalence of temporary indwelling medical devices.....	7
Table 6: Existing policies.....	8
Table 7: Critical care isolation capacity.....	9
Table 8a: Equipment to facilitate compliance with standard and transmission-based precautions: Hand hygiene and personal protective equipment.....	9
Table 8b: Equipment to facilitate compliance with standard and transmission-based precautions: Waste and sharps disposal.....	10
Table 9a: Infrastructure to facilitate compliance with environmental hygiene.....	10
Table 9b: Infrastructure to facilitate compliance with environmental hygiene.....	10
Table 10: Record storage for patients in isolation rooms.....	11
Table 11: Critical care unit ventilation.....	11
Table 12: Airborne infection isolation room capacity.....	12
Table 13: Critical care environmental cleaning schedule.....	12
Table 14: Frequency of routine change of privacy curtains.....	13
Table 15: Active surveillance culture schedule for detection of multi-drug resistant organism carriage – number of units performing screening.....	14
Table 16: Surveillance of multi-drug resistant organism acquisition in the unit.....	15
Table 17: Surveillance of HCAI in the unit.....	15
Table 18: HCAI prevention policies.....	16
Table 19a: Healthcare worker (HCW) HCAI prevention education.....	17
Table 19b: HCW HCAI prevention education.....	17
Table 20a: HCAI prevention – CRI.....	18
Table 20b: HCAI prevention – CVC-CRI.....	19
Table 21: HCAI prevention – VAP, CAUTI.....	19

Table 22: Monitoring of antimicrobial consumption within the critical care unit.....21

Appendices

Appendix A: HSE CCP & HCAI clinical programmes – HCAI steering group membership.....29

Appendix B: 2012 Hygiene & HCAI Prevention Survey.....30

Appendix C: List of Participating Hospitals.....34

Appendix D: JFICMI & ICSI Levels of Critical Care (2011).....35

Appendix E: Links to Useful Information.....35

1.0 Introduction

Patients admitted to critical care are at high risk for healthcare-associated infections (HCAI), with the potential for one-in-four patients to develop a HCAI. A European point prevalence survey of hospital acquired infections (HAI) and antimicrobial use conducted during May 2012 included 215 patients admitted to the intensive care units (ICUs) of 33 Irish hospitals and identified a HAI in 50 patients (23.3%) and antimicrobial use in 160 (74.4%). (Source: Health Protection Surveillance Centre). The nature of the acute critical illness, underlying chronic disease, high usage of invasive medical devices for supportive care, patient immobility and high dependency, along with close contact with healthcare professionals for all aspects of medical and personal care results in a unique set of circumstances in which transmission of pathogens and invasive infection is very likely to occur. Critically ill patients who develop HCAI have increased length-of-stay in critical care and they are at increased risk of death. In addition to significant morbidity and mortality for patients who develop HCAI in the critical care setting, such infections are associated with increased costs to the healthcare provider.

In 2011, the Joint Faculty of Intensive Care Medicine of Ireland (JFICMI) in association with the Intensive Care Society of Ireland (ICSI) issued National Standards for Adult Critical Care Services, which represent minimum recommended standards required in Ireland for a critical care unit and recommend that processes be put in place to achieve these standards over a fixed period of time.¹ This document describes the levels of critical care, guidelines for admission to critical care, clinical governance, intensive care unit (ICU) design and staffing recommendations for critical care. There is emphasis within this document regarding the requirement of each critical care unit to comply with the 2009 Health Information & Quality Authority (HIQA) National Standards for Prevention and Control of HCAI, to engage with relevant hospital committees (decontamination, infection prevention and control, drugs and therapeutics and antimicrobial stewardship committees), to provide continuing staff education, participate in clinical audit and identify key performance indicators.² The essential requirement for multi-disciplinary involvement in critical care is also highlighted, with particular reference to infection specialist (clinical microbiology and infectious diseases) access and input. The document recommends that ICU design complies with national building and infection control standards.^{3,4}

In 2011, the Health Services Executive (HSE) Critical Care and Healthcare Associated Infection National Clinical Programmes convened a joint multi-disciplinary group to steer for HCAI prevention in Irish critical care units. The members of the steering group felt that it was important to obtain baseline data with regard to existing hygiene and HCAI prevention practices in Irish critical care units (See Appendix A for steering group membership). A voluntary survey was devised by the steering group members and circulated to all critical care units in January 2012. The survey was also circulated to the members of relevant professional groups (See Appendix B for survey content).

2.0 Methods

The clinical nurse manager and lead clinician/director of each critical care unit were asked to complete the survey. Completed surveys were returned to the critical care programme (CCP) administrator for collation into a Microsoft Excel database.

3.0 Results

3.1 Critical Care Unit Demographics & Casemix

Completed surveys were received from 29 hospitals (25 public and four private). Of the 25 public hospitals, 14 were classified as general (56%), eight as tertiary (32%) and three as regional (12%) (See Appendix C for participating hospitals).

The 29 hospitals incorporated 36 critical care units (35 adult and one paediatric). Participating critical care units were further classified based on the 2009 UK Intensive Care Society Levels of Critical Care for Adult Patients.⁵ The JFICMI & ICSI have also defined levels of critical care in the 2011 National Standards for Adult Critical Care Services (See Appendix D).¹

Table 1: Classification of participating critical care units⁵

LEVEL OF CARE	NUMBER OF UNITS	DEFINITION
LEVEL 2 ONLY High Dependency Unit	7	Patients needing pre-operative optimisation Patients needing extended post-operative care Patients stepping down to Level 2 from Level 3 Patients receiving basic respiratory support Patients receiving basic cardiovascular support Patients receiving advanced cardiovascular support Patients receiving renal/neurological/dermatological support
LEVEL 3 ONLY Intensive Care Unit	14	Patients receiving advanced respiratory support OR Patients receiving a minimum of two organs supported
MIXED LEVEL 2 & LEVEL 3 CARE PROVIDED	15	
TOTAL	36	

The case mix of 28 units (78%) was defined as mixed medical and surgical patients, seven units (19%) admitted surgical patients [general surgical (2), cardiothoracic surgical (2), neurosurgical (1), thoracic and vascular surgery (1) and liver transplant (1)]. One high dependency unit (3%) admitted medical patients only.

One hospital provided combined activity data for the HDU and ICU. The remaining 28 hospitals provided separate data for 28 ICUs and six HDUs. [Data in Tables 3 to 5 and 7 to 12 represents that submitted from 34 units. Data in tables 6 and 13 to 22 represents that submitted from all 36 units].

3.2 Critical Care Unit Infrastructure & Activity

Thirty-three units (91%) provided information regarding the year that patient accommodation was last reconfigured within the unit. Information regarding the nature/type of any reconfiguration works was not specifically requested.

Table 2: Last reconfiguration of patient accommodation within the critical care unit

TIMELINE	NUMBER OF UNITS
0 - 12 months ago	6
1 – 5 years ago	8
6 – 10 years ago	12
>10 years ago	7
Not answered	3
TOTAL	36

Table 3: Critical care bed capacity and 2011 admissions

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA*	AVERAGE BED CAPACITY (RANGE)	AVERAGE 2011 ADMISSIONS (RANGE)
Level 2 (HDU)	6	5 (3 – 12)	571 (240 – 1,230)**
Level 3 (ICU)	13	10 (6 – 20)	594 (366 – 1,180)
Mixed ICU	15	5 (4 – 8)	372 (192 – 878)
TOTAL	34		

*One hospital provided combined activity data for the HDU and ICU. The remaining 28 hospitals provided separate data for 28 ICUs and six HDUs.

**One HDU had opened within the past five months. As activity data for that unit related to quarter four only, it was excluded from 2011 average admissions calculation.

Critical Care Activity – Prevalence Survey

A prevalence survey of unit occupancy and acuity of clinical care was completed by each unit.

Table 4 – Unit occupancy and acuity of clinical care

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	AVERAGE % OCCUPANCY (% RANGE)	AVERAGE % PATIENTS ON INVASIVE VENTILATORY SUPPORT (% RANGE)	AVERAGE % PATIENTS ON CARDIOVASCULAR SUPPORT (% RANGE)	AVERAGE % PATIENTS ON HAEMODIALYSIS (% RANGE)	AVERAGE % PATIENTS ON TOTAL PARENTERAL NUTRITION (% RANGE)	AVERAGE % PATIENTS ON ENTERAL NUTRITION (% RANGE)
LEVEL 2 (HDU)	6	101 (75 – 133)	1 (0 - 8)*	7 (0 – 25)**	0	8 (0 – 50)	21 (0 – 67)
LEVEL 3	13	93 (50 – 118)	70 (44 – 100)	41 (0 – 88)	22 (10 – 50)	13 (0 – 50)	62 (11 – 100)
MIXED ICU	15	95 (75 – 100)	46 (0 – 100)	24 (0 – 80)***	1 (0 17)~	19 (0 - 80)	38 (0 – 100)
OVERALL	34	96%	48%	28%	9%	15%	44%

*There were no ventilated patients in 5/6 HDUs

**There were no patients on inotropes in 4/6 HDUs

***14 units provided data

~There were no patients on haemodialysis in 13/15 mixed ICUs

Table 5 – Prevalence of temporary indwelling medical devices

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	AVERAGE % PATIENTS WITH TEMPORARY CVC (% RANGE)	AVERAGE % PATIENTS WITH URINARY CATHETER (% RANGE)	AVERAGE % PATIENTS WITH NASOGASTRIC TUBE (% RANGE)
LEVEL 2 (HDU)	6	42 (0 – 100)	43 (0 – 100)	25 (0 – 67)
LEVEL 3 (ICU)	13	78 (43 – 100) [#]	92 (71 – 100) [#]	77 (40 – 100) [#]
MIXED ICU	15	76 (14 – 100)~	88 (25 – 100)~	65 (13 – 100)~
OVERALL	34	70%	81%	61%

[#]12 units provided data

~14 units provided data

3.3 Critical Care Unit Policies, Procedures and Environment to Support Hygiene, Infection Prevention and Control

The critical care units in all 29 hospitals indicated that the hospital has an active infection control committee. There was critical care representation on this committee in 17 hospitals (59%). All 29 hospitals have access to an on-site infection prevention and control nurse (IPCN) and all but one of 36 units report daily liaison with the hospital's IPCN on weekdays and as required. Four of seven HDUs (57%), nine of 14 Level 3 ICUs (64%) and 12 of 15 mixed ICUs (80%) report having a member of the unit's nursing staff nominated as the link nurse for infection prevention and control issues. All 36 units reported the existence of a hospital infection control policy, a hospital decontamination policy and for some a unit-specific policy was also available. Thirty-three of 36 units in 27 hospitals (92%) reported the existence of a hospital legionella control policy. In one unit there was no policy available and in the remaining two units, a policy was in draft format. Thirty-five of 36 units (97%) in 28 hospitals reported the existence of a hospital aspergillus prevention policy. In one hospital there was no aspergillus prevention policy.

Table 6 – Existing policies

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	INFECTION CONTROL POLICY	DECONTAMINATION POLICY	LEGIONELLA CONTROL POLICY	ASPERGILLUS PREVENTION POLICY
Level 2 (HDU)	7	100%	100%	100%	100%
Level 3 (ICU)	14	100%	100%	93%^	100%
Mixed ICU	15	100%	100%	86%^	93%*
OVERALL	36	100%	100%	92%	97%

^13/15 mixed ICUs and 13/14 level 3 ICUs report having a legionella control policy

*14/15 mixed ICUs report having an aspergillus prevention policy

Table 7 – Critical care isolation capacity

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	AVERAGE BED CAPACITY	AVERAGE % ISOLATION ROOMS (% RANGE)	AVERAGE % ISOLATION ROOMS WITH LOBBY/ANTEROOM (% RANGE)
Level 2 (HDU)	6	5	10 (0 – 25)*	100
Level 3 (ICU)	13	11	40 (17 – 100)	42 (0 – 100)
Mixed ICU	15	5	28 (0 – 63)**	38 (0 – 100)
OVERALL	34	7	28%	49%

*Three HDUs (50%) have no isolation rooms

**Two mixed ICUs (15%) have no isolation rooms

Table 8a – Equipment to facilitate compliance with Standard and Transmission-based Precautions: Hand hygiene and personal protective equipment (PPE)

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	HAND WASH BASIN (HWB) IN EVERY ISOLATION ROOM	ALCOHOL HAND RUB (AHR) DISPENSER AT EVERY BEDSPACE	NON-STERILE GLOVE DISPENSER AT EVERY BEDSPACE	PLASTIC APRON DISPENSER AT EVERY BEDSPACE
Level 2 (HDU)	6	66%	83%	50%	17%
Level 3 (ICU)	13	100%	100%	77%	62%
Mixed ICU	15	100%	93%	80%	80%
OVERALL	34	94%	92%	75%	62%

*Three of six HDUs have no isolation rooms

Table 8b - Equipment to facilitate compliance with Standard and Transmission-based Precautions: Waste and sharps disposal

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	FOOT OPERATED PEDAL WASTE BIN AT EVERY HWB	SHARPS DISPOSAL BIN AT EVERY BEDSPACE
Level 2 (HDU)	6	100%	17%
Level 3 (ICU)	13	100%	92%
Mixed ICU	15	100%	87%
OVERALL	34	100%	76%

Table 9a – Infrastructure to facilitate compliance with environmental hygiene

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	DEDICATED CLEAN UTILITY FOR CRITICAL CARE UNIT	DEDICATED DIRTY UTILITY FOR CRITICAL CARE UNIT	DEDICATED SLUICE ROOM FOR CRITICAL CARE UNIT	ADEQUATE EQUIPMENT STORAGE SPACE
Level 2 (HDU)	6	17%	33%	50%	33%
Level 3 (ICU)	13	62%	62%	92%	38%
Mixed ICU	15	60%	80%	100%	13%
OVERALL	34	53%	65%	88%	26%

Table 9b – Infrastructure to facilitate compliance with environmental hygiene

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	FREE-STANDING MONITORING EQUIPMENT	WALL/CEILING-MOUNTED MONITORING EQUIPMENT	DEDICATED CLERICAL AREA
Level 2 (HDU)	6	0%*	100%*	50%
Level 3 (ICU)	13	8%	100%	46%
Mixed ICU	15	7%	93%	47%
OVERALL	34	6%	97%	47%

*5/6 HDUs provided information

Table 10 – Record storage for patients in isolation rooms

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	HEALTHCARE RECORD	MEDICATION CHART
Level 2 (HDU)	6*	<ul style="list-style-type: none"> ▪ Inside patient room = 1 (33%) ▪ Outside patient room = 2 (66%) 	<ul style="list-style-type: none"> ▪ Outside patient room = 2 (66%) ▪ Electronic record = 1 (33%)
Level 3 (ICU)	13	<ul style="list-style-type: none"> ▪ Inside patient room = 7 (54%) ▪ Outside patient room = 6 (46%) 	<ul style="list-style-type: none"> ▪ Inside patient room = 6 (46%) ▪ Outside patient room = 3 (23%) ▪ Electronic record = 4 (31%)
Mixed ICU	15~	<ul style="list-style-type: none"> ▪ Inside patient room = 3 (23%) ▪ Outside patient room = 8 (61%) ▪ Electronic record = 1 (8%) ▪ Not answered = 1 (8%) 	<ul style="list-style-type: none"> ▪ Inside patient room = 2 (15%) ▪ Outside patient room = 10 (77%) ▪ Electronic record = 1 (8%)
OVERALL	34	<ul style="list-style-type: none"> ▪ INSIDE PATIENT ROOM = 38% ▪ OUTSIDE PATIENT ROOM = 55% 	<ul style="list-style-type: none"> ▪ INSIDE PATIENT ROOM = 28% ▪ OUTSIDE PATIENT ROOM = 52% ▪ ELECTRONIC RECORD = 20%

*Three HDUs have no isolation rooms

~Two mixed ICUs have no isolation rooms

Table 11 – Critical care unit ventilation

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	NATURAL VENTILATION	ARTIFICIAL VENTILATION	% OF UNITS THAT RECEIVE HEPA FILTERED AIR
Level 2 (HDU)	6	17%	83%	50%~
Level 3 (ICU)	13	8%	92%	77%^
Mixed ICU	15*	25%	75%	33%#
OVERALL	34	15%	76%	53%

~Two HDUs have HEPA-filtered air supplied to side rooms and third HDU has HEPA-filtered air supplied to the whole unit

^Of the 10 Level 3 ICUs receiving HEPA-filtered air, 6 (60%) have supply to the whole unit and 4 have HEPA-filtered air supplied to at least one isolation room

*12 mixed ICUs provided information

#Of the 5 mixed ICUs receiving HEPA-filtered air, 3 (60%) have supply to all isolation rooms and two have supply to at least one isolation room

Table 12 – Airborne infection isolation room (AIIR) capacity

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	NUMBER OF UNITS WITH AT LEAST ONE AIIR (%)
Level 2 (HDU)	4*	0 (0%)
Level 3 (ICU)	13	9 (69%)
Mixed ICU	14~	8 (57%)
OVERALL	31	17 (55%)

*4/6 HDUs provided data

~14/15 mixed ICUs provided data

Table 13 – Critical care unit environmental cleaning schedule

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	GENERAL ENVIRONMENT	PATIENT BEDSPACE	BED/BESIDE LOCKER/FREQUENT HAND-TOUCH SURFACES	PATIENT EQUIPMENT
Level 2 (HDU)	7	100% DAILY*	100% DAILY*	100% DAILY#	83% DAILY~
Level 3 (ICU)	14	100% DAILY*	100% DAILY*	100% DAILY#	100% DAILY+
Mixed ICU	14^	100% DAILY*	100% DAILY*	100% DAILY#	100% DAILY^^
OVERALL	35	100% DAILY	100% DAILY	100% DAILY	94% DAILY

*Twice daily cleaning of general environment and bed space in one HDU, four Level 3 ICUs and one mixed ICU

#Twice daily cleaning of bed/locker/frequent hand touch surfaces in one HDU, four Level 3 ICUs and one mixed ICU

~Weekly cleaning of equipment in one HDU

+Twice daily cleaning of patient equipment in two Level 3 ICUs

^14/15 mixed ICUs provided data

^^13/15 mixed ICUs provided data

Table 14 – Frequency of routine change of privacy curtains

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	WEEKLY	FORTNIGHTLY	MONTHLY	QUARTERLY	BIANNUALLY	NO PRIVACY CURTAINS
Level 2 (HDU)	7	2	0	2	2	1	0
Level 3 (ICU)	13*	2	1	4	4	1	1
Mixed ICU	13^	3 change following patient discharge		7	2	0	1
OVERALL	33	8		13	8	2	2

*13/14 Level 3 ICUs and ^13/15 mixed ICUs provided data

In addition to a routine schedule of privacy curtain changes, most units report that curtains are also changed when visibly soiled and upon discharge of a patient colonised or infected with a multi-drug resistant organism.

3.4 Critical Care Unit Audit Schedule

All 36 units reported that environmental hygiene and hand hygiene audits are performed within the unit. There was wide variety in the schedule for hand hygiene audits; with biannual audits the preferred frequency for 15 units and quarterly audits for eight units followed by monthly audits in six units. Transmission based precaution compliance audits were performed in just over half of the units (n=19; 53%). Of the units that performed transmission-based precaution audits, the preferred frequency was for either quarterly (seven units) or annual audits (six units). There was also a wide variety in the schedule for environmental hygiene audits, with monthly audits the preferred frequency for 15 units and quarterly audits the preferred frequency for ten units.

3.5 Active Surveillance for Multi-drug Resistant Organisms

Units were asked to provide details regarding active surveillance cultures (ASC) for detecting carriage of the following multi-drug resistant organisms (MDROs): Meticillin resistant *Staphylococcus aureus* (MRSA), vancomycin resistant enterococci (VRE), extended spectrum β lactamase-producing *Enterobacteriaceae* (ESBLs) and carbapenem resistant *Enterobacteriaceae* (CRE).

Table 15: ASC schedule for detection of MDRO carriage – Number of units performing screening

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	ADMISSION MRSA SCREEN (%)*	WEEKLY MRSA SCREEN (%)	ADMISSION VRE SCREEN (%)	WEEKLY VRE SCREEN (%)	ADMISSION ESBL SCREEN (%)	WEEKLY ESBL SCREEN (%)	ADMISSION CRE SCREEN (%)	WEEKLY CRE SCREEN (%)
Level 2 (HDU)	7	7 100%	7 100%	5 71%	2 29%	4 57%	2 29%	3 43%	1 14%
Level 3 (ICU)	14	14 100%	14 100%	9 64%	9 64%	3 21%	3 21%	5 36%	5 36%
Mixed ICU	15	15 100%	15 100%	5 33%	4 27%	2 13%	1 7%	4 27%	1 7%
OVERALL	36	100%	100%	53%	42%	25%	17%	33%	19%

3.6 HCAI Surveillance

Units were asked to provide details regarding the surveillance of MDRO acquisition in the unit and the surveillance of the following unit-acquired infections: bloodstream infection (UABSI), vascular catheter related infection (CRI), ventilator associated pneumonia (VAP) and catheter associated urinary tract infection (CAUTI).

Table 16: Surveillance of MDRO acquisition in the unit

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	UNIT ACQUIRED MRSA (%)	UNIT ACQUIRED VRE (%)	UNIT ACQUIRED ESBL (%)	UNIT ACQUIRED CRE (%)
Level 2 (HDU)	7	7 100%	7 100%	4 57%	5 71%
Level 3 (ICU)	14	13 93%	12 86%	6 43%	9 64%
Mixed ICU	15	14 93%	10 66%	8 53%	7 47%
OVERALL	36	94%	81%	50%	58%

Table 17: Surveillance of HCAI in the unit

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	UNIT ACQUIRED BSI (%)	UNIT ACQUIRED CRI [^] (%)	UNIT ACQUIRED VAP [#] (%)	UNIT ACQUIRED CAUTI [~] (%)
Level 2 (HDU)	7	2* 33%	1 14%	0 0%	0 0%
Level 3 (ICU)	14	6* 46%	9 64%	3 21%	2 14%
Mixed ICU	15	4 27%	3 20%	2 13%	1 7%
OVERALL	36	35%	36%	14%	8%

*6/7 HDU and 13/14 Level 3 ICUs provided data

^Of the 13 units performing CRI surveillance, six reported using HELICS definitions, five reported using CDC definitions and two did not specify what definitions are in use.

#Of the five units performing VAP surveillance, two reported using HELICS definitions and one reported using CDC definitions. Two did not specify what definitions are in use.

~Of the three units performing CAUTI surveillance, one reported using HELICS definitions; one reported using CDC definitions and the third did not specify what definitions are in use.

Table 18: HCAI prevention policies

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	VASCULAR CATHETER INFECTION PREVENTION POLICY (%)	VAP PREVENTION POLICY (%)	CAUTI PREVENTION POLICY (%)
Level 2 (HDU)	7	7 100%	2 29%	6 86%
Level 3 (ICU)	14	13 93%	5 36%	6 43%
Mixed ICU	15	13 87%	5 33%	9 60%
OVERALL	36	92%	33%	58%

3.7 HCAI Prevention Education

All units provide hand hygiene training – 12 units stated that training is part of staff induction and all units have a programme of hand hygiene education, with the majority (23 units) providing annual staff education. All units provide training in both standard and transmission-based precautions training – 17 units stated that training is part of staff induction and all units have an ongoing programme of training, with the majority providing either annual (13 units) or biennial (10 units) education. Formal training on prevention of vascular catheter infection is not provided in all units. Of the 29 units that provided

information, 25 provide this training. VAP prevention training is not provided in all units. Of the 28 units that provided information, 19 provide this training. CAUTI prevention training is not provided in all units. Of the 27 units that provided information, 15 provide this training.

Table 19a: Healthcare worker (HCW) HCAI prevention education

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	DOCUMENTED RECORD OF STAFF HCAI PREVENTION TRAINING (%)	HAND HYGIENE TRAINING (%)	STANDARD PRECAUTIONS TRAINING (%)	TRANSMISSION-BASED PRECAUTIONS TRAINING (%)
Level 2 (HDU)	7	6 86%	7 100%	7 100%	7 100%
Level 3 (ICU)	14	13 93%	14 100%	14 100%	14 100%
Mixed ICU	15	12* 86%	15 100%	15 100%	15 100%
OVERALL	36	89%	100%	100%	100%

*14/15 mixed ICUs provided information

Table 19b: HCW HCAI prevention education

UNIT TYPE	NUMBER OF UNITS	PREVENTION OF VASCULAR CATHETER INFECTION TRAINING (%)	PREVENTION OF VAP TRAINING (%)	PREVENTION OF CAUTI TRAINING (%)
Level 2 (HDU)	7	6^ 100%	3~ 50%	3# 75%
Level 3 (ICU)	14	10^ 91%	10~ 83%	7# 64%
Mixed ICU	15	9^ 75%	6~ 46%	5# 42%
OVERALL	36	86%	68%	56%

^6/7 HDUs, 11/14 Level 3 ICUs and 12/15 mixed ICUs provided information on training for vascular catheter prevention.

~3/7 HDUs, 12/14 Level 3 ICUs and 13/15 mixed ICUs provided information on training for VAP prevention.

#4/7 HDUs, 11/14 Level 3 ICUs and 12/15 mixed ICUs provided information on training for CAUTI prevention.

3.8 HCAI Prevention

Table 20a: HCAI prevention – CRI

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	USE OF CVC INSERTION CHECKLIST (%)	USE OF CVC INSERTION PACK (%)	USE OF CVC MAINTENANCE CARE BUNDLE (%)	USE OF PVC MAINTENANCE CARE BUNDLE (%)	POLICY FOR CHANGE OF IV GIVING SETS (FLUIDS, BLOOD PRODUCTS, TPN)* (%)
Level 2 (HDU)	7	4 57%	3 43%	4 57%	5 71%	7 100%
Level 3 (ICU)	14	11 79%	10 71%	7 50%	8 57%	14 100%
Mixed ICU	15	9^ 64%	11 73%	6 40%	11 73%	15 100%
OVERALL	36	69%	66%	47%	66%	100%

^14/15 mixed ICUs provided information

*All units have policies for change of IV infusion equipment: All change giving sets after single infusion of an antimicrobial or blood products, change IV fluid giving sets every 24-72 hours and change TPN giving sets every 24 hours.

Table 20b: HCAI prevention – CVC-CRI

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	USE OF ANTISEPTIC IMPREGNATED CVC (%)	USE OF ANTIBIOTIC IMPREGNATED CVC (%)	USE OF CHLORHEXIDINE PATCH/SPONGE (%)	USE OF TRANSPARENT CVC DRESSING (%)	USE OF GAUZE CVC DRESSING (%)
Level 2 (HDU)	7	2 29%	2 29%	2 29%	7 100%	0 0%
Level 3 (ICU)	14	2 14%	3 21%	7 50%	14 100%	1^ 7%
Mixed ICU	15	6 40%	1 7%	9 60%	15 100%	0 0%
OVERALL	36	28%	17%	50%	100%	3%

^Transparent CVC dressing in routine use in that unit, but gauze CVC dressing used on occasion, where transparent dressing unsuitable for a particular CVC site (e.g. excessive secretions/persistent ooze from site).

Table 21: HCAI prevention – VAP, CAUTI

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	USE OF VAP PREVENTION CARE BUNDLE (%)	USE OF CAUTI PREVENTION CARE BUNDLE (%)
Level 2 (HDU)	7	1^ 25%	2 29%
Level 3 (ICU)	14	8 57%	2 14%
Mixed ICU	15	6 40%	7 47%
OVERALL	36	45%	31%

^4/7 HDU provided information regarding VAP prevention care bundle use.

3.9 Seasonal Influenza Vaccine Uptake

Eighteen of 36 units [3/7 HDUs, 11/14 Level 3 ICUs and 4/15 mixed ICUs] provided information regarding staff uptake of seasonal influenza vaccine during the previous influenza season (2010-2011). The average uptake of seasonal influenza vaccine by staff working in critical care units was 42% (range = 10 – 90%). Units were not requested to provide breakdown of vaccine uptake by healthcare profession. All 36 units reported having access to an occupational health physician.

3.10 Antimicrobial Stewardship

Of the 29 hospitals participating in the survey, it was reported from their critical care units that 22 had an active antimicrobial stewardship committee (76%) and seven did not. Of the 22 hospitals with an active committee, the critical care unit was formally represented in 14 (64%).

Formal documented antibiotic policies for empiric therapy of community-acquired infections exist in 28 of 29 hospitals. All 36 units reported the existence of hospital policies for therapeutic drug monitoring of glycopeptides (vancomycin) and aminoglycosides (gentamicin). Twenty-six of 36 units (72%) operate a policy of restricted access to certain antimicrobials (antibacterial and antifungal agents), which should not be prescribed without prior consultation with an infection specialist (clinical microbiologist or infectious diseases physician).

An on-site consultant microbiologist service is provided for 20 of 29 hospitals (69%). The critical care units of nine hospitals (31%) report that there is no on-site consultant microbiologist service for the unit. Seven of 36 units (19%) report not having round-the-clock access to consultant microbiologist advice. Daily microbiology ward rounds occur in two of seven HDUs (29%); in 13/14 Level 3 ICUs (93%) with three times weekly rounds occurring in the remaining ICU. Of the 15 mixed ICUs, information was provided for 14. Two mixed ICUs (14%) do not have any microbiology rounds. Daily microbiology rounds occur in just two mixed ICUs (14%) with the remaining 10 units (72%) reporting microbiology rounds with differing frequencies of thrice, twice or once weekly.

A dedicated unit pharmacist service was reported to be provided to 23 units (64%) [Six of seven HDUs (86%), 11 of 14 Level 3 ICUs (79%) and six of 15 mixed ICUs (40%). The critical care units in six of the participating 29 hospitals (21%) report that there is no antimicrobial pharmacist in the hospital.

Table 22: Monitoring of antimicrobial consumption within the critical care unit

UNIT TYPE	NUMBER OF UNITS PROVIDING DATA	MONTHLY	QUARTERLY	ANNUALLY	NOT DONE	NOT ANSWERED
Level 2 (HDU)	7	0	4	1	0	2
Level 3 (ICU)	14	3	7	3	0	1
Mixed ICU	15	0	7	3	3	2
OVERALL	36	3	18	7	3	5

Units were also asked to provide 2011 antimicrobial consumption data expressed as defined daily doses per 100 bed days used (DDD/100 BDU). Of the seven HDUs, two provided data on 2011 consumption of 171 DDD/100 BDU and 338 DDD/100 BDU respectively. Of the 14 Level 3 ICUs, four provided data – average consumption of 232 DDD/100 BDU (range 212 – 261 DDD/ 100BDU). Of the 15 mixed ICUs, four provided data – average consumption of 160 DDD/100 BDU (range 111 – 237 DDD/100 BDU).

4.0 Discussion

This survey was devised by the HCAI steering group of the joint Critical Care and HCAI National Clinical Programmes to establish baseline data regarding hygiene and HCAI prevention practices in Irish critical care units. There was a good response to the invitation to complete this voluntary survey with 36 units (35 adult and one paediatric) in 29 hospitals returning completed surveys. Seven level 2 [high dependency] units, 14 level 3 ICUs and 15 mixed ICUs (caring for both level 2 and level 3 patients) provided data. Mixed medical and surgical patients accounted for admissions to 28 units (78%), with seven units (19%) admitting surgical patients only and one HDU admitting medical patients only (3%). The overall average critical care unit occupancy in this survey was 96%, with 48% of patients on mechanical ventilation, 70% of patients with a temporary CVC and 81% of patients with a urinary catheter *in situ*.

Fourteen units reported undergoing reconfiguration of patient accommodation within the past five years, three provided no information and for the remaining 19 (53%), more than five years had elapsed since patient accommodation was last reconfigured. Units were not asked to provide specific details regarding the nature of reconfiguration works. Overall, isolation rooms accounted for just over one quarter of bed capacity in participating units (28%) Of the isolation rooms, 49% contained an ante-room/lobby. The majority of units (76%) are artificially ventilated and 53% receive high-efficiency particulate air (HEPA)-filtered supply either to the entire unit or to at least one isolation room. Of the 31 units that provided data, only 17 (55%) reported having at least one airborne infection isolation room (AIIR): none of the HDUs had an AIIR, whilst 57% of the mixed ICUs and 69% of level 3 ICUs reported having at least one designated AIIR.

Hand wash basins were reported as present in every isolation room in all of the level 3 ICUs and mixed ICUs. Overall, an alcohol hand rub dispenser was reported as present at 92% of critical care bed spaces. All 36 units reported that hand hygiene training is delivered and that hand hygiene audits are carried out, with considerable variation in the audit frequency between units. All 36 units reported that training on standard and transmission-based precautions is delivered. Audits of compliance with transmission-based precautions were carried out in 53% of units.

There was considerable variation and a lack of universal availability of personal protective equipment (non sterile glove dispensers [75%] and disposable aprons [62%]) and a sharps disposal bin [76%] at every bed space. The existence of a separate clean utility was reported by just 53% of units and a separate dirty utility was reported by 65%. Half of the high dependency units reported that there was no dedicated sluice room for the unit. Just over one-quarter of units (26%) reported having adequate equipment storage space.

Patient monitoring equipment was reported as being either wall or ceiling mounted in 97% of units. All 36 units reported a daily cleaning schedule with some units reporting cleaning frequencies in excess of once daily. All 36 units reported that environmental hygiene audits are carried out, again with considerable variation in the audit frequency between units.

All participating hospitals reported having an active infection control committee with critical care representation in 59% of hospitals. All hospitals have an infection control and decontamination policy. Thirty-five units (97%) report having daily liaison with the hospital's infection prevention and

control nurse and 69% of units reported having a nominated member of the critical care nursing staff who leads on infection prevention and control issues.

Admission and weekly screening for carriage of meticillin resistant *S. aureus* (MRSA) was conducted by all 36 units (100%). Admission screening for rectal carriage of vancomycin resistant enterococci (VRE) by 19 (53%), extended spectrum β lactamases (ESBLs) by 9 (25%) and carbapenem resistant *Enterobacteriaceae* (CRE) by 12 (33%) of units.

A vascular catheter related infection (CRI) prevention policy was available in 33 units (92%) with CRI prevention training provided by 25 of 29 units that provided information (86%). Formal surveillance of unit-acquired CRI was reported as being carried out in 13 units (36%) [HELICS definitions (6), CDC definitions (5), not specified (2)]. For insertion of central venous catheters (CVC), an insertion checklist was in use in 24 units (69%) and a CVC insertion pack was in use by 24 units (66%). Seventeen units (47%) reported that a CVC maintenance care bundle was in use. Use of antiseptic-impregnated CVCs was reported by 10 units (28%) and of antibiotic-impregnated CVCs by six units (17%). All 36 units reported routine use of transparent CVC exit site dressings.

A ventilator associated pneumonia (VAP) prevention policy was available in 12 units (33%), with formal VAP prevention training provided by 19 units (68%). Formal surveillance of unit-acquired VAP was reported as being carried out in five units (14%) [HELICS (2), CDC (1), not specified (2)]. A VAP prevention care bundle was in use by 15 units (45%).

A catheter associated urinary tract infection (CAUTI) prevention policy was available in 21 units (58%) with CAUTI prevention training being provided by 15 units (56%). Formal surveillance of unit-acquired CAUTI was reported as being carried out in three units (8%) [HELICS (1), CDC (1), not specified (1)]. A CAUTI prevention care bundle was in use by 11 units (31%).

There was no on-site consultant microbiologist service for the critical care units of nine hospitals (31%) and seven units (19%) do not have round-the-clock access to infection specialist advice. Two mixed ICUs (14%) do not have any microbiology rounds.

All 36 units reported access to an occupational health physician. The average uptake of seasonal influenza vaccine by critical care unit staff during the 2010-2011 influenza season was approximately 42% (range 10 – 90%).

Twenty-two of 29 participating hospitals were reported to have an active antimicrobial stewardship committee (76%) with critical care representation on the committee in 14 hospitals (64%). A dedicated pharmacist service was provided to 23 units (64%). Six of 29 participating hospitals (21%) had no designated antimicrobial pharmacist. Antimicrobial consumption was actively monitored in 28 of 31 units providing data (90%), three (10%) reported that consumption was not monitored and five units (13%) did not provide information. The average antimicrobial consumption in reported by level 3 ICUs and mixed ICUs respectively were; 232 and 160 defined daily doses per 100 bed days used (DDD/100 BDU).

5.0 Conclusions

- It has been over five years since 19 critical care units underwent reconfiguration of patient accommodation. In the 29 hospitals participating in this survey, single room accommodation accounted for just 28% of critical care unit beds. The 'Infection Prevention & Control Building Guidelines for Acute Hospitals in Ireland (2009)' recommends that all newly built acute inpatient accommodation should be made up entirely of single patient rooms.⁴ Current isolation capacity in Irish critical care units is inadequate. Critically ill patients are at risk of HCAI, in particular HCAI caused by multi-drug resistant organisms (MRSA, VRE, ESBLs and CRE) and *C. difficile* infection. Inability to isolate patients colonised or infected with these organisms increases the risk of onward transmission to a neighbouring patient.
- None of the HDUs, 43% of mixed ICUs and 31% of level 3 ICUs have an airborne infection isolation room (AIIR). Prompt isolation of patients with suspected or confirmed infection transmitted via the airborne route (e.g., tuberculosis, measles, and varicella) is vitally important as such pathogens are highly infectious. National Infection Prevention and Control Building Guidelines and the Guidelines on the Prevention and Control of Tuberculosis in Ireland (2009) both recommend that a critical care unit should have at least one AIIR.^{4,6}
- Access to alcohol hand rub (AHR) at every bed space was available in 92% of units. The Guidelines for Hand Hygiene in Irish Healthcare settings (2005) recommend that AHR should be available at the bedside of each patient in critical care.⁷ However, personal AHR dispensers may have been in use by staff in some units and this information was not specifically requested in this survey.
- Access to a formal training programme on preventable device-related HAI (CRI, VAP and CAUTI) is not universal in Irish critical care units. Formal staff training on CRI prevention is provided by 86%, VAP prevention by 68% and CAUTI prevention by 56%. The provision of formal ongoing education for staff on prevention of device-related infections is a key recommendation of guidelines for prevention of CRI, VAP and CAUTI.^{8,9,10}
- CVC insertion checklists are in use in 69% and insertion packs are in use in 66% of Irish critical care units. Their introduction is recommended in guidelines for prevention of CRI.⁸
- Use of care bundles as one method to prevent device-related HCAI (peripheral and central venous catheter related infections, VAP and CAUTI) is not universal in Irish critical care units. Care bundles for CVC-CRI prevention are in use in 47%, for VAP prevention in 45% and for CAUTI prevention in 31% of units. Sample care bundles are provided in national guidance documents.^{8,9,10.}
- Ongoing prospective surveillance of potentially-preventable HCAI (BSI, CRI, VAP & UTI) is currently being undertaken by only the minority of critical care units (35%, 36%, 14% and 8%, respectively). HCAI surveillance in critical care is resource-intensive and requires multi-disciplinary input. However, there is evidence to support the introduction of systematic HCAI surveillance to prevent device-related infections.^{11, 12} In US critical care units, a 58% reduction in CRI was achieved between 2001 and 2009 as a result of a multi-faceted national intervention, which included a CRI surveillance programme.¹¹ A three-month pilot study of

CRI in nine Irish critical care units demonstrated the feasibility of introduction of CRI surveillance with the provision of a local audit nurse resource for each unit.¹³ In that study, collection of paper-based CRI surveillance data required approximately one hour per patient per week.¹³

- Access to clinical advice from an infection specialist is not available in all Irish critical care units. Of the 29 hospitals participating in this survey, 20 (69%) have an on-site consultant microbiologist. However, seven critical care units (19%) report having no access to round-the-clock infection specialist advice. This is an improvement when compared with a survey of acute hospital infection control resources and services in the Republic of Ireland conducted in 2003, in which 66 hospitals returned completed questionnaires and only 47% reported having an on-site consultant microbiologist.¹⁴ Guidelines for Antimicrobial Stewardship in Hospitals in Ireland recommend that prescribers should have ready access to clinical microbiology or infectious diseases expertise on a 24-hour basis.¹⁵ A designated antimicrobial pharmacist was not in post in six (21%) hospitals participating in this survey. National guidelines also recommend that all acute hospitals must have at least one clinical pharmacist with dedicated responsibility for antimicrobial stewardship.¹⁵ National Standards for the Prevention & Control of Healthcare-associated Infections also recommend that microbiological services are available in a timely and effective manner to support the service to prevent and control HCAI and that there are systems in place to reduce and control antimicrobial resistance.² The recent national point prevalence survey of antimicrobial use highlights the very high prevalence of antimicrobial use (74.4%) in Irish critical care units. Critically ill patients are at risk of HCAI, in particular HCAI caused by multi-drug resistant organisms (MRSA, VRE, ESBLs, and CRE) and *C. difficile* infection. A systematic review of antimicrobial stewardship interventions in critical care reported reductions in antimicrobial use, lower total antimicrobial costs, shorter average duration of antimicrobial therapy, less inappropriate use and fewer antimicrobial adverse events without compromise of short-term clinical outcomes.¹⁶
- Seasonal influenza vaccine uptake is variable across Irish critical care units (average 42%). Nosocomial transmission of influenza via the patient-to-patient or healthcare worker-to-patient routes has been reported and patients who acquire influenza in the healthcare setting are at increased risk of requiring escalated care or mechanical ventilation.¹⁷ Every effort must be made to prevent nosocomial transmission of influenza, particularly in the setting where critically ill patients are cared for. In addition, in the context of an influenza season with high incidence of infection or an influenza pandemic, adequate staffing levels are a crucial component of critical care surge capacity. Annual seasonal influenza vaccination for healthcare workers is recommended in Ireland.¹⁸

6.0 Recommendations and Implementation Proposals

1. Ongoing investment in and capital development of the physical infrastructure of critical care units in Ireland is urgently required to bring existing units up to the standards outlined in national guidance documents.^{2, 3, 4, 6} This should include increasing the overall isolation room capacity in critical care units and for beds not in isolation rooms, increasing the space between beds. The provision of at least one isolation room per unit with a ventilation design capable of accommodating patients with specialised requirements is also recommended.
2. Ongoing formal education regarding impact, consequences and prevention of device-related infection (CRI, VAP, and CAUTI) should be provided to all healthcare workers in critical care.
3. Care bundles for maintenance of vascular catheters, intubation equipment and urinary catheters should be implemented in all Irish critical care units. Where existing practice guidelines are available, these should be adapted to include recommended care bundle components.
4. It is recommended that critical care units are supported in establishing HCAI surveillance modules using European Hospitals in Europe Link for Infection Control through Surveillance (HELICS) definitions.¹⁹ Priorities for HCAI surveillance include; unit-acquired bloodstream infection, catheter related infection, ventilator-associated pneumonia and catheter associated urinary tract infection. Resources to support the introduction of HCAI surveillance in Irish critical care units should be prioritised and central collation, analysis and reporting of surveillance data is recommended.
5. Every critical care unit must have round-the-clock access to infection specialist advice and an active antimicrobial stewardship programme, including daily clinical microbiology rounds and access to a dedicated critical care and antimicrobial pharmacist.
6. All healthcare workers in critical care units should be encouraged to avail of annual seasonal influenza vaccine and vaccine uptake should be recorded and reported within each unit. Measures to promote and improve healthcare worker uptake of seasonal influenza vaccine should be encouraged.

7.0 Acknowledgements

We would like to thank the staff from the participating units for taking the time to complete the survey and for sharing their existing HCAI prevention documentation.

We would like to thank Una Quill, CCP Administrator for entering the completed data into an Excel database.

8.0 References

1. Joint Faculty of Intensive Care Medicine of Ireland (JFICMI) in association with The Intensive Care Society of Ireland (ICSI). National Standards for Adult Critical Care Services 2011.
2. Health Information and Quality Authority (HIQA) National Standards for the Prevention and Control of Healthcare Associated Infections 2009.
3. Strategy for the Control of Antimicrobial Resistance in Ireland (SARI). Infection Prevention and Control Building Guidelines for Acute Hospitals in Ireland 2009.
4. NHS Estates. Health Building Note (HBN) 57: Facilities for Critical Care 2003. ISBN: 978-0-11-322459-3.
5. Intensive Care Society. Levels of Critical Care for Adult Patients 2009.
6. Health Protection Surveillance Centre. Guidelines on the Prevention and Control of Tuberculosis in Ireland 2009.
7. SARI Infection Control Subcommittee. Guidelines for Hand Hygiene in Irish Healthcare Settings 2005.
8. SARI Sub-Committee. Prevention of Intravascular Catheter-related Infection in Ireland 2009.
9. SARI Working Group. Guidelines for the Prevention of Ventilator-associated Pneumonia in adults in Ireland 2011.
10. SARI HSE/HPSC. Guidelines for the Prevention of Catheter-associated Urinary Tract Infection 2011.
11. Central Line-associated Bloodstream Infections – United States, 2001, 2008 and 2009. *Morbidity & Mortality Weekly Report*, Volume 60. March 2 2011.
12. Zuschneid I, Schwab F, Geffers C, Behnke M, Ruden H, Gastmeier P. Trends in Ventilator-Associated Pneumonia Rates within the German Nosocomial Infection Surveillance System (KISS). *Infection Control and Hospital Epidemiology* 2007;28(3):314-318.
13. Irish Critical Care Trials Group, Intensive Care Society of Ireland, Health Protection Surveillance Centre & Health Service Executive Critical Care Programme. Catheter-related Infection (CRI) in Irish Intensive Care Units – A Pilot Surveillance Study 2011.
14. Cunney R, Humphreys H, Murphy N. Survey of acute hospital infection control resources and services in the Republic of Ireland. *Journal of Hospital Infection* 2006;64:63-68.
15. SARI Hospital Antimicrobial Stewardship Working Group. Guidelines for Antimicrobial Stewardship in Hospitals in Ireland 2009.
16. Kaki R, Elligsen M, Walker S, Simor A, Palmay L, Daneman N. Impact of antimicrobial stewardship in critical care: a systematic review. *Journal of Antimicrobial Chemotherapy* 2011;66:1223-1230.

17. Enstone JE *et al.* Nosocomial Pandemic (H1N1) 2009, United Kingdom, 2009-2010. *Emerging Infectious Diseases* 2011;17(4):592-98.
18. National Immunisation Advisory Committee of the Royal College of Physicians of Ireland. Immunisation Guidelines for Ireland 2008. [Chapter 7: Influenza. Updated August 2012]. <http://www.immunisation.ie/en/HealthcareProfessionals/ImmunisationGuidelines2008/>
19. European Centre for Disease Prevention and Control. European Surveillance of Healthcare Associated Infections in Intensive Care Units. HAIICU Protocol (Standard and Light) v1.01 December 2010.

Appendix A: HSE CCP & HCAI Clinical Programmes – HCAI Steering Group Membership

- Dr Fidelma Fitzpatrick, Consultant Microbiologist Health Protection Surveillance Centre (HPSC), Beaumont Hospital & HSE & RCPI HCAI Clinical Programme Lead (Joint Chairperson)
- Dr Michael Power, Consultant in Intensive Care Medicine, Beaumont Hospital & HSE CCP Lead (Joint Chairperson)
- Dr Karen Burns, Consultant Microbiologist, HPSC, Beaumont Hospital & HSE CCP (Secretary and Report Author)
- Dr Rory Dwyer, ICU Director, Beaumont Hospital & HSE CCP Clinical Audit Lead
- Dr Maria Donnelly, Consultant in Intensive Care Medicine, Adelaide, Meath and National Children's Hospital
- Dr Dermot Phelan, Consultant in Intensive Care Medicine, Mater Misericordiae Hospital
- Dr Colman O'Loughlin, ICU Director, Mater Misericordiae Hospital
- Dr Criona Walshe, Consultant in Intensive Care Medicine, Beaumont Hospital
- Ms Martha Hanlon, CNM3 Intensive Care Unit, Mater Misericordiae Hospital
- Ms Dympna McDonnell, Infection Prevention & Control Nurse, AMNCH
- Mr Damodar Solanki, Intensive Care Pharmacist, Beaumont Hospital

Appendix B: Hygiene and Healthcare Associated Infection Prevention Practices in Irish Critical Care Units Survey 2012.

CONTACT INFORMATION		ACTIVITY	ENTER ANSWERS HERE
SURVEY OF HYGIENE & HEALTHCARE ASSOCIATED INFECTION PREVENTION PRACTICES IN IRISH CRITICAL CARE UNITS - ONE SURVEY TO BE COMPLETED FOR EACH CRITICAL CARE UNIT WITHIN EACH HOSPITAL			
DATE SURVEY COMPLETED			
SURVEY COMPLETED BY			
JOB TITLE			
WORK EMAIL ADDRESS			
WORK TELEPHONE NUMBER			
HOSPITAL NAME			
HOSPITAL TYPE			
NUMBER OF CRITICAL CARE UNITS IN THIS HOSPITAL			
WHEN WAS THIS CRITICAL CARE UNIT LAST REQUISITED?			
CRITICAL CARE UNIT TYPE FOR THIS UNIT (CHOOSE LEVEL THAT APPLIES MOST FREQUENTLY)			
LEVEL 2 (ICCU)			
LEVEL 3 (ICU)			
MIXED (LEVEL 2 & LEVEL 3)			
MEDICAL			
SURGICAL			
MIXED MEDICAL AND SURGICAL			
SPECIALIST - NEUROLOGICAL			
SPECIALIST - CARDIOLOGICAL			
SPECIALIST - OTHER (PLEASE SPECIFY TYPE)			
HOW MANY PATIENTS WERE ADMITTED TO THIS CRITICAL CARE UNIT IN 2011			
NUMBER OF BEDS CURRENTLY OPEN IN THIS CRITICAL CARE UNIT (TOTAL BEDS MINUS CLOSED BEDS)			
NUMBER OF BEDS OCCUPIED AT THE TIME OF COMPLETION OF SURVEY			
NUMBER OF PATIENTS CURRENTLY VENTILATED			
NUMBER OF PATIENTS CURRENTLY WITH AT LEAST ONE OF TEMPORARY CENTRAL VENOUS CATHETER, CATHETERIZED PERIPHERAL MONITOR ARTERY CATHETER, INTRODUCER IN SITU			
NUMBER OF PATIENTS CURRENTLY WITH URINARY CATHETER IN SITU			
NUMBER OF PATIENTS CURRENTLY WITH A NASOGASTRIC TUBE IN SITU			
NUMBER OF PATIENTS CURRENTLY RECEIVING NUTRITION			
NUMBER OF PATIENTS CURRENTLY RECEIVING TOTAL PARENTERAL NUTRITION (TPN)			
NUMBER OF PATIENTS CURRENTLY RECEIVING ENTERAL NUTRITION			
INFRASTRUCTURE			
WHEN WAS THE LAST RECONFIGURATION OF PATIENT ACCOMMODATION IN THE UNIT (YEAR)			
TOTAL NUMBER OF BEDS THAT ARE AVAILABLE			
NUMBER OF BEDS THAT ARE NOT IN A SINGLE ROOM			
FOR BEDS NOT IN SINGLE ROOM MEASURE AND RECORD THE DISTANCE IN METRES BETWEEN THE CENTRE OF ONE BED AND THE CENTRE OF ADJACENT BED			
NUMBER OF SINGLE ROOMS			
NUMBER OF SINGLE ROOMS WITH AN ANTE-ROOM, OR BY			
IS THERE A HANDWASH BASIN IN EVERY PATIENT ROOM (Y/N)			
NUMBER OF SINGLE ROOMS WITH EN SUITE BATHROOM			
NUMBER OF PATIENT BATHROOMS FOR THE CRITICAL CARE UNIT (OTHER THAN EN SUITE FACILITIES)			
NUMBER OF HAND WASH BASINS IN THE CRITICAL CARE UNIT (DO NOT INCLUDE THOSE IN SINGLE ROOMS)			
IS THERE A FOOT PEDAL OPERATED OR HANDS FREE WASTE BIN AT EVERY HAND WASH BASIN? (Y/N)			
WHAT BRAND OF ALCOHOL HAND RUB IS USED IN THE CRITICAL CARE UNIT?			
NUMBER OF ALCOHOL HAND RUB (AHR) DISPENSERS IN THE CRITICAL CARE UNIT			
IS THERE AN AIR DISPENSER AT EVERY BED SPACE IN THE CRITICAL CARE UNIT? (Y/N)			
IS THERE A PLASTIC CARBON DISPENSER AT EVERY BED SPACE IN THE CRITICAL CARE UNIT? (Y/N)			
IS THERE A DISPOSABLE NON-STERILE GLOVE DISPENSER AT EVERY BED SPACE IN THE CRITICAL CARE UNIT? (Y/N)			
IS THERE A SEPARATE CLEAN UTILITY FOR PREPARATION OF MEDICATION? (Y/N)			
IS THERE A SEPARATE DRY UTILITY FOR DISPOSAL OF USED SINGLE USE PATIENT EQUIPMENT AND TO DECONTAMINATE REUSABLE PATIENT EQUIPMENT? (Y/N)			

IS THERE A SHARPS DISPOSAL BIN AT EACH BED SPACE IN THE CRITICAL CARE UNIT? (Y/N)		
IS THERE A DEDICATED SUJCE ROOM FOR THE CRITICAL CARE UNIT? (Y/N)		
IS THERE A DEDICATED STOCK SUPPLY ROOM FOR THE CRITICAL CARE UNIT? (Y/N)		
IS THERE A DEDICATED EQUIPMENT STORAGE ROOM FOR THE CRITICAL CARE UNIT? (Y/N)		
DOES THE UNIT HAVE ADEQUATE SPACE FOR STORAGE OF DAY-TO-DAY EQUIPMENT? (Y/N)		
PATIENT MONITORING EQUIPMENT IS FREE STANDING (Y/N)		
PATIENT MONITORING EQUIPMENT IS WALL MOUNTED OR CEILING MOUNTED (Y/N)		
IS THERE A DEDICATED CLERICAL AREA FOR THE CRITICAL CARE UNIT? (Y/N)		
PATIENT HEALTHCARE RECORDS ARE USUALLY KEPT (TICK APPROPRIATE BOX)		
	FOR BEDS NOT IN SINGLE ROOMS	AT END OF PATIENT'S BED
	FOR BEDS IN SINGLE ROOMS	AT THE NURSE STATION
		INSIDE THE PATIENT ROOM
		OUTSIDE THE PATIENT ROOM
		AT THE NURSE STATION
PATIENT MEDICATION CHARTS ARE USUALLY KEPT (TICK APPROPRIATE BOX)		
	FOR BEDS NOT IN SINGLE ROOM	AT THE END OF THE PATIENT'S BED
		AT THE NURSE STATION
	FOR BEDS IN SINGLE ROOMS	INSIDE THE PATIENT ROOM
		OUTSIDE THE PATIENT ROOM
		AT THE NURSE STATION
		IN THE CLEAN UTILITY
VENTILATION		
THIS CRITICAL CARE UNIT IS NATURALLY VENTILATED (Y/N)		
THIS CRITICAL CARE UNIT IS ARTIFICIALLY VENTILATED (Y/N)		
NUMBER OF ROOMS IN THIS CRITICAL CARE UNIT THAT RECEIVE HEPA FILTERED AIR SUPPLY		
NUMBER OF ROOMS WITH NEUTRAL PRESSURE VENTILATION (PROVIDES BOTH PROTECTIVE AND SOURCE ISOLATION)		
NUMBER OF ROOMS WITH POSITIVE PRESSURE VENTILATION (PROTECTIVE ISOLATION ONLY)		
NUMBER OF ROOMS WITH NEGATIVE PRESSURE VENTILATION (SOURCE ISOLATION ONLY)		
NUMBER OF ROOMS THAT HAVE VENTILATION SYSTEM WHICH CAN BE MANUALLY SWITCHED FROM POSITIVE TO NEGATIVE PRESSURE VENTILATION		
ENVIRONMENTAL HYGIENE		
WHAT IS THE CLEANING SCHEDULE FOR THE CRITICAL CARE UNIT?		
	GENERAL ENVIRONMENT (FLOORS, SURFACES, LEDGES)	
	PATIENT BEDSPACE	
	PATIENT BEDS, LOCKERS, FREQUENT HAND TOUCH SURFACES	
	PATIENT EQUIPMENT (DRIP STANDS, MONITORING EQUIPMENT)	
WHAT CLEANING AGENT IS USUALLY USED FOR ENVIRONMENTAL CLEANING?		
WHAT CLEANING AGENT IS USUALLY USED FOR ENVIRONMENTAL DISINFECTION?		
HOW OFTEN ARE PRIVACY CURTAINS CHANGED AROUND BEDS NOT IN SINGLE ROOMS?		
AUDIT ACTIVITY		
HOW OFTEN ARE ENVIRONMENTAL HYGIENE AUDITS CARRIED OUT IN THIS CRITICAL CARE UNIT?		
DATE OF LAST ENVIRONMENTAL HYGIENE AUDIT (DD/MM/YY)		
SCORE RECEIVED BY UNIT AT LAST ENVIRONMENTAL HYGIENE AUDIT (%)		
HOW OFTEN ARE HAND HYGIENE COMPLIANCE AUDITS CARRIED OUT IN THIS CRITICAL CARE UNIT?		
DATE OF LAST HAND HYGIENE AUDIT (DD/MM/YY)		
OVERALL SCORE RECEIVED BY UNIT AT LAST HAND HYGIENE AUDIT (%)		
PROVIDE CONSUMPTION OF ALCOHOL HAND RUB (AHR) FOR THE UNIT FOR 2011 (LITRES CONSUMED) (DATA FROM PHARMACY)		
HOW OFTEN IS COMPLIANCE WITH TRANSMISSION BASED PRECAUTIONS (TBP) AUDITED IN THIS CRITICAL CARE UNIT?		
DATE OF LAST TBP AUDIT (DD/MM/YY)		
SCORE RECEIVED BY UNIT AT LAST TBP COMPLIANCE AUDIT (%)		
HOW OFTEN IS ANTIMICROBIAL CONSUMPTION AUDITED IN THIS UNIT?		
DATE OF LAST ANTIMICROBIAL CONSUMPTION AUDIT (DD/MM/YY)		

ANTIMICROBIAL CONSUMPTION FOR THIS CRITICAL CARE UNIT IN 2011 (DDO/100 DDU) (DATA FROM PHARMA/C)			
EDUCATION ACTIVITY			
IS THERE A DOCUMENTED LOG OF STAFF TRAINING IN HCAI PREVENTION ACTIVITIES MAINTAINED IN THE UNIT? (Y/N)			
FREQUENCY OF HAND HYGIENE TRAINING (PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)		STAFF INDUCTION /ANNUALLY/ EVERY TWO YEARS	
FREQUENCY OF STANDARD PRECAUTIONS TRAINING (PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)		STAFF INDUCTION /ANNUALLY/ EVERY TWO YEARS	
FREQUENCY OF TRANSMISSION BASED PRECAUTIONS TRAINING (PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)		STAFF INDUCTION /ANNUALLY/ EVERY TWO YEARS	
VASCULAR CATHETER RELATED INFECTIONS (PVC & CVC) AND PREVENTION TRAINING (PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)		STAFF INDUCTION /ANNUALLY/ EVERY TWO YEARS	
VENTILATOR ASSOCIATED PNEUMONIA PREVENTION TRAINING (PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)		STAFF INDUCTION /ANNUALLY/ EVERY TWO YEARS	
CATHETER ASSOCIATED UTI PREVENTION TRAINING (PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)		STAFF INDUCTION /ANNUALLY/ EVERY TWO YEARS	
HCAI PREVENTION			
ARE ANTISEPTIC IMPREGNATED CVC USED IN THIS CRITICAL CARE UNIT? (Y/N)			
ARE ANTI-BIOTIC IMPREGNATED CVC USED IN THIS CRITICAL CARE UNIT? (Y/N)			
ARE TRANS-PALENT CVC DRESSINGS USED IN THIS CRITICAL CARE UNIT? (Y/N)			
ARE GAUZE/NON-TRANSPARENT CVC DRESSINGS USED IN THIS UNIT? (Y/N)			
ARE CHLORHEXIDINE IMPREGNATED SPONGES - BIOPATCH USED IN THIS CRITICAL CARE UNIT? (Y/N)			
HOW OFTEN ARE IV GIVING SETS USED FOR ADMINISTRATION OF FLUIDS/ANTI-BIOTICS CHANGED?			
HOW OFTEN ARE IV GIVING SETS USED FOR ADMINISTRATION OF BLOOD/BLOOD PRODUCTS CHANGED?			
HOW OFTEN ARE IV GIVING SETS USED FOR ADMINISTRATION OF TPN CHANGED?			
CENTRAL VENOUS CATHETER (CVC) INSERTION CHECKLIST IN USE? (Y/N)			
CVC INSERTION PACK IN USE (CONTAINS ALL EQUIPMENT REQUIRED TO INSERT A CVC) (Y/N)			
CVC MAINTENANCE CARE BUNDLE IN USE?			
PERIPHERAL VENOUS CATHETER (PVC) MAINTENANCE CARE BUNDLE IN USE? (Y/N)			
VENTILATOR ASSOCIATED PNEUMONIA (VAP) PREVENTION CARE BUNDLE IN USE? (Y/N)			
URINARY CATHETER CARE BUNDLE IN USE? (Y/N)			
WHAT PROPORTION OF CRITICAL CARE UNIT STAFF RECEIVED SEASONAL INFLUENZA VACCINE IN 2010? (%)			
HCAI ACTIVE SURVEILLANCE CULTURES			
PATIENTS ARE SCREENED FOR CARRIAGE OF MERTICILIN RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) (Y/N)	(PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)	ON ADMISSION/WEEKLY	
PATIENTS ARE SCREENED FOR RECTAL CARRIAGE OF VANCOMYCIN RESISTANT ENTEROCOCCUS (VRE) (Y/N)	(PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)	ON ADMISSION/WEEKLY	
PATIENTS ARE SCREENED FOR RECTAL CARRIAGE OF EXTENDED SPECTRUM BETA LACTAMASE (ESBL) (Y/N)	(PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)	ON ADMISSION/WEEKLY	
PATIENTS ARE SCREENED FOR RECTAL CARRIAGE OF CARBAPENEM RESISTANT ENTEROBACTERIACAE (CRE) (Y/N)	(PLEASE CIRCLE OR HIGHLIGHT APPROPRIATE ANSWERS)	ON ADMISSION/WEEKLY	
HCAI SURVEILLANCE			
SURVEILLANCE OF UNIT-ACQUIRED MRSA TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
SURVEILLANCE OF UNIT-ACQUIRED VRE TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
SURVEILLANCE OF UNIT-ACQUIRED ESBL TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
SURVEILLANCE OF UNIT-ACQUIRED CRE TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
SURVEILLANCE OF UNIT-ACQUIRED BLOOD STREAM INFECTIONS (UA-BSI) TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
	IF YES, PLEASE PROVIDE LAST AVAILABLE RATE OF UA-BSI (INFECTIONS PER 1000 PATIENT-DAYS)		
SURVEILLANCE OF UNIT-ACQUIRED VASCULAR CATHETER RELATED INFECTION TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
	IF YES, WHICH DEFINITIONS OF INFECTION ARE USED BY THE UNIT (HELICS OR CDC)		
SURVEILLANCE OF VENTILATOR ASSOCIATED PNEUMONIA TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
	IF YES, PLEASE PROVIDE LAST AVAILABLE RATE OF VASCULAR CATHETER RELATED INFECTION		
	IF YES, WHICH DEFINITIONS OF INFECTION ARE USED BY THE UNIT (HELICS OR CDC)		
SURVEILLANCE OF CATHETER-RELATED UTI TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
	IF YES, PLEASE PROVIDE LAST AVAILABLE RATE OF VAP		
	IF YES, WHICH DEFINITIONS OF INFECTION ARE USED BY THE UNIT		
	IF YES, PLEASE PROVIDE LAST AVAILABLE CA-UTI RATE		
SURVEILLANCE OF SEASONAL INFLUENZA TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
SURVEILLANCE OF UNIT-ACQUIRED INFLUENZA TAKES PLACE IN THIS CRITICAL CARE UNIT (Y/N)			
PLEASE PROVIDE FURTHER DETAILS OF ANY OTHER HCAI SURVEILLANCE OR PREVENTION ACTIVITIES UNDERTAKEN IN THE UNIT IN THE PAST 12 MONTHS			
THIS HOSPITAL HAS AN ACTIVE INFECTION CONTROL COMMITTEE (Y/N)			

DATE OF LAST INFECTION CONTROL COMMITTEE MEETING (DD/MM/YY)		
THIS CRITICAL CARE UNIT IS REPRESENTED ON THE INFECTION CONTROL COMMITTEE (Y/N)		
THIS HOSPITAL HAS AN ACTIVE ANTIMICROBIAL STEWARDSHIP COMMITTEE (Y/N)		
DATE OF LAST ANTIMICROBIAL STEWARDSHIP COMMITTEE (DD/MM/YY)		
THIS CRITICAL CARE UNIT IS REPRESENTED ON THE ANTIMICROBIAL STEWARDSHIP COMMITTEE (Y/N)		
THERE ARE FORMAL DOCUMENTED ANTI-BIOTIC POLICIES IN THIS HOSPITAL (Y/N)		
THERE ARE POLICIES FOR EMPIRIC TREATMENT OF COMMUNITY-ACQUIRED INFECTIONS (Y/N)		
THERE ARE POLICIES FOR THERAPEUTIC DRUG MONITORING (VANCOMYCIN AND GENTAMICIN) (Y/N)		
CERTAIN ANTI-BIOTICS ARE RESTRICTED AND CANNOT BE GIVEN WITHOUT DISCUSSION WITH MICROBIOLOG/INFECTIOUS DISEASES (Y/N)		
CERTAIN ANTI-FUNGALS ARE RESTRICTED AND CANNOT BE GIVEN WITHOUT DISCUSSION WITH MICROBIOLOG/INFECTIOUS DISEASES (Y/N)		
STAFFING		
ICU IS STAFFED BY CONSULTANT IN INTENSIVE CARE MEDICINE (Y/N)	NUMBER OF CONSULTANTS	
ICU IS STAFFED BY CONSULTANT ANAESTHETISTS WITH INTEREST IN INTENSIVE CARE MEDICINE (Y/N)	NUMBER OF CONSULTANTS	
NUMBER OF WHOLE TIME EQUIVALENT (WTE) NURSING STAFF PER BED		
NUMBER OF WTE HEALTHCARE ASSISTANTS		
THERE IS AN ON-SITE CONSULTANT MICROBIOLOGIST AT THIS HOSPITAL (Y/N)		
THERE IS AN ON-SITE MICROBIOLOGY LABORATORY AT THIS HOSPITAL (Y/N)		
WHAT IS THE FREQUENCY OF MICROBIOLOGY ROUNDS IN THE UNIT?		
THERE IS ACCESS TO CONSULTANT MICROBIOLOGIST ADVICE 24/7 (Y/N)		
THERE IS ACCESS TO MICROBIOLOGY RESULTS 24/7 I.E. ARE SIGNIFICANT POSITIVE RESULTS COMMUNICATED OUTSIDE OF NORMAL WORKING HOURS? (Y/N)		
THERE IS AN ON-SITE INFECTION PREVENTION AND CONTROL NURSE (IPC/N) AT THIS HOSPITAL (Y/N)		
THERE IS DAILY LIAISON WITH THE IPCN (Y/N)		
THERE IS AN INFECTION CONTROL LINK NURSE ON THE ICU NURSING STAFF OR NOMINATED CRITICAL CARE NURSE WHO LEADS ON INFECTION PREVENTION (Y/N)		
THERE IS A PHARMACIST DEDICATED TO THIS CRITICAL CARE UNIT (Y/N)		
THERE IS AN ANTIMICROBIAL PHARMACIST IN THIS HOSPITAL (Y/N)		
THERE IS AN ON-SITE OCCUPATIONAL HEALTH PHYSICIAN AT THIS HOSPITAL (Y/N)		
THERE IS ACCESS TO AN OCCUPATIONAL HEALTH PHYSICIAN (Y/N)		
POLICIES - PLEASE SPECIFY IF AVAILABLE POLICY IS GENERAL HOSPITAL POLICY OR POLICY SPECIFIC TO THE CRITICAL CARE UNIT		
INFECTION CONTROL POLICY (Y/N)		
DECONTAMINATION POLICY (Y/N)		
VASCULAR CATHETER INFECTION PREVENTION POLICY (Y/N)		
VAP PREVENTION POLICY (Y/N)		
CA-UTI PREVENTION POLICY (Y/N)		
LEGIONELLA MONITORING AND CONTROL POLICY (Y/N)		
AS PERIGILUS CONTROL POLICY (Y/N)		
ORAL HYGIENE/CARE POLICY (Y/N)		
PART NINE - NOMINATED HCAI PREVENTION LEADS FOR YOUR UNIT I.E. STAFF MEMBERS WHO WILL LIAISE WITH HSE CCP ON HCAI PREVENTION		
NAME HCAI PREVENTION LEAD (1) FOR YOUR UNIT		
WORK E-MAIL ADDRESS HCAI PREVENTION LEAD (1)		
NAME HCAI PREVENTION LEAD (2) FOR YOUR UNIT		
WORK E-MAIL ADDRESS HCAI PREVENTION LEAD (2)		
CONTACT TELEPHONE NUMBER FOR YOUR UNIT		
IF YOUR UNIT USES CVC INSERTION CHECKLISTS AND OR CARE BUNDLES FOR HCAI PREVENTION, PLEASE RETURN A COPY OF YOUR LOCAL DOCUMENTATION YOUR FEEDBACK AND INPUT IS CRITICAL TO IMPROVING DEVELOPMENT OF GENERIC POLICIES WHICH COULD BE USED NATIONALLY		

Appendix C: List of Participating Hospitals

- St. James's Hospital, Dublin
- Adelaide, Meath & National Children's Hospital, Tallaght, Dublin
- Naas General Hospital, Naas
- St Vincent's University Hospital, Dublin
- St Columcille's Hospital, Loughlinstown, Dublin
- Midlands Regional Hospital, Mullingar
- Midlands Regional Hospital, Tullamore
- Midlands Regional Hospital, Portlaoise
- Children's University Hospital, Temple St
- Mater Misericordiae University Hospital, Dublin
- Beaumont Hospital, Dublin
- Connolly Hospital, Blanchardstown, Dublin
- Our Lady of Lourdes Hospital, Drogheda
- Our Lady's Hospital, Navan
- Cork University Hospital
- Kerry General Hospital, Tralee
- Waterford Regional Hospital
- South Tipperary General Hospital, Clonmel
- Galway University Hospital
- Mayo General Hospital, Castlebar
- Portiuncula Hospital, Ballinasloe
- Midwestern Regional Hospital, Nenagh
- Midwestern Regional Hospital, Limerick
- Sligo General Hospital
- Cavan General Hospital
- Bons Secours Hospital, Dublin
- Mater Private Hospital, Dublin
- Galway Clinic, Doughiska, Galway
- UPMC Beacon Hospital, Dublin

Appendix D Joint Faculty of Intensive Care Medicine of Ireland & Intensive Care Society of Ireland – Levels of Critical Care

Acute Care	Level 0	Hospital ward clinical management
	Level 1	Higher level of observation eg. PACU
Critical Care	Level 2	Active management by critical care team to treat and support critically ill patients with primarily single organ failure
	Level 3	Active management by critical care team to treat and support critically ill patients with two or more organ failures
	Level 3 s	Level 3 with regional / national service

Appendix E Links to Useful Information

1. Health Protection Surveillance Centre (Ireland): <http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/InfectionControlandHAI/Guidelines/#d.en.3439>
2. Health Protection Scotland: <http://www.documents.hps.scot.nhs.uk/hai/hai-compendium/hai-compendium.pdf>
3. Health Protection Agency (England): <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/HCAI/GuidelinesForProfessionalsHCAI/>
4. Welsh Healthcare Associated Infection Programme (WHAIP): <http://www.wales.nhs.uk/sites3/page.cfm?orgid=379&pid=50077>
5. Northern Ireland Public Health Agency: <http://www.publichealth.hscni.net/directorate-public-health/health-protection/healthcare-associated-infections-clean-your-hands>
6. European Centre for Disease Prevention & Control (ECDC): http://www.ecdc.europa.eu/en/healthtopics/Healthcare-associated_infections/Pages/index.aspx
7. US Centers for Disease Control & Prevention (CDC): <http://www.cdc.gov/hicpac/pubs.html>