



**A SERVICE DEVELOPMENT PLAN
for
INTENSIVE CARE UNITS**

2000 - 2002

South East Health

Foreword

I have much pleasure in presenting this service development plan for Intensive Care Units in South East Health. Intensive Care services are a specialised component of the comprehensive health care services provided in South East Health. This Plan is a response to a recognised need for a co-ordinated approach to the development of these services to contribute to health improvement in the community we serve.

The Plan was prepared by the Intensive Care Subcommittee of the Critical Care Network in South East Health. The group has made a set of recommendations for enhancing service delivery in terms of medical and nursing staff education and recruitment, database development and quarantining of bed numbers and budgets.

This plan also reinforces the status of South East Health in the Critical Care Networks across the state and reaffirms our commitment to high quality tertiary services for residents of NSW.



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Chief Executive Officer

March 2000

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Executive Summary

An Intensive Care Unit (ICU) is a specially staffed, specially equipped, separate section of a hospital dedicated to the observation, care and treatment of patients with life threatening or potentially life threatening illnesses, injuries or complications, from which recovery is possible. It provides special facilities for the support of vital functions, and utilises the skills of medical, nursing and other staff experienced in the management of these problems.¹

Intensive Care Services provide a critical phase to the spectrum of health care provided in South East Health.

This paper provides an overview of the current intensive care status and highlights issues that are of concern to the Intensive Care Subcommittee of the Area's Critical Care Network. It provides a variety of recommendations for future enhancement of the efficiency and effectiveness of the services.

Recommendations:

1. That SEH ICU bed numbers be increased by two in the area of General Adult Intensive Care.
2. That SEH residents requiring ICU admissions be managed in the Area; and transfer of residents out of the Area be avoided or that they will be transferred only as a last resort.
3. That each ICU collect 'refused admission' data in a standardised format to provide accurate information of the true demand for ICU services.
4. That the ICU management is involved in hospital wide or Area integrated bed management strategies.
5. That there be an organisational review of the High Dependency Units (and surgical ICUs) within SEH with an aim to coordinate service delivery with the Intensive Care services.
6. That High Dependency Units be incorporated administratively under the ICU in accordance with the standards.
7. That High Dependency Units have data collections, clinical indicators and formal audit processes in place.
8. That the Intensive Care Subcommittee explore the definition of FTE for medical staff and on call commitments within the ICU setting and present findings to the Critical Care Committee for discussion.
9. That any deficits in staffing across the Area be rectified over time.

¹ Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists. Minimum Standards for intensive care unit. Draft. 1999.

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10. That the Intensive Care Subcommittee endorse the recommendations from the SEH Intensive Care Nursing Management and Educational Standards and begin their implementation.
11. That the Biomedical Services for ICUs be reviewed across South East Health and the service upgraded.
12. That South East Health facilities develop a plan for the repair, maintenance and replacement of intensive care equipment.
13. That the Intensive Care Subcommittee continue to explore the development of a minimum data set.
14. That the Area support the development of an Area ICU database.
15. That a data manager be employed for each ICU.
16. That the Intensive Care Subcommittee consider methods for improving communication with IT services.
17. That the Intensive Care Subcommittee explore the feasibility of designing an Area wide data form to assist in the monitoring of the ACHS Clinical Indicators.
18. That the Critical Care Committee provide the venue for discussion of problems and ideas for further cooperation with rural areas.
19. That the important role of education be emphasised and that arrangements are in place at each Unit to provide access for all staff to ongoing education, inservice and research opportunities.
20. That the important role of research within ICU services be acknowledged.
21. That the development of Intra Area cooperative research projects be explored.
22. That ICU medical and nursing managers be provided with appropriate budget information to allow them to manage the Unit budget.

The recommendations outlined in this Service Development Plan will provide direction for a coordinated approach to the further development of intensive services within South East Health.

1 Introduction

South East Health has adopted *Good Health Care, Better Health* as its Mission,² emphasising the concept that improvement in health of a community over many years lies in the provision of high quality health services. Intensive care is the provision of care to very ill patients needing major life support. In South Eastern Sydney there is a comprehensive range of types and levels of Intensive Care Units in the public and private sector for both adults and children.

An Intensive Care Unit (ICU) is a specially staffed, specially equipped, separate section of a hospital dedicated to the observation, care and treatment of patients with life threatening or potentially life threatening illnesses, injuries or complications, from which recovery is possible. It provides special facilities for the support of vital functions, and utilises the skills of medical, nursing and other staff experienced in the management of these problems.³

South East Health has four strategic directions for service development and our plan for intensive care services incorporates these priorities:

- **Innovation in health service delivery**
 - population based needs
 - balance of primary, secondary and tertiary services
 - continuum of prevention, curative, restorative and maintenance care
 - access for residents to core services locally
 - networked tertiary and special statewide services

- **Leadership and management**
 - support for teaching and research
 - workforce planning which supports a comprehensive profile of care

- **Development of co-operative partnerships**
 - liaison with community services, non government organisations and the voluntary sector
 - liaison with private practitioners and private hospitals
 - private investment in research

- **Achievement of efficient economic performance**
 - preparation for clinical funding according to a Resource Distribution Formula which will include cross border purchasing

This South East Health Intensive Care Service Development Plan aligns with these themes for planning clinical services and provides a direction for the delivery of these services over the next three years. This document is guided by the NSW Department of

² *South Eastern Sydney Area Health Service, Corporate Directions – An Expression of intent 1998 – 2000.*

³ *Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists. Minimum Standards for intensive care unit. Draft. 1999.*

Health recommendations for ICU services and is also consistent with the principles of critical care we outlined in the *South East Health Improving our Emergency Departments 1998 – 2001*⁴ document.

2 South East Health

South East Health (SEH) encompasses the Local Government Areas (LGA's) of Sutherland, Hurstville, Kogarah, Rockdale, Randwick, Botany, Waverley, Woollahra and approximately 60% of South Sydney and Sydney. The largest proportion of SEH residents lives in Sutherland LGA and the smallest proportion in Sydney LGA.

There are approximately 749,209 people living in SEH.⁵ Sixteen percent of these are children under 15 years and 14% are people aged 65 years and over. Of all residents in SEH, 0.7% are Aboriginal and Torres Strait Islander people, 33% were born overseas and 23% are from non-English speaking backgrounds.

With many principal referral hospitals falling inside its boundaries, SEH has major statewide specialist responsibilities to the population of NSW in addition to providing comprehensive services for its resident population.

SEH is committed to providing comprehensive Intensive Care Services. This plan provides an overview of current services and highlights the issues that are facing the intensive care services within SEH.

⁴ *South Eastern Sydney Area Health Service, Improving Our Emergency Departments 1998 – 2001, June 1998.*

⁵ *Australian Bureau of Statistics. 1997 Age and sex distribution of the estimated resident population of statistical local areas, New South Wales. Cat No. 3209.1, Canberra: ABS, 1998.*

3 SEH Critical Care Framework

Intensive Care Units form one of the clinical settings for critical care as outlined in the *NSW Metropolitan Critical Care Plan*⁶ released in September 1996. This plan recommended the establishment of an Area Critical Care Committee (CCC) and outlined various principles in regard to Intensive Care Services.

An Area CCC was established for South East Health in 1997. This committee meets six weekly and addresses all issues involved with Critical Care. There are a number of subcommittees, with the Emergency Department and Intensive Care Subcommittees being the primary groups.

Table I provides a profile of the Critical Care setting available at each public hospital by role delineation and provides comments on critical care networks internal to SEH.

TABLE 1: CRITICAL CARE NETWORKS IN SOUTH EAST HEALTH

HOSPITAL	ICU	EMERGENCY DEPT.	CORONARY CARE UNIT	CARDIO THORACIC SERVICES	NEURO SURGICAL	COMMENTS
St. George	Level 3	Level 6	Yes	Level 6	Level 6	
St. Vincent's	Level 3	Level 6	Yes	Level 6 (Level 3 ICU)	Level 6	
Prince Of Wales	Level 3	Level 6	Yes	Level 6	Level 6	
Sutherland	Level 2	Level 5	Yes	Level 5 (thoracic only)	Level 4	Ambulances bypass ED with major trauma, which is taken to St. George Hospital.
Sydney Children's	Paediatric/ Neonatal	Level 6	N/A	Level 6	Level 6	Links with St. George & Sutherland
Sydney/Sydney Eye	N/A	Level 4	N/A			Specialist role in hand surgery and ophthalmology Complex cases are resuscitated and referred on.

SEH has six Emergency Departments, four of which are designated as major trauma centres. The St. George Hospital accommodates the base for Statewide Retrieval Services.

External Critical Care Networks link the POW Hospital with Bega and Queanbeyan, St. George Hospital with Wollongong, and St Vincent's Hospital with the Greater Murray Area Health Service hospitals.

The Royal Hospital for Women provides a Level 3 neonatal intensive care service and participates in the statewide Perinatal Services Network.

⁶ *NSW Department of Health, New South Wales Metropolitan Critical Care Plan, Statewide Services Development Branch, September, 1996*

4 Definition of ICU Services

The “*NSW Intensive Care Service Survey – A Basis for Review*”⁷ detailed a number of principles of intensive care and made recommendations for exploration in each Area Health Service. These principles and recommendations covered intensive care bed numbers, staffing, equipment and support services, intensive care activity, high dependency units and networking and patient flows (Appendix 1). These principles have been considered in the development of this document.

SEH has adopted the ANZCA definition of an Intensive Care Unit.⁸:

“A specially staffed, specially equipped, separate section of a hospital dedicated to the observation, care and treatment of patients with life threatening or potentially life threatening illnesses, injuries or complications, from which recovery is possible. It provides the special expertise and facilities for the support of vital functions, and utilises the skills of medical, nursing and other staff experienced in the management of these problems.

The concentration of staff and equipment to care for these critically ill patients in one area of the hospital encourages efficient use of expertise and limited resources. The concept of a general intensive care unit, rather than separate specialized units, such as medical, respiratory and surgical has developed in Australasia. This is because the skills and resources necessary to care for the critically ill are common and most efficiently organised in one area.

This does not preclude the division of an intensive care unit into a higher level (e.g. for ventilated patients) and a lower or “step down” level (e.g. for post operative patients, acute diabetic emergencies etc.), nor does it preclude the siting of specific high dependency areas elsewhere (e.g. neurosurgical, postoperative cardiothoracic area.) Neonatal intensive care units are usually separate from general intensive care units. Coronary care patients and children are occasionally managed in a general intensive care unit

⁷ 1998 *Statewide Services Development Branch NSW Department of Health, Intensive Care Service Survey – A Basis for Review.*

⁸ *Minimum Standards for Intensive Care Units, Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists.*

5 Current ICU Service Capacity in South Eastern Sydney

SEH is committed to providing the continuum of prevention, curative, restorative and maintenance care and a balance of primary, secondary and tertiary services. The priority is to provide access for residents to core services locally and then to ensure integrated access to tertiary and specialist statewide services.

ICU beds are defined as Levels 3, 2 or 1 according to the Minimum Standards for Intensive Care Units, Faculty of Intensive Care Australian and New Zealand College of Anaesthetists (Appendix 2).

Intensive Care Services are provided in all the acute hospitals. The principal referral hospitals St. Vincent's, St. George and POW/PHH provide Level 3 adult ICUs. St. Vincent's Hospital has a Level 3 specialty ICU for cardiothoracic surgery and St George and POW/PHH also provide cardiothoracic intensive care beds.

Sutherland Hospital provides level 2 adult ICU beds. Historically, at Sutherland the ICU and Coronary Care beds were combined. These units are now recognised as separate units and operate side by side.

Sydney Hospital has no ICU facilities. Sydney Children's Hospital provides a Paediatric/ Neonatal ICU and the Royal Hospital for Women has neonatal ICU beds.

The POW, St George, St Vincent's and St Luke's Private Hospitals provide intensive care beds, many of which are staffed by conjoint appointees from the public hospitals.

5.1 Overall bed availability

The number of beds available and / or unavailable⁹ at February 2000 is shown in Table 2.

Physical bed capacity in February 2000 for Intensive Care within SEH was 101 beds including adult level 3 & 2, specialty adult level 3, and paediatric.

Of that number there are 28 **general adult** Level 3 ICU beds and 4 Level 2 operational. There is physical capacity for another 8 beds for Level 3 and 2 beds for Level 2 if funding and staffing were available.

⁹ An available bed is a bed or treatment chair (e.g. Dialysis chair, endoscopy chair) which is immediately available to be used for treatment of admitted patients in a hospital or health Services, i.e. it is resourced with services and staff; and located in a suitable place for care. A bed is unavailable if it is temporarily not available for some reason, e.g. renovation, refurbishment, staff absences, temporary withdrawal of support services. (Source: DOHRS – Glossary of Activity Reporting Terms for 1998/99.)

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TABLE 2: SEH ICU BEDS FEBRUARY 2000

HOSPITAL	LEVEL 3 ADULT ICU		LEVEL 2 ADULT ICU		PAEDIATRIC/NEONATAL ICU	
	Available	Unavailable	Available	Unavailable	Available	Unavailable
St. George	10	5				
St George Cardiothoracic**	6					
St. Vincent's	7	2				
St. Vincent's Cardiothoracic	8 + 4*					
Prince Of Wales	11	1				
POW Cardiothoracic**	6	6				
Sutherland			4	2		
Sydney Children's					10 - 12	9 - 11
Royal for Women					10 L3, 24 L2	
Total	52	14	4	2	20	9

* The 4 refer to the transplant beds for transplant cases if the basic 8 beds are occupied.

** Cardiothoracic ICU beds number 6 at POW and 6 at St George. These beds are not staffed by intensivists to the Level 3 definition conditions met by St Vincent's.¹⁰

5.2 Activity

Activity within hospitals is usually obtained from the NSW Inpatients Statistics Collection (ISC). Unfortunately ICU inpatient episodes are not easily identifiable from the NSW ISC and alternate data sources are required to generate activity information. The following information was obtained by a survey of SEH ICUs in early 1999.

Table 3 indicates the numbers of admissions at each Unit. The timeframe is for the financial year 1997/1998. The POW Adult Intensive Care Unit (combined POW/PHH units) began on 22.12.97, the time frame provided for these data is for 1.1.98 until 30.9.98.

TABLE 3: NUMBERS OF ADMISSIONS SEH INTENSIVE CARE UNITS 1997/98

HOSPITAL	ADMISSION NUMBER
St. George	736 (9 beds)
POW	642 (11 beds)
St. Vincent's General	738 (8 beds)
St. Vincent's Cardiothoracic	1000 + 2 paediatric, (Short Term Admissions -Central Line insertion 250 & Bronchoscopy 50)
Sutherland	349 + 1 paediatric (Procedures: Plasmaphoresis 8 & Central Lines 50)
Sydney Children's	741 (Adult 16 > 15 years, Paediatric 568 & Neonates 157)
Royal for Women	640 paediatric patients 199 in Level 111Nursery 441 are acute admissions not step down from Level 3.

¹⁰ This report will include the St Vincent's Cardiothoracic ICU information collected via the survey. The survey did not collect information from the St George or POW Cardiothoracic units.

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Table 4 indicates the interventions required for respiratory support.

TABLE 4: INTERVENTIONS REQUIRED FOR RESPIRATORY SUPPORT

TYPE OF RESPIRATORY SUPPORT	ST. GEORGE	ST. VINCENT'S GEN	ST. VINCENT'S CARDIO	POW	Sutherland	SCH	RHW
Continuous Positive Airway Pressure	3.8%(face mask only)	4	20%	12% by mask alone 77.8% by tube	Approx. 50%	24	9
Non Invasive Ventilation	N/A	150	-	2.25% by mask	0%	26	0
Artificial Airway Intubation	78%		98%	69%	47%	395	N/A
Tracheotomy	8%		1%	18%	2.5%		
Positive Pressure Ventilation	77%	568	97%	80% via tube	40%	368	138

Table 5 indicates the incidence for ICP monitoring and Pulmonary Artery Catheter during 1997/98.

TABLE 5: PATIENT ACTIVITY

Hospital	ICP MONITORING	PULMONARY ARTERY CATHETER	PATIENTS VENTILATED
St. George	40 (5.4%)	57 (7.7%)	570 / 736 (77%)
St. Vincent's Gen.	Unknown		
St. Vincent's Cardio	Nil	150	
POWH	28	40	
Sutherland	0	21	
Sydney Children's	11		

There are various systems to score the severity of illness of ICU admissions. The systems and the mean and range of severity of illness are listed in Table 6.

TABLE 6: SEVERITY OF ILLNESS

HOSPITAL	SYSTEM	MEAN SEVERITY OF ILLNESS	RANGE OF SEVERITY OF ILLNESS
St. George	ANZICS Apache II Apache III SAPS available but review of APACHE 2 only is undertaken	15.2 (AP 2)	(0 – 49) AP 2
St. Vincent's Gen.	Apache	No figures	No figures
POW	Apache II Apache III SAPS SAPS 2	01.01.98 – 30.09.98 APACHE II 14.79	APACHE II 2 – 44 APACHE III 7 – 192 SAPS 2 - 98
Sutherland	APACHE 2 & 3 SAPS	1.1.97 – 31.12.97 Mean Apache Score 16.76	1.1.97 – 31.12.97 SD Apache Score 10.36
Sydney Children's	PIM PRISM III CRIB (Neonates)		
Royal For Women	Data collection criteria consistent with NICUS	N/A	N/A

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The St. Vincent's Cardiothoracic Unit does not use a system at present to score the severity of illness as APACHE II/III are not suitable for the patient base.

ANZICS data can provide a breakdown of the surgical and medical patients. The hospitals that utilise this database have indicated their details as presented in Table 7.

TABLE 7: ANZICS SURGICAL AND MEDICAL COMPONENTS

	ST. GEORGE	POWH	SUTHERLAND	SYDNEY CHILDREN'S
	Percentage of ANZICs		Number of Patients seen	
Surgical	48%	36%	151	327
Medical	52%	64%	205	408
Elective			81	245
Emergency			73	490

5.3 Refused admissions

The demand for Intensive Care Services is a composite of the numbers of patients within a Unit and those patients who were delayed or refused entry into the Unit. The ANZICS data collection provides refusal entry forms and a profile of this activity is presented in Table 8.

TABLE 8: REFUSED ADMISSIONS

HOSPITAL	Timeframe	NUMBERS	REASONS
St. George	Jul 1997 to Jul 1998	40	During this time also went 'over capacity' to 10,11 and 12 beds 72 times
St. Vincent's Gen	Has just commenced refused entry data May and June 1998	13.	The capacity of funded beds and staff shortages
St. Vincent's Cardio	Oct 1997 – June 1998	60	These are minimal as operating lists have been adjusted according to staff / bed availability.
POW	1.1.198 – 30.9.98	101	58 Capacity of funded beds 35 Staff shortages 8 Not medically indicated
Sutherland	Not collected		
Sydney Children's	Jul 97 / Jun 98	12	Staff Shortages
Royal For Women	Obstetric Admitting Officer is responsible for accepting or redirecting inutero referrals.	Unit record Maintained Data not available	Medical/surgical service not available Capacity of funded beds Staff shortages

5.4 Destination on discharge

Discharge destination outcomes and results are presented in Table 9.

TABLE 9: DISCHARGE DESTINATIONS

HOSPITAL	DESTINATION
St. George	N/A
St. Vincent's Gen.	646 same hospital acute ward, 1 another hospital in SEH, 7 to private hospitals, 20 to another AHS.
St. Vincent's Cardio	99% are discharged to the same hospital acute wards (cardiac step-down or coronary care unit). Some are transferred to the private hospital on campus.
POW	92 transferred to same hospital, 7 to another hospital in SEH and 16 to another AHS.
Sutherland	184 same hospital high dependency 97 acute ward 9 another hospital within SEH 3 another AHS 24 Private / home
Sydney Children's	40 Same hospital high dependency bed 488 same hospital acute ward 20 another hospital within SEH 118 to another AHS
Royal For Women	48 transferred to another hospital within SEH 51 to other AHS non tertiary nurseries

As would be expected, the majority of patients are discharged to the surgical high dependency units or other acute wards at the same hospital. However, there were 84 transfers of patients between hospitals within SEH and to other Area Health Services in 1999. Some of these patients may have been transferred from other Areas due to lack of ICU beds and were being returned to their own Areas of residence.

These data (in conjunction with information from other Area Health Services) suggest a need for another 2 general adult intensive care beds in South East Health. There is likely to be an enhancement of 11 beds across the metropolitan area in the near future.

It is also understood that there is a recommendation in the State Plan for Neonatal ICUs for another Level 3 bed at the Royal Hospital for Women.

Recommendations:

- 1) That South East Health ICU bed numbers be increased by two in the area of General Adult Intensive Care.*
- 2) That SEH residents requiring ICU admissions be managed in the Area and transfer of residents out of the Area be avoided; or that they be transferred only as a last resort.*
- 3) That the each ICU collect 'refused admission' data in a standardised format to provide accurate information of the demand for ICU services.*

5.5 Quaternary services

“Quaternary” ICU services are provided at four sites. The POW Adult ICU provides for Hyperbaric Management and the Spinal Injuries Unit and subsequently has a longer average length of stay than the other two adult ICUs. The Sydney Children’s Hospital ICU can provide neonatal surgery, high frequency ventilation, paediatric cardiac, neuro and subspecialty surgery, plasmapheresis and hyperbaric chamber management.

At St. Vincent’s the Cardiothoracic ICU provides for heart, heart-lung and lung transplantations, heart failure surgery (transmyocardial laser revascularisation, cardiomyoplasty, L.V.A.D. insertion) and support of critically ill patients pre transplant. It also serves respiratory failure surgery (lung volume reduction and laser bronchoscopy) post cardiothoracic surgery care and the management of acute problems requiring cardiothoracic surgery. The POWH Cardiothoracic ICU is capable of providing all levels of support except transplantation and myocardial laser care.

6 Integrated bed management

In line with the NSW Department of Health’s 1996 *Metropolitan Critical Care Plan* the capacity of metropolitan Intensive Care Units impacts on Emergency Departments for bed access block, medical retrieval and trauma services.

As the ICU supports the trauma, major surgery and complex medical specialties it is felt that a more formalised system is required to define the responsibility for the patient flow through all hospital departments in all South East Health hospitals. The ICU unit is not an isolated unit within the hospital. If there is any pressure on ICU beds it will impact on the transfers from the Emergency Department and postoperative patients. Bed management requires a degree of flexibility, and exit block from ICU may relate to admissions and discharges not only from the High Dependency Unit (HDU), but also from any ward within the hospital. The increased need for integrated bed management, to accommodate increased emergency demand as well as elective work, is most noticeable during the winter months.

Recommendation:

4) That the ICU management is involved in hospital wide or Area integrated bed management strategies.

7 High Dependency Units

The Faculty of Intensive Care, Australian & New Zealand College of Anaesthetists' definition of High Dependency Units¹¹ states that the HDU is a specially staffed and equipped, self contained section of an intensive care complex for the management of patients with potentially life threatening conditions.

High dependency beds in South East Health are available at:

St. George Hospital	Subspecialty surgical, ICU has no input into management.
Sydney Children's Hospital	Neonatal surgical and medical beds.
POW Adult	Subspecialty is neuroscience – four beds in another building. The Adult ICU clinicians do not have admitting rights.
St. Vincent's Hospital	There is no HDU.
Sutherland Hospital	There are four funded surgical HDU beds. HDU beds are considered a high priority for inclusion in the hospital's new facilities.
Royal Hospital for Women	Acute Care Centre with five beds which do not have ventilators.
Sydney/Sydney Eye Hospital	There are four HDU beds, located on the medical ward.

There is no ICU at Sydney/Sydney Eye Hospital. The high dependency beds are staffed by nurses who have ICU experience. The Acute Care Centre at the Royal for Women is for more intensive nursing care rather than medical care.

The South East Health survey findings indicate that the various HDUs are run independently of the ICUs. There are no dedicated Directors for the HDUs and no dedicated medical staff, though for some there is consultative intensivist review available.

The Faculty of Intensive Care is developing minimum standards for HDUs. These standards address various issues such as the HDU being operationally linked to the ICU in that hospital and standards for medical cover, nursing cover and the need for defined admission, discharge and referral policies as well as formal audits of activities and

¹¹ Faculty of Intensive Care, Australian & New Zealand College of Anaesthetists : Minimum Standards for High Dependency Units DRAFT ic-13 (1999)

outcomes. The Subcommittee feels very strongly that the issue of High Dependency Beds should be addressed formally in South East Health.¹²

A member of the Intensive Care Subcommittee is a representative on the NSW Department of Health Working Group for Intensive Care Strategic Directions. The draft document¹³ developed by this working group is currently being circulated for consultation and the SEH Intensive Care Subcommittee endorses these recommendations.

Recommendations:

5) That there be an organisational review of the High Dependency Units (and surgical ICUs) within SEH with an aim to coordinate service delivery with the Intensive Care services.

6) That High Dependency Units be incorporated administratively under the ICU in accordance with the standards.

7) That High Dependency Units have data collections, clinical indicators and formal audit processes in place.

¹² Havill, J.H *The High Dependency Unit: Role and Management*, Australasian Anaesthesia, Australian and New Zealand College of Anaesthetists, 1998 pp.57 -64.

¹³ NSW Health Department, *Draft Intensive Care Strategic Directions – A Framework for the NSW Health System*

8 Intensive Care Unit Standards

8.1 Staffing and Workforce Standards

The *NSW Intensive Care Services Survey – A Basis for Review*⁵ summarised criteria for the intensive care units workforce requirements in NSW as detailed in the Guide to the Role Delineation for Health Services.¹⁴ The medical and nursing staffing levels for the Intensive Care Units in SEH for October 1998 are detailed below. SEH meets the requirements that all ICU medical and nursing managers have specialist qualifications.

8.1.1 Medical Staffing

TABLE 10: MEDICAL FTE STAFFING IN FEBRUARY 2000

HOSPITAL	STAFF SPEC.	REGISTRAR	RMO	TOTAL MEDICAL	STAFF SPEC ONCALL ICU	STAFF SPEC. ONCALL NON ICU
St. George	4.5	6	3	13.5	1:2	
St. Vincent's Gen.	2*	4	3	9	1:3	
St. Vincent's Cardio	1.8	1	3	5.8	1:4	1.2
POW	3.5*	5	5	13.5	1:3	1:3
Sutherland*	1.6	0.15	0.5	2.25	1:2 (1:3)	
Sydney Children's	3.5	9	0	12.5	1:4	
Royal For Women	2.5	6	3	11.5		

* Four by 0.5 staff specialists at St. Vincent's

* VMOs and part time staff specialists

* Sutherland has a 0.2 FTE for VMO with 1:6 oncall commitment.

All hospitals have a full time Director of the ICUs. The qualifications of Directors and staff specialists are detailed in Table 11.

TABLE 11: QUALIFICATIONS OF SENIOR MEDICAL STAFF

HOSPITAL	DIRECTOR	STAFF SPECIALISTS
St. George	FANZCA, FFICANZCA	FFICANZCA FRACP ICU x2 FRCA – NSQAC ICU
St. Vincent's Gen.	FRACP, FFARACS	FRACP FFICANZA FFICANZA x2
St. Vincent's Cardio	FFICANZA, FANZCA, MHP.Ed	B.SC. FANZCA FANZCA x2
POW	FFICANZA, FANZCA	FANZCA x 3.5 FFICANZCA x 3.5
Sutherland	FRACP, MRCP (UK), MRCPI	FFICANZCA FANZCA x2
Sydney Children's	FRACP	FRACP x 4
Royal For Women	FRACP	FRACP x 2

¹⁴ NSW Department of Health, *Guide to the Role Delineation of Health Services, Service Development Branch, June 1991 updated November 1992*

ICU Service Development Plan

Survey findings revealed that all staff have appropriate qualifications. However, there appears to be some discrepancies within the definition of FTE (Full Time Equivalent). There appear to be different staffing ratios between the hospitals as well as differences in the separation of clinical time and on call commitments.

These issues have been discussed at various forums and the AMWAC Report¹⁵ suggested that a 1:4 on call commitment is reasonable. This has been supported by the NSW Department of Health Working Group for the NSW Intensive Care Strategic Directions. It should be noted in SEH that some of the on call commitments relate to areas outside the ICU.

Recommendations:

8) That the Intensive Care Subcommittee explore the definition of FTE for medical staff and on call commitments within the ICU setting and present findings to the Critical Care Committee for discussion.

9) That any deficits in staffing across the Area be rectified over time.

8.1.2 Nursing Staff

The Intensive Care Subcommittee has developed a report on *SEH Intensive Care Nursing Management and Educational Standards*.¹⁶ This report addressed issues such as the differences in nursing structures within the ICUs and also the high turn over of Intensive Care nursing staff. The recommendations (Appendix 3) address the management structure and priorities for education in an effort to promote the recruitment and retention of nursing staff within this specialised field.

TABLE 12: NURSING FTE STAFFING IN FEBRUARY 2000

NURSING CATEGORY	ST. GEORGE	ST. VINCENT'S GEN.	ST. VINCENT'S CARDIO	POW	SUTHERLAND	SYDNEY CHILDREN'S	ROYAL FOR WOMEN
SNM:	1	1	0	0	0	1	1
NUM:	2	0	1	1	1	1	1
CNC	0	0	0	1	0	0	1
CNS	8.5	9	14	19.24	6.8	19	18
RN	49.5	30.81	15	40.78	24.54	39	32
EN / AIN	0	0		0	0	4	3
NEd.	1	1	1	1	1	1	1
Total Nursing	60.25	41.8****	31*	61.02**	38.9***	65	57

* There are 8 vacant positions **There are 8 vacant positions ***Includes ICU/CCU **** There are 2 vacancies

¹⁵ Australian Medical Workforce Advisory Committee (1998), *The Intensive Care Workforce in Australia*, AMWAC Report, 1998 Sydney.

¹⁶ 1998 Intensive Care Sub Committee of Area Critical Care Committee, *SEH Intensive Care Nursing Management and Educational Standards*.

The “*A Basis for Review*” principles guiding ICU services highlight four recommendations relating to staffing and education. Implementing the recommendations contained in the *SEH Intensive Care Nursing Management and Educational Standards* will address some of these points. However, there may be a need to determine if the staffing numbers are adequate for the size and acuity of each unit and that these staff are appropriately qualified and experienced. There are some settings in which a ratio of nurse to patient of one to one may not be necessary.

Recommendation:

10) That the Intensive Care Subcommittee endorse the recommendations from the SEH Intensive Care Nursing Management and Educational Standards and begin their implementation.

8.2 Intensive Care Equipment

A survey of ICU Biomedical Engineering resources has been undertaken and an initial analysis indicates that the current biomedical services are inequitable.

Historically many items of equipment were replaced through private donations and this avenue for revenue is decreasing. In addition little allowance has been made for provision of regular maintenance. The technology utilised within the ICU may impact on a patients length of stay if it is not well maintained and up to date.

Recommendation:

11) That the Biomedical Services for ICUs be reviewed across South East Health and the service upgraded.

12) That South East Health facilities develop a plan for the repair, maintenance and replacement of intensive care equipment.

8.3 Data Collection

It is anticipated that all hospitals will be providing data to the ANZICS data collection from January 2000. St. Vincent’s General ICU is currently working on improving its database to align with the other ICUs who have been providing information to the ANZICS database. St. Vincent’s Cardiothoracic Unit does not provide data to the ANZICS database (ICON database not suited to cardiothoracic) although it is currently developing a database, which includes some of the ANZICS items. The Royal Hospital for Women and Sydney Children’s provide information to their respective age range databases.

The introduction of the Year 2000 compliant 'AORTIC' Database will replace the DOS based ICON database. This development has had many teething problems however the new version is imminent. NSW Department of Health is currently funding the development of the AORTIC Database. The POWH is also developing an internal database that is being supported by Trust Funds from the hospital.

TABLE 13: CLINICAL DATABASES

CLINICAL DATABASE	POW/PH	ST. GEORGE	ST. VINCENT'S GENERAL	ROYAL FOR WOMEN	SYDNEY CHILDREN'S HOSPITAL	SUTHERLAND
ANZICS	ANZICS	ANZICS	ANZICS			ANZICS
Other Computerised Database	POW A.I.C.U			NSW NICUS ANZNN	NICUS ANZNN ANZPIC	

It is acknowledged that there have been difficulties with some data collection. The data collection for interventions and scorings are required to be consistent to facilitate planning and benchmarking. The development of a minimum data set for SEH will require a close working relationship between the ICUs and the Information Technology Services. Access to Information Technology Services has been limited and the Intensive Care Subcommittee will consider methods for improving communication.

Recommendations:

- 13) That the Intensive Care Subcommittee continue to explore the development of a minimum data set.*
- 14) That the Area support the development of an Area ICU database.*
- 15) That a data manager be employed for each ICU.*
- 16) That the Intensive Care Subcommittee consider methods for improving communication with IT services.*

9 Private Hospital Intensive Care Services

There has been a loss of private patients from the public hospital intensive care system in recent years. This may be partly explained by the decrease in private health insurance but it is probably more likely related to the increase in private intensive care beds across the Area.

Intensive Care Services are located at the POW, St George, St Vincent's and St Luke's Private Hospitals. Three of these hospitals are collocated with the public hospitals and many are staffed by conjoint appointees.

10 Quality Services

The NSW Department of Health document *A Framework for Managing Quality of Health Services in NSW*¹⁷ is under discussion by the Intensive Care Subcommittee.

The SEH Area Quality Council has developed a Quality Improvement Framework. It is anticipated that all services in the Area will follow the directive that services demonstrate use of a formal evaluation system e.g. ACHS accreditation, that they will participate in use of better practice guidelines and contribute to and review safety and appropriateness databases.

All units have an ICU Quality Management Committee or ICU Quality Management is a component of other committees. These committees meet on a fortnightly or monthly basis. Clinical staff throughout the units are involved in review of mortality, admissions/discharges and critical incidents and there is also a multidisciplinary senior staff meeting for quality activities in most hospitals.

There are four Clinical Indicators released for Intensive Care by the Australian Council on Health Care Standards¹⁸:

- Utilisation of patient assessment systems:
 - participation in National Patient Database and Intensive Care Registry.
- Utilisation of Intensive Care Resources:
 - Inability to admit into an intensive care unit.
- Intensive Care patient management:
 - Unplanned re-admission into an intensive care unit, up to (and including) forty eight hours post discharge from the intensive care unit and
- Complications of Treatment:-
 - Pneumothorax following attempted and actual central venous catheterisation within an intensive care unit
 - Accidental extubation of an intensive care patient.

Discussion has been held by the Intensive Care Subcommittee regarding the feasibility of an Area wide data form (minimum data set) that may enable the centralised collections of these indicators.

Recommendation:

17) That the Intensive Care Subcommittee explore the feasibility of designing an Area wide data form to assist in the monitoring of the ACHS Clinical Indicators.

¹⁷ NSW Department of Health, *A Framework for Managing the Quality of Health Service in NSW, 1999.*

¹⁸ ACHS, *Care Evaluation program, Clinical Indicators – A users' manual: Intensive Care Indicators Version 1, 1999.*

11 Networking and Flows

Networking between Units has been covered in Section 7.3 'destination on discharge'. It has been difficult to obtain valid data concerning the area of residence of the patients admitted to the Intensive Care Units.

The principles guiding ICU services as detailed in *A Basis for Review* highlight that interfacility transfers of the critically ill should only occur when clinically necessary and should be the last resort for managing beds. The survey findings indicated that there were 84 transfers between hospitals within SEH and to other AHS in the stated timeframe. It did not, however, state how many of these transfers were to another ICU within SEH.

The *Metropolitan Critical Care Plan* established the links between the rural areas and the metropolitan ICUs. The Medical Retrieval Unit is the state-coordinating centre for the ICU bed availability. However, in the event of a default situation i.e. no ICU beds available the receiving or linked hospital with that rural Area has the responsibility for finding a bed for that patient. This is generally coordinated via the 'On call Retrieval Consultant.'

Recommendation:

18) That the Critical Care Committee provide the venue for discussion of problems and ideas for further cooperation with rural areas.

12 Education and Research

The role of the principal referral and teaching hospitals is to provide education and training for the various disciplines involved in health. The Intensive Care Subcommittee expressed concern that there was limited support for teaching and research beyond that provided by local medical and nursing goodwill, with dedicated funding mostly coming from external sources such as the NH&MRC.

12.1 Education

Each Unit provides accredited medical training programs and a variety of postgraduate training programs for nursing education as listed in Appendix 4. The decrease in numbers of private patients has become a concern as traditionally much of the retained revenue funds were used to buy new equipment and to support staff in attending conferences. The decrease in private patients has meant a decrease in this type of revenue.

Recommendation:

19) That the important role of education be emphasised and that arrangements are in place at each Unit to provide access for all staff to ongoing education, inservice and research opportunities.

12.2 Research Supports

In its *Corporate Directions* statement South East Health established its commitment to research. The Area has established a Research Committee that has agreed to principles for further research development in the Area. These principles acknowledge that research is an integral component of the business of the Area Health Service. SEH is committed to continuation of research in established priority areas and for research in issues identified as important to the population of SEH and to the Statewide Services provided by the Area.

The Intensive Care Subcommittee highlighted problems relating to the distribution of income from multicentre trials carried out in the ICUs. The committee would like to ensure that these funds go to the units participating in the trials rather than to consolidated hospital revenue.

Recommendation:

20) That the important role of research within ICU services be acknowledged.

21) That the development of Intra area cooperative research projects be explored.

13 Funding

The allocation of funds to the ICUs varies for each hospital. Some hospitals provide a dedicated budget, other hospitals do not. The 'cost' of a freestanding tertiary intensive care 'bed' in South East Health is approximately \$600,000 per year, with a marginal increase required of approximately \$450,000.

Recommendation:

22) That ICU medical and nursing managers are provided with appropriate budget information to allow them to manage the Unit budget.

14 Conclusion

The twenty two recommendations outlined in this Service Development Plan will provide direction for a coordinated approach to the further development of intensive services within South East Health.

Appendix 1

Principles Guiding Intensive Care Unit Services

The *NSW Intensive Care Service Survey – A Basis for Review* detailed a number of recommendations for further exploration. These were that:

1. The NSW Department of Health, in collaboration with the NSW Critical Care Advisory Committee develop a set of guidelines and recommendations to assist with determining service requirements on a Statewide and regional basis.
2. There be no further reduction in intensive care beds in any Area Health Service
3. The classification of intensive care bed types be aligned by the NSW Health, National Data Dictionary, Australian and New Zealand College of Anaesthetists – Faculty of Intensive Care and Australia and New Zealand Intensive care Society to allow comparative assessment and planning.
4. A standardised refusal of admission form be developed and adopted by all units to enable collection and measurement of unmet need.
5. The Australian and New Zealand College of Anaesthetists - Faculty of Intensive Care Minimum Standards be applied to all intensive care units.
6. All intensive care units have appropriately qualified and experienced nursing and medical staff. These numbers should allow flexibility for further education, leave and protected non-clinical time for nursing and medical managers.
7. All units in the Area Health Service have access to a clinical educator and ongoing education to provided to all nursing and medical staff.
8. Current strategies to increase the recruitment and retention of critical nursing and medical staff are continued and further innovations are explored.
9. Determination of adequate staffing numbers take into consideration the variable and unpredictable activity of intensive care units and the requirement for flexibility.
10. All NSW intensive care units submit data to ANZICS for confidential reports of unit performance as part of their audit and review process.
11. Tertiary referral centers investigate the feasibility of setting up a high dependency area in addition to current intensive care units.
12. High dependency units are closely related to the intensive care unit to provide coordinated care aimed to optimise patient management and use of resources.
13. Hospitals and units explore the option of the intensive care director administering the high dependency unit to better provide a continuum of care to the critically ill patient.
14. Management and planning of intensive care beds within Area Health Service should follow the guidelines of the Metropolitan Critical care Plan.
15. Each metropolitan Area Health Service is ultimately responsible for meeting the intensive care needs, superspecialty services withstanding, of that Area, with the additional responsibility for their linked rural Area Health Service. The Area Critical Care Committee would be best to determine how to provide for this.
16. The Area performance agreement should reflect these responsibilities.
17. Interfacility transfers of the critically ill should only occur when clinically necessary. Decisions must take into account advantages of transfer to an expert facility relative to the facilities within the sending hospital and the risks inherent in the transfer process. This should only be a last resort when managing beds at a State level.

Appendix 2

Levels of Intensive Care Units

Minimum Standards for Intensive Care Units, Faculty of Intensive Care Australian and New Zealand College of Anaesthetists

The level of intensive care available should support the delineated role of the particular hospital. The role of a particular ICU will vary, depending on the staffing, facilities and support services as well as the type and number of patients it has to manage.

Level 3 Adult Intensive Care Unit

A Level 3 ICU is a tertiary referral unit for intensive care patients and should be capable of providing the highest level of care including complex multi system life support for an indefinite period. It must be capable of providing mechanical ventilation, extra-corporeal renal support services and invasive cardiovascular monitoring for an indefinite period. It should have extensive back up laboratory and clinical service facilities. All patients admitted to the Unit must be referred for management to the attending intensive care specialist.

Level 2 Adult Intensive Care Unit

A Level 2 ICU should be capable of providing a high standard of general intensive care including complex multi system life support which supports the hospitals other delineated roles e.g. general medicine, surgery, trauma management, neurosurgery, vascular surgery etc. It should be capable of providing mechanical ventilation, extra-corporeal renal support services and invasive cardiovascular monitoring for at least several days. All patients admitted to the Unit must be referred for management to the attending intensive care specialist.

Level 1 Adult Intensive Care Unit

A Level 1 ICU should be capable of providing immediate resuscitative management for the critically ill, short term cardio-respiratory support and have a major role in monitoring and prevention of complications in “at risk” medical and surgical patients. It must be capable of providing mechanical ventilation and simple invasive cardiovascular monitoring for a period of at least several hours.

Paediatric Intensive Care Unit

A Paediatric Intensive Care Unit must be a separate area in the hospital capable of providing complex multi-system life support for an indefinite period. It should have easy access to the emergency department, operating theatres and organ imaging. It must be capable of providing mechanical ventilation, extra-corporeal renal support services and invasive cardiovascular monitoring for an indefinite period to infants and children less than 16 years of age. It must be a tertiary referral centre for children needing intensive care and extensive back up laboratory and clinical service facilities to support this tertiary role. All patients admitted to the Unit must be referred for management to the attending intensive care specialist.

Appendix 3

Recommendations:

SEH Intensive Care Nursing Management and Educational Standards Report, March 1998.

Management (listed in order of priority)

- 1) That there be a management structure for ICU's that is consistent throughout the SEH. Based on existing management structures in similar specialties with comparable staff numbers and administrative functions, it is proposed that the nurse manger position be no less that that of NM level 4 for a level 6 tertiary hospital.
- 2) That in each ICU there should be a supernumerary team leader available for each shift. This position would provide clinical support and assistance with managerial duties while providing a stream for professional development.
- 3) That each unit should have a technical officer or Registered Nurse position responsible for equipment.
- 4) That clerical Support should be available Monday to Friday and on the weekends.
- 5) That there should be 24-hour Social Worker cover to assist in the management of acute problems that frequently arise with critically ill patients and relatives.
- 6) That the feasibility of coordinating a pool of Intensive Care nurses to cover sick leave and periods of high activity be investigated at an area level. Regular assessments and appropriate education should also be implemented to ensure these staff are able to provide a safe and effective level of care for Intensive Care patients.

Education (listed in order of priority)

- 1) That to optimise the new graduates educational experience and reduce the demands for clinical support new graduates should not be placed in ICU until their last rotation of the transition programme.
- 2) That introductory or extended Intensive Care orientation courses be available to each unit on an ongoing basis. These courses are an essential feature of intensive care education and should occur at a frequency that is able to meet the demands of the individual units. Based on current experience these courses should be run a minimum of 3 times per year with additional courses run according to demand.
- 3) That the cost of supporting supernumerary days, personnel, and the formal educational programme should be fully identified and built into the units' Education budgets.
- 4) That study leave should be readily available for relevant postgraduate courses and conference / seminars so that staff can maintain standards of professional development and clinical competence in this specialty area of nursing. This addresses the pressing need to establish and maintain an appropriate number of experienced and qualified intensive care nurses.

Appendix 4:

Accredited medical training programs

St. George

- F.R.A.C.P.
- F.A.N.Z.C.A.
- F.R.C.E.M.
- F.R.A.C.P.
- F.I.C.A.N.Z.C.A.

St. Vincent's Cardiothoracic

- F.A.N.Z.C.A. Anaesthetic Training program
- F.F.A.C.S. Cardiothoracic Surgery Training program
- F.R.A.C.P. Respiratory Medicine Training program
- F.R.A.C.P. Cardiology Training program
- F.R.I.C.A.N.Z.A. Optional Year

St. Vincent's General

- FANZCA
- FICANZCA
- FRAZP

Sydney Children's Hospital

- RACP 12 months neonatal
- RACP Paediatric Core and post Basic

POWH

- F.I.C.A.N.Z.C.A. Weekly equipment tutorials and clinical tutorials
- Accredited to train RMOs by Post Grad committee medicine

Sutherland

- FRACP-basic program

Royal Hospital for Women

- Accredited Perinatal – neonatal advance training programs with Royal Australasian College of Physicians. Last site visit by training committee 28 / 10 /98.

Postgraduate training programs for nursing

St. George

- New Graduate RN's Rotation
- Grad Diploma Students in Critical Care UTS / Sydney

St. Vincent's Cardiothoracic

- Post Graduate Diploma of Cardiothoracic Nursing (Australian Catholic University)
- Postgraduate Diploma of Intensive Care Nursing.

St. Vincent's General

- Post Graduate Certificate / Diploma of Intensive Care Nursing (Australian Catholic University)

POWH

- Affiliation with the University of Sydney
- Master in Critical Care Nursing (Intensive Care)
- College of Nursing Course. Grad Certificate (2 places / year)

Sydney Children's Hospital

- Paediatric Intensive Care Course (College of Nursing)
- Neonatal Intensive Care Course (College of Nursing)

Royal Hospital for Women

- Perinatal Intensive Care Courses at NSW College of Nursing
- Internal Postgraduate Course for new graduates
OPSCA for graduates.