PROSPECTUS
PUTTING STRATEGY TO WORK

Towards Excellence in Critical Care

REVIEW OF ADULT CRITICAL CARE SERVICES IN THE REPUBLIC OF IRELAND

APPENDICES

to

FINAL REPORT

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PROSPECTUS
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APPENDIX A

Bibliography

Ackerman M H, Norsen L, Martin B, Wiedrich J, Kitzman H J. *"Development of a model of advanced practice."* AJCC, 5: 68-73, 1996

Adam S, Osborne S. *"Critical Care Nursing, Science and Practice."* Oxford Medical Publications, pg. 7, 2000

Aitkenhead A R, Willis M I, Barnes W H. *"An economical mobile intensive care unit."* BMJ, 280: 1219-2, 1980

Ambrosino N, Porta R. *"Rehabilitation and acute exacerbations of chronic obstructive pulmonary disease."* In: Siafakas N M, Anthonisen N R, Georgopoulos D. *"Acute exacerbations of chronic obstructive pulmonary disease."* New York: Marcel Dekker 507–530, 2004

American College of Critical Care Medicine. *"Critical care delivery in the intensive care unit: Defining clinical roles and the best practice model."* Crit Care Med 29: 2007–2019, 2001

American Nurses Association. *"Working definition: nurses in advanced practice."* Approved by ANA Congress of Nursing Practice. February 28, 1992

Association of Anaesthetists of Great Britain and Ireland. *"Recommendations for standards of monitoring during anaesthesia and recovery."* Rev ed. London: The Association, 1994

Baggs J G, Ryan S A, Phelps C E, Richeson F, Johnson J E. *"The association between inter-disciplinary collaboration and patient outcomes in medical intensive care."* Heart Lung, 21: 18-24, 1992

Baggs J G. *"Development of an instrument to measure collaboration and satisfaction about care decisions."* J Adv Nurse, 20: 176-182, 1994

Baldinger S L, Chow M S, Gannon R H, Kelly E T. *"3rd Cost savings from having a clinical pharmacist work part-time in a medical intensive care unit."* Am J Health Syst Pharm, 54: 2811-2814, 1997

Baldock G, Foley P, Brett S. *"The impact of organisational change on outcome in an intensive care unit in the United Kingdom."* Intensive Care Med 27: 865-872, 2001

Ball C, Cox C L. *"Part two: the core components of legitimate influence and the conditions that constrain or facilitate advanced nursing practice in adult critical care."* International Journal of Nursing Practice 10: 10–20, 2004

Ball C, Kirkby M, S Williams. *"Effect of the critical care outreach team on patient survival to discharge from hospital and readmission to critical care: non-randomised population based study."* BMJ 327: 1014, 2003

Baudouin S, Blumenthal S, Cooper B, Davidson A, Davidson C, Elliot M, Kinnear W, Paton R, Sawicka E, Turner L. *"BTS Guideline: Non-invasive ventilation in acute respiratory failure."* Thorax, 57: 192-211, 2002

Beattie J, Calpin-Davies P. *"Workforce dilemmas: a comparison of staffing in a generalist and a specialist ICU."* Intensive and Critical Care Nursing 15: 52– 57, 1999

Bedell S E, Deitz D C, Leeman D, Delbanco T L. *"Incidence and characteristics of preventable iatrogenic cardiac arrest."* JAMA 265, 2815-2820, 1991

Bellingan G, Olivier T, Batson S, Webb A. *"Comparison of a specialist retrieval team with current United Kingdom practice for the transport of critically ill patients."* Intensive Care Med, 26: 740–4, 2000

Bellomo R, Goldsmith D, Uchino S, Buckmaster J, Hart G, Opdam H, Silvester W, Doolan L, Gutteridge G. *"Prospective controlled trail of the effect of the emergency team on post-operative morbidity and mortality rates."* Critical Care Medicine, 32(4): 916-921, 2004

Bernard S A, Gray T W, Buist M D, Jones B, Silvester W, Gutteridge G, Smith K. *"Treatment of comatose survivors of out-of-hospital cardiac arrest with induced hypothermia."* N Engl J Med, 346: 557-563, 2002

Bion J F, Wilson I H, Taylor P A. *"Transporting critically ill patients by ambulance: audit by sickness scoring."* BMJ, 296: 170, 1988

Bloomfield E L, Divertie G D, Burgier C D, Larson J S, Brown D R, Patel B M, Rady M Y, Johnson M M, Murray M J. *"A comparison of intensive care unit physician staffing costs at the 3 Mayo clinic sites."* Mayo Clinic Proceedings: 81(11): 1457-61, 2006

Bond C A, Raehl C L. *"Clinical pharmacy services, pharmacy staffing, and hospital mortality rates."* Pharmacotherapy, 27: 481-493, 2007

Borlase B C, Baxter J K, Kennedy P R, Forse R A, Benotti P N, Blackburn G L. *"Elective intrahospital admissions versus acute interhospital transfers to a surgical intensive care unit: cost and outcome prediction."* J Trauma, 31; 915-8, 1991

Bristow P J, Hillman K M, Chey T, Daffurn K, Jacques T C, Norman S L, Bishop G F, Simmons E G. *"Rates of in-hospital arrests, deaths and intensive care admissions: the effect of a medical emergency team."* MJA 173: 236-240, 2000

Brook A, Ahrens T, Schaiff R, Prentice D, Sherman G, Shannon W, Kollef M. *"Effect of a nursing-implemented sedation protocol on the duration of mechanical ventilation."* Crit Care Med, 27(12): 2609-15, 1999

Brown J J, Sullivan G. *"Effect on ICU mortality of a full-time critical care specialist."* Chest 96: 127-129, 1989

Buist M D, Moore G E, Bernard S A, Waxman B P, Anderson J N, Nguyen T V. *"Effects of a medical emergency team on reduction of incidence of and mortality from unexpected cardiac arrests in hospital."* BMJ May 18, 324 (7347): 1215, 2002

Bumroongkit C, Liwsrisakun C, Deesomchok A, Theerakittikul T, Pothirat C. *"Efficacy of weaning protocol in medical intensive care unit of tertiary care centre."* J Med Assoc Thai, 88(1): 52-57, 2005

Burney R E, Fisher R P. *"Ground versus air transport of trauma victims: medical and logistical considerations."* Ann Emerg Med, 15: 1491-1497, 1986

Burns S M, Earven S. *"Improving outcomes for mechanically ventilated medical intensive care unit patients using advanced practice nurses: a 6-year experience."* Crit Care Nursing Clinics of North America, 14: 231-243, 2002

Callahan M. *"The advanced practice nurse in an acute care setting."* Nursing Clinics of North America, 31: 487-93, 1996

Canadian Critical Care Society. *"Duties of an Intensivist and the Practice of Critical Care Medicine."* Canadian Critical Care Society, Canada, 2008

Carl L. *"Nursing criteria for trauma center site review."* J Emerg Nurs, 9: 74-77, 1983

Carlson R W, Weiland D E , Srivathsan K. *"Does a full-time 24 hour Intensivist improve care and efficiency?"* Critical Care Clin 12(3): 525-551, 1996

Carson S S, Stocking C, Podsadecki T, Christenson J, Pohlman A, MacRae S, Jordan J, Humphrey H, Siegler M, Hall J. *"Effects of organisational change in the medical intensive care unit of a teaching hospital: A comparison of open and closed formats."* JAMA 276: 322-328, 1996

Casaburi R. *"Deconditioning."* In: Fishman A P. *"Pulmonary rehabilitation."* New York: Marcel Dekker 213–230, 1996

Chalfin D, Trzeciak S, Likourezos A, Baumann B M, Dellinger R P. *"Impact of delayed transfer of critically ill patients from the emergency department to the intensive care unit."* Crit Care Med, 35: 1477-83, 2007

Chang A. *"Perceived functions and usefulness of health service support workers."* Journal of Advanced Nursing 21: 64-74, 1995

Charles R, Marsh B, Carton E, Power M, Motherway C, Claffey L, Crowley K, Donnelly M, O'Hare B, O'Leary E, Ryan T. *"Accessibility of intensive care facilities in Ireland to critically ill patients."* Irish Medical Journal, 95: 72, 2002

Cohen I L, Bari N, Strosberg M A, Weinberg P F, Wacksman R M, Millstein B H, Fein I A. *"Reduction of duration and cost of mechanical ventilation in an intensive care unit by use of a ventilator management team."* Crit Care Med 19: 1278-1284, 1991

Coser R L. *"Authority and decision-making in a hospital."* Am Sociol Rev, 23: 56-67, 1958

Cowley R A. *"The resuscitation and stabilization of major multiple trauma patients in a trauma center environment."* Clin Med, 83: 16-22, 1976

Critical Care Stakeholder Forum. *"Quality Critical Care - Beyond Comprehensive Critical Care."* Department of Health, UK, 2005

Department of Health & Children. *"Report of the National Task Force on Medical Staffing."* Department of Health & Children, Ireland, 2003

Department of Health & Children. *"Acute Hospital Bed Capacity – A National Review. (Bed Capacity Report)"* Department of Health & Children, Ireland, 2002

Department of Health & Children. *"Current and Future Supply and Demand Conditions in the Labour Market for Certain Professional Therapists (The Bacon Report)."* Department of Health & Children, Ireland, 2001

Department of Health. *"Comprehensive Critical Care - A Review of Adult Critical Care Services."* Department of Health, UK, 2000

Department of Health. *"Publication of January 2001 census of adult critical care (intensive care and high dependency) provision."* Department of Health, UK, 2001

Department of Health. *"The Nursing Contribution to the provision of Comprehensive Critical Care for Adults: A Strategic Programme of Action."* Department of Health, UK, 2001

Department of Health. *"The National Outreach Report – Critical Care Outreach 2003: progress in developing services."* The Department of Health, UK, 2003

Depasse B, Pauwels D, Somers Y, Vincent J-L. *"A profile of European ICU nursing."* Intensive Care Med, 24: 939-945, 1998

DeVita M, Bellomo R. *"Findings of the First Consensus Conference on Medical Emergency Teams."* Crit Care Med 34: 2463-2478, 2006

Dimick J B, Pronovost P J, Heitmiller R F, Lipsett P A. *"Intensive care unit physician staffing is associated with decreased length of stay, hospital cost, and complications after esophageal resection."* Crit Care Med 29 (4): 753-758, 2001

Dowdy M D, Robertson C, Bander J A. *"A study of proactive ethics consultation for critically and terminally ill patients with extended lengths of stay."* Crit Care Med 26: 252–259, 1998

Dracup K, DeBusk R F, De Mots H, Gaile E H, Morton J B, Rudy E B. *"Task force 3: Partnerships in delivery of cardiovascular care."* JACC, 24: 296-304, 1994

Eastern Region Health Authority. *"Review of Critical Care Services in the Eastern Region."* Department of Health & Children, Ireland, 2004

Edbrooke D, Hibbert C, Corcoran M. *"Review for the NHS Executive of Adult Critical Care Services: An International Perspective."* Medical Economics and Research Centre, Sheffield, UK, 1999

Edwards N. *"Planning and policy for emergency services: four fallacies, two problems and some possible solutions."* Journal of the Royal Society of Medicine, 94 (suppl 39), 2001

Ehrenwerth J, Solbo S, Hackez A. *"Transport of critically ill adults."* Crit Care Med, 14: 543-547, 1986

Endacott R. *"Staffing Intensive Care Units: a consideration of contemporary issues."* Intensive and Critical Care Nursing 12(4): 193-199, 1996

Engoren M. *"The effect of prompt physician visits on intensive care unit mortality and cost."* Crit Care Med, 33: 727-732, 2005

Ferdinande P. *"Recommendations on minimal requirements for Intensive care departments."* Intensive Care Med 23: 226-232, 1997

Field B E, Devich L E, Carlson R W. *"Impact of a comprehensive supportive care team on management of hopelessly ill patients with multiple organ failure."* Chest 96: 353–356, 1989

Foster K, Despotis G, Scott M G. *"Point-of-care testing. Cost issues and impact on hospital operations."* Clin Lab Med, 21: 269-284, 2001

Franklin C, Mathew J. *"Developing strategies to prevent in-hospital cardiac arrest: analysing responses of physicians and nurses in the hours before the event."* Critical Care Medicine 22, 244-247, 1994

Galley J, O'Riordan B. *"Guidance for nurse staffing in critical care."* Royal College of Nursing, UK, 2003

Garrard C, Young D. *"Suboptimal care of patients before admission to intensive care."* British Medical Journal; 316: 1841–1842, 1998

Gawlinski A, McCloy K, Jesurtun J. *"Measuring outcomes in cardiovascular APN practice."* New York, Springer: 131-188, 2001

Gebremichael M, Borg U, Habashi N M, Cottingham C, Cunsolo L, McCunn M, Reynolds H N. *"Interhospital transport of the extremely ill patient: The mobile intensive care unit."* Crit Care Med, 14: 543-47, 1986

Gentleman D, Jennett B. *"Hazards of inter-hospital transfer of comatose head-injured patients."* Lancet, ii: 853-855, 1981

Ghorra S, Reinert S E, Cioffi W, Buczko G, Simms H H. *"Analysis of the effect of conversion from open to closed surgical ICUs."* Ann Surg 229: 163-171, 2001

Gilligan J E. "*Stabilisation and transport of the critically ill."* Clinics in Anaesthesiology, WB Saunders / London, 3: 789-810, 1985

Goldhill D R, Worthington L, Mulcahy A, Tarling M, Sumner A. *"The patient-at-risk team: identifying and managing seriously ill ward patients."* Anaesthesia 54: 853-860, 1999

Goldhill D R. *"The critically ill: following your MEWS."* QJM 94: 507-10, 2001

Golestanian E, Scruggs J, Gangon R, Mak R, Wood K. *"Effect of interhospital transfer on resource utilization and outcomes at a tertiary care referral centre."* Crit Care Med, Vol. 35, No. 6, 2007

Goodwin N, Perri E, Peck E, Freeman T, Posaner R. "*Managing across diverse networks of care: lessons from other sectors. Final report. Health services management centre."* Birmingham: University of Birmingham, 2003

Grahm T W, Zadrozny D B, Harrington T. *"The benefits of early jejunal hyper-alimentation in the head-injured patient."* Neurosurgery, 25: 729-735, 1989

Greenbaum D M. *"Availability of critical care personnel, facilities, and services in the United States."* Crit Care Med 12: 1073-1077, 1984

Guidelines Committee of the American College of Critical Care Medicine, Society of Critical Care Medicine and American Association of Critical-Care Nurses Transfer Guidelines Task Force. *"Guidelines for the transfer of critically ill patients."* Crit Care Med 21: 931–937, 1993

Haiyan G, Harrison D, Parry G. *"The impact of the introduction of critical care outreach services in England: a multicentre interrupted time-series analysis."* Critical Care, 2007

Hall J B, Wood L D. *"Liberation of the patient from mechanical ventilation."* JAMA 257: 1621-1628, 1987

Hamman B L, Cue J, Miller F B, O'Brien D A, House T, Polk H C, Richardson J D. *"Helicopter transport of trauma victims: does a physician make a difference?"* J Trauma, 31: 490-494, 1991

Harrington T, Connolly M, Biffl W L, Majercik S D, Cioffi W G. "Transfer Times to Definitive Care Facilities Are Too Long – A Consequence of an Immature Trauma System." Annals of Surgery, vol. 241, no. 6: 961-968, 2005

Haupt M, Bekes C, Brilli R, Carl L, Gray A, Jastremski S, Naylor D, Rudis M, Spevetz A, Wedel S, Horst M. *"Guidelines on critical care services and personnel: recommendations based on a system of categorization of three levels of care."* Crit Care Med 31: 2677-83, 2003

Hedberg A M, Lairson D R, Aday L A, Chow J, Suki R, Houston S, Wolf J A. *"Economic implications of an early postoperative enteral feeding protocol."* J Am Diet Assoc, 99: 802-807, 1999

Hemsley B, Sigafoos J, Balandin S, Forbes R, Taylor C, Green V, Parmenter T. *"Nursing the person with severe communication impairment."* Journal of Advanced Nursing, 35: 827-835, 2001

Hillman K, Parr M, Flabouris A, Bishop G, Stewart A. *"Redefining in-hospital resuscitation: the concept of the medical emergency team."* Resuscitation 48(2): 105-110, 2001

Hind M, Jackson D, Andrews C, Fulbrook P, Galvin K, Frost S. *"Health care support workers in the critical care setting."* Nurse Critical Care, 5(1): 31-39, 2000

Hochman J S, Sleeper L A, Webb J G, Sanborn T A, White H D, Talley J D, Buller C E, Jacobs A K, Slater J N, Col J, McKinlay S M, LeJemtel T H, Picard M H, Menegus M A, Boland J, Dzavik V, Thompson C R, Wong S C, Steingart R, Forman R, Aylward P E, Godfrey E, Desvigne-Nickens P. *"Early revascularization in acute myocardial infarction complicated by cardiogenic shock. SHOCK Investigators. Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock."* N Engl J Med, 341: 625-634 1999

Hoffman L, Tasota F, Zullo T G, Scharfenberg C, Donahoe M R. *"A controlled trial of nurse practitioner-managed care in a sub-acute medical intensive care unit."* In review.

Horst H M, Mouro D, Hall-Jenssens R A, Pamukov N. *"Decrease in ventilation time with a standardised weaning process."* Arch Surg 133: 483-488, 1998

Ingersoll G L. *"Evaluating the impact of a clinical nurse specialist"*. Clinical Nurse Specialist 2, 150–155, 1988

Intensive Care Society (UK). "Guideline for the transport of the critically ill adult."

Intensive Care Society / Intercollegiate Board for Training in Intensive Care Medicine. *"Standards for Consultant Staffing of Intensive Care Units."* 2006

Intensive Care Society of Ireland. *"Transport of the critically ill."* www.icmed.com, 1994

Intensive Care Society Standards Committee. *"Allied Health Professionals (AHP) and Healthcare Scientists (HCS) Critical Care Staffing Requirements."* National AHP and HCS Critical Care Advisory Group, 2003

Joint Faculty of Intensive Care Medicine. *"Minimum Standards for Intensive Care Units."* JFICM, Australia, 2003

Kause J, Smith G, Prytherch D, Parr M, Flabouris A, Hillman K. *"A comparison of antecedents to cardiac arrests, deaths and emergency intensive care admissions in Australia and New Zealand, and the United Kingdom—the ACADEMIA study."* Resuscitation 62: 275–282, 2004

Kellett J, Deane B. *"The Simple Clinical Score predicts mortality for 30 days after admission to an acute medical unit."* Q J Med, 99: 771-781, 2006

Kleinpell R M. *"Acute-care nurse practitioners: Roles and practice profiles."* AACN Clinical Issues, 8: 156-62, 1997

Knaus W A, Draper E A, Wagner D P, Zimmerman J E. *"An evaluation of outcome from intensive care in major medical centers."* Ann Intern Med, Mar 104(3): 410-8, 1986

Knowles P R, Bryden D C, Kishen R, Gwinnutt C L. *"Meeting the standards for inter hospital transfer of adults with severe head injury in the United Kingdom."* Anaesthesia, 54: 283-88, 1999

Knox S, Gharity J, Baker B. *"The successful utilisation of non-licensed assistive staff in a critical care area."* Critical Care Nursing Quarterly 18(3): 56-66, 1995

Kollef M H, Horst H M, Prang L, Brock W A. *"Reducing the duration of mechanical ventilation: three examples of change in the intensive care unit."* New Horiz 6: 52-60, 1998

Kollef M H, Shapiro S D, Silver P, St John R E, Prentice D, Sauer S, Ahrens T S, Shannon W, Baker-Clinkscale D. *"A randomised, controlled trial of protocol-directed versus physician directed weaning from mechanical ventilation."* Crit Care Med 25: 567-574, 1997

Kopp B J, Mrsan M, Erstad B L, Duby J J. *"Cost implications of and potential adverse events prevented by interventions of a critical care pharmacist."* American Journal of Health System Pharmacy, 64(23): 2483-7, 2007

Kress J P, Pohlman A S, O'Connor M F, Hall J B. *"Daily interruption of sedative infusions in critically ill patients undergoing mechanical ventilation."* N Engl J Med 342: 1471–1478, 2000

Leape L L, Cullen D J, Dempsey-Clapp M, Burdick E, Demonaco H J, Ives-Erickson J, Bates D W. *"Pharmacist Participation on Physician Rounds and Adverse Drug Events in the Intensive Care Unit."* JAMA, 282: 267-270, 1999

Lee-Lewandrowski E, Lewandrowski K. *"Point-of-care testing: an overview and a look to the future."* Clin Lab Med, 21: 269-284, 2002

Leeson-Payne C G, Aitkenhead A R. *"A prospective study to assess the demand for a high dependency unit."* Anaesthesia, 50: 383-7, 1995

LeVasseur S A, Calder W. *"A comparative descriptive study of patients admitted to a high dependency unit after major and non-major surgery."* Intensive and Critical Care Nursing, 11: 66-70, 1995

Li T C M, Phillips M C, Shaw L. *"On-site physician staffing in a community hospital intensive care unit."* JAMA 252: 2023–2027, 1984

Lundberg J S, Perl T M, Wiblin T, Costigan M D, Dawson J, Nettleman M D, Wenzel R P. *"Septic shock: An analysis of outcomes for patients with onset on hospital wards versus intensive care units."* Crit Care Med, 26: 1020-1024, 1998

Lusterbader D, Fein A. *"Emerging trends in ICU management and staffing."* Crit Care Clinics 15(4): 735-748, 2000

Lyons R, Major E. *"Critical Care Beds: the Numbers"*. The Lancet 355 (9219): 1997.

Lyons R, Wareham K, Hutchings H A, Major E, Ferguson B. *"Population requirement for adult critical-care beds: a prospective quantitative and qualitative study."* The Lancet 355: 2000.

MacDonald R C, Banks J G, Ledingham I M. *"Transportation of the injured."* Injury, 12: 225-33, 1981

Manley K. *"A conceptual framework for advanced practice: an action research project operationalising an advanced practitioner / consultant nurse role."* Journal of Clinical Nursing 6: 179–190, 1997

Manthous C A, Amoateng-Adjepong Y, al-Kharrat T, Jacob B, Alnuaimat H M, Chatila W, Hall J B. *"Effects of a medical Intensivist on patient care in a community teaching hospital."* Mayo Clin Proc 72: 391-399, 1997

Mari P E, Zaloga G P. *"Early enteral nutrition in acutely ill patients: a systematic review."* Crit Care Med. 29: 2264–2270, 2001

Marik P E, Janower M L. *"The impact of routine chest radiography on ICU management decision: An observational study."* Am J Crit Care, 6: 95, 1997

Martin N, Hendrickson P. *"Telemetry monitoring in acute and critical care."* Crit Care Nurs Clin North Am, 11: 77-85, 1999

McClune B, Frankin K. *"An update on the Mead model and nursing care plan."* Intensive and Critical Care Nursing, 10: 127-132, 1994

McDonnell A, Esmonde L, Morgan R, Brown R, Bray K, Parry G, Adam S, Sinclair R, Harvey S, Mays N. *"The provision of critical care outreach services in England: findings from a national survey."* J Crit Care, 22: 212-218, 2007

McGinn G H, Mackenzie R F, Donnelly J A, Smith E A, Runcie C J. *"Inter-hospital transfer of the critically ill trauma patient: the potential role of a specialist transport team in a trauma system."* J Accident Emerg Med, 13: 90–2, 1996

McGloin H, Adam S K, Singer M. *"Unexpected deaths and referrals to intensive care of patients on general wards. Are some cases potentially avoidable?"* J R Coll Physicians London 33: 255-258, 1999

McGuffie A C, Graham C A, Beard D, Henry J M, Fitzpatrick M O, Wilkie S C, Kerr G W, Parke T R. *"Scottish urban versus rural trauma outcome study."* J Trauma, 59(3): 632-8, 2005

McQuillan P, Pilkington S, Allan A, Taylor B, Short A, Morgan G, Nielsen M, Barrett D, Smith G, Collin C H. *"Confidential inquiry into quality of care before admission to intensive care."* BMJ 316: 1853-1858, 1998

Metcalfe M A, Sloggett A, McPherson K. *"Mortality among appropriately referred patients refused admission to intensive-care units."* Lancet 350: 7-11, 1997

Meyer S C, Miers L J. *"Effect of cardiovascular surgeon and acute care nurse practitioner collaboration on postoperative outcomes."* AACN Clinical Issues, 16: 149-158, 2005

Miranda D, Moreno R, Iapichino G. *"Nine equivalents of nursing manpower use score (NEMS)."* Intensive Care Med, 23: 760-765, 1997

Montazeri M, Cook D J. *"Impact of a clinical pharmacist in a multidisciplinary intensive care unit."* Critical Care Medicine, 22: 1044-1048, 1994

Moyen E, Camiré E, Stelfox H T. *"Clinical review: Medication errors in critical care."* Critical Care, 12, 2008

Multz A, Chalfin D, Samson I, Dantzker D, Fein A, Steinberg H, Niederman M, Scharf S. *"A 'Closed' Medical Intensive Care Unit (MICU) Improves Resource Utilization When Compared with an 'Open' MICU"* Am J Resp Crit Care Med 157: 1468-1473, 1998

Nathens A B, Maier R V, Brundage S, Jurkovich, G J, Grossman D C. *"The effect of inter-facility transfer on outcome in an Urban Trauma System."* J Trauma, 55: 444-449, 2003

National Council for the Professional Development of Nursing and Midwifery. *"Framework for the Establishment of Advanced Nurse Practitioner and Advanced Midwife Practitioner Posts."* National Council for the Professional Development of Nursing and Midwifery, 2007

National Institute for Health & Clinical Excellence. *"Acutely ill patients in hospital - implementing NICE guidelines."* Department of Health, UK, 2007

Nava S, Evangelisti I, Rampulla C, Compagnoni M L, Fracchia C, Rubini F. *"Human and financial costs of non-invasive mechanical ventilation in patients affected by COPD and acute respiratory failure."* Chest 111: 1631-1638, 1997

Nava S. Confalonieri M, Rampulla C. *"Intermediate respiratory intensive care units in Europe: a European perspective."* Thorax 53: 798-802, 1998

NHS Confederation. "*Clinical networks."* Vol 8, NHS Confederation, 2002.

NHS. *"HBN 57 Facilities for critical care."* London: The Stationery Office, 2005

Nicholl J, West J, Goodacre S, Turner J. *"The relationship between distance to hospital and patient mortality in emergencies: an observational study."* Emerg. Med J, 24: 665-668, 2007

Norrenberg M, Vincent J. *"A profile of European Intensive Care Unit Physiotherapists."* Intensive Care Med 26: 988-994, 2000

Norrie P. *"Nurses' time management in intensive care."* Nursing in Critical Care 2(3): 121-125, 1997

Oakley P A. *"The need for standards for inter-hospital transfer."* Anaesthesia, 49: 565-6, 1994

Ó Riain S, Power M. *"Preliminary Survey of Adult Critical Care Capacity, Activity and Medical Staffing in Ireland."* Irish Journal of Medical Science, Volume 174, Issue 2, Supplement 1, 2005

Obremskey W, Henley M B. *"A comparison of transferred versus direct admission orthopaedic trauma patients."* J. Trauma, 36: 373-6, 1994

Odderson, R, Keaton J C, McKenna B S. *"Swallowing management in people on an acute stroke pathway: quality is cost effective."* Archives of Phys Meds Rehabil. Vol. 76 p1130-1133, 1995

Office for Health Management. *"Clinicians in Management: Introduction and Case Studies."* Department of Health & Children, Ireland, 2001

Office for Health Management. *"Public and Patient Participation in Healthcare."* Department of Health & Children, Ireland, 2002

O'Neill J, Dowling J, Wright P, Murphy A W, Bury G, Tedstone-Doherty D, Bannan L. *"Patients presenting with acute myocardial infarction to a district general hospital: baseline results and effect of audit."* Irish Medical Journal, 96: 70, 2003

American College of Critical Care Medicine, Society of Critical Care Medicine, American Association of Critical Care Nurses Transfer Guidelines Task Force. *"Guidelines for the transfer of critically ill patients."* Critical Care Med, 21: 931-37, 1993

Padilha K, Sousa R, Kimura M, Miyadahira A M, Monteiro da Cruz D A, Vattimo M, Fusco S, Ferraz de Campos M E, Mendes E M, Mayor E R. *"Nursing workload in intensive care units: A study using the Therapeutic Intervention Scoring System."* Intensive and Critical Care Nursing, 23: 162-169, 2007

Park G R, Johnson S, Ferguson A, Grant D. *"A mobile intensive care unit based on a standard ambulance trolley bed."* British Journal of Anaesthesia, Vol. 54, No. 10: 1081-1085, 1982

Parshuram C S. *"Pharmacotherapeutica Friendly Fire in the intensive care unit: high stakes seeking high calibre."* Critical Care 12: 137, 2008

Patak L, Gawlinski A, Fung N, Doering L, Berg J. *"Patient's reports of health care practitioner interventions related to communication during mechanical ventilation."* Heart and Lung - The Journal of Acute and Critical Care, 33 (5): 308-320, 2004

Pearce J. *"Skill mix and workforce planning: is it time to open up the debate?"* Nursing in Critical Care 1(5): 213, 1996

Phillips S J. *"A comprehensive look at the legislative issues affecting advanced practice nursing."* The Nurse Practitioner, 31: l-25, 2006

Pinilla J C, Samphire J, Arnold C, Liu L, Thiessen B. *"Comparison of gastrointestinal tolerance of two enteral feeding protocols in critically ill patients: a prospective, randomized controlled trial."* JPEN J Parenter Enteral Nutr., 25: 81-86, 2001

Pittard, A J. *"Out of our reach? Assessing the impact of introducing a critical care outreach service."* Association of Anaesthetists of Great Britain & Ireland Volume 58 (9): 882–885, 2003

Priestley G, Watson W, Rashidian A, Mozley C, Russell D, Wilson J, Cope J, Hart D, Kay D, Cowley K, Pateraki J. *"Introducing critical care outreach: a ward randomized trial of phased introduction in a general hospital."* Intensive Care Medicine 30 (7): 1398-404, 2004

Pronovost P J, Angus D C, Dorman T, Robinson K, Dremsivoz T, Young T. *"Physician staffing patterns and clinical outcomes in critically ill patients: a systematic review."* JAMA 288: 2151-2162, 2002

Pronovost P, Berenholtz S, Dorman T, Lipsett P, Simmonds T, Haraden C. "*Improving communication in the ICU using daily goals*." J Crit Care 18: 71-75, 2003

Rapoport J, Teres D, Steingrub J, Higgins T, McGee W, Lemeshow S. *"Patient characteristics and ICU organizational factors influencing pulmonary artery catheter use in the ICU."* JAMA 283: 2559–2567, 2000

Rewe W G, Runcie C J, Reidy J, Wallace P G. *"Current practices in transferring critically ill patients among hospitals in the west of Scotland."* BMJ, 300: 85-7, 1990

Reynolds H N, Haupt M T, Thill-Baharozian M, Carlson R W. *"Impact of critical care physician staffing on patients with septic shock in a university hospital medical intensive care unit."* JAMA 260: 3446–3450, 1988

Richardson L Y. *"High-dependency care: developing a joint surgical recovery unit."* British Journal of Nursing, 11: 129-134, 2002

Ridley S A, Carter R. *"The effects of secondary transport on critically ill patients."* Anaesthesia, 44: 822-7, 1989

Rivers E, Nguyen B, Havstad S, Ressler J, Muzzin A, Knoblich B, Peterson E, Tomlanovich M. *"Early goal-directed therapy in the treatment of severe sepsis and septic shock."* N Engl J Med, 345: 1368–1377, 2001

Roberts R, Kennerly D A, Keane D, George C. *"Nutrition Support in the Intensive Care, Unit Adequacy, Timeliness, and Outcomes."* Crit Care Nurse Dec, 23(6): 49-57, 2003

Rohan D, Dwyer R, Costello J, Phelan D. *"Audit of Mobile Intensive Care Ambulance Service."* IMJ, Vol. 99, No. 3, 3006

Rosenberg A L, Hofer T P, Strachan C, Watts C M, Hayward R A. *"Accepting critically ill transfer patients: adverse effect on a referral center's outcome and benchmark measures."* Annals of Internal Medicine, Vol. 138, No. 11, 2003

Royal College of Nursing Critical Care Forum. *"The Nature of Intensive Care Nursing Work in Intensive Care."* Royal College of Nursing, London, 1997

Rudisill P T. *"Unit-based advanced practice nurse in critical care."* Critical Care Nursing Clinics of North America, 7(1): 53-59, 1995

Rudy E B, Davidson L J, Daly B, Clochesy J M, Sereika S, Baldisseri M, Hravnak M, Ross T, Ryan C. *"Care activities and outcomes of patients cared for by acute care nurse practitioners, physician assistants, and resident physicians: a comparison."* Am J Crit Care, 7: 267-81, 1998

Runcie C J, Reeve W R, Wallace P G M. *"Preparation of the critically ill patient for inter-hospital transfer."* Anaesthesia, 47: 327-31, 1992

Runcie C J, Reeve W R, Reidy J, Wallace P M G. *"Secondary transport of the critically ill adult."* Clin Int Care, 2: 217-225, 1991

Runcie C J. *"Resuscitation, stabilisation and preparation for transport."* In: Morton N F, Pollack M M, Wallace P G M. *"Stabilisation and Transport of the Critically Ill."* London: Churchill Livingstone, 1997

Russell D, Vorder-Bruegge M, Burns S M. *"Effect of an outcomes-managed approach to care of neuroscience patients by acute care nurse practitioners."* Am J Crit Care, 11: 353-364, 2002

Ryan W, Bayly P J M, Weldon O G W, Jingree M. *"A prospective two month audit of the lack of provision of a high-dependency unit and its impact on intensive care."* Anaesthesia, 52: 265-75, 1997

SAMPALIS, J S, DENIS R, FRECHETTE P, BROWN R, FLEISZER D, MULDER D. *"Direct transport to tertiary trauma centers versus transfer from lower level facilities: impact on mortality and morbidity among patients with major trauma."* J Trauma, 43(2): 288-95, 1997

Sampalis J S, Denis R, Lavoie A, Frechette P, Boukas S, Nikolis A, Benoit D, Fleiszer D, Brown R, Churchill-Smith M, Mulder D. *"Trauma care regionalization: a process-outcome evaluation."* J Trauma, 46: 565-581, 1999

Scarsi K K, Fotis M A, Noskin G A *"Pharmacist participation in medical rounds reduces medication errors."* American Journal of Health System Pharmacy, 59(21): 2089-2092, 2002

Schein R M, Hazday N, Pena M, Ruben B H, Sprung C L. *"Clinical antecedents to in-hospital cardiopulmonary arrest."* Chest 98, 1388-1392, 1990

Shein R M H, Hazday N, Pena M, Ruben B H, Sprung C L. *"Clinical antecedents to in-hospital cardiopulmonary arrests."* Chest 98: 1388–1392, 1990

Shortell S M, Zimmerman J E, Rousseau D M, Gillies R R, Wagner D P, Draper E A, Knaus W A, Duffy J. *"The performance of intensive care units: Does good management make a difference?"* Med Care, 32: 508-525, 1994

Sidani S, Irvine D. *"A conceptual framework for evaluating the acute care nurse practitioner role."* Journal of Advanced Nursing, 30: 58-66, 1999

Sinuff T, Kahnamoui K. *"Rationing critical care beds: A systematic review."* Critical Care Medicine, Volume 32, Issue 7, 2004

Smith D F, Hackel A. *"Selection criteria for paediatric critical care transport teams."* Crit Care Med, 11: 10-2, 1983

Spain D A, McClave S A, Sexton L K, Adams J L, Blanford B S, Sullins M E, Owens N A, Snider H L. *"Infusion protocol improves delivery of enteral tube feeding in the critical care unit."* J Parenter Enteral Nutr., 23: 288-292, 1999

Strauss M J, LoGerfo J P, Yeltatzie J A, Temkin N, Hudson L D. *"Rationing of intensive care unit services. An everyday occurrence."* JAMA 255: 1143-1146, 1986

Suntharalingam G, Cousins J, Gattas D, Chapman M. *"Scanning the horizon: emerging hospital-wide technologies and their impact on critical care." Critical Care*, 9: 12-15, 2005

Sutcliffe L. *"Philosophy and models in critical care nursing."* Intensive and Critical Care Nursing, 10: 212-221, 1994

Sutton J, Valentine J, Rayment K. *"Staff views on the extended role of health care assistants in the critical care unit."* Intensive and Critical Care Nursing, 20: 249-256, 2004

Tarnow-Mordi W O, Hau C, Warden A, Shearer A J. *"Hospital mortality in relation to staff workload: a 4-year study in an adult intensive care unit."* Lancet, 15: 356(9225):185-9, 2000

Thijs L, Baltopoulos G, Burchardi H, Carlet J, Chiolero R, Dragsted L, Edwards D, Ferdinande P, Giunta F, Kari A, Kox W, Planas M, Vincent L, Pfenninger J, Edberg K, Floret D, Leijala M, Tegtmeyer F. *"European*

Society of Intensive Care Medicine - Guidelines for a training programme in intensive care medicine." Intensive Care Med, 22: 166-172, 1996

Thornley C. *"A question of competence? Re-evaluating the roles of the nursing auxiliary and health care assistant in the NHS."* J Clin Nurs, 9: 451-458, 2000

Turner M, McFarlane H J, Krukowski Z H. *"Prospective study of high dependency care requirements and provision."* Journal of the Royal College of Surgeons of Edinburgh, 44: 19-23, 1999

Vyvyan H A L, Kee S, Bristow A. *"A survey of secondary transfers of head injured patients in the south of England."* Anaesthesia, 4: 728–31, 1991

Waddell G, Scott P D R, Lees N W, Ledingham I M. *"Effects of ambulance transport in the critically ill patients."* Br Med J, 1: 386-389, 1975

Waddell G, Stuart B, Tehrani M A, McGarrity G, Reyes A, Smith H C, Ledingham I M, Green H L, Weller C. *"Intra-arterial monitoring of critically ill patients in ambulances."* Br Med J, 206: 25, 1975

Wallis C B, Davies H T O, Shearer A J. *"Why do patients die on general wards after discharge from intensive care units?"* Anaesthesia 52(1): 9-14, 1997

Warren D, Shukla S, Olsen M, Kollef M, Hollenbeak C, Cox M, Cohen M, Fraser V. *"Outcome and attributable cost of ventilator-associated pneumonia among intensive care unit patients in a suburban medical centre."* Crit Care Med, 31(5): 1312-7, 2003

Warren, J, Fromm R E, Orr R A, Rotello L C, Horst H M. *"Guidelines for the intra-hospital transport of critically ill patients."* Critical Care Med, 32: 256-62, 2004

Weaver W D. *"Time to thrombolytic treatment: Factors affecting delay and their influence on outcome."* J Am Coll Cardiol, 25: 3S-9S, 1995

World Health Organisation. *"European Strategy for Continuing Education for Nurses and Midwives."* WHO Europe, 2003

Young J S, Bassam D, Cephas G A, Brady W J, Butler K, Pomphrey M. *"Interhospital versus direct scene transfer of major trauma patients in a rural trauma system."* Am Surg, 64: 88-92, 1998

Zimmerman J E, Shortell S M, Knaus W A, Rousseau D M, Wagner D P, Gillies R R, Draper E A, Devers K. *"Value and cost of teaching hospitals: A prospective, multicenter, inception cohort study."* Crit Care Med 21: 1432–1442, 1993

Appendix B

Glossary of Abbreviations

A&E	Accident & Emergency
ALoS	Average Length of Stay
AHP	Allied Health Professional
ANP	Advanced Nurse Practitioner
AP	Advanced Paramedic
CCO	Critical Care Outreach
CSO	Central Statistics Office
CCU	Coronary Care Unit
CNS	Clinical Nurse Specialist
CNM	Clinical Nurse Manager
DOHC	Dept of Health and Children
FETAC	Further Education and Training Awards Council
HDU	High Dependency Unit
HETAC	Higher Education and Training Awards Council
HIPE	Hospital In-Patient Enquiry
HIQA	Health Information and Quality Authority
HSE	Health Service Executive
IACCN	Irish Association of Critical Care Nurses
IBICM	Irish Board of Intensive Care Medicine
ICNARC	Intensive Care National Audit and Research Centre
ICS	Intensive Care Society
ICU	Intensive Care Unit
MICAS	Mobile Intensive Care Ambulance Service
NCHD	Non-Consultant Hospital Doctor
NHO	National Hospitals Office
OT	Occupational Therapy
OECD	Organisation of Economic Co-operation and Development
ROI	Republic of Ireland
SpR	Specialist Registrar
WTE	Whole Time Equivalent

Appendix C

Project Team Members and Advisors

Appendix C

Project Team Members and Advisors

Prospectus Team

Mr. Vincent Barton	Managing Director, Prospectus
Ms. Justine McCarthy	Director of Consulting, Prospectus
Dr. Kathy Rowan	Director, ICNARC
Prof. Monty Mythen	Professor of Anaesthesia and Critical Care, UCLH
Dr. Andrew Webb	Medical Director, UCL Hospitals and Chair, Welsh Assembly Critical Care Advisory Group
Ms. Sheila Adam	Head of Nursing at University College London Hospitals Foundation Trust
Ms. Annette Hughes	Healthcare Planner, Prospectus
Ms. Jenny Horan	Senior Consultant, Prospectus
Mr. Brian Griffin	Senior Consultant, Prospectus

HSE Project Team

Ms. Fionnuala Duffy (Chair)	Assistant National Director, HSE
Dr. Freda O'Neill	Population Health Directorate, HSE
Mr. Pat Grant	Ambulance Officer, HSE
Ms. Eithne Cusack	Assistant Director of Nursing & Midwifery, Planning & Development Unit, HSE
Dr. Philip Crowley	Deputy Chief Medical Officer, DoHC
Ms. Sylvia Kelly	Acute Hospitals Division, DoHC
Dr. Brian Marsh	Intensive Care Society of Ireland
Dr. Michael Power	Intensive Care Society of Ireland
Mr. Freddy Woods	Royal College of Surgeons Ireland
Dr. Kate McGarry	Royal College of Physicians Ireland
Ms. Martha Hanlon	Irish Association of Critical Care Nursing
Ms. Fidelma MacHale (Project Manager)	National Hospitals Office
Mr. Peter McGowan	Procurement, HSE
Ms. Eileen O'Donovan	Health Service Executive

ICSI nominated critical care experts

Dr. Gavin Lavery	Consultant in Intensive Care Medicine & Director of N.I. Critical Care Transfer Service NICCaTS
Prof. Armand Girbes	Professor/Ordinarius in Intensive Care Medicine

HSE Steering Group

Ms. Ann Doherty	National Director, National Hospitals Office
Dr. Patrick Doorley	National Director, Population Health

Appendix D

List of Hospitals Visited

Hospital
HSE South
Wexford General Hospital
Waterford Regional Hospital
St Luke's General Hospital, Kilkenny
South Tipperary General Hospital, Clonmel
Cork University Hospital Group
Kerry General Hospital
Mercy Hospital Cork
Bantry General Hospital
South Infirmary Victoria University Hospital
Mallow General Hospital
HSE Dublin North East
Our Lady of Lourdes Hospital, Drogheda
Louth County Hospital, Dundalk
Cavan General Hospital
Monaghan General Hospital
Our Lady's Hospital, Navan
Mater Misericordiae University Hospital
Beaumont Hospital
Connolly Hospital
HSE West
Galway University Hospital
Merlin Park University Hospital
Mayo General Hospital, Castlebar
Roscommon County Hospital
Portiuncula Hospital, Ballinasloe
Sligo General Hospital
Letterkenny General
Mid-Western Regional Hospital, Dooradoyle
Mid-Western Regional Hospital, Ennis
Mid-Western Regional Hospital, Nenagh
St John's Hospital Limerick
HSE Dublin Mid Leinster
St Vincent's Hospital
St Colmcille's Hospital, Loughlinstown
St James' Hospital
Adelaide & Meath Hospital & National Children's Hospital
Naas General Hospital
Midland Regional Hospital, Mullingar
Midland Regional Hospital, Tullamore
Midland Regional Hospital, Portlaoise

Appendix E

Hospital Visits Feedback

PROSPECTUS
PUTTING STRATEGY TO WORK

PROSPECTUS
PUTTING STRATEGY TO WORK

Review of Adult Critical Care Services in the Republic of Ireland

Hospital Visits Feedback

June 2008

Member of Eurogroup Consulting Alliance

Hospital Visits – key themes

- Critical care bed configuration
- Critical care bed utilisation
- Critical care unit physical infrastructure
- Critical care staff resourcing
- Critical care staff skill mix
- Governance in critical care units
- Retrieval / transportation services
- Accessing tertiary referral services for critical care patients
- Difficulties for tertiary referral centres in managing critical care workload

PROSPECTUS
PUTTING STRATEGY TO WORK

Critical Care Bed Configuration

- A single, joint ICU/HDU was the most common configuration, although the incorporation of coronary care into these units was evident in smaller hospitals.
- Where separate coronary care units existed, they were often used for step-down from ICU/HDU (in particular for medical/respiratory patients)
- Children were sometimes accommodated in adult critical care units, which was seen as inappropriate but often unavoidable.
- Hospitals with obstetric services struggled to meet the required critical care needs, particularly in light of increased C-Sections and older primigravidas

"I don't even ask for beds in the ICU or HDU anymore, I just know there won't be one available, I make plans elsewhere" Consultant Surgeon

PROSPECTUS PUTTING STRATEGY TO WORK

Critical Care Bed Utilisation

- Occupancy rates were generally high
- Inappropriate placement of patients was significant and widespread:
  - Almost all hospitals cited discharging patients early due to pressure on critical care beds; typically CCU and normal ward beds are being used for these patients.
  - Many hospitals had delayed discharges due to difficulties in securing beds on wards.
  - In some ICUs, patient stays were unnecessarily lengthened due to a lack of any appropriate step-down critical care.
  - Although most combined units had a defined allocation of ICU, HDU, and CCU beds, in most cases these were not being used as "labelled".

"We always decide who's first out, even if they're not ideally ready, we have to decide who is the least critically ill" Consultant Anaesthetist

PROSPECTUS PUTTING STRATEGY TO WORK

Critical Care Unit Physical Infrastructure

- There was significant variation in the physical space and layout of critical care units, they ranged from state-of-the-art units to ward annexes.
- Infection control was a widespread worry for units: prompted by lack of space, lack of isolation facilities, lack of sinks and en-suite facilities, old equipment, inappropriate layout of clean and dirty utilities, etc.
- Widespread shortage of storage and staff facilities. Family facilities were also generally poor, including lack of or poor bereavement facilities, common areas, overnight accommodation, kitchens, etc.
- There was variation in level and age of equipment, and a general lack of uniformity and connection between different units and services. There was limited IT infrastructure

> *"Our one office is used for nurses, doctors, giving bad news to families, hosting visitors, and everything else"* Critical Care Nurse

Critical Care Staff Resourcing

- Overall, staff were very skilled, experienced and committed, and worked well together.
- Lack of dedicated critical care sessions, both at Consultant and NCHD level, was a challenge for medical staffing. In addition, out-of-hours cover was often an issue.
- Nursing staff were under significant pressure, particularly out-of-hours. The recent hiring embargo has left many units with shortages.
- Certain AHPs were widely available to critical care, though very few were dedicated to the service. Other AHPs were largely inaccessible.
- There were few Health Care Assistants, and where they did exist they were not integrated members of the unit team.
- Lack of clerical support or secretarial staff across the board.
- Clinical and biomedical engineers seemed to be widely available.

> *"It's very rare that you get a day off where you don't get a phone call asking you to come in and cover for someone"* ICU Nurse, Regional Hospital

Critical Care Staff Skill Mix

- Consultant staffing ranged from dedicated Consultant Intensivists, to Consultant Anaesthetists with a special interest in Intensive Care, to Consultant Anaesthetists with no particular Intensive Care focus.
- Recruitment and retention of critical care nurses was a significant challenge, in particular the up skilling of new staff. Interestingly, there seemed to be greater stability and continuity of nursing staff in the regional and local hospitals.
- Nursing staff felt that professional development and training was being sacrificed due to the heavy workloads.
- Structured in-hospital critical care training seemed to be irregular across most hospitals.
- There has been an overall lack of specialist intensive care training for NCHDs.

"I did the ICU course, spent four years in one of the big teaching hospitals before I moved down here, it's near my family, and the work is not so stressful" ICU Nurse, Local Hospital

Governance in Critical Care Units

- There was a variety of structures and systems in place for unit leadership and decision making. Joint decision making between anaesthetist and primary physician or surgeon was most common and seemed to work well.
- Admission and discharge policies specific to critical care were not always in place.
- Rotation of Consultant staff sometimes resulted in a lack of continuity of patient care, particularly when a daily rotation system was in place.
- Formal multidisciplinary team meetings, case conferencing, outcome reviews, and incident reflection and review were generally informal and irregular.
- There was no resourced out-reach service from critical care units.
- Audit systems were generally poor.

"Having clearly defined admission and discharge policies in place works really well" ICU Nurse

Retrieval / transportation services

- Moving critical care patients was a significant challenge across the board, both for those transferring and receiving
- Lack of standard protocols result in long sessions of phone calls and negotiations with different staff in different departments and hospitals.
- MICAS when available is excellent, but difficulties in accessing the service due to geographical distance and limited hours of operation.
- There are sometimes difficulties in accessing ambulance services as required.

> *"It could sometimes take 24 hours – to try to secure a bed, to bring patients from one hospital to another, to wait with them when they have scans, then to get them admitted"* Consultant Anaesthetist

Accessing Tertiary Referral Services for Critical Care Patients

- It seems difficult for outlying hospitals, local and regional, to get access to beds in national centres. Most consultants spoke of long hours of phone calls and negotiations.
- Certain major specialties seem to be very difficult to access due to lack of capacity.
- Widespread difficulties created by the loss of nursing and anaesthetic staff for transport of critical care patients.
- The introduction of some specific services in outlying hospitals, e.g. Haemofiltration facilities, seems to have improved access for many critical care units.

> *"We used to have to send critical care patients to Dublin for haemofiltration, but now we can deal with them here"* Consultant Anaesthetist, South East.

Difficulties for Tertiary Referral Centres in Managing Critical Care Workload

- A number of the larger hospitals, with more complex activity, quoted receiving patients from local or regional hospitals who were accepted but when arrived did not need the level of critical care that had been stated.
- Transferring patients back to referring hospital once they are well enough often proves very difficult, and this creates bed blocking.
- There was little ring-fencing of critical care beds for complex national referrals, either beds within general ICUs or dedicated specialist ICUs.

> *"Sometimes we accept referrals, and when they get here we find out that we have a dozen patients on wards who are sicker than them. We can't justify having them in our ICU"* Consultant Anaesthetist, South East.

Appendix F

Copy of Medical Times Advertisement

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

PROSPECTUS
PUTTING STRATEGY TO WORK
Member of Eurogroup Consulting Alliance

National Review of Adult Critical Care Services in the Republic of Ireland

The HSE has engaged Prospectus to undertake a **comprehensive review of current adult critical care services to identify future requirements** to the year 2020. This review will be conducted by Prospectus, with a number of expert international advisors: Dr. Kathy Rowan, Director, ICNARC, Prof. Monty Mythen, Professor of Anaesthesia and Critical Care, UCLH, Dr. Andrew Webb, Medical Director, UCLH and Chair, Welsh Assembly Critical Care Advisory Group, Ms. Sheila Adam, European Society of Intensive Care Medicine (Nursing and AHP committee), Prof. Armand Girbes, Professor/Ordinarius in Intensive Care Medicine (ICSI nominated expert), and Dr. Gavin Lavery, Consultant in Intensive Care Medicine & Director of N.I. Critical Care Transfer Service (NICCaTS) (ICSI-nominated expert).

The review will include:

- **Site visits** to all adult critical care units in the Republic of Ireland, during May and June 2008, to meet with key staff and discuss current issues and challenges in the critical care service.
- Completion of an **overview questionnaire** by each site to establish the scale and scope of current service provision.
- A **4-week data collection exercise** where staff will be asked to track their hospital's critical care activity from 3rd June – 1st July 2008 through completion of a template on a daily basis.
- A **web-based consultation tool** for all staff working within a critical care environment to share their thoughts in relation to current and future services. It will be available for the month of June 2008, and can be accessed online via: www.prospectus.ie, www.icmed.com and www.ncnm.ie/iaccn

We would like to thank you in advance for your participation in this review. We firmly believe that the involvement of all critical care services throughout the country is necessary for its success, and your support is very much appreciated.

In August 2008, following the analysis of the activity data collected, each hospital will receive a report summarising its hospital data in addition to an aggregated national overview based on data from all 37 hospitals providing critical care in Ireland. Prospectus will also host three regional forum meetings to which critical care staff will be invited to discuss key messages emerging from the review process.

This review is supported by the **Intensive Care Society of Ireland** and the **Irish Association for Critical Care Nurses.**

For more information please do not hesitate to contact Prospectus:
Justine McCarthy, jmccarthy@prospectus.ie

Appendix G

List of Individuals Interviewed

Department of Health and Children - Mr. Fergal Lynch, Assistant Secretary

Department of Health and Children - Ms. Jane Whelan, Specialist Registrar in Public Health Medical

Department of Health and Children - Mr. Philip Crowley, Deputy Chief Medical Officer

Department of Health and Children - Ms. Sheila O'Malley, Chief Nursing Officer

Department of Health - Ms. Bernie McNally, Chief Therapy Advisor

Economic and Social Research Institute - Prof. Miriam Wiley, Head of Health Research & Information Division

Health Information and Quality Authority - Dr. Tracy Cooper, Chief Executive

Health Protection Surveillance Centre - Dr. Robert Cunney, Consultant Microbiologist

Health Service Executive - Mr. Alan Moran, Hospital Network Manager

Health Service Executive - Ms. Ann Doherty, Director of the National Hospitals office

Health Service Executive, Ms. Berno Kiberd, Assistant National Director of Performance Management

Health Service Executive - Prof. Brendan Drumm, CEO

Health Service Executive - Mr. Brian Gilroy, Head of Estates

Health Service Executive - Mr. Ciaran Browne, Head of Performance Management Unit

Health Service Executive - Dr. Freda O Neill, Population Health

Health Service Executive - Mr. Pat Grant, Chief Ambulance Officer

Health Service Executive - Ms. Mary McCarthy, HSE Skill-mix project

Health Service Executive - Dr. Michael Scully, - Critical Care Network Group, North East

Health Service Executive - Dr. Pat Doorley, National Director of Population Health

Health Service Executive - Dr. Paul Kavanagh, Deputy Assistant National Director

Health Service Executive - Mr. Stephen Mulvany, Hospital Network Manager

Health Service Executive - Mr. Tom Finn, Assistant National Director Contracts and Utilisation

Health Service Executive - Prof. Tom Keane. Director of the National Cancer Control Programme

Institute of Obstetricians and Gynaecologists – Dr. Rory O Connor, Chair

Irish Board of Intensive Care Medicine - Dr. Brian Marsh, ICSI Critical Care Trials Group

Irish Board of Intensive Care Medicine - Dr. Jeanne Moriarty, Co-Opted Chair IBICM

Royal College of Physicians in Ireland - Dr. Kate McGarry, Critical Care Project Team Representative

Royal College of Physicians in Ireland - Dr. Gerard Boran, Dean Faculty of Pathology

Royal College of Surgeons in Ireland - Dr. Freddie Wood, Critical Care Project Team Representative

Appendix H

List of Submissions Received

Biomedical / Clinical Engineering Association of Ireland

Bon Secours Hospital, Dublin

Bon Secours Hospital, Tralee

Department of Nutrition and Dietetics, Mid Western Regional Hospital, Limerick

Department of Pathology, Mid-Western Regional Hospital, Limerick

Department of Pharmacy, Connolly Hospital, Blanchardstown

Department of Pharmacy, Mater Misericordiae University Hospital, Dublin

Department of Pharmacy, Mid-Western Regional Hospital, Limerick

Department of Pharmacy, Our Lady of Lourdes Hospital, Drogheda

Division of Anaesthesia, Intensive Care and Pain Relief Services, Cork University Hospital

Hermitage Medical Clinic, Dublin

Hospice friendly Hospitals Programme

Hospital Pharmacists Association of Ireland

Irish Association of Speech and Language Therapists

Irish Nephrology Society

Irish Hospice Foundation, Dublin

Irish Society of Chartered Physiotherapists

Irish Thoracic Society

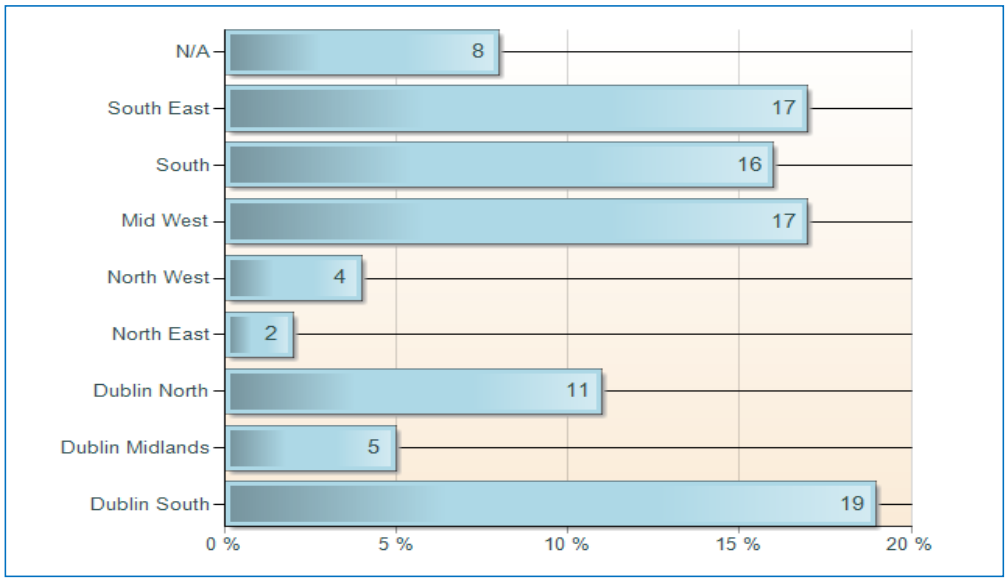
The Irish Nutrition & Dietetic Institute (INDI)

VHI Healthcare

Appendix I

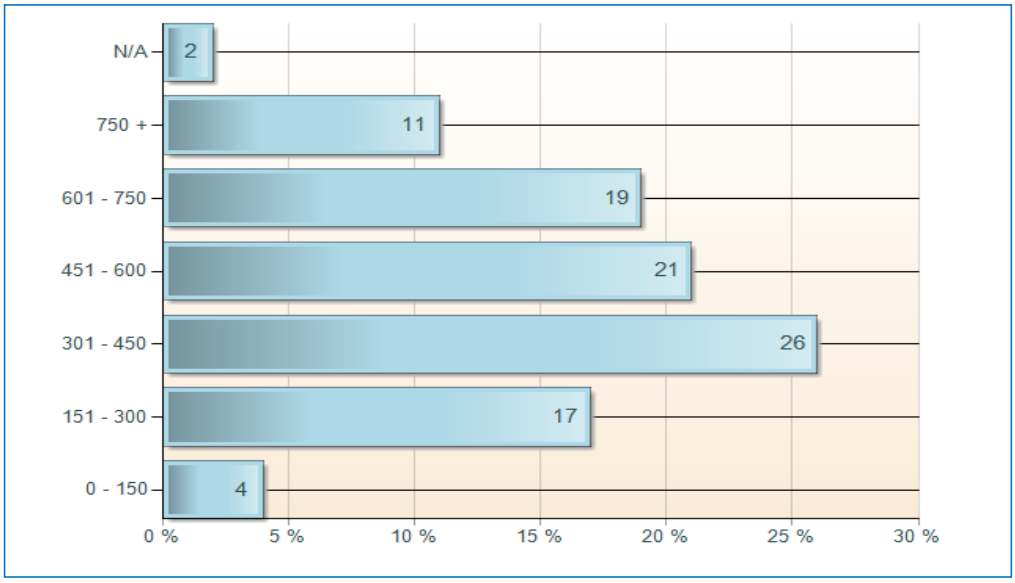
Findings from Web-based Consultation Tool

1. Please select the hospital network that you currently work within



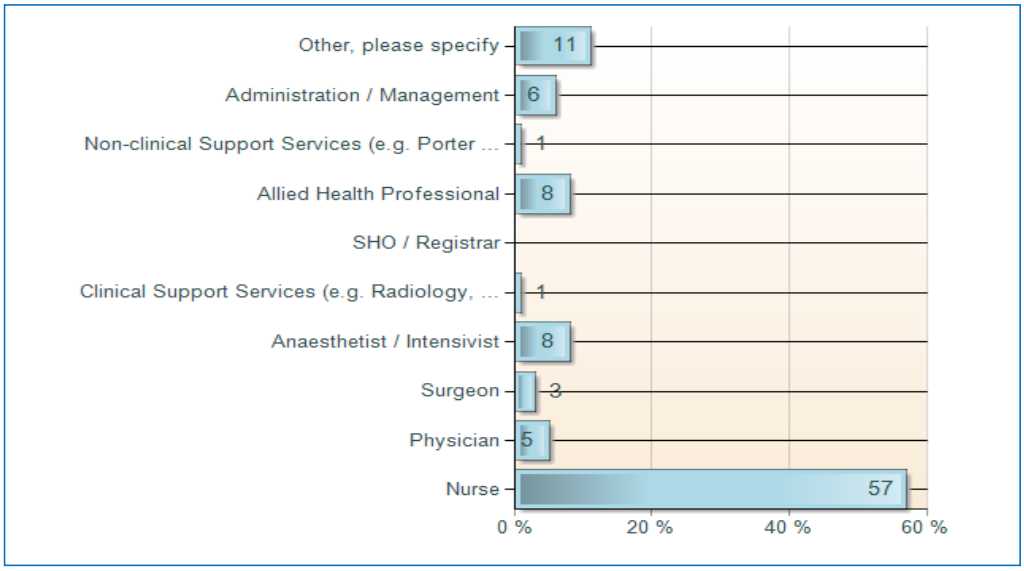
2

2. Please enter the approximate number of beds within your hospital



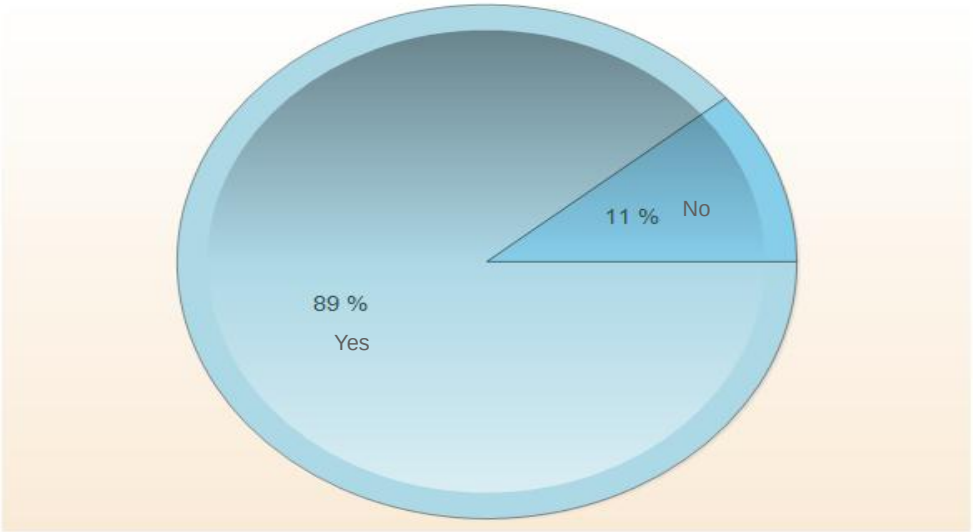
3

3. Which of the following best describes your current post within this hospital



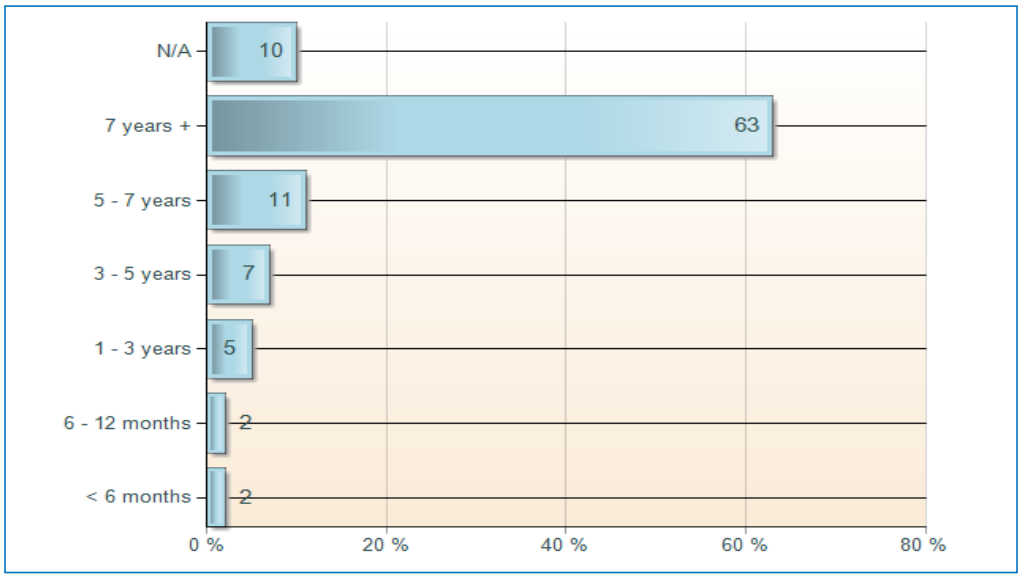
4

4. Are you currently working within an adult critical care unit?



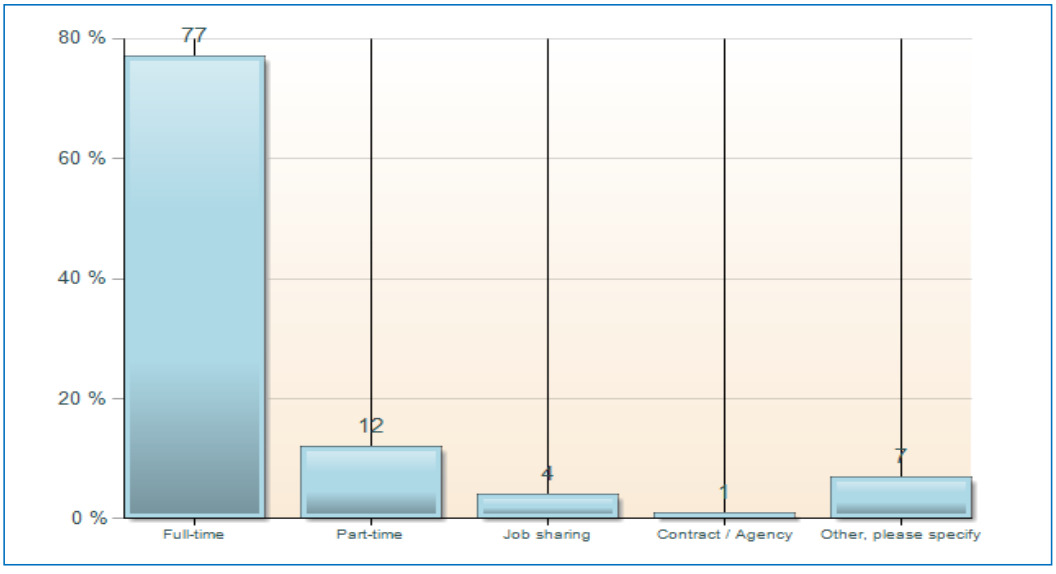
5

5. How long have you been working in adult critical care?



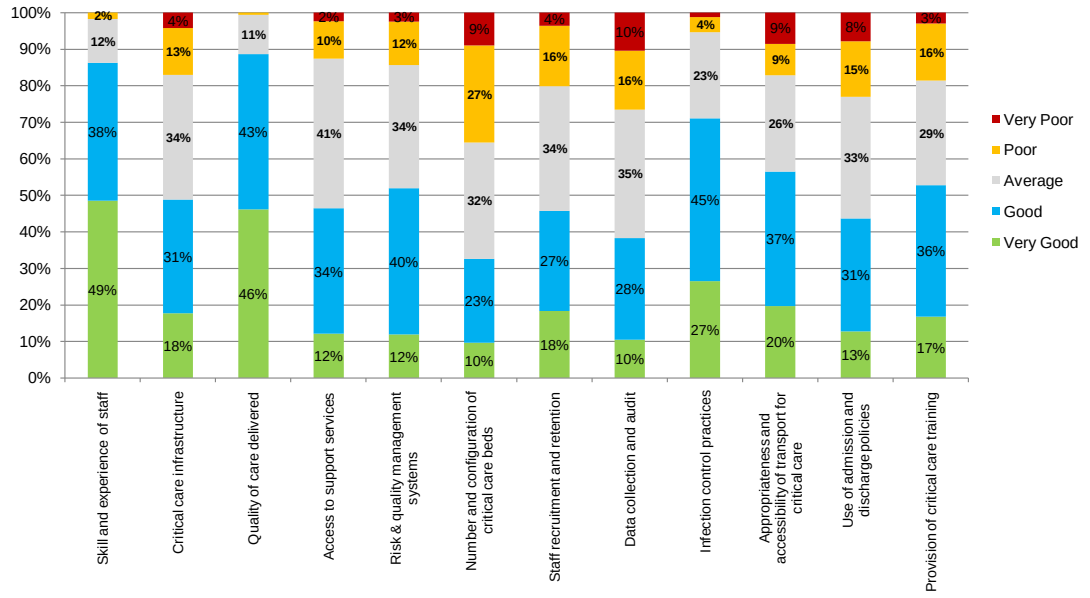
6

6. Which of the following options best describes your current working arrangement?



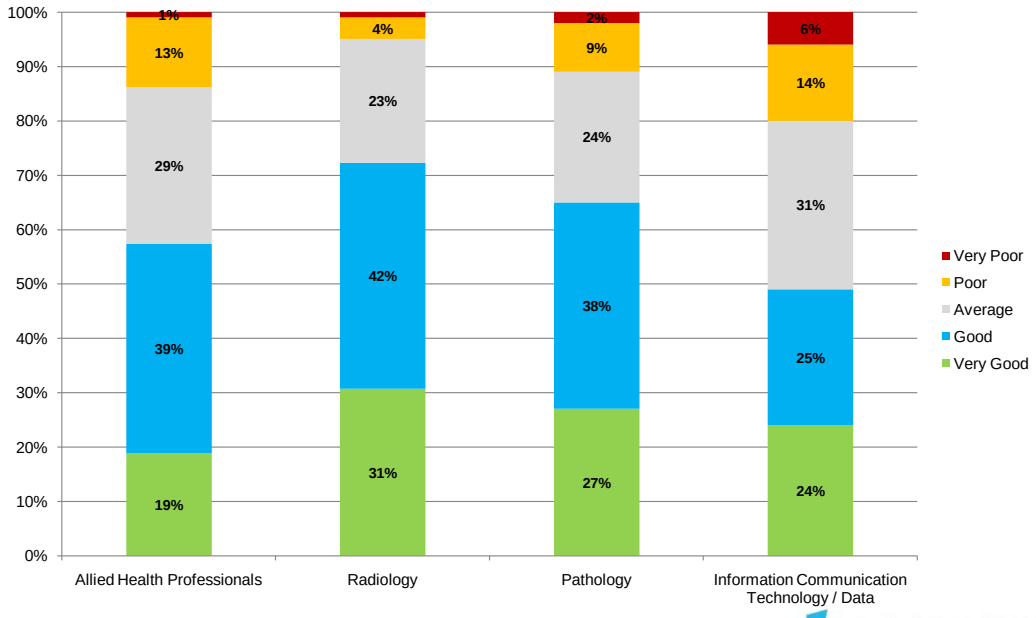
7

7. How would you rate the following within your critical care unit(s)?



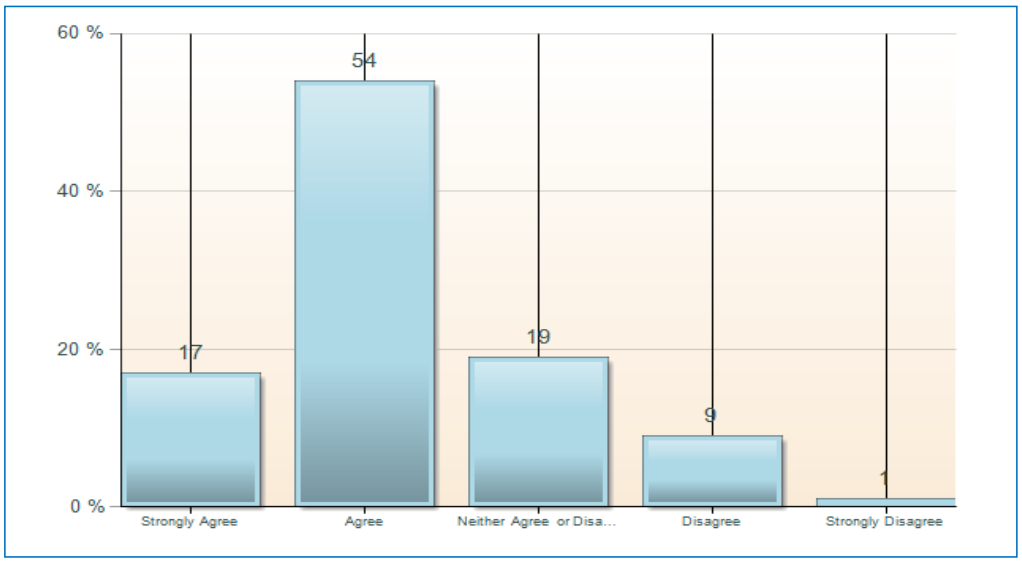
8

8. Please rate the level of availability regarding the following associated services to your critical care unit(s)?



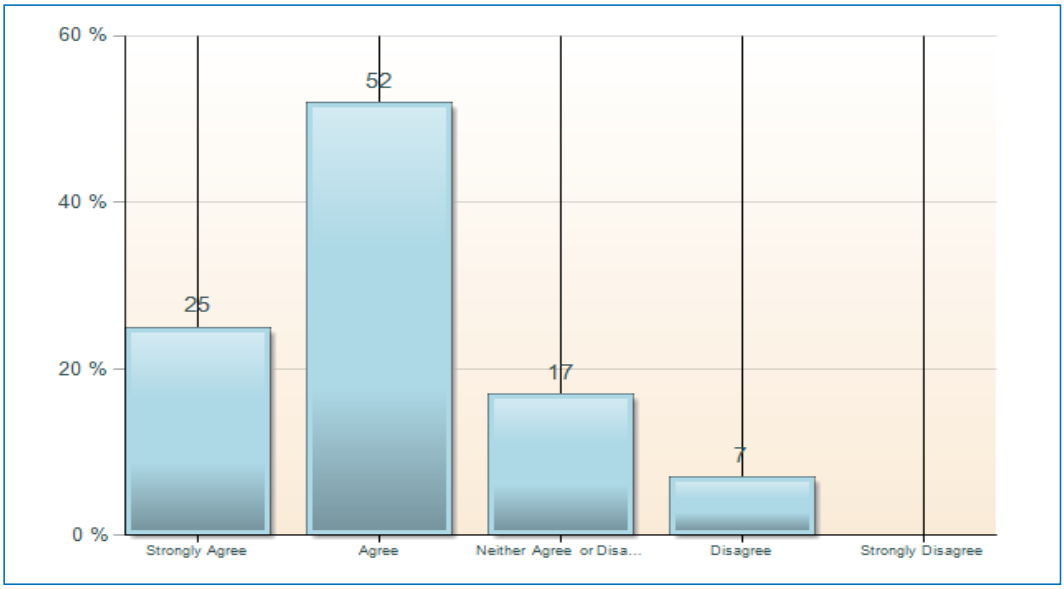
9

9. My job offers more positive than negative experiences?



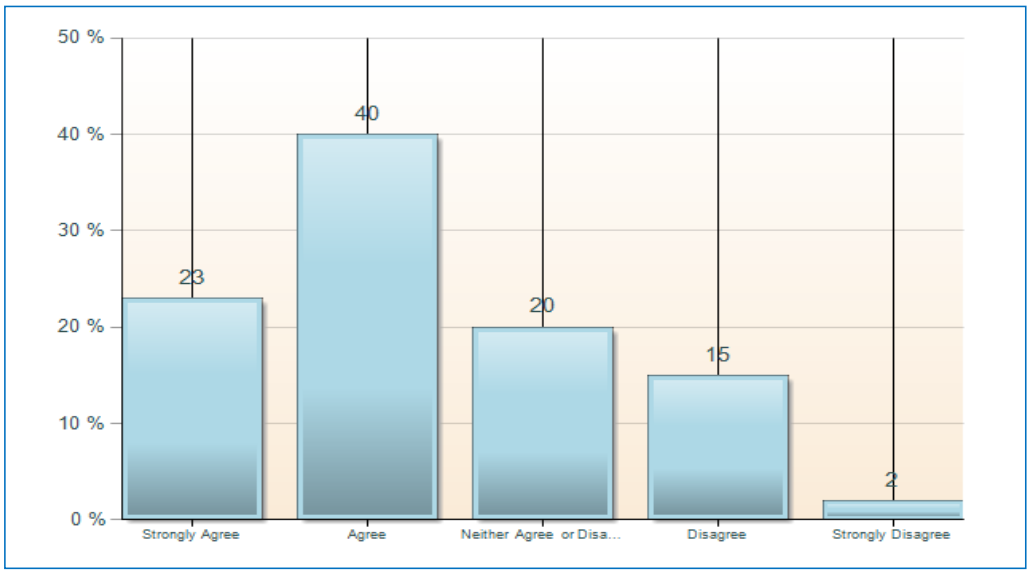
10

10. Working within critical care gives me a strong feeling of personal accomplishment?



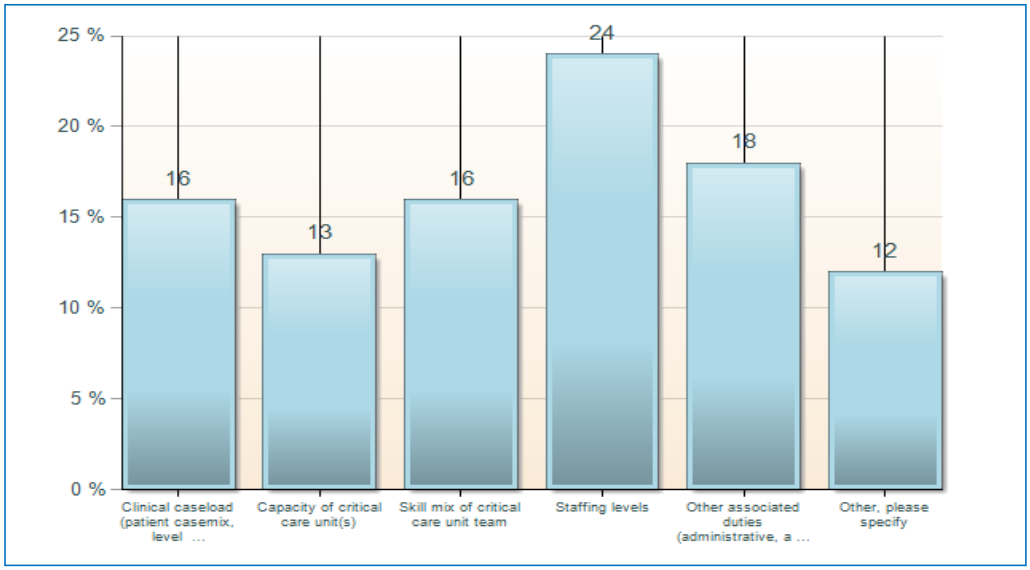
11

11. The environment in which I currently work is stressful and pressurised?



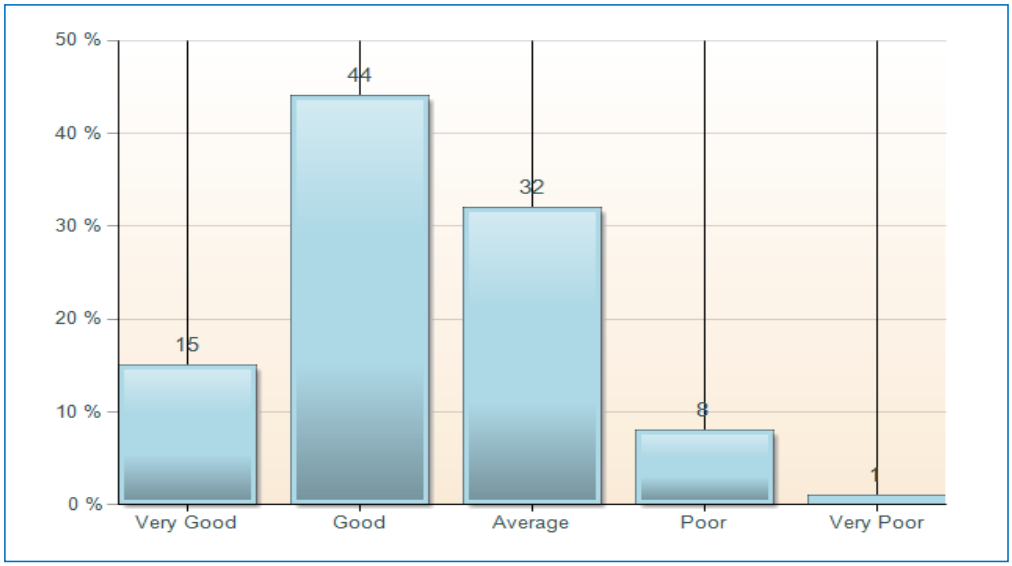
12

12. Which of the following places the biggest pressure on your workload?



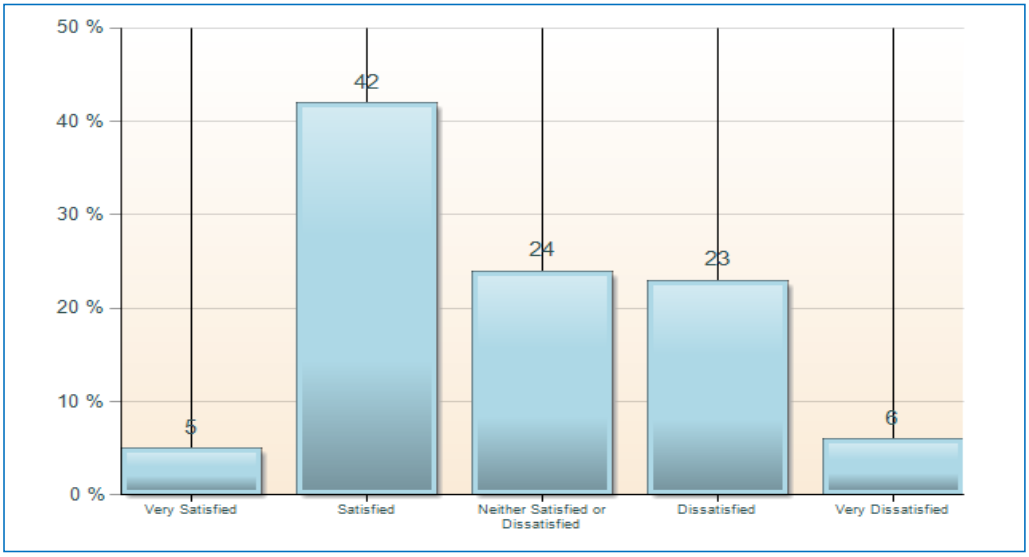
13

13. The morale and team spirit within my unit is?



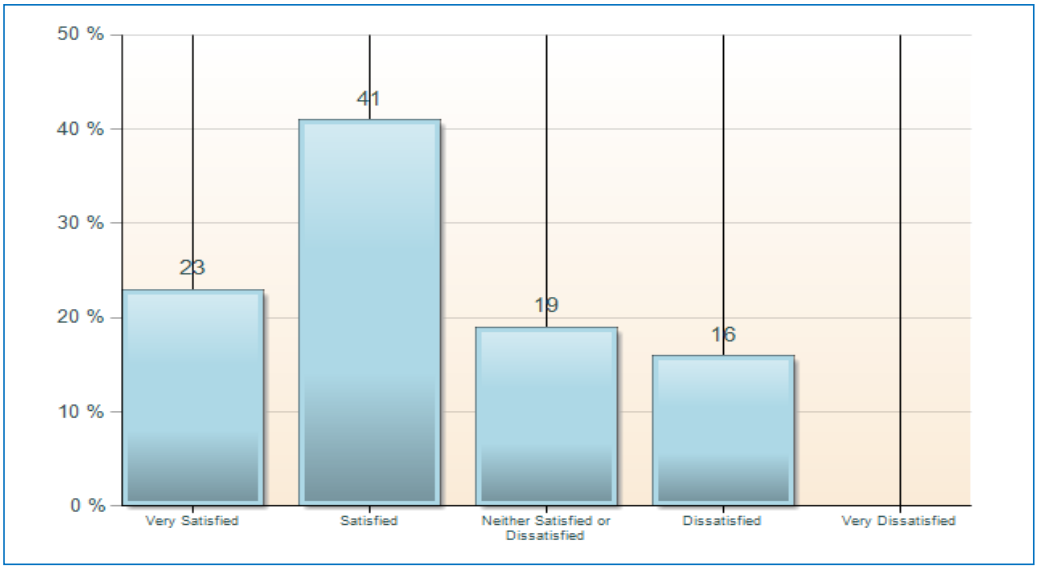
14

14. How satisfied are you with the level and type of critical care training available in the Republic of Ireland?



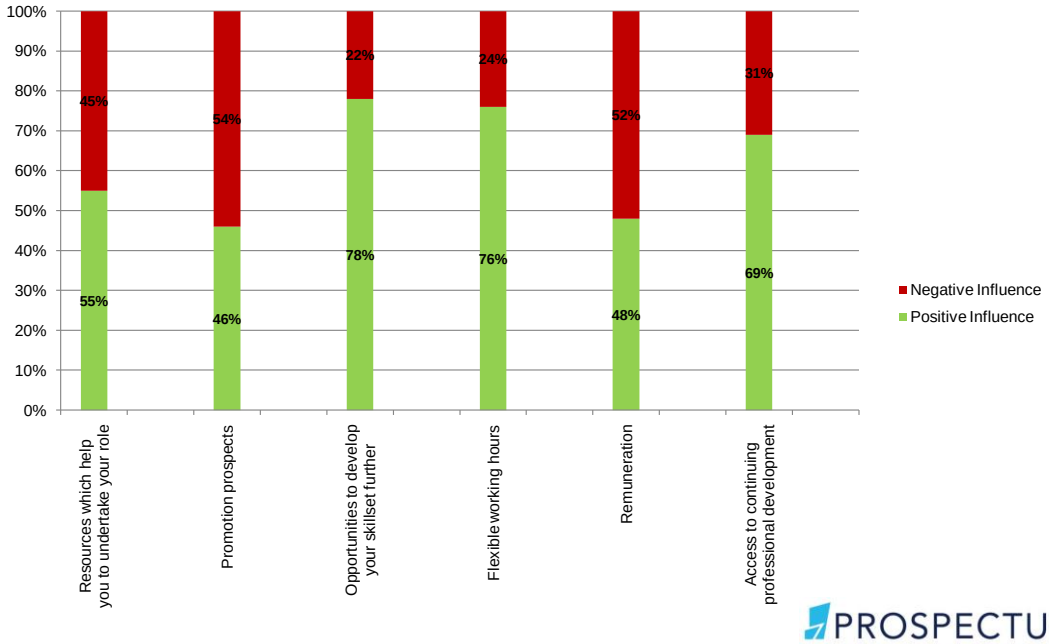
15

15. How satisfied are you with the level and type of critical care training that you have received to date?



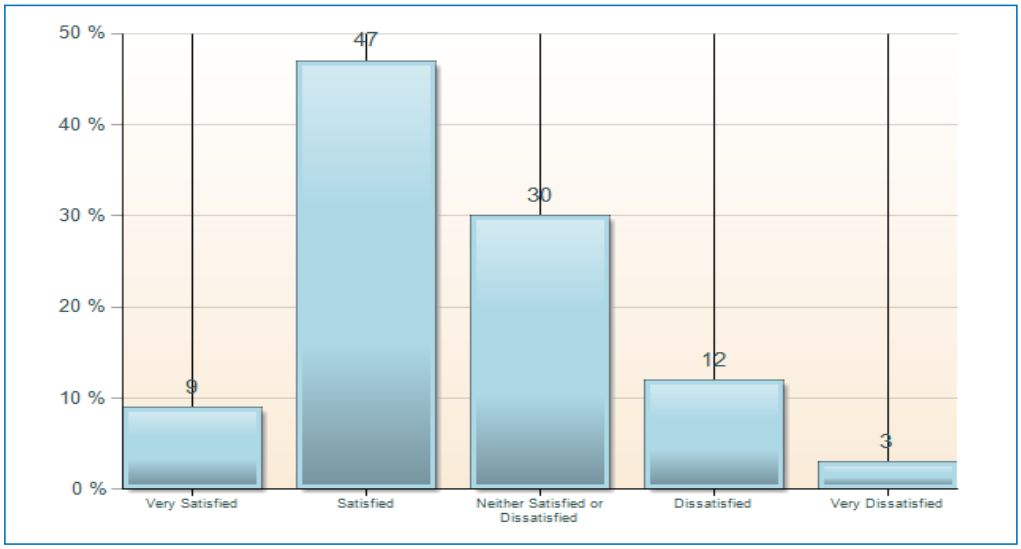
16

16. Please indicate which of the following positively or negatively may influence your decision to continue to work within critical care?



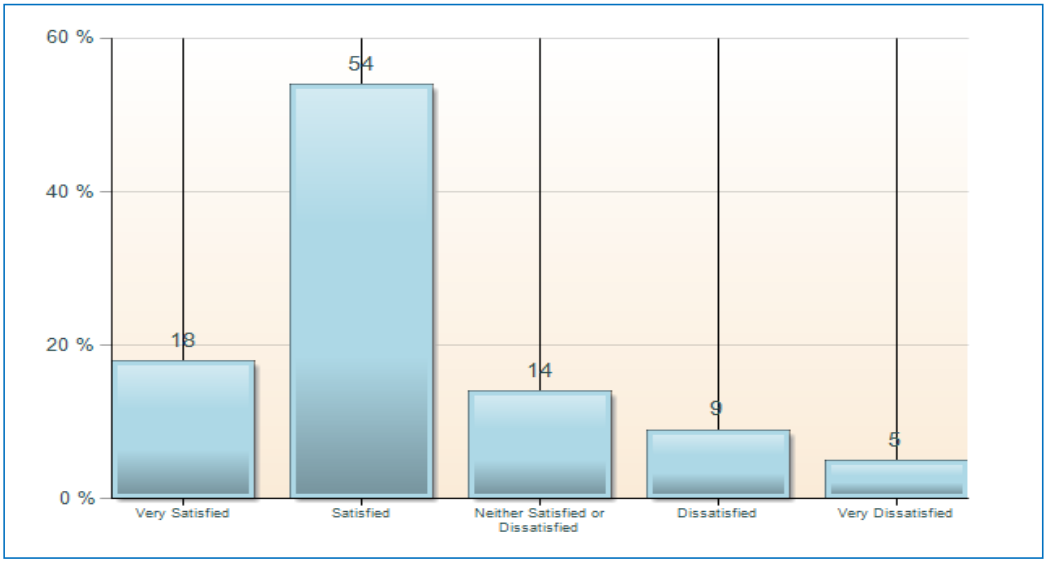
17

17. How satisfied are you that your critical care unit(s) has developed and implemented appropriate risk assessment / management policies and procedures?



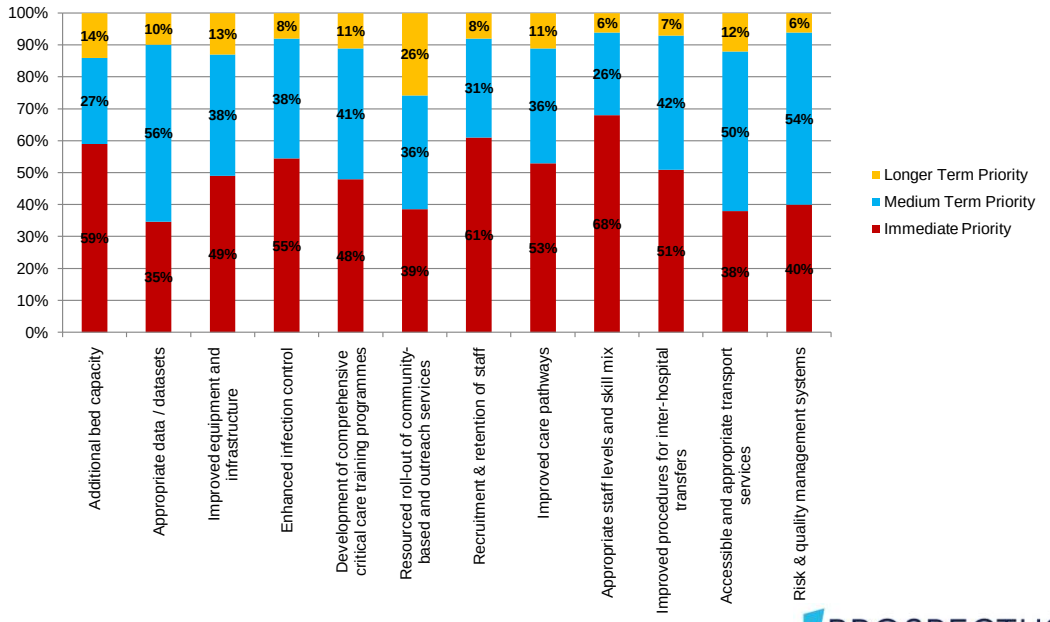
18

18. How satisfied are you that your critical care unit(s) has taken and continues to take the necessary steps to minimise the risks to patients of acquiring a health care associated infection?



19

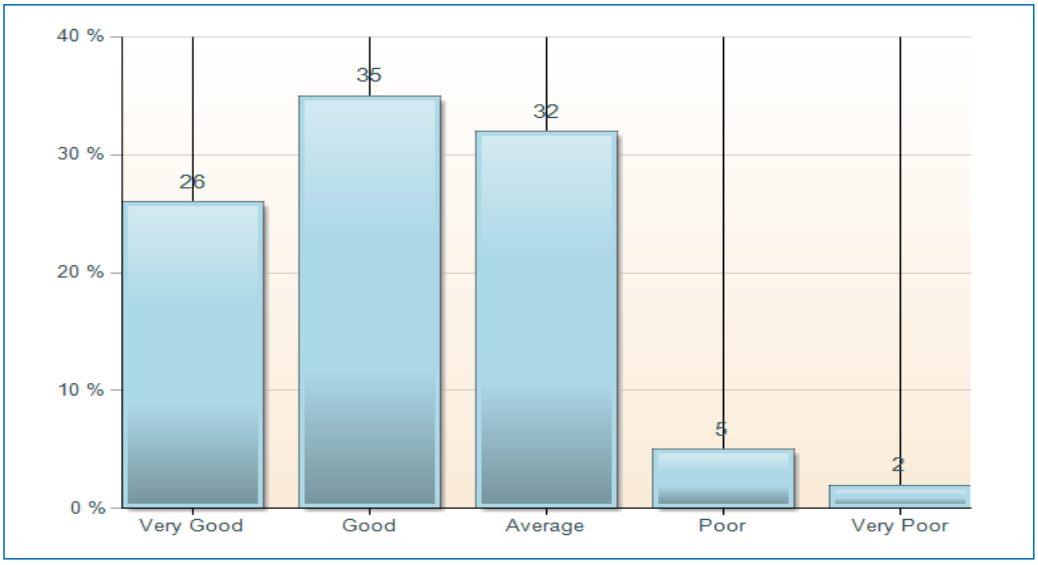
19. If you were to prioritise areas for development in adult critical care services, how might you rank the following potential developments?



PROSPECTUS
PUTTING STRATEGY TO WORK

20

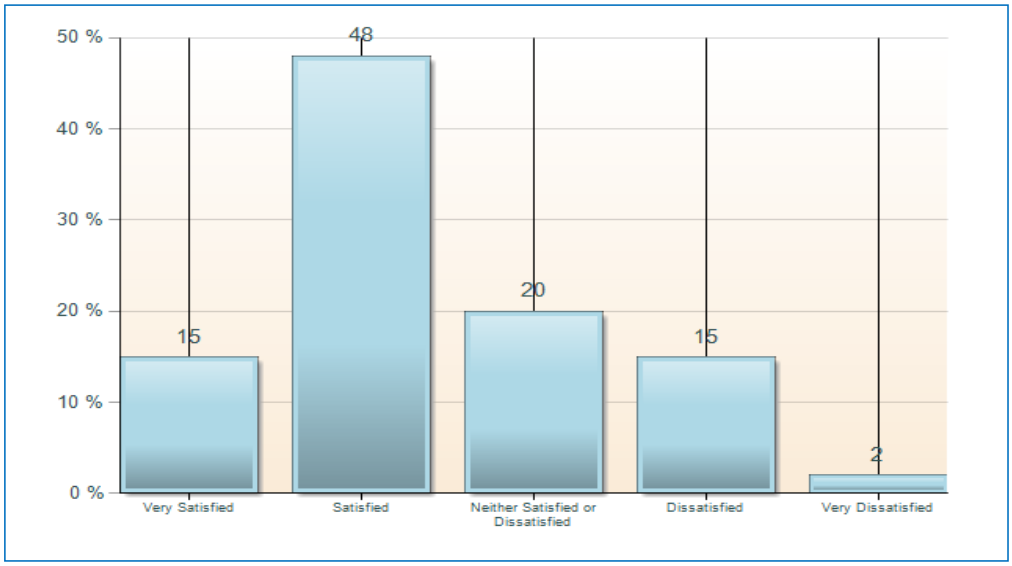
20. Please rate the current provision of adult critical care services within your hospital



PROSPECTUS
PUTTING STRATEGY TO WORK

21

21. Please rate your overall level of satisfaction working within a critical care environment in the Republic of Ireland



22

Appendix J

Activity Data Templates

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

National Review of Adult Critical Care Services in the Republic of Ireland

Unit Overview at 07:59 on Tuesday June 3rd
Summary

Hospital:	
Unit:	
Specialty of Unit: (where applicable)	

Please complete the Table overleaf for all patients currently receiving care in your unit on Tuesday the 3rd of June at 07:59. When all of the included patients have been discharged/transferred, please return the completed template to Prospectus.

Total number of beds within your unit	
Total number of occupied beds within your unit	
Total number of staffed beds within your unit	

Patients in a bed within your unit at 07:59 on Tuesday June 3rd

	Admission to your Unit		Discharge from your Unit	
	Date	Time	Date	Time
Patient 1	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 2	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 3	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 4	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 5	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 6	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 7	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 8	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 9	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 10	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 11	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 12	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 13	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 14	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 15	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 16	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 17	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 18	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 19	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 20	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 21	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 22	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK
Patient 23	DD / MM / YEAR	HH:MM - 24 HR CLOCK	DD / MM / YEAR	HH:MM - 24 HR CLOCK

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

National Review of Adult Critical Care Services in the Republic of Ireland

Referrals (not admitted) and cancellations to your unit

Weekly Summary

Hospital:	
Unit:	
Specialty of Unit: (where applicable)	
Week Ending: (Please circle as appropriate)	June 10th June 17th June 24th July 1st

Please complete the Table overleaf on a weekly basis to include all patients that either were referred to your unit but not admitted or where elective surgery was cancelled because of a planned admission to your unit not being possible. Please return the template completed to Prospectus on a weekly basis.

Referrals / Cancellations	Referrals (not admitted) and cancellations to your unit						
	Please select most appropriate reason for non-admission or cancellation of planned admission						
	Lack of beds available within your unit	Isolation room required but not available	Lack of staff available within your unit	Inappropriate referral	Bed Closures	Cancellation of Elective Surgery	Other, please specify (Please also use this area for supplementary notes where necessary)
Patient 1	☐	☐	☐	☐	☐	☐	
Patient 2	☐	☐	☐	☐	☐	☐	
Patient 3	☐	☐	☐	☐	☐	☐	
Patient 4	☐	☐	☐	☐	☐	☐	
Patient 5	☐	☐	☐	☐	☐	☐	
Patient 6	☐	☐	☐	☐	☐	☐	
Patient 7	☐	☐	☐	☐	☐	☐	
Patient 8	☐	☐	☐	☐	☐	☐	
Patient 9	☐	☐	☐	☐	☐	☐	
Patient 10	☐	☐	☐	☐	☐	☐	
Patient 11	☐	☐	☐	☐	☐	☐	
Patient 12	☐	☐	☐	☐	☐	☐	
Patient 13	☐	☐	☐	☐	☐	☐	
Patient 14	☐	☐	☐	☐	☐	☐	
Patient 15	☐	☐	☐	☐	☐	☐	
Patient 16	☐	☐	☐	☐	☐	☐	
Patient 17	☐	☐	☐	☐	☐	☐	
Patient 18	☐	☐	☐	☐	☐	☐	
Patient 19	☐	☐	☐	☐	☐	☐	
Patient 20	☐	☐	☐	☐	☐	☐	
Patient 21	☐	☐	☐	☐	☐	☐	
Patient 22	☐	☐	☐	☐	☐	☐	
Patient 23	☐	☐	☐	☐	☐	☐	
Patient 24	☐	☐	☐	☐	☐	☐	
Patient 25	☐	☐	☐	☐	☐	☐	

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

National Review of Adult Critical Care Services in the Republic of Ireland

Unit Activity Data for all Admissions between 08:00 AM June 3rd and 07:59 AM on July 1st

Daily Summary

Hospital:	
Unit:	
Specialty of Unit: (where applicable)	

Admission Details	
Age:	Years
Gender:	Female / Male

This template should be completed for all admissions to your critical care unit between 08:00 AM on Tuesday June 3rd to 07:59 AM on Tuesday July 1st

A template should be completed for all admissions to your unit during the above period

Please include any relevant additional comments regarding this admission:

Admission to your Hospital

Date:	DD / MM / YEAR
Time:	HH:MM - 24HR CLOCK

Admission to your Unit

Date:	DD / MM / YEAR
Time:	HH:MM - 24HR CLOCK

Readmission to your Unit ☐ Yes ☐ No

If yes, discharged within last: ☐ 24 hrs ☐ 48 hrs ☐ 72 hrs ☐ 72 hrs +

CPR in last 24 hours (prior to admission) ☐ Yes ☐ No

Visited by Critical Care Team Member (on duty for unit) Prior to Admission ☐ Yes ☐ No

	Referred by:	**Admitted to your Unit by:**
SHO	☐	☐
Registrar	☐	☐
Anaesthetist/Intensivist	☐	☐
Consultant (other)	☐	☐
Other:		

Delayed Admission: ☐ Yes ☐ No

- If yes, hours between referral and admission to your unit: ☐

Seen by Consultant Anaesthetist in unit within (number of hour(s): ☐

Admitted From:

Internal Hospital Transfer ☐

External Hospital Transfer ☐ → Public Hospital ☐ Private Hospital ☐

Reason for External Transfer

Other, please specify: ☐ Specialist ICU Service ☐ National Specialty Service ☐

Mode of Transfer

Other, please specify: ☐ Regular Ambulance ☐ Mobile Intensive Care Unit ☐

Location within Internal/ External Hospital Prior to Admission to your Unit:

Theatre ☐ → Elective Surgery ☐ Emergency Surgery ☐

Ward ☐

Accident & Emergency ☐

Recovery Only ☐

Standalone ICU ☐ →

Combined ICU/HDU/CCU ☐ → Level 3 Bed* ☐ Level 2 Bed* ☐

Standalone HDU ☐ *see definition on back page

CCU ☐

Other, please specify: ☐

Specialty of Admission:

Cardiology	☐	Gastroenterology	☐	Hepatology	☐	General Medicine	☐
Orthopaedic	☐	Burns & Plastics	☐	Urology	☐	General Surgery	☐
Cardio Thoracic	☐	Neurosurgery	☐	Vascular Surgery	☐	Respiratory	☐

Other, please specify

Admission Infections:

	Yes - Known to Have	No	No Sample/Screen Done
Admission MRSA	☐	☐	☐
Admission C. Diff	☐	☐	☐
Admission VRE	☐	☐	☐

Isolation Room

	Yes	No
Required:	☐	☐
Available:	☐	☐
Utilised:	☐	☐

Reason for Admission: (Please select the primary reason)

Pneumonia	☐	Large Bowel Tumour	☐	Abnormality of aortic valve	☐
Acute Renal Failure	☐	Aortic / Illiac Dissection/Aneurysm	☐	Primary brain / meningeal tumour	☐
Chronic Obstructive Pulmonary Disease	☐	Non-traumatic Large Bowel Perforation/rupture	☐	Subarachnoid bleeding	☐
Status Epilepticus / Uncontrolled Seizures	☐	Oesophageal / Gastro-oesophageal Tumour	☐	Primary brain injury	☐
Acute Myocardial Infarction	☐	Surgery for Rheumatoid / Osteoarthritis	☐	Intracerebral bleeding	☐
Post Cardiac Arrest	☐	CABG	☐	Subdural haematoma	☐
Multiple Trauma	☐	Chronic Degeneration of aortic valve	☐		

If other, please specify:

Level of Sepsis at Admission to Unit No Sepsis ☐ Sepsis (3 SIRS + infection) ☐ Severe Sepsis (+ organ dysfunction) ☐

Admission SOFA (Sequential Organ Failure Assessment) - based on tests completed within first 2 hours post admission

Mean Arterial Pressure / vasopressors (vasopressor drug doses are in mcg/kg/min)		**Glasgow Coma Score**		**Creatinine (mg/dl) [micromol/L] (or urine output)**	
≥70 mmHg	☐	15	☐	≤1.1	☐
< 70 mmHg	☐	13 – 14	☐	1.2 – 1.9 [110 - 170]	☐
dop <= 5 or dob (any dose)	☐	10 – 12	☐	2.0 – 3.4 [171 - 299]	☐
dop > 5, epi <= 0.1 or nor <= 0.1	☐	6 – 9	☐	3.5 – 4.9 [300 - 440] (or < 500 ml/d)	☐
dop > 15, epi > 0.1 or nor > 0.1	☐	< 6	☐	> 5.0 [>440] (or < 200 ml/d)	☐
		Not Measured	☐	Neither Measured	☐
PaO2/FiO2 (KPA)		**Bilirubin (mg/dl), [micromol/L]**		**Platelets×10³/mcl**	
≥55.33	☐	≤1.1	☐	≥150	☐
< 55.33 (+/- respiratory support)	☐	1.2 – 1.9 [20 - 32]	☐	< 150	☐
< 40 (+/- respiratory support)	☐	2.0 – 5.9 [33 - 101]	☐	< 100	☐
< 26.66 and respiratory support	☐	6.0 – 11.9 [102 - 204]	☐	< 50	☐
< 13.33 and and respiratory support	☐	> 12.0 [>204]	☐	< 20	☐
Not Measured	☐	Not Measured	☐	Not Measured	☐

Daily Record - Organ Support[1]	Calendar Days 00:00 - 23:59														
	Day 1[2]	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15
Basic Respiratory Support															
Advanced Respiratory Support															
Basic Cardiovascular Support															
Advanced Cardiovascular Support															
Renal Support															
Neurological Support															
Gastrointestinal Support															
Dermatological Support															
Liver Support															
Other (please, specify type):															
Nurse-Patient Ratio Received[3]															
Dedicated Nurse: Highest Level of Training Completed[4] (see scale below - please complete for the number of shifts utilised on a daily basis)															
Shift 1															
Shift 2															
Shift 3															
Shift 4															
Ready for Discharge?	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N

[2] Time of admission up to 23:59 on the day of admission

[3] Maximum ratio for each calendar day

Please continue on a new sheet should a patient's episode of care extend beyond 15 days

[1]Basic Respiratory Support - indicated by one of the following:

- admissions receiving 50% or more oxygen delivered by a face mask except those receiving short-term increases in FiO_2
- admissions receiving close observation due to the potential for acute deterioration to the point of requiring advanced respiratory monitoring and support
- admissions receiving physiotherapy or suction to clear secretions, at least two hourly, either via tracheostomy, a minitracheostomy or in the absence of an artificial airway
- admissions recently extubated after a prolonged period (e.g. More than 24 hours) of intubation and ventilation until the admission is deemed to have recovered normal protective airway reflexes and adequate respiration
- admissions receiving mask CPAP or non-invasive ventilation
- admissions intubated to protect their airway but receiving no ventilatory support and who are otherwise stable

[1]Advanced Respiratory Support - indicated by one of the following:

- admissions receiving invasive, mechanical, ventilatory support including BiPAP or CPAP via a tracheal tube but excluding mask CPAP or non-invasive methods
- admissions receiving extracorporeal respiratory support

[1]Basic Cardiovascular Support - indicated by one of the following:

- admissions receiving treatment for circulatory instability due to hypovolaemia from any cause
- admissions with a CVP line in place and used for basic monitoring or for central venous access to deliver therapeutic agents
- admissions with an arterial line being in place and used for basic monitoring of arterial pressure or for sampling of arterial blood
- admissions receiving a single, intravenous, vasoactive drug to support arterial pressure, cardiac output or organ perfusion
- admissions receiving intravenous drugs to control cardiac arrhythmias
- admissions receiving non-invasive measurement of cardiac output and other indices

[1]Advanced Cardiovascular Support - indicated by one of the following:

- admissions receiving multiple intravenous vasoactive and/or rhythm controlling drugs to support arterial pressure, cardiac output or organ perfusion
- admissions receiving critical care after resuscitation following cardiac arrest
- admissions receiving invasive measurement of cardiac output and other indices
- admissions with an intra aortic balloon pump in place
- admissions with a temporary cardiac pacemaker
- admissions with a gastrointestinal tonometer in place

[1]Renal Support - indicated by the following:

- admissions receiving acute renal replacement therapy (e.g. Haemodialysis, haemofiltration, etc)

[1]Neurological Support - indicated by one of the following:

- admissions with central nervous system depression sufficient to prejudice their airway and protective reflexes except depression caused by sedation prescribed to facilitate mechanical ventilation
- admissions receiving invasive measurement of ICP, jugular bulb sampling, cerebral function monitoring, or cooling etc
- admissions with an External Ventricular Drain (EVD) for drainage purposes
- admissions requiring constant nursing attention and/or heavy sedation due to being severely agitated or epileptic

[1]Gastrointestinal Support - indicated by the following:

- admissions receiving parental or enteral nutrition (i.e. Any method of feeding other than normal oral intake)

[1]Dermatological Support - indicated by one of the following:

- admissions with major (e.g. Greater than 30% of body surface area affected) skin rashes, exfoliation, or burns
- admissions receiving multiple, large trauma dressings
- admissions receiving complex dressings (e.g. Open abdomen or major - greater than 30% body surface affected - skin dressings)

[1]Liver Support - indicated by the following:

- admissions receiving extracorporeal liver replacement via a device and includes charcoal haemoperfusion via a haemofiltration machine where it is being used to replace liver function

[4]Levels of Critical Care Training Completed - Nursing Staff

A: Higher Diploma / Graduate Diploma in critical care completed (or equivalent) and at least one years experience working in critical care

B: Post graduate certificate in critical care completed and at least one years experience working in critical care

C: Hospital specific critical care programme(s) completed

D: Previous experience in critical care (include where staff member is working on an agency basis or has worked for under 6 months in current unit)

Discharge from your Unit

Status at Discharge: Alive ☐ Deceased ☐

Where patient is alive on discharge, please complete the following:

Date:	DD / MM / YEAR
Time:	HH:MM - 24HR CLOCK

Timeliness of Discharge from your Unit:

Fully Ready ☐ Delayed ☐ Early ☐

Discharged to:

Internal Hospital Transfer ☐

External Hospital Transfer (Ireland) ☐ ➡ Public Hospital ☐ Private Hospital ☐

External Hospital Transfer (overseas) ☐

Mode of Transfer (Please complete for all external hospital transfers)

Regular Ambulance Vehicle ☐

Mobile Intensive Care Unit ☐

Other, please specify: ☐

Location Out:

Ward ☐

Standalone ICU ☐ ➡

Combined ICU/HDU/CCU ☐ ➡ Level 3 Bed* ☐ Level 2 Bed* ☐

Standalone HDU ☐ ***see definition below**

CCU ☐

Other, please specify ☐

Where Patient has died, please complete:

Date of Death DD / MM / YEAR Time of Death HH : MM

Organ Donor Yes ☐ No ☐

Please keep a record of the date of hospital discharge and the patients status at discharge as this will be required at a later date for follow up.

Levels of Critical Care for Adult Patients (The Intensive Care Society UK)

Level 3: Patients requiring advanced respiratory support alone or basic respiratory support together with support of at least two organ systems. This level includes all complex patients requiring support for multi-organ failure.

Level 2: Patients requiring more detailed observation or intervention including support for a single failing organ system or postoperative care, and those stepping down from higher levels of care

Please return this completed template to the Lead Coordinator within your hospital.

Appendix K

Overview Questionnaire Template

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

National Review of Adult Critical Care Services in the Republic of Ireland

Overview Questionnaire

(to be completed by each hospital delivering critical care services)

Background

It has been recognised for some time that a detailed national review of adult critical care services is required to inform the planning and development of services in line with best international practice. The HSE has engaged Prospectus Consultants to undertake this review. The Prospectus Team includes a number of expert international advisors: Dr. Kathy Rowan, Director, ICNARC, Prof. Monty Mythen, Professor of Anaesthesia and Critical Care, UCLH, Dr. Andrew Webb, Medical Director, UCL Hospitals and Chair, Welsh Assembly Critical Care Advisory Group and Ms. Sheila Adam, European Society of Intensive Care Medicine (Nursing and AHP committee).

A Steering Group and Project Team have also been established by the HSE to oversee the review and subsequent implementation. This review is fully supported by the ICSI and the IACCN, and in addition to ICSI and IACCN representatives on the Project Team, ICSI has nominated two Critical Care experts, Dr. Gavin Lavery, Director, Critical Care Services, Royal Group Hospitals, Belfast and Prof. Armand Girbes, Chairman of Department of Intensive Care medicine at the University Hospital VU Medical Center in Amsterdam to work with the Prospectus Team.

The project will involve **a comprehensive review of current services, including visits to all Republic of Ireland adult critical care units, and an assessment of future requirements** to the year 2020.

In order to obtain a comprehensive overview of the type and scale of your current critical care facilities and services, please complete all the following relevant sections of this document and return it to Prospectus by post or email by Wednesday 9th July 2008. Each hospital has already nominated a lead co-ordinator, whose responsibility it is to organise completion of this document. If you have any questions please contact: Annette Hughes: ahughes@prospectus.ie; or Jenny Horan: jhoran@prospectus.ie; or phone: 01 260 3122.

Overview of this questionnaire

This questionnaire is divided into two parts. Part A relates to the overall **critical care bed stock** in your hospital and its **governance**. Part B examines **each specific critical care unit** within the overall hospital.

Part A (to be completed once)

Section 1: **Hospital information, Critical Care bed numbers and configuration and Governance of Critical Care**

This Section (1) is designed to provide an overview of adult critical care bed allocations and Governance within your hospital. This should be completed by the nominated Lead Coordinator in each hospital, as identified for the purposes of this review.

Part B (to be completed by each critical care unit)

Section 2: **Facilities and equipment**
Section 3: **Access to clinical support services**
Section 4: **Critical Care staffing overview**
Section 5: **Nursing Professional Development**

Sections 2 - 5 examine specific characteristics of each critical care unit within your hospital, and should be completed by each ICU and HDU facility or combined unit. (So, for example, Sections 2-5 might be completed by: the main ICU, by two separate HDUs, and by two other wards that have HDU beds. This would necessitate therefore that Part B would be completed five times). Each critical care unit should receive a copy of this section of the questionnaire from the Lead Co-ordinator and complete as required before returning to the Lead Coordinator. The Lead Coordinator should nominate a member of staff to complete Part B on behalf of each unit.

Definitions used in this questionnaire

A key part of this review is to establish the critical care bed allocation throughout the country. So, in answering the questions in relation to bed types, it is in relation to how the beds are allocated by your hospital and/or the HSE.

Please use the following definitions for critical care bed allocation:

Intensive Care Unit (ICU) beds

- Designated Critical Care beds which provide **at least one** of the following:
  - Complex support for multi-organ failure including haemofiltration and/or renal replacement therapy
  - Advanced respiratory support alone or basic respiratory support together with support of at least two organ systems.
- ICUs can be general ICUs or specialist ICUs (e.g. Cardio-thoracic, neurosurgery, burns and plastics, hepatology, etc.)
- This level aligns with 'Level 3' in the Intensive Care Society 2002 Standards and Guidelines

High dependency Unit (HDU) beds

- Designated Critical Care beds which provide **at least one** of the following:
  - Detailed observation and/or intervention including support for a single failing organ system or postoperative care
  - Observation facilities for patients recently relocated from higher levels of care whose needs can be met on an acute ward with additional advice and support from the critical care team.
- HDUs can be general HDUs or specialist HDUs (e.g. for Cardio-thoracic, neurosurgery, burns and plastics, hepatology, etc.)
- This level aligns with 'Level 2' in the Intensive Care Society 2002 Standards and Guidelines

Coronary Care Unit (CCU) beds – Coronary care beds should only be included in this Questionnaire if part of a shared ICU or HDU facility

- Designated Coronary Care beds provide the following:
  - Facilitates observation, monitoring, etc., following a cardiac episode, MI, insertion of pacemaker, post angiography, etc.

In relation to "dedicated" unit and "combined" unit please see explanation below

Dedicated units refer to units where all beds are designated to one level of care, for example, all intensive care beds or all high dependency beds.

Combined units refer to units where beds are allocated to provide two or more levels of care, for example, Intensive Care and High Dependency care provided in the same unit.

In relation to classifying beds as 'open' or 'not-open' please see explanation below.

Beds should be classified as **'open'** where the beds have access to the full range of critical care services and are fully staffed.

Beds should be classified as **'not-open'** when the beds do not have access to the full range of critical care services for any reason, including: closed for cleaning or infection control reasons, closed due to lack of staff, closed due to lack of equipment, or closed due to a combination of the above.

1. Hospital Information, Critical Care Bed Numbers and Configuration, and Governance of Critical Care

Hospital Information

1.1	**Hospital Name**		
1.2	**Hospital Band (as per HSE categories)** (Please choose one of the following)	**Band 1** (Major Academic Teaching Hospital)	
		Band 2 (Large Non-Teaching Hospital)	
		Band 3 (Smaller Hospital)	
1.3	**Level of Accident & Emergency service provided**	**24 hour service, 7 days per week**	
		12 hour daytime service, 7 days per week	
		8 hour daytime service, 7days per week	
		Other (please specify)	
1.4	**National Specialty (if applicable)**	• • • • •	
1.5	**How many critical care beds do you have? (please see definitions on Page 2)**	**ICU**	
		HDU	

Critical care bed numbers and configuration

1.6 Please provide details on the numbers and allocation of the critical care beds in your hospital (as per the definitions on Page 2)

Allocation of critical care beds

(Please identify whether each configuration type exists in your hospital and the number of these units that exist)

Allocation of Critical Care beds		Yes/no	Please state number of beds
A	Dedicated Intensive Care Unit		
	Dedicated High Dependency Unit		
	Dedicated Coronary Care Unit		
B	Combined critical care unit – ICU, HDU and CCU		
	Combined critical care unit – ICU and HDU		
	Combined critical care unit – ICU and CCU		
	Combined critical care unit – HDU and CCU		
C	Dedicated critical care beds situated on wards on in recovery areas.		

Please complete the following tables which best suits your Critical Care Facilities

(For example, if you have dedicated units, please complete section A and if you have combined units please complete section B.)

A. Dedicated Units

Beds in Dedicated Intensive Care Units

Please complete in relation to all ICU beds that exist on dedicated Intensive Care Units (this could be a 'General ICU' or may include specialist units, e.g. 'Cardio-thoracic ICU')

Intensive Care Beds (as defined on Page 2)	Number of Beds (Open)	Number of Beds (Not-open)	If not open, please give reason (e.g. not staffed, not equipped, infection control)
General ICU			
Dedicated Cardio-thoracic ICU			
Dedicated Burns & Plastics ICU			
Dedicated Hepatology ICU			
Dedicated Neurosurgical ICU			
Other (please specify)			
Other (please specify)			
Combined total ICU beds in your hospital			

Beds in Dedicated High Dependency Care Units

Please complete in relation to all HDU beds that exist in dedicated High Dependency Care Units (this could be a 'General HDU' or may include specialist units, e.g. 'Cardio-thoracic HDU)

High Dependency Care Beds (as defined on Page 2)	Number of Beds (Open)	Number of Beds (Not-open)	If not open, please give reason (e.g. not staffed, not equipped, infection control)
General HDU			
Dedicated Cardio-thoracic HDU			
Dedicated Burns & Plastics HDU			
Dedicated Hepatology HDU			
Dedicated Neurosurgical HDU			
Other (please specify)			
Other (please specify)			
Combined total HDU beds in your hospital			

Beds in Dedicated Coronary Care Units*

*Please note that this review does not include dedicated Coronary Care Units, so no further information on these facilities will be required.

Total Number of CCU beds in dedicated Coronary Care Unit	

B. Combined Units

Please complete the sections below which best reflect your facility:

i) Combined critical care unit – ICU, HDU and CCU
ii) Combined critical care unit – ICU and HDU
iii) Combined critical care unit – ICU and CCU
iv) Combined critical care unit – HDU and CCU

i) Combined ICU, HDU and CCU – Please complete with the breakdown of different types of critical care beds within your Unit

	Number of Beds (Open)	Number of Beds (Not-open)	If not-open, please state reason
Designated ICU beds			
Designated HDU beds			
Designated CCU beds			
Combined total ICU, HDU and CCU beds in this unit			

ii) Combined ICU and HDU – Please complete with the breakdown of different types of critical care beds within your Unit

	Number of Beds (Open)	Number of Beds (Not-open)	If not-open, please state reason
Designated ICU beds			
Designated HDU beds			
Combined total ICU and HDU beds in this unit			

iii) Combined ICU and CCU – Please complete with the breakdown of different types of critical care beds within your Unit

	Number of Beds (Open)	Number of Beds (Not-open)	If not-open, please state reason
Designated ICU beds			
Designated CCU beds			
Combined total ICU and CCU beds in this unit			

iv) Combined HDU and CCU – Please complete with the breakdown of different types of critical care beds within your Unit

	Number of Beds (Open)	Number of Beds (Not-open)	If not-open, please state reason
Designated HDU beds			
Designated CCU beds			
Combined total HDU and CCU beds in this unit			

C. Designated Critical Care facilities on wards or in recovery areas

We recognise that not all critical care beds (regardless of whether ICU or HDU) will be situated within dedicated critical care facilities either general or specialist.

In relation to critical care beds that are situated on other wards (including theatre recovery wards) please complete the table below

Number of designated Critical Care beds (ref. Page 2) situated on wards or in recovery areas

	ICU beds		HDU beds	
	Open	Not-open	Open	Not-open
General critical care beds				
Cardio-thoracic critical care beds				
Burns & Plastics critical care beds				
Hepatology critical care beds				
Neurosurgical critical care beds				
Other (please specify)				

Governance of Critical Care

1.7	**Critical Care Unit Leadership**	
	Is there a Critical Care Unit Director (i.e. Consultant Anaesthetist / Intensivist who is head of the unit)?	(yes / no)
	If yes:	
	Does the Director have dedicated sessions to fulfil this role? And if yes, how many sessions are allocated for the role?	(yes / no) (*number*)
	Is he/she dedicated to the unit (sole responsibility)?	(yes / no)
	Does he/she have clinical sessions within the Unit? And if yes, how many sessions?	(yes / no) (*number*)

1.8	**Day to day management of the Critical Care Unit**		
	Is there rotation of consultant anaesthetists to cover the critical care unit? If yes, how often to consultant anaesthetists rotate through the critical care unit?		(yes / no) Daily Weekly Other (specify)
	Does the unit have dedicated critical care admission and discharge policies?		(yes / no)
	Who makes the decision regarding the admission and discharge of patients to/from the critical care unit? (Choose one)	Anaesthetist / Intensivist	
		Anaesthetist / Intensivist and Physician or Surgeon (jointly)	
		Physician or Surgeon	
		Other (Please specify)	

1.9	**Provision of outreach care from critical care unit**	
	Is your unit resourced to provide outreach services?	(yes / no)
	If yes:	
	Please provide details on who provides the outreach service (medical and nursing staff, grade, etc): • Medical (e.g. Consultant, Registrar, etc.) • Nursing (e.g. Staff nurse, CNM, etc.)	
	How often is an outreach service provided?	Daily Weekly Monthly Other (specify)
	If no:	
	Does your unit provide an ad-hoc (unresourced) outreach service?	(yes / no)
	If yes, please provide details on who provides this service (medical and nursing staff, grade, etc) • Medical (e.g. Consultant, Registrar, etc.) • Nursing (e.g. Staff nurse CNM, etc.)	
	How often is an outreach service provided?	Daily Weekly Monthly Other (specify)

1.10	**Multidisciplinary team approach**		
	Are there regular multidisciplinary team meetings?	(*Daily / Weekly / Monthly / No)*	
	If yes, which of the following staff groups attend the meetings? (Please choose all that apply)	Medical	
		Nursing	
		AHPs (Please specify)	
		Others (e.g. infection control, risk management, etc.) (Please specify)	
	Are there regular multidisciplinary ward rounds?	(*Daily / Weekly / Monthly / No)*	
	If yes, which of the following staff groups participate in the ward rounds? (Please choose all that apply)	Medical	
		Nursing	
		AHPs (Please specify)	
		Others? (e.g. infection control, risk management, etc.) (Please specify)	

The remaining Sections of this questionnaire (Sections 2 – 5) should be completed by <u>each adult critical care unit</u> (including ICUs, HDUs, and other areas accommodating critical care beds) within your hospital	
Name/type of Unit	
Specialty (where applicable)	

2. Facilities & Equipment

2.1 Bed Configuration

Layout Type	Number of beds		
	Allocated as ICU	Allocated as HDU	Other
Number of single/isolation rooms (without air flow for protective isolation)			
Number of single/isolation rooms (with air flow for protective isolation)			
Number of beds in open plan areas (if more than one open plan area, please specify number of beds per area)			

Of all of the above beds, how many have access to:

Haemodialysis _____ Continuous Renal Replacement Therapy _____

2.2 Are the following facilities available on your unit – as separate, dedicated facilities (for the critical care unit)

Facility	Yes / No	Comment (if required)
Open plan nursing station		
Separate equipment room		
Separate equipment room (including Bioengineer workspace)		
Clean utility room		
Dirty utility room		
Storage room		
Waiting area (within the unit)		
Staff hand washing and gowning area		
Family/visitor hand washing and gowning area		
Offices – Medical (Number of offices and number of people accommodated in each)		
Offices – Nursing (Number of offices and number of people accommodated in each)		
Staff rest area (including facilities)		
Staff WC (number)		
Patient interview room		
Pantry		

2.3 Are the following facilities available for use by your unit? (may not be separate or dedicated)

Facility	Yes / No	Comment (if required)
Overnight accommodation for relatives of critical care patients		
Seminar or teaching room for critical care staff		

3. Access to Clinical Support Services

Does your critical care service have access to the following services, and on what basis?

	On-site service availability			Where service is not available on-site, is service available off-site?(yes/no)
	24 hours	Less than 24 hours	None	
Radiology Services				
• Plain film radiography				
• Ultrasonography				
• CT				
• MRI				
Laboratory services - Near patient testing				
• Blood gases				
• Glucose				
• Electrolytes				
• Lactate				
• Co-oximeter				
• Haemoglobin				
• Coagulation				
• Troponin				
Laboratory services - Off unit testing				
• Biochemistry				
• Haematology				
• Histopathology				
• Toxicology				
• Microbiology				
• Blood gases				
• Blood transfusion services				
EEG/neurophysiology				
Medical electronics/medical physics services				

4. Critical Care Staffing Overview

4.1 Medical Staff

Consultants - please complete one line per member of consultant staff

Consultant specialty (e.g. anaesthetist, intensivist, other base specialty)	Number of sessions in critical care unit	Does the consultant have other commitments while working in critical care unit? (please describe) (e.g. Consultant covering ICU and OT)

What are the on-call arrangements for consultant staff?

What is the out-of-hours on-call rota? (e.g. 1 in 3)	
Is the on-call critical care consultant: 1. Dedicated to the critical care service? 2. Shared with other services?	
Is the critical care consultant resident in the hospital while on-call?	
Do the on-call consultants for critical care also have day-time critical care sessions in the hospital?	

Non Consultant Hospital Doctors (NCHDs)

Specialist Registrars (SPR) - please complete one line per SPR staff member

Base specialty	Time in critical care unit		Does the SPR have other commitments while working in the critical care unit? (please describe)
	If part of a modular programme please detail number of months on critical care rotation	If part of a non-modular programme please detail number of months spent in critical care unit	

Registrars - please complete one line per staff member

Base specialty	Time in critical care unit		Does the Registrar have other commitments while working in the critical care unit? (please describe)
	If part of a modular programme please detail number of months on critical care rotation	If part of a non-modular programme please detail number of months spent in critical care unit	

Senior House Officers (SHOs) - please complete one line per staff member

Base specialty	Time in critical care unit		Does the SHO have other commitments while working in the critical care unit? (please describe)
	If part of a modular programme please detail number of months on critical care rotation	If part of a non-modular programme please detail number of months spent in critical care unit	

Are there currently any unfilled or vacant medical positions? (yes / no)

If yes, please describe (e.g. type and level of position, number of sessions or hours unfilled)

Type and level of position	Number of sessions / hours unfilled

Is this centre recognised for training by the Irish Board of Intensive Care Medicine? (yes / no)

Does your hospital offer any specific training or education specifically for critical care medical staff? (yes / no)

If yes, please describe

Medical staff category (Consultant, Reg, SHO, etc.)	In-house training / education provided

4.2 Nursing Staff

Critical Care Nursing staff allocation by grade and number (NB: staff dedicated to critical care only)

	Number currently employed		Number of vacant positions (within approved headcount) - WTE
	WTE	Headcount	
Divisional Nurse Manager/ADON *(where time is dedicated to critical care)*			
Advanced Nurse Practitioners			
Clinical Nurse Manager 3			
Clinical Nurse Manager 2			
Clinical Nurse Manager 1			
Clinical Facilitator/Co-ordinator for nurse education			
Clinical Nurse Specialists (please specify)			
Staff Nurses			
Informatics Nurse			
Student Nurses, undergraduate (supernumerary)			
Post-registration Student Nurses			
Other (please specify)			

Leave

What is the average number of nursing staff 'sick leave' hours per week in your unit?	
What is the average number of nursing staff 'maternity leave' hours per week in your unit?	
What is the average number of nursing staff 'parental leave' hours per week in your unit?	
How many people in your unit benefit from term time leave? And what is the time impact?	

In relation to your current vacant/unfilled positions please describe how these are covered.

	Please describe how this vacancy is covered (e.g. replaced by agency/overtime, number of staff, hours worked per week, etc.)
For vacant positions	
For sick leave	
For maternity leave	
For parental leave	
For term time leave	
For other requirements (please specify)	

Specialist Nursing Support from outside of Critical Care Units

Please describe the Nursing Specialist support which although *not* dedicated to the critical care unit, is providing a service to the patients within the unit. (e.g. Respiratory Clinical Nurse Specialist)

Clinical Nurse Specialist	Approx. number of hours per week spent in the Unit

What was your unit's nursing annual turnover rate for 2007? _____

Role in delivery of Critical Care Courses (if any)

If your unit currently runs any critical care courses, please describe below.

Type of course	Duration	Frequency	Staff involved in delivery	Other comments

4.3 Health Care Assistants (dedicated to the critical care unit)

	Number currently employed		Number of vacant positions (within approved headcount) - WTE
	WTE	Headcount	
Health Care Assistants			

For Healthcare Assistants working within critical care, please list number of years experience in a critical care setting and what training achieved (e.g. FETAC Level 5, internal course, etc) for each staff member.

If FETAC Level 5 please indicate whether critical care module was included.

4.4 Allied Health Professionals

	Is the service available to critical care?		If yes, approximate time spent in unit (sessions, days, hours, etc) per week
	Daytime	Out of hours	
Physiotherapist			
Medical Social Worker			
Speech & Language Therapist			
Occupational Therapist			
Pharmacist			
Dietician			
Respiratory Therapist			
Psychology/bereavement support			
Chaplaincy			
Clinical and/or biomedical engineers			
Other (please specify)			

Are there currently any unfilled/vacant AHP positions? (yes / no)

If yes, please describe

Do AHPs have any specific training or preparation for working in the critical care unit (yes / no)

If yes, please describe

4.5 Support Staff

	Are these staff members available to your unit?			If yes - Please give number of hours per week
	Yes, as dedicated resources	Yes, through accessing a general/hospital resource	No, not available	
Secretaries				
Data clerks				
Ward clerks				
Household staff				
Pantry staff				
Contract cleaners				
Other (please specify)				

Does any specific training or education in critical care exist for support staff?

Staff category (e.g. as above)	*Description of Training or Education*

5. Nursing Professional Development

5.1 Nursing staff, Professional development and competency assessment within the Unit

Does your unit have a professional development plan in place (for all levels of nursing staff)? If only available to certain staff, please describe	Yes / No
Do all registered staff have a baseline competency assessment completed on commencement of employment within the unit (regardless of previous work experience)?	Yes / No
Does your unit have an induction / orientation programme?	Yes / No
Does rostering ensure that someone with ACLS is always on duty?	Yes / No
Are agency nurses required to complete formal competency assessment/testing?	Yes / No

5.2 Critical care nursing experience, please complete one line for each member of nursing staff from the critical care unit.

Staff Grade *(Please complete one line for each staff member)*	Number of years working in current unit	Year of registration	Age *A: Under 30 B: 30-39 C: 40-49 D: Over 50*	Where registration obtained *(ROI, Other EU or non EU)*	Details of past critical care nursing experience			Details of post registration critical care qualifications			
					Total number of years critical care nursing experience	Type of Hospital *(e.g. Major teaching hospital, Regional hospital, small local hospital)*	Location of Hospital *(ROI, Other EU or non EU)*	In-house critical care course (less than 6 months duration)	Advanced Cardiac Life Support Qualification	Post registration certificate, diploma, higher diploma or postgrad diploma in critical care	Other critical care specific qualification *(please specify)*

Appendix L

Detailed Breakdown of Future Bed Projections

A	B	C	D	E	F	G	H	I
Reason for admission	**1a. Total bed-days of care (June 2008)**					**1b. Bed-days by level of care (June 2008)**		
	LOS	**Bed-days**	**Imputed**	**Post 2/7**	**Total**	**Level 3**	**Level 2**	**Level 1/0**
General	5458	259	0	996	6713	3772	1543	1398
Neurosciences	1193	51	0	286	1529	1138	190	201
Neurosciences requiring specialist care	1060	31	0	261	1353	1041	140	172
Cardiothoracic	890	57	3	65	1015	475	354	186
Cardiothoracic requiring specialist care	798	44	3	54	899	426	309	164
Liver	203	16	0	27	247	136	46	65
Liver requiring specialist care	139	2	0	19	160	89	23	49
Burns	79	4	0	5	88	68	16	4
Burns requiring specialist care	53	1	0	5	59	49	10	0
All admissions not requiring specialist care	5774	308	0	1039	7121	3986	1666	1470
Dublin North-East	1521	109	0	321	1951	1139	456	357
Dublin Mid-Leinster	1485	48	0	197	1730	1165	316	248
Southern	1334	65	0	228	1627	846	463	318
Western	1435	85	0	293	1814	835	431	547

A	J	K	L
Reason for admission	**2. Bed-days of unmet need for admitted patients (June 2008)**		
	Delayed admission	**Early discharge**	**Total**
General	20	126	146
Neurosciences	7	40	47
Neurosciences requiring specialist care	6	30	36
Cardiothoracic	7	9	15
Cardiothoracic requiring specialist care	7	9	15
Liver	1	6	7
Liver requiring specialist care	1	4	4
Burns	0	3	3
Burns requiring specialist care	0	2	2
All admissions not requiring specialist care	22	139	161
Dublin North-East	5	31	36
Dublin Mid-Leinster	7	21	27
Southern	6	47	52
Western	5	41	46

A	M	N	O	P	Q	R	S	T
Reason for admission	**3. Extrapolation to full 2008 data**				**3. Extrapolation to 2008 - sensitivity analysis**			
	Level 3	**Level 2**	**Level 1/0**	**Unmet**	**Level 3**	**Level 2**	**Level 1/0**	**Unmet**
General	48,279	19,142	18,898	1,997	47,806	19,881	17,903	1,930
Neurosciences	13,876	2,371	2,547	613	14,409	2,555	2,493	606
Neurosciences requiring specialist care	12,671	1,782	2,194	467	13,218	1,963	2,129	460
Cardiothoracic	5,586	4,304	2,356	193	5,777	4,330	2,466	192
Cardiothoracic requiring specialist care	5,004	3,770	2,040	192	5,199	3,778	2,174	192
Liver	1,605	577	775	90	1,619	565	787	87
Liver requiring specialist care	1,049	276	576	56	1,049	273	574	53
Burns	850	190	49	37	957	186	52	38
Burns requiring specialist care	590	124	0	25	628	119	0	26
All admissions not requiring specialist care	50,882	20,632	19,815	2,189	50,475	21,384	18,824	2,122
Dublin North-East	14,059	5,608	4,492	452	14,307	5,730	4,476	460
Dublin Mid-Leinster	14,185	3,805	3,022	332	14,704	4,222	3,263	343
Southern	10,586	5,715	3,970	692	10,871	5,817	4,178	718
Western	12,053	5,505	8,330	713	10,593	5,614	6,907	601

A	U	V	W	X	Y	Z	AA	AB	AC	AD
Reason for admission	**4. Inflation for unmet need**		**5. Projected demand**		**6. Projection to 2020**					
	Level 3	**Level 2**	**2008 L3**	**2008 L2**	**2011 L3**	**2011 L2**	**2016 L3**	**2016 L2**	**2020 L3**	**2020 L2**
General	13,464	5,338	63,173	25,047	68,409	27,220	78,368	31,514	87,818	35,368
Neurosciences	100	17	14,500	2,477	15,539	2,663	17,494	3,037	19,173	3,363
Neurosciences requiring specialist care	92	13	13,172	1,852	14,098	1,989	15,832	2,272	17,301	2,533
Cardiothoracic	35	27	5,730	4,415	6,190	4,777	7,179	5,536	8,065	6,182
Cardiothoracic requiring specialist care	31	24	5,145	3,876	5,546	4,200	6,401	4,887	7,178	5,479
Liver	0	0	1,671	600	1,761	639	1,879	697	1,948	742
Liver requiring specialist care	0	0	1,093	288	1,157	304	1,252	325	1,310	339
Burns	0	0	880	197	1,010	214	1,300	252	1,596	283
Burns requiring specialist care	0	0	611	128	684	142	842	172	981	195
All admissions not requiring specialist care	14,190	5,754	66,630	27,018	72,185	29,334	82,795	33,891	92,860	37,946
Dublin North-East	3,921	1,564	18,303	7,300	20,041	7,948	23,448	9,242	26,803	10,424
Dublin Mid-Leinster	3,956	1,061	18,402	4,937	20,052	5,405	23,300	6,328	26,382	7,148
Southern	2,952	1,594	13,988	7,551	15,095	8,175	17,158	9,418	19,142	10,451
Western	3,361	1,535	15,903	7,263	17,099	7,833	19,216	8,946	21,127	9,969

A	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT
Reason for admission	**7. Translation of bed-days to total bed requirements**															
	2008 L3 80%	**2008 L2 80%**	**2011 L3 80%**	**2011 L2 80%**	**2016 L3 80%**	**2016 L2 80%**	**2020 L3 80%**	**2020 L2 80%**	**2008 L3 90%**	**2008 L2 90%**	**2011 L3 90%**	**2011 L2 90%**	**2016 L3 90%**	**2016 L2 90%**	**2020 L3 90%**	**2020 L2 90%**
General	217	86	235	94	269	108	301	122	193	77	209	83	239	96	268	108
Neurosciences	50	9	54	10	60	11	66	12	45	8	48	9	54	10	59	11
Neurosciences requiring specialist care	46	7	49	7	55	8	60	9	41	6	43	7	49	7	53	8
Cardiothoracic	20	16	22	17	25	19	28	22	18	14	19	15	22	17	25	19
Cardiothoracic requiring specialist care	18	14	19	15	22	17	25	19	16	12	17	13	20	15	22	17
Liver	6	3	7	3	7	3	7	3	6	2	6	2	6	3	6	3
Liver requiring specialist care	4	1	4	2	5	2	5	2	4	1	4	1	4	1	4	2
Burns	4	1	4	1	5	1	6	1	3	1	4	1	4	1	5	1
Burns requiring specialist care	3	1	3	1	3	1	4	1	2	1	3	1	3	1	3	1
All admissions not requiring specialist care	229	93	248	101	284	117	319	130	203	83	220	90	253	104	283	116
Dublin North-East	63	26	69	28	81	32	92	36	56	23	62	25	72	29	82	32
Dublin Mid-Leinster	64	17	69	19	80	22	91	25	57	16	62	17	71	20	81	22
Southern	48	26	52	28	59	33	66	36	43	23	46	25	53	29	59	32
Western	55	25	59	27	66	31	73	35	49	23	53	24	59	28	65	31

A	AU	AV	AW	AX	AY	AZ	BA	BB
Reason for admission	**8. Analyses excluding inflation due to unmet need - bed-days**							
	2008 L3	**2008 L2**	**2011 L3**	**2011 L2**	**2016 L3**	**2016 L2**	**2020 L3**	**2020 L2**
General	49,709	19,709	53,827	21,418	61,660	24,795	69,090	27,825
Neurosciences	14,400	2,460	15,431	2,645	17,373	3,016	19,040	3,339
Neurosciences requiring specialist care	13,081	1,839	14,000	1,975	15,722	2,256	17,181	2,516
Cardiothoracic	5,694	4,388	6,152	4,748	7,135	5,502	8,016	6,145
Cardiothoracic requiring specialist care	5,113	3,852	5,513	4,175	6,361	4,857	7,134	5,445
Liver	1,671	600	1,761	639	1,879	697	1,948	742
Liver requiring specialist care	1,093	288	1,157	304	1,252	325	1,310	339
Burns	880	197	1,010	214	1,300	252	1,596	283
Burns requiring specialist care	611	128	684	142	842	172	981	195
All admissions not requiring specialist care	52,440	21,264	56,810	23,086	65,153	26,669	73,066	29,858
Dublin North-East	14,382	5,736	15,747	6,245	18,422	7,261	21,056	8,189
Dublin Mid-Leinster	14,446	3,876	15,743	4,243	18,294	4,968	20,715	5,613
Southern	11,035	5,958	11,909	6,450	13,534	7,429	15,097	8,243
Western	12,542	5,728	13,484	6,177	15,150	7,053	16,653	7,858

A	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR
Reason for admission	**8. Analyses excluding inflation due to unmet need - bed-requirements**															
	2008 L3 80%	**2008 L2 80%**	**2011 L3 80%**	**2011 L2 80%**	**2016 L3 80%**	**2016 L2 80%**	**2020 L3 80%**	**2020 L2 80%**	**2008 L3 90%**	**2008 L2 90%**	**2011 L3 90%**	**2011 L2 90%**	**2016 L3 90%**	**2016 L2 90%**	**2020 L3 90%**	**2020 L2 90%**
General	171	68	185	74	212	85	237	96	152	60	164	66	188	76	211	85
Neurosciences	50	9	53	10	60	11	66	12	44	8	47	9	53	10	58	11
Neurosciences requiring specialist care	45	7	48	7	54	8	59	9	40	6	43	7	48	7	53	8
Cardiothoracic	20	16	22	17	25	19	28	22	18	14	19	15	22	17	25	19
Cardiothoracic requiring specialist care	18	14	19	15	22	17	25	19	16	12	17	13	20	15	22	17
Liver	6	3	7	3	7	3	7	3	6	2	6	2	6	3	6	3
Liver requiring specialist care	4	1	4	2	5	2	5	2	4	1	4	1	4	1	4	2
Burns	4	1	4	1	5	1	6	1	3	1	4	1	4	1	5	1
Burns requiring specialist care	3	1	3	1	3	1	4	1	2	1	3	1	3	1	3	1
All admissions not requiring specialist care	180	73	195	80	224	92	251	103	160	65	173	71	199	82	223	91
Dublin North-East	50	20	54	22	64	25	73	29	44	18	48	20	57	23	65	25
Dublin Mid-Leinster	50	14	54	15	63	18	71	20	44	12	48	13	56	16	64	18
Southern	38	21	41	23	47	26	52	29	34	19	37	20	42	23	46	26
Western	43	20	47	22	52	25	58	27	39	18	42	19	47	22	51	24

Appendix M

Summary of ICS and Haupt Definitions

ICS Levels of Care, 2003

Levels of Care:		
	Level	Definition[1]
Acute hospital ward bed	Level 0	Patients whose needs can be met through normal ward care in an acute hospital
Observation unit (e.g. CCU)	Level 1	Patients at risk of their condition deteriorating, or those recently relocated from higher levels of care whose needs can be met on an acute ward with additional advice and support from the critical care team
Critical Care Unit:		
High dependency unit	Level 2	Patients requiring more detailed observation or intervention including support for a single failing organ system or postoperative care and those stepping down from higher levels of care
Intensive care unit	Level 3	Patients requiring advanced respiratory support alone or basic respiratory support together with support of at least two organ systems. This level includes all complex patients requiring support for multi-organ failure.

Haupt Guidelines for level I, II and III centers.

Criteria	**Level I Centre**	**Level II Centre**	**Level III Centre**
Haupt Guidelines: [2]			
Types of Centre:	Haupt I: multi-organ multi-specialty	Haupt II: regional hospital, comprehensive Require transfer for specialist care	Haupt III: local hospital, invasive ventilation, resuscitation, stabilisation, transfer if necessary
Directorship			
Medical Staffing	Intensivist[3] with appropriate time, expertise, and commitment to oversee the care of critically ill patients within the hospital. Sees the patient twice daily and as often as required. Availability to the unit 24 hours a day, 7 days a week for both clinical and administrative matters. Budgetary activities relating to unit function, quality assurance, and utilisation review are conducted jointly with other members of staff		On-site physician 24 hours a day who can manage emergencies, including: • Airway management • Can establish rapid intravenous access • Qualified in Advanced Cardiac Life Support A critical care trained nurse should be on site, 24 hrs per day.

[1] Intensive Care Society (UK) "Levels of critical care for adult patients"
[2] Haupt M et al on behalf of ACCM/SCCM Task Force; Guidelines on critical care services and personnel: recommendations based on a system of categorization of three levels of care; Crit Care Med 2003, 31: 2677-83.
[3] American College of Critical Care Medicine: Critical care delivery in the intensive care unit: Defining clinical roles and the best practice model. Crit Care Med 2001; 29: 2007–2019

Appendix N

ICNARC Case Mix Programme, Summary Data Flows

Flows

ICNARC Case Mix Programme Dataset Specification (ICMPDS)

Version 3.0

Version 3.0 ICMPDS / 14 August 2007 / Doc.version 3.0.1

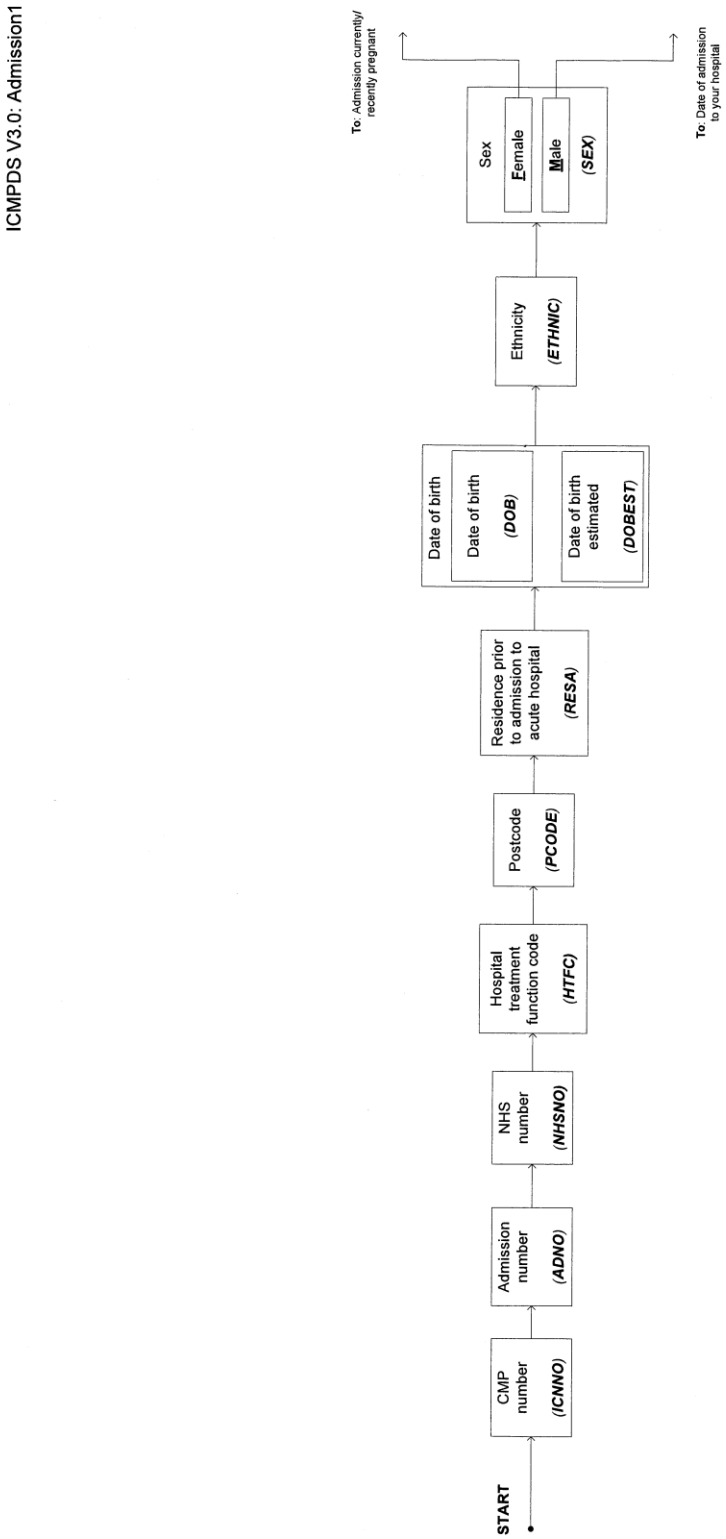
Flows

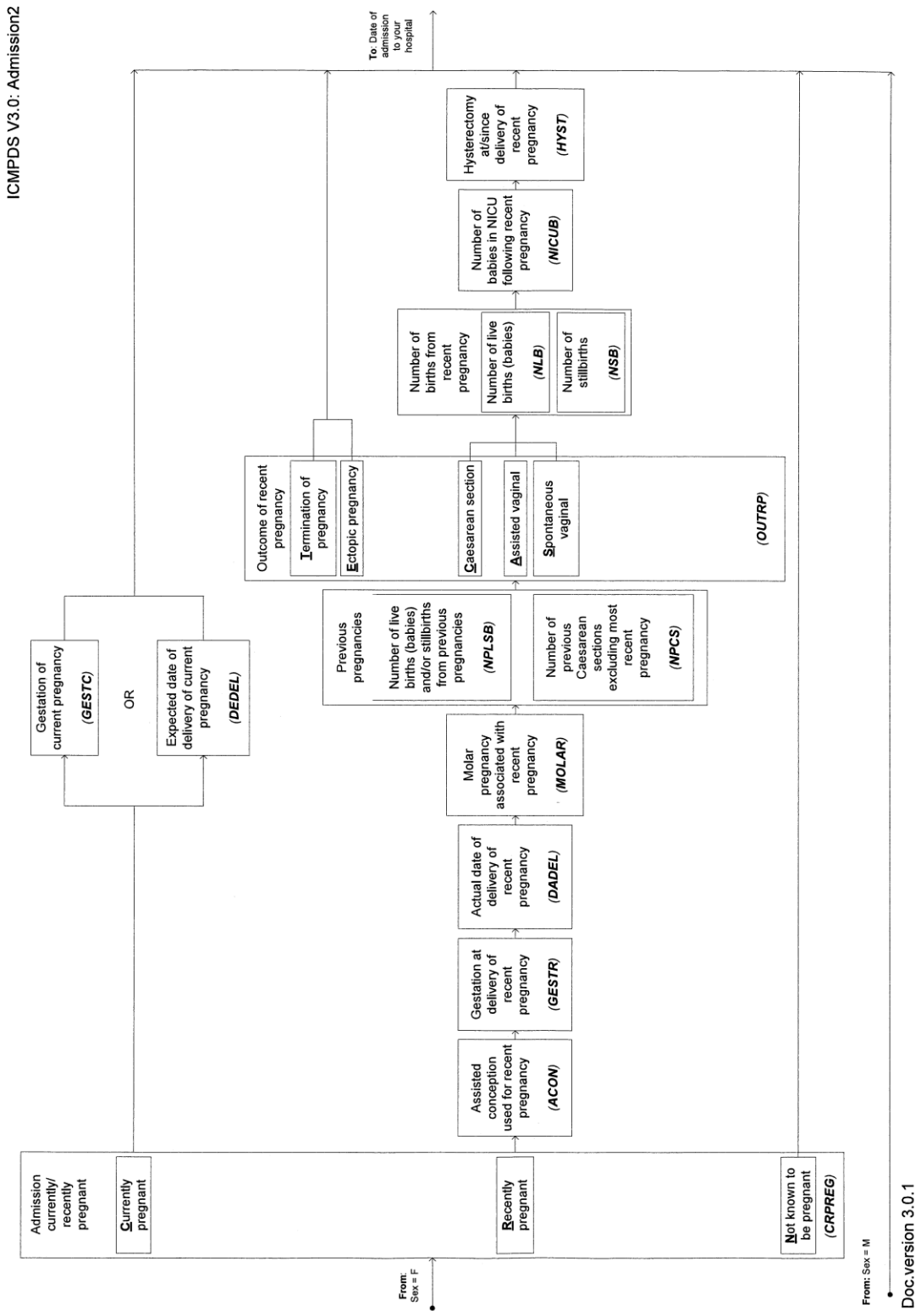
Order

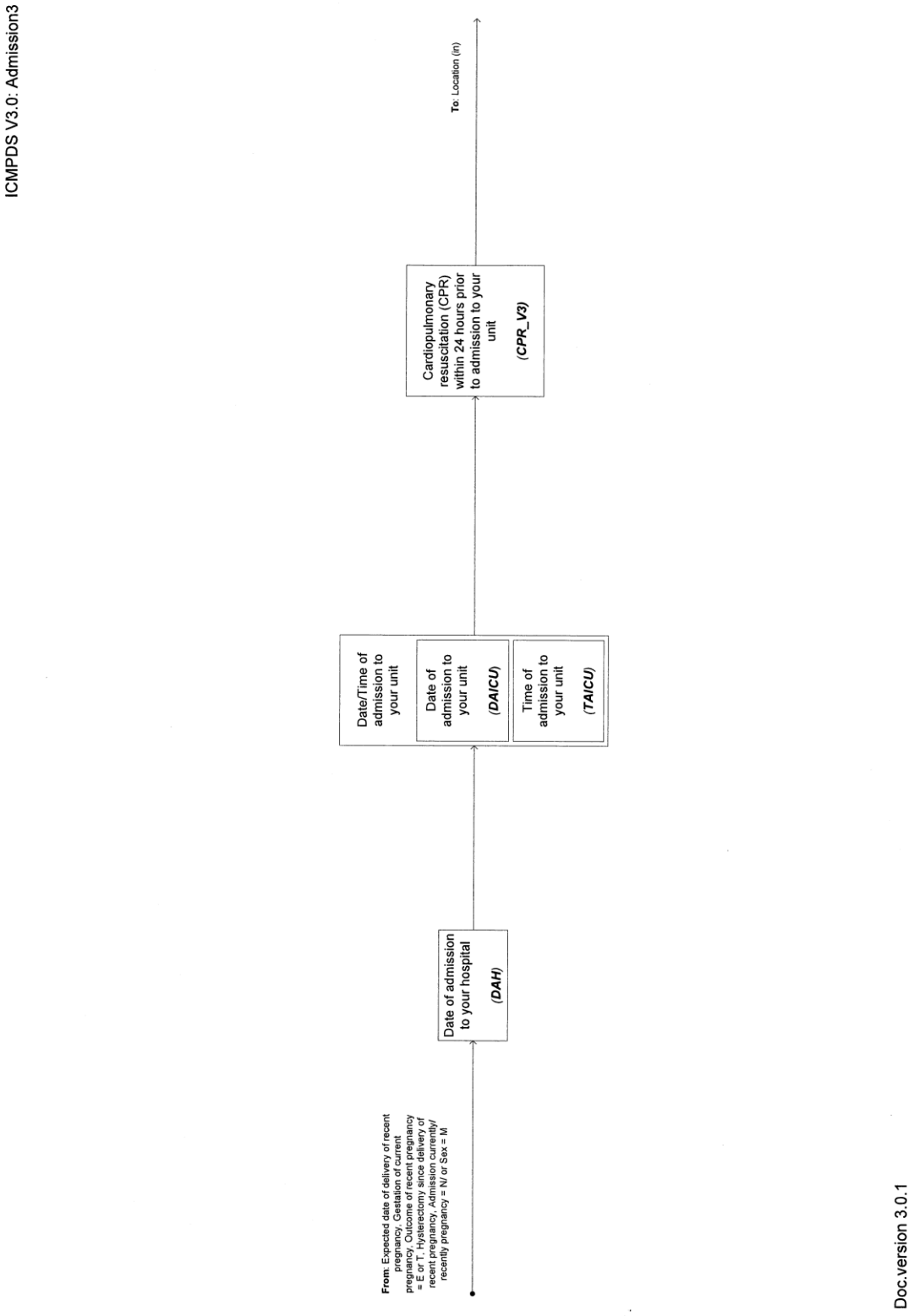
- The ICNARC Case Mix Programme Dataset Specification (ICMPDS) Version 3.0 contains the following sections, which appear in this order in the flows:
  - Admission
  - Reason for Admission
  - Past Medical History
  - Physiology
  - Infection
  - Outcome

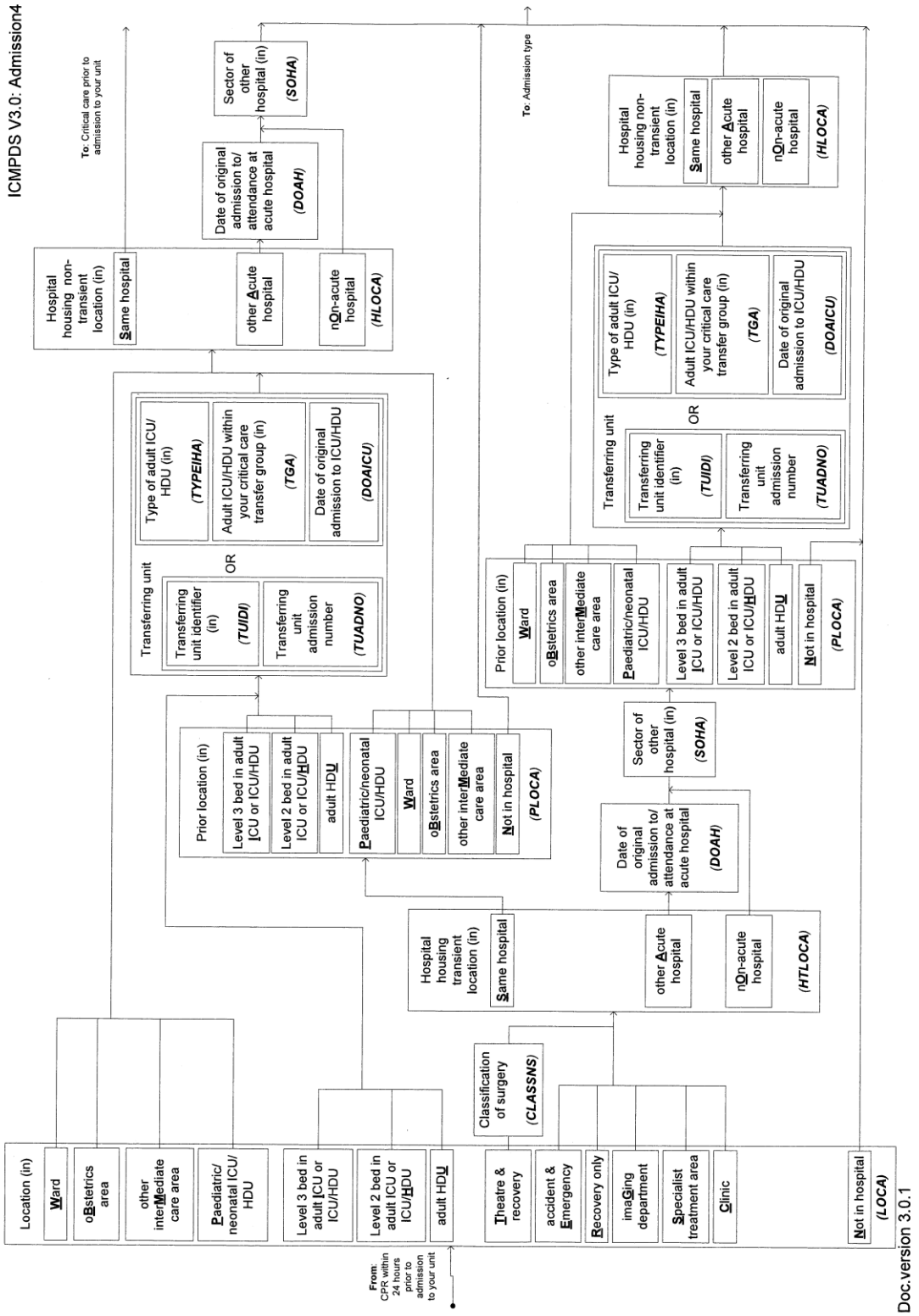
Display

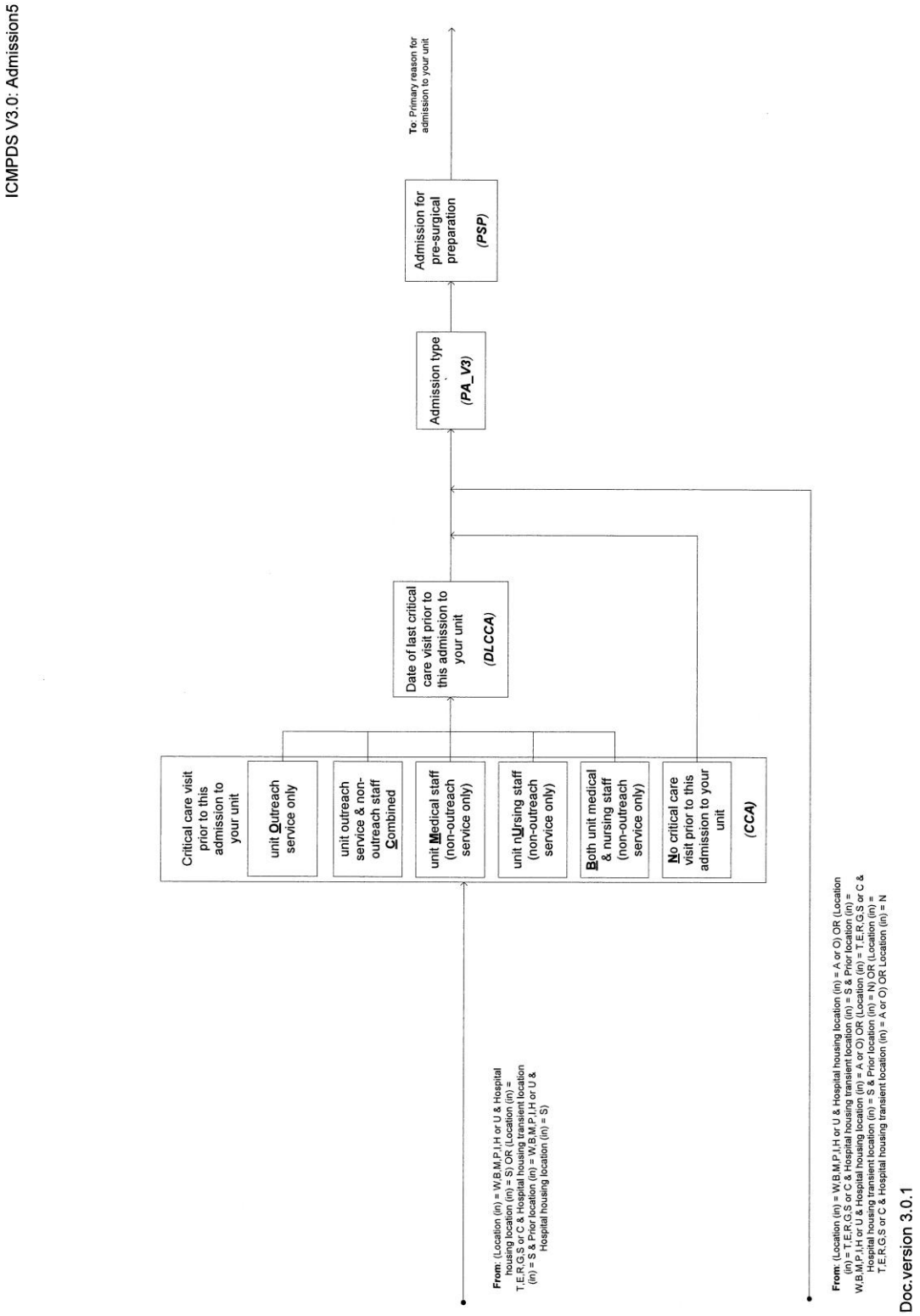
- flows run from left to right displaying the field and field description together
- sections are indicated in the header of each page

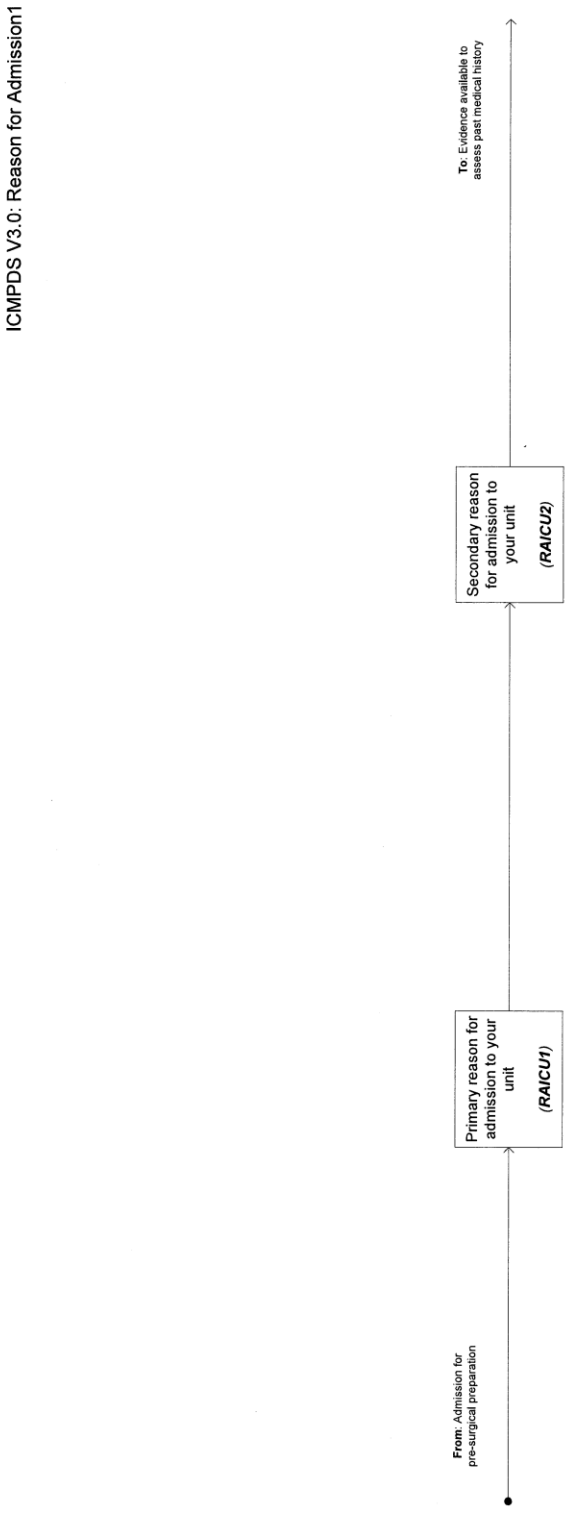

ICMPDS V3.0: Admission1
START
CMP number (ICNNO)
Admission number (ADNO)
NHS number (NHSNO)
Hospital treatment function code (HTFC)
Postcode (PCODE)
Residence prior to admission to acute hospital (RESA)
Date of birth
Date of birth (DOB)
Date of birth estimated (DOBEST)
Ethnicity (ETHNIC)
Sex
Female
Male
(SEX)
To: Admission currently/ recently pregnant
To: Date of admission to your hospital
Doc.version 3.0.1

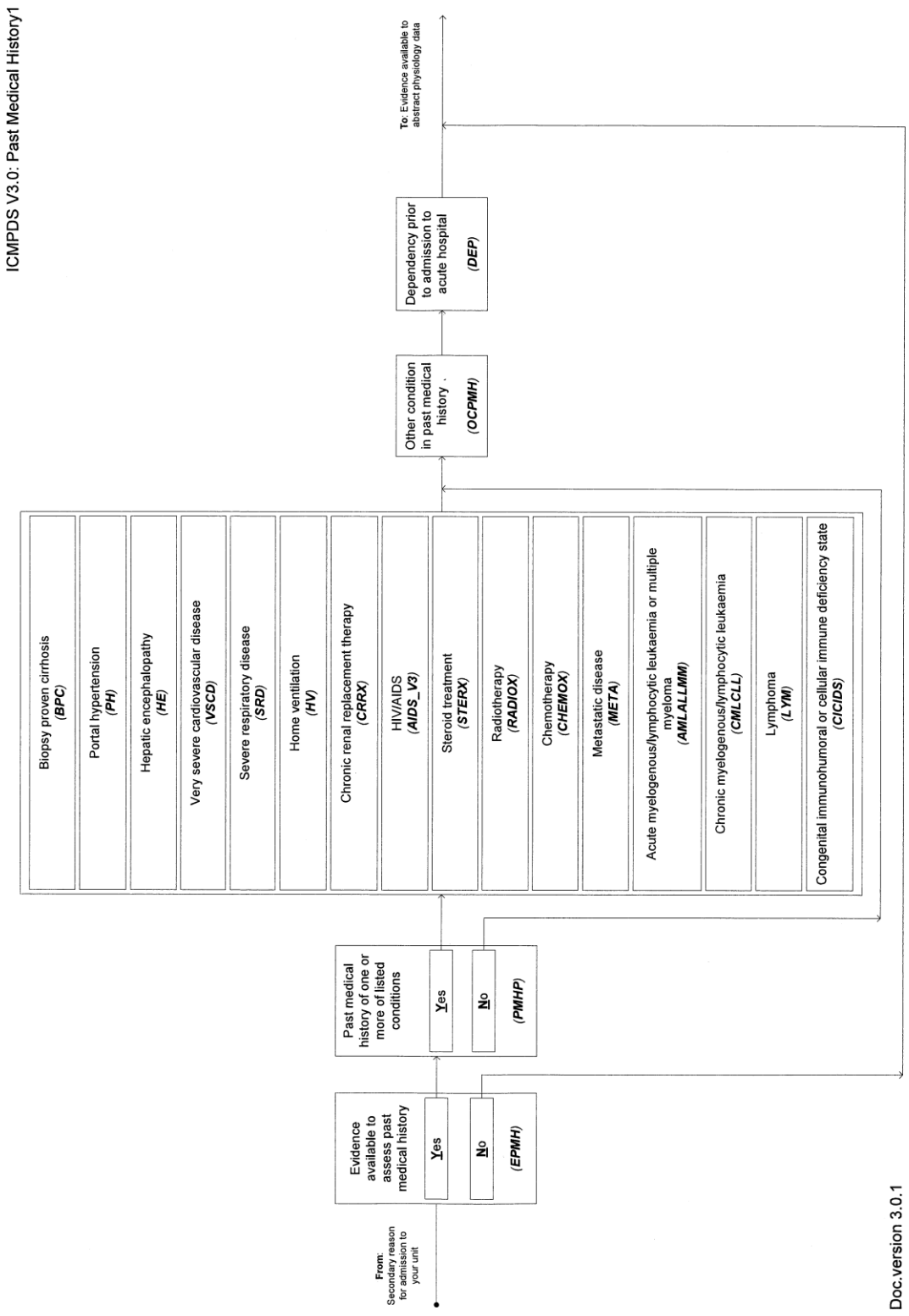

ICMPDS V3.0: Admission2
To: Date of admission to your hospital
Hysterectomy at/since delivery of recent pregnancy (HYST)
Number of babies in NICU following recent pregnancy (NICUB)
Number of births from recent pregnancy
Number of live births (babies) (NLB)
Number of stillbirths (NSB)
Outcome of recent pregnancy
Termination of pregnancy
Ectopic pregnancy
Caesarean section
Assisted vaginal
Spontaneous vaginal
(OUTRP)
Previous pregnancies
Number of live births (babies) and/or stillbirths from previous pregnancies (NPLSB)
Number of previous Caesarean sections excluding most recent pregnancy (NPCS)
Molar pregnancy associated with recent pregnancy (MOLAR)
Actual date of delivery of recent pregnancy (DADEL)
Gestation at delivery of recent pregnancy (GESTR)
Assisted conception used for recent pregnancy (ACON)
Gestation of current pregnancy (GESTC)
OR
Expected date of delivery of current pregnancy (DEDEL)
Admission currently/ recently pregnant
Currently pregnant
Recently pregnant
Not known to be pregnant (CRPREG)
From: Sex = F
From: Sex = M
Doc.version 3.0.1

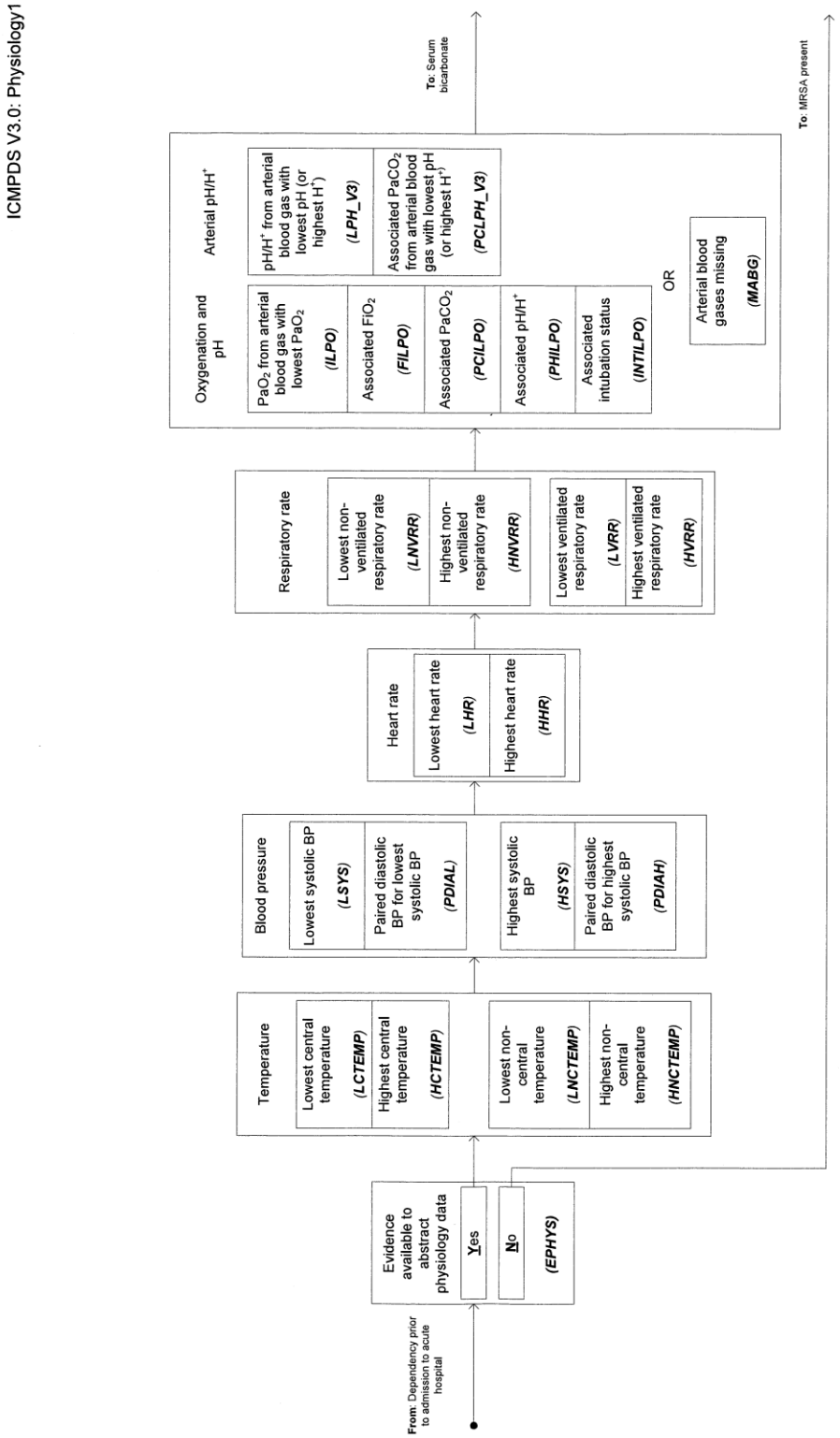

ICMPDS V3.0: Admission3
From: Expected date of delivery of recent pregnancy, Gestation of current pregnancy, Outcome of recent pregnancy = E or T, Hysterectomy since delivery of recent pregnancy, Admission currently/ recently pregnancy = N/ or Sex = M
Date of admission to your hospital (DAH)
Date/Time of admission to your unit
Date of admission to your unit (DAICU)
Time of admission to your unit (TAICU)
Cardiopulmonary resuscitation (CPR) within 24 hours prior to admission to your unit (CPR_V3)
To: Location (in)
Doc.version 3.0.1

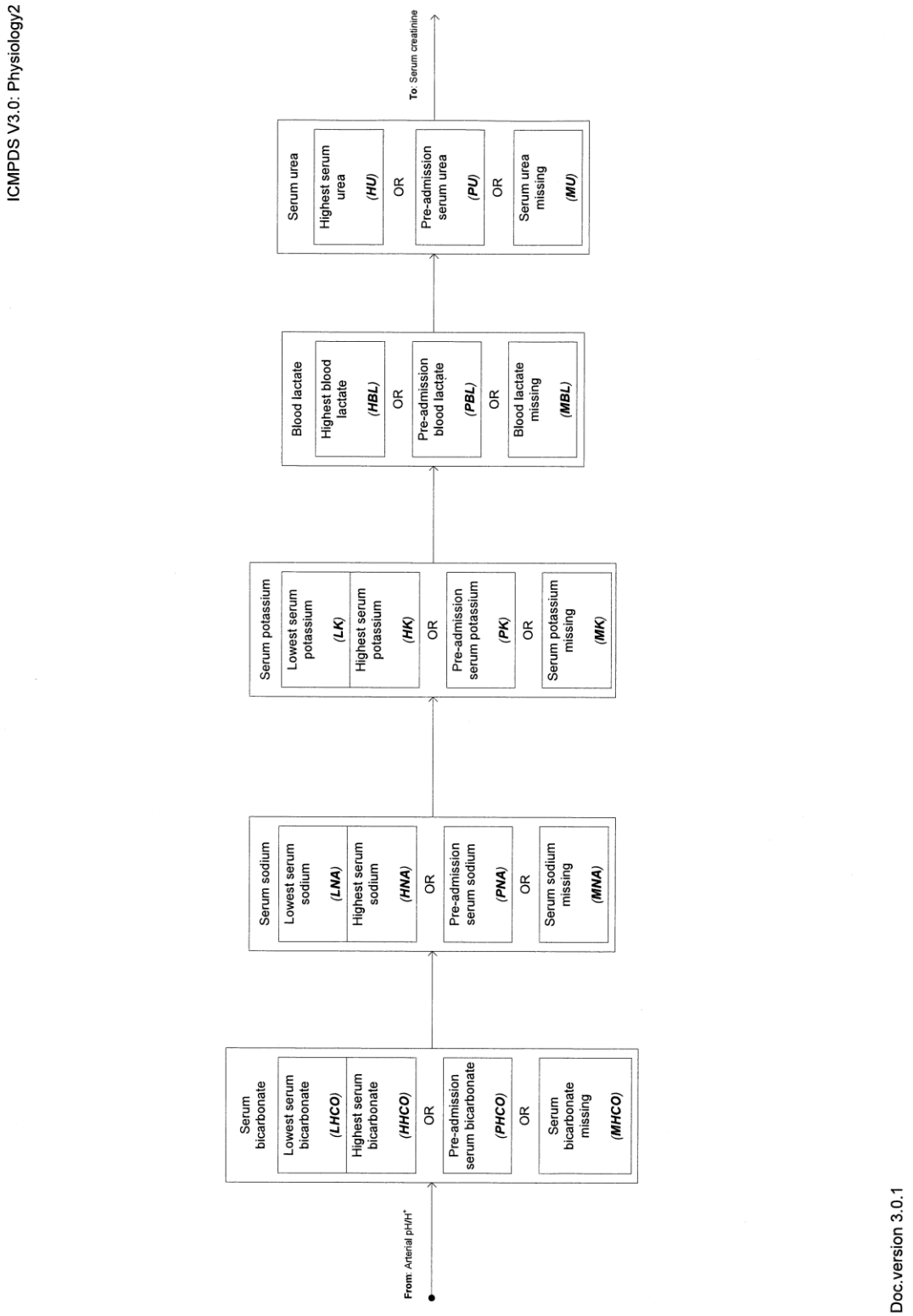

ICMPDS V3.0: Admission4
To: Critical care prior to admission to your unit
To: Admission type
Location (in)
Ward
oBstetrics area
other interMediate care area
Paediatric/ neonatal ICU/ HDU
Level 3 bed in adult ICU or ICU/HDU
Level 2 bed in adult ICU or ICU/HDU
adult HDU
Theatre & recovery
accident & Emergency
Recovery only
imaGing department
Specialist treatment area
Clinic
Not in hospital (LOCA)
From: CPR within 24 hours prior to admission to your unit
Classification of surgery (CLASSNS)
Hospital housing transient location (in)
Same hospital
other Acute hospital
nOn-acute hospital
(HTLOCA)
Prior location (in)
Level 3 bed in adult ICU or ICU/HDU
Level 2 bed in adult ICU or ICU/HDU
adult HDU
Paediatric/neonatal ICU/HDU
Ward
oBstetrics area
other interMediate care area
Not in hospital
(PLOCA)
Date of original admission to/ attendance at acute hospital (DOAH)
Sector of other hospital (in) (SOHA)
Hospital housing non-transient location (in)
Same hospital
other Acute hospital
nOn-acute hospital
(HLOCA)
Transferring unit
OR
Transferring unit identifier (in) (TUIDI)
Transferring unit admission number (TUADNO)
Type of adult ICU/ HDU (in) (TYPEIHA)
Adult ICU/HDU within your critical care transfer group (in) (TGA)
Date of original admission to ICU/HDU (DOAICU)
Prior location (in)
Ward
oBstetrics area
other interMediate care area
Paediatric/neonatal ICU/HDU
Level 3 bed in adult ICU or ICU/HDU
Level 2 bed in adult ICU or ICU/HDU
adult HDU
Not in hospital
(PLOCA)
Sector of other hospital (in) (SOHA)
Date of original admission to/ attendance at acute hospital (DOAH)
Hospital housing non-transient location (in)
Same hospital
other Acute hospital
nOn-acute hospital
(HLOCA)
Transferring unit
OR
Transferring unit identifier (in) (TUIDI)
Transferring unit admission number (TUADNO)
Type of adult ICU/ HDU (in) (TYPEIHA)
Adult ICU/HDU within your critical care transfer group (in) (TGA)
Date of original admission to ICU/HDU (DOAICU)
Doc.version 3.0.1

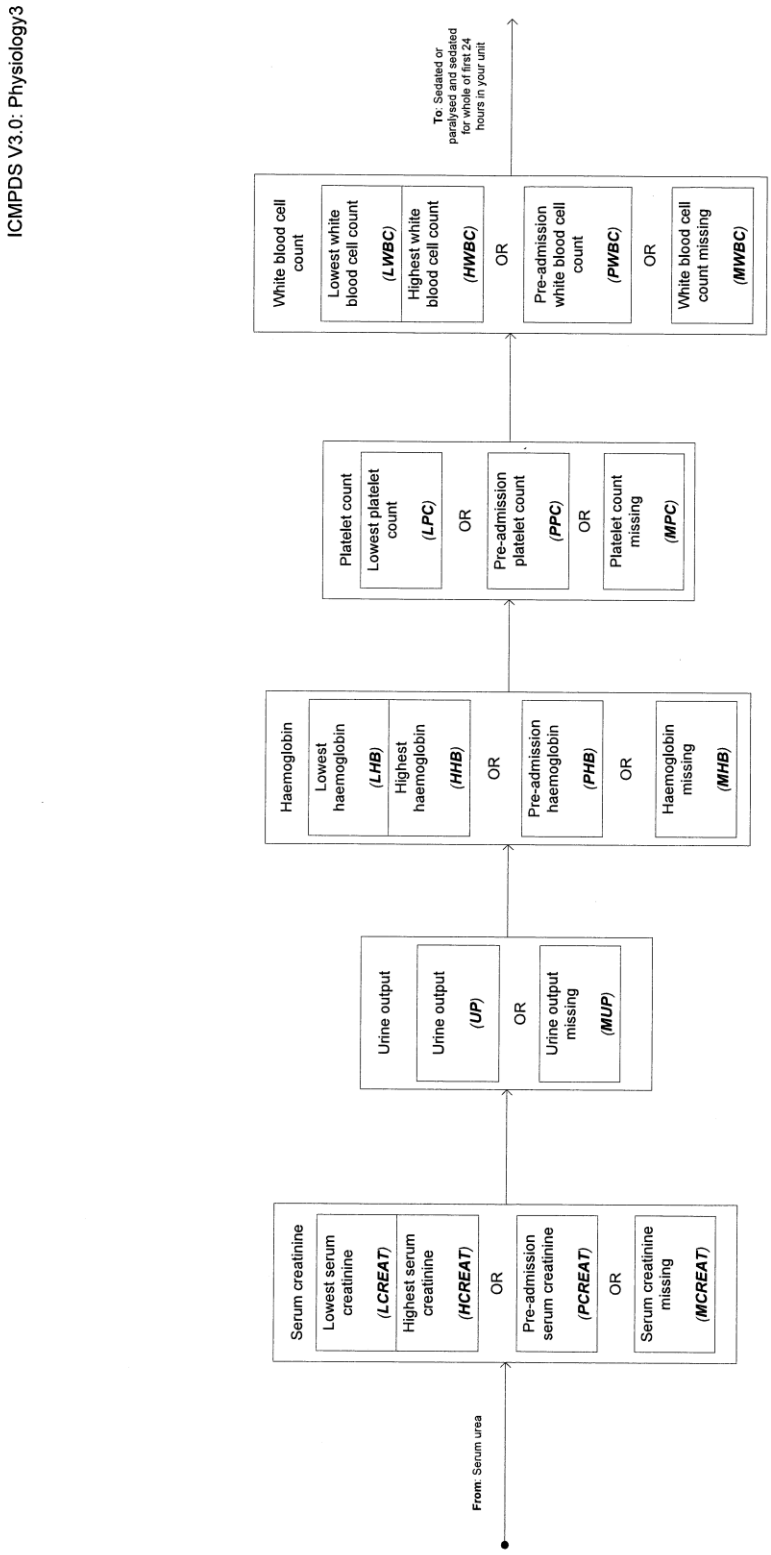

ICMPDS V3.0: Admission5
From: (Location (in) = W,B,M,P,I,H or U & Hospital housing location (in) = S) OR (Location (in) = T,E,R,G,S or C & Hospital housing transient location (in) = S & Prior location (in) = W,B,M,P,I,H or U & Hospital housing location (in) = S)
From: (Location (in) = W,B,M,P,I,H or U & Hospital housing location (in) = A or O) OR (Location (in) = T,E,R,G,S or C & Hospital housing transient location (in) = S & Prior location (in) = W,B,M,P,I,H or U & Hospital housing location (in) = A or O) OR (Location (in) = T,E,R,G,S or C & Hospital housing transient location (in) = S & Prior location (in) = N) OR (Location (in) = T,E,R,G,S or C & Hospital housing transient location (in) = A or O) OR Location (in) = N
Critical care visit prior to this admission to your unit
unit Outreach service only
unit outreach service & non-outreach staff Combined
unit Medical staff (non-outreach service only)
unit nUrsing staff (non-outreach service only)
Both unit medical & nursing staff (non-outreach service only)
No critical care visit prior to this admission to your unit
(CCA)
Date of last critical care visit prior to this admission to your unit
(DLCCA)
Admission type
(PA_V3)
Admission for pre-surgical preparation
(PSP)
To: Primary reason for admission to your unit
Doc.version 3.0.1

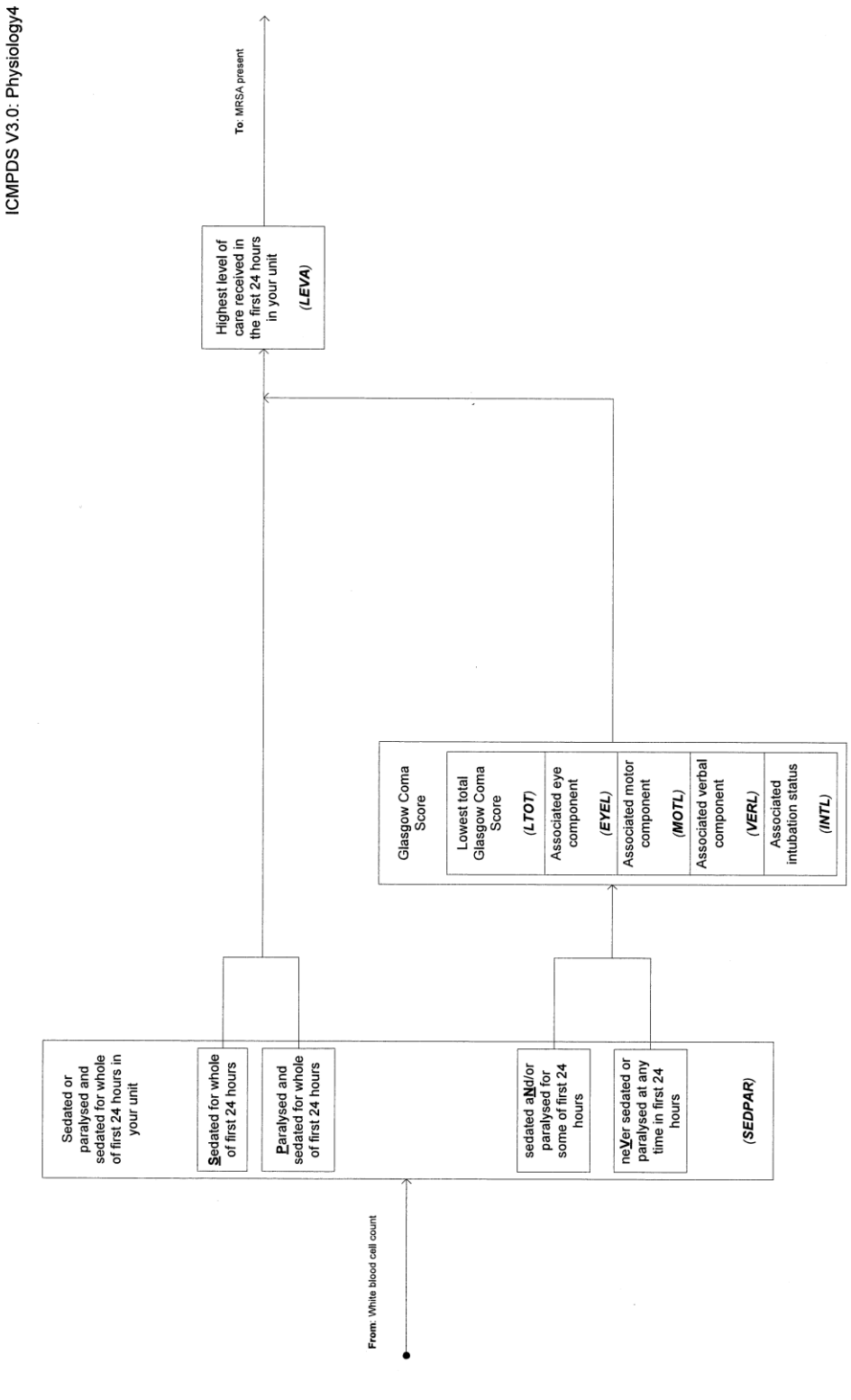

ICMPDS V3.0: Reason for Admission1
From: Admission for pre-surgical preparation
Primary reason for admission to your unit (RAICU1)
Secondary reason for admission to your unit (RAICU2)
To: Evidence available to assess past medical history
Doc.version 3.0.1


ICMPDS V3.0: Past Medical History1
From: Secondary reason for admission to your unit
Evidence available to assess past medical history
Yes
No
(EPMH)
Past medical history of one or more of listed conditions
Yes
No
(PMHP)
Biopsy proven cirrhosis (BPC)
Portal hypertension (PH)
Hepatic encephalopathy (HE)
Very severe cardiovascular disease (VSCD)
Severe respiratory disease (SRD)
Home ventilation (HV)
Chronic renal replacement therapy (CRRX)
HIV/AIDS (AIDS_V3)
Steroid treatment (STERX)
Radiotherapy (RADIOX)
Chemotherapy (CHEMOX)
Metastatic disease (META)
Acute myelogenous/lymphocytic leukaemia or multiple myeloma (AMLALLMM)
Chronic myelogenous/lymphocytic leukaemia (CMLCLL)
Lymphoma (LYM)
Congenital immunohumoral or cellular immune deficiency state (CICIDS)
Other condition in past medical history . (OCPMH)
Dependency prior to admission to acute hospital (DEP)
To: Evidence available to abstract physiology data
Doc.version 3.0.1

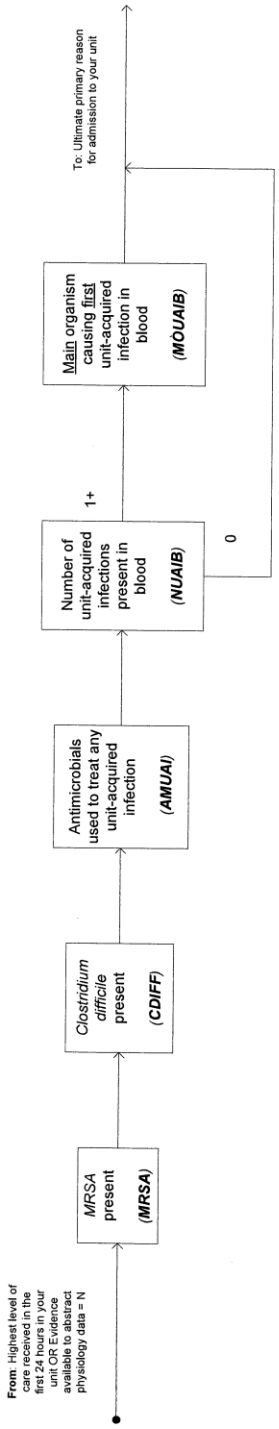

ICMPDS V3.0: Physiology1
From: Dependency prior to admission to acute hospital
Evidence available to abstract physiology data
Yes
No
(EPHYS)
Temperature
Lowest central temperature (LCTEMP)
Highest central temperature (HCTEMP)
Lowest non-central temperature (LNCTEMP)
Highest non-central temperature (HNCTEMP)
Blood pressure
Lowest systolic BP (LSYS)
Paired diastolic BP for lowest systolic BP (PDIAL)
Highest systolic BP (HSYS)
Paired diastolic BP for highest systolic BP (PDIAH)
Heart rate
Lowest heart rate (LHR)
Highest heart rate (HHR)
Respiratory rate
Lowest non-ventilated respiratory rate (LNVRR)
Highest non-ventilated respiratory rate (HNVRR)
Lowest ventilated respiratory rate (LVRR)
Highest ventilated respiratory rate (HVRR)
Oxygenation and pH
PaO2 from arterial blood gas with lowest PaO2 (ILPO)
Associated FiO2 (FILPO)
Associated PaCO2 (PCILPO)
Associated pH/H+ (PHILPO)
Associated intubation status (INTILPO)
OR
Arterial blood gases missing (MABG)
Arterial pH/H+
pH/H+ from arterial blood gas with lowest pH (or highest H+) (LPH_V3)
Associated PaCO2 from arterial blood gas with lowest pH (or highest H+) (PCLPH_V3)
To: Serum bicarbonate
To: MRSA present
Doc.version 3.0.1


ICMPDS V3.0: Physiology2
From: Arterial pH/H+
Serum bicarbonate
Lowest serum bicarbonate (LHCO)
Highest serum bicarbonate (HHCO)
OR
Pre-admission serum bicarbonate (PHCO)
OR
Serum bicarbonate missing (MHCO)
Serum sodium
Lowest serum sodium (LNA)
Highest serum sodium (HNA)
OR
Pre-admission serum sodium (PNA)
OR
Serum sodium missing (MNA)
Serum potassium
Lowest serum potassium (LK)
Highest serum potassium (HK)
OR
Pre-admission serum potassium (PK)
OR
Serum potassium missing (MK)
Blood lactate
Highest blood lactate (HBL)
OR
Pre-admission blood lactate (PBL)
OR
Blood lactate missing (MBL)
Serum urea
Highest serum urea (HU)
OR
Pre-admission serum urea (PU)
OR
Serum urea missing (MU)
To: Serum creatinine
Doc.version 3.0.1

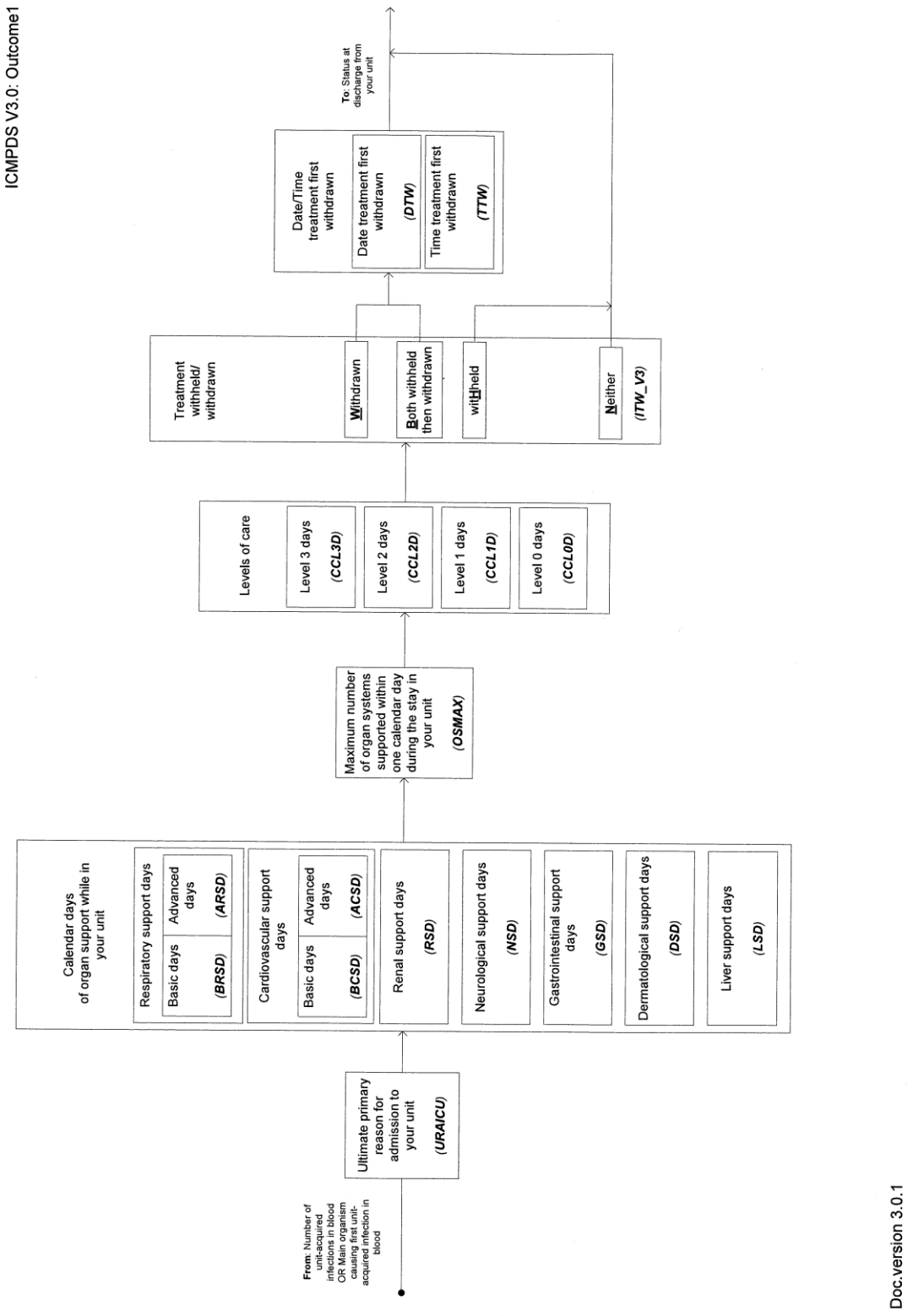

ICMPDS V3.0: Physiology3
From: Serum urea
Serum creatinine
Lowest serum creatinine (LCREAT)
Highest serum creatinine (HCREAT)
OR
Pre-admission serum creatinine (PCREAT)
OR
Serum creatinine missing (MCREAT)
Urine output
Urine output (UP)
OR
Urine output missing (MUP)
Haemoglobin
Lowest haemoglobin (LHB)
Highest haemoglobin (HHB)
OR
Pre-admission haemoglobin (PHB)
OR
Haemoglobin missing (MHB)
Platelet count
Lowest platelet count (LPC)
OR
Pre-admission platelet count (PPC)
OR
Platelet count missing (MPC)
White blood cell count
Lowest white blood cell count (LWBC)
Highest white blood cell count (HWBC)
OR
Pre-admission white blood cell count (PWBC)
OR
White blood cell count missing (MWBC)
To: Sedated or paralysed and sedated for whole of first 24 hours in your unit
Doc.version 3.0.1

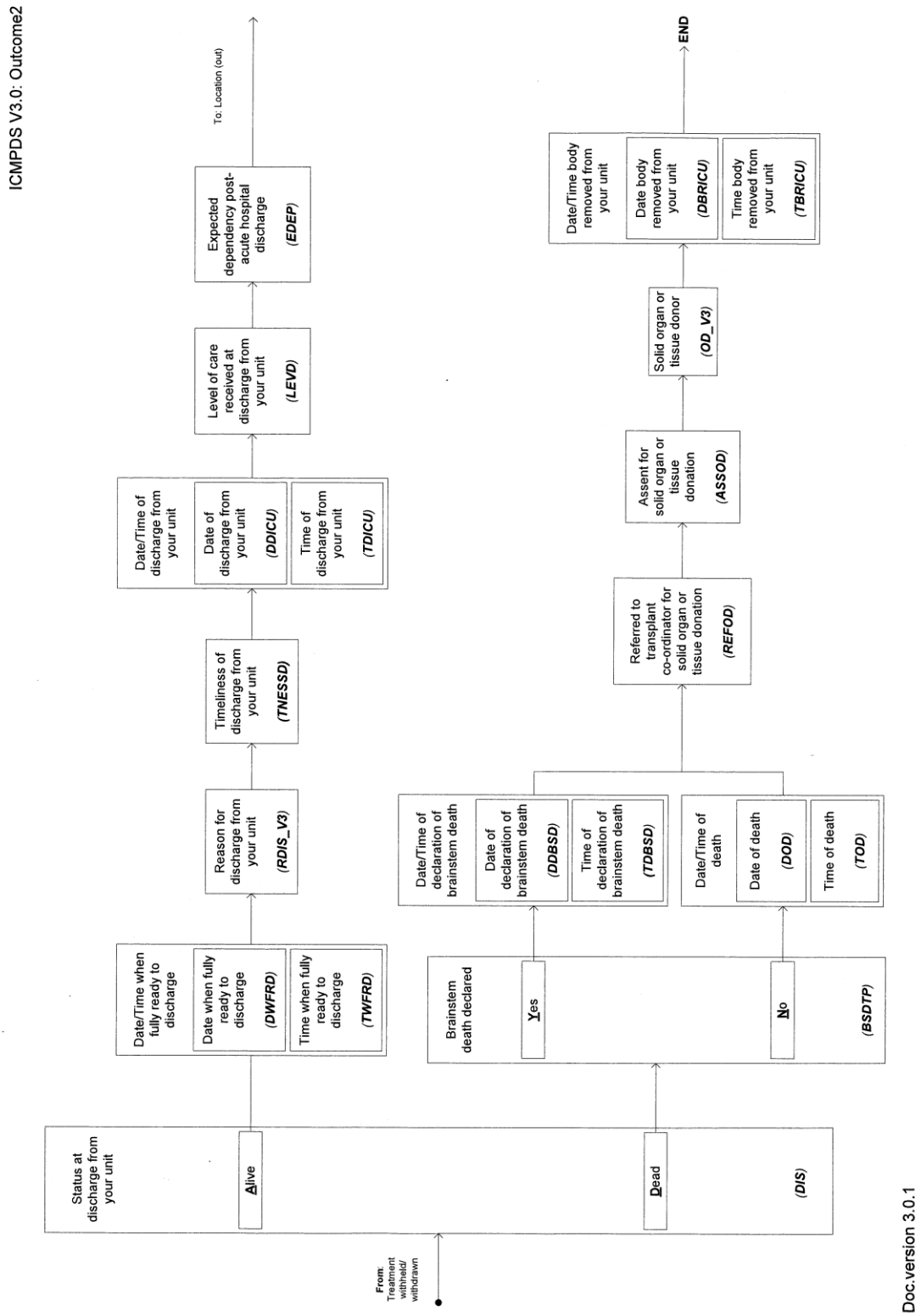

ICMPDS V3.0: Physiology4
From: White blood cell count
Sedated or paralysed and sedated for whole of first 24 hours in your unit
Sedated for whole of first 24 hours
Paralysed and sedated for whole of first 24 hours
sedated aNd/or paralysed for some of first 24 hours
neVer sedated or paralysed at any time in first 24 hours
(SEDPAR)
Glasgow Coma Score
Lowest total Glasgow Coma Score (LTOT)
Associated eye component (EYEL)
Associated motor component (MOTL)
Associated verbal component (VERL)
Associated intubation status (INTL)
Highest level of care received in the first 24 hours in your unit (LEVA)
To: MRSA present
Doc.version 3.0.1

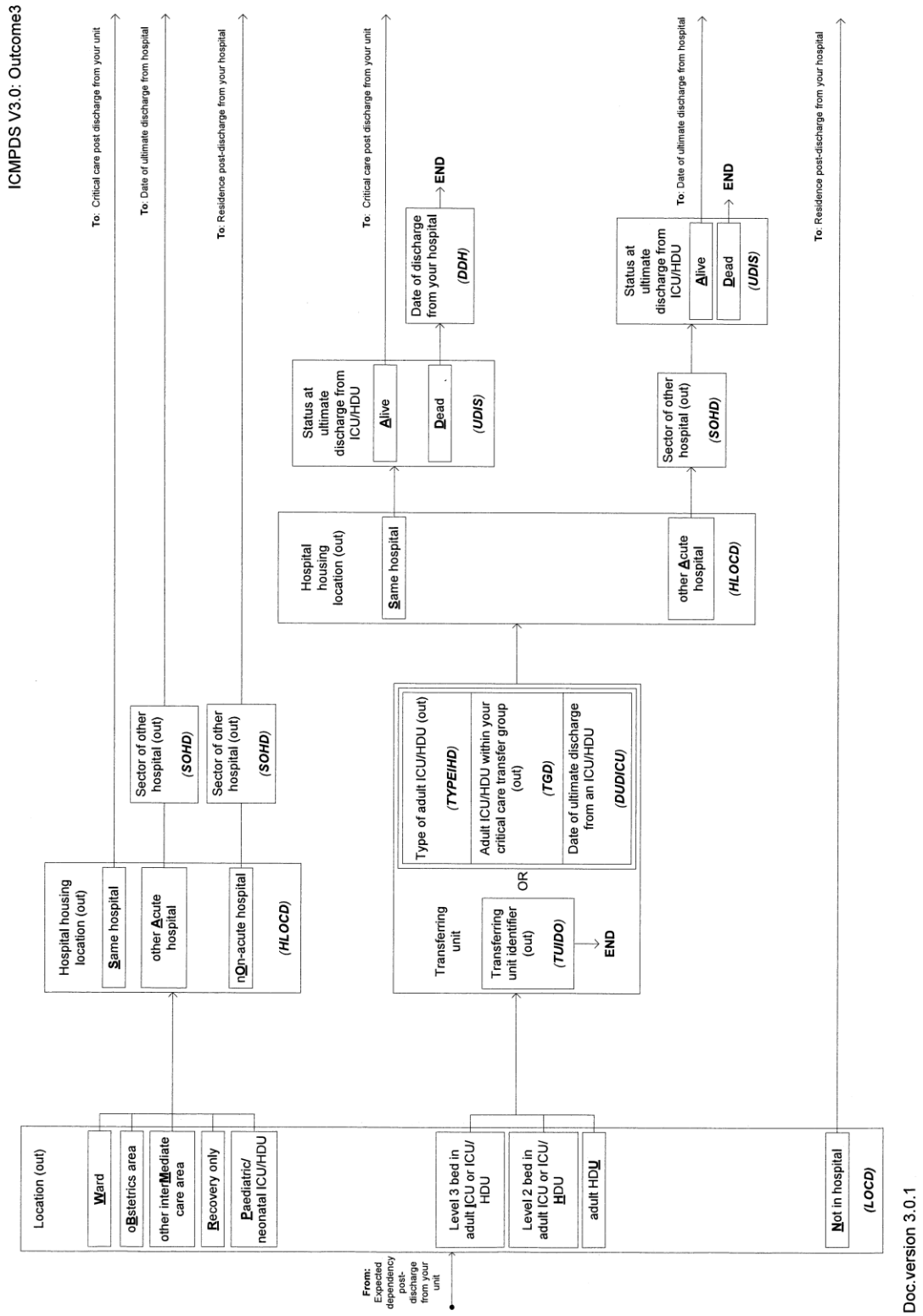
ICMPDS V3.0: Infection1

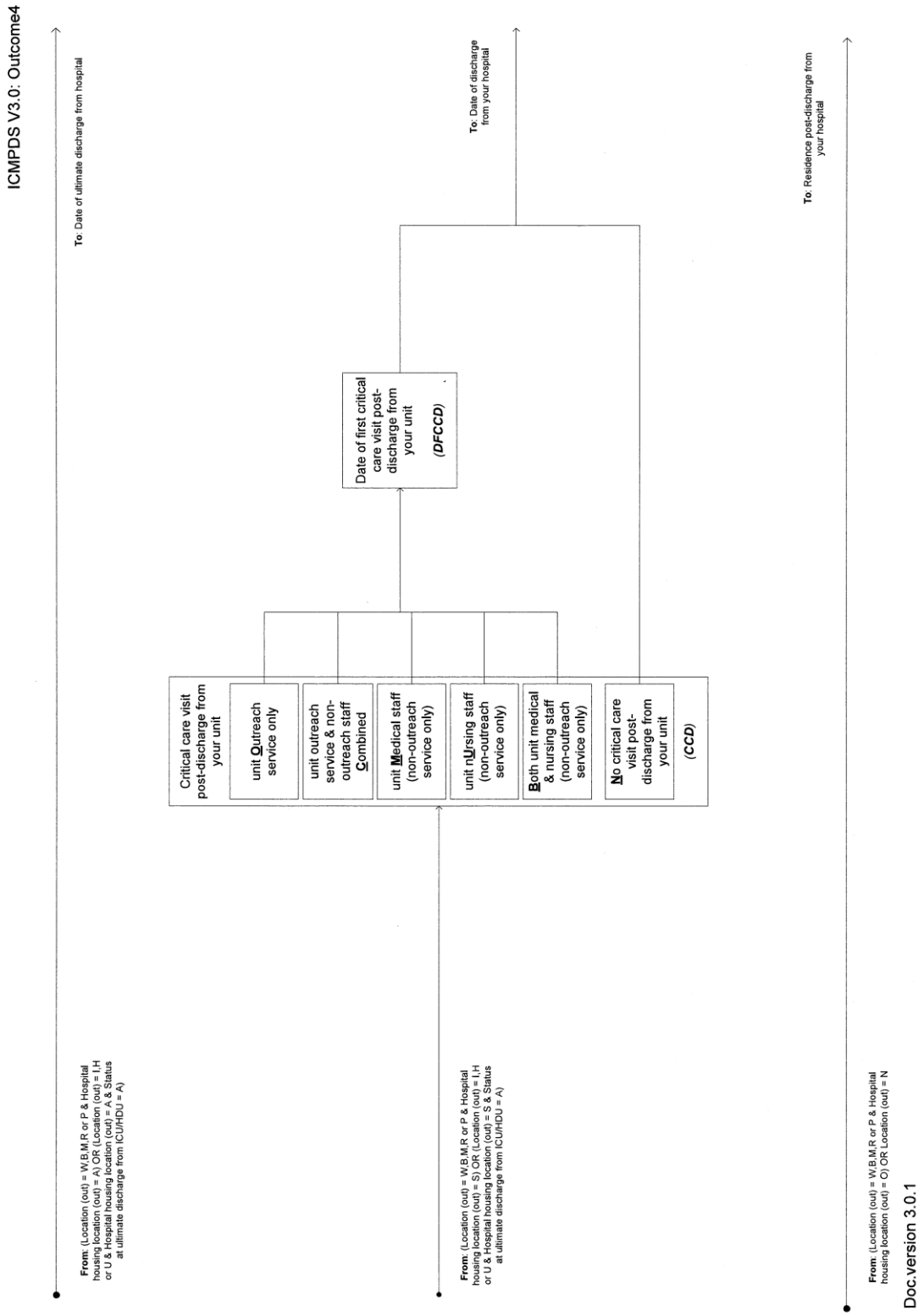


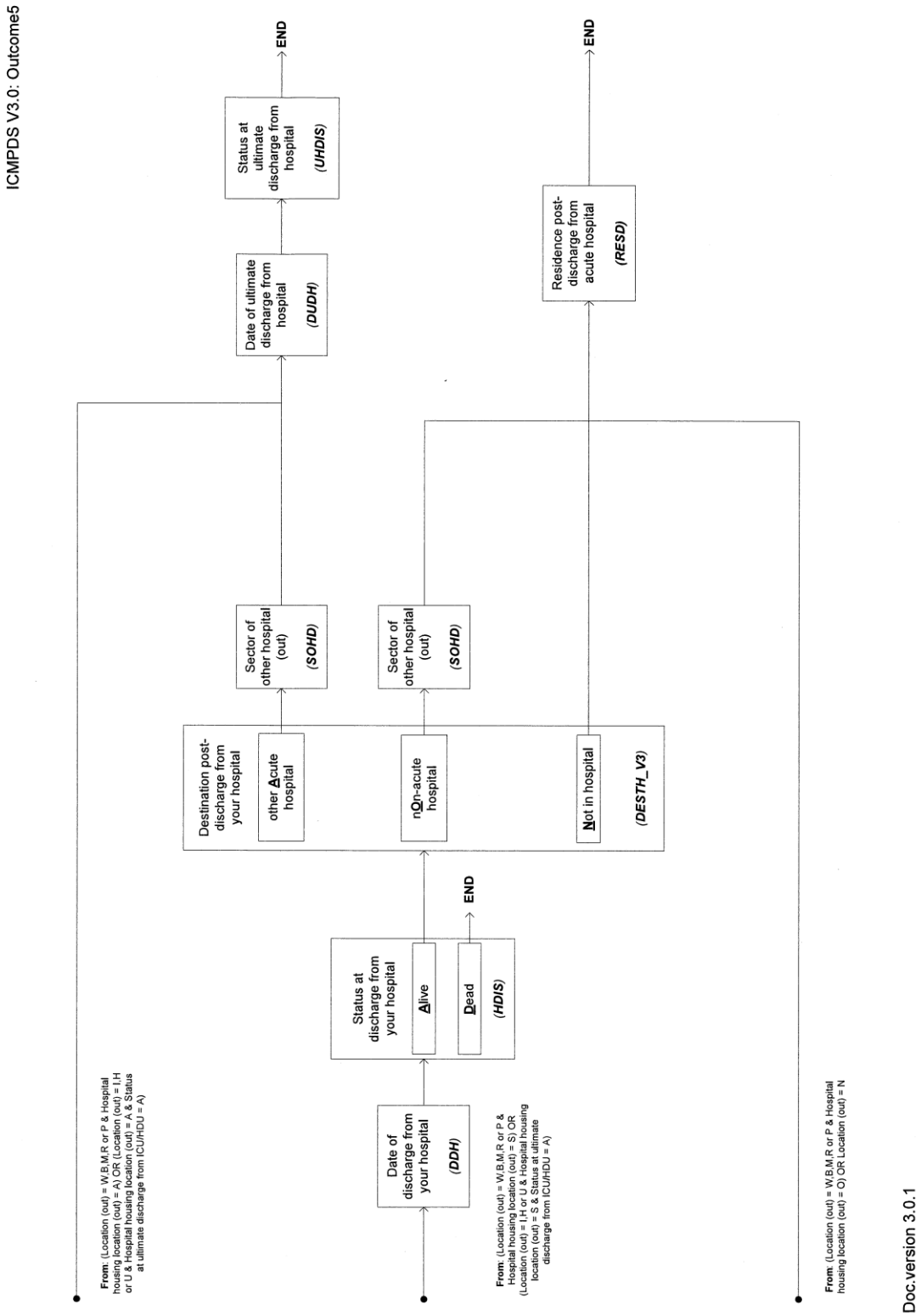
Doc.version 3.0.1


ICMPDS V3.0: Outcome1
From: Number of unit-acquired infections in blood OR Main organism causing first unit-acquired infection in blood
Ultimate primary reason for admission to your unit (URAICU)
Calendar days of organ support while in your unit
Respiratory support days
Basic days (BRSD)
Advanced days (ARSD)
Cardiovascular support days
Basic days (BCSD)
Advanced days (ACSD)
Renal support days (RSD)
Neurological support days (NSD)
Gastrointestinal support days (GSD)
Dermatological support days (DSD)
Liver support days (LSD)
Maximum number of organ systems supported within one calendar day during the stay in your unit (OSMAX)
Levels of care
Level 3 days (CCL3D)
Level 2 days (CCL2D)
Level 1 days (CCL1D)
Level 0 days (CCL0D)
Treatment withheld/ withdrawn
Withdrawn
Both withheld then withdrawn
withheld
Neither (ITW_V3)
Date/Time treatment first withdrawn
Date treatment first withdrawn (DTW)
Time treatment first withdrawn (TTW)
To: Status at discharge from your unit
Doc.version 3.0.1


ICMPDS V3.0: Outcome2
From: Treatment withheld/ withdrawn
Status at discharge from your unit
(DIS)
Alive
Dead
Date/Time when fully ready to discharge
Date when fully ready to discharge (DWFRD)
Time when fully ready to discharge (TWFRD)
Brainstem death declared
Yes
No
(BSDTP)
Reason for discharge from your unit (RDIS_V3)
Timeliness of discharge from your unit (TNESSD)
Date/Time of discharge from your unit
Date of discharge from your unit (DDICU)
Time of discharge from your unit (TDICU)
Level of care received at discharge from your unit (LEVD)
Expected dependency post-acute hospital discharge (EDEP)
To: Location (out)
Date/Time of declaration of brainstem death
Date of declaration of brainstem death (DDBSD)
Time of declaration of brainstem death (TDBSD)
Date/Time of death
Date of death (DOD)
Time of death (TOD)
Referred to transplant co-ordinator for solid organ or tissue donation (REFOD)
Assent for solid organ or tissue donation (ASSOD)
Solid organ or tissue donor (OD_V3)
Date/Time body removed from your unit
Date body removed from your unit (DBRICU)
Time body removed from your unit (TBRICU)
END
Doc.version 3.0.1


ICMPDS V3.0: Outcome3
From: Expected dependency post-discharge from your unit
Location (out)
Ward
oBstetrics area
other intermEdiate care area
Recovery only
Paediatric/ neonatal ICU/HDU
Level 3 bed in adult ICU or ICU/ HDU
Level 2 bed in adult ICU or ICU/ HDU
adult HDU
Not in hospital (LOCD)
To: Residence post-discharge from your hospital
Hospital housing location (out)
Same hospital
other Acute hospital
nOn-acute hospital (HLOCD)
To: Critical care post discharge from your unit
To: Date of ultimate discharge from hospital
To: Residence post-discharge from your hospital
Sector of other hospital (out) (SOHD)
Sector of other hospital (out) (SOHD)
Transferring unit
Transferring unit identifier (out) (TUIDO)
END
OR
Type of adult ICU/HDU (out) (TYPEIHD)
Adult ICU/HDU within your critical care transfer group (out) (TGD)
Date of ultimate discharge from an ICU/HDU (DUDICU)
Hospital housing location (out)
Same hospital
other Acute hospital (HLOCD)
To: Critical care post discharge from your unit
To: Date of ultimate discharge from hospital
Status at ultimate discharge from ICU/HDU
Alive
Dead (UDIS)
Date of discharge from your hospital (DDH)
END
Sector of other hospital (out) (SOHD)
Status at ultimate discharge from ICU/HDU
Alive
Dead (UDIS)
END
Doc.version 3.0.1


ICMPDS V3.0: Outcome4
To: Date of ultimate discharge from hospital
From: (Location (out) = W,B,M,R or P & Hospital housing location (out) = A) OR (Location (out) = I,H or U & Hospital housing location (out) = A & Status at ultimate discharge from ICU/HDU = A)
To: Date of discharge from your hospital
From: (Location (out) = W,B,M,R or P & Hospital housing location (out) = S) OR (Location (out) = I,H or U & Hospital housing location (out) = S & Status at ultimate discharge from ICU/HDU = A)
To: Residence post-discharge from your hospital
From: (Location (out) = W,B,M,R or P & Hospital housing location (out) = O) OR Location (out) = N
Date of first critical care visit post-discharge from your unit (DFCCD)
Critical care visit post-discharge from your unit
unit Outreach service only
unit outreach service & non-outreach staff Combined
unit Medical staff (non-outreach service only)
unit nUrsing staff (non-outreach service only)
Both unit medical & nursing staff (non-outreach service only)
No critical care visit post-discharge from your unit (CCD)
Doc.version 3.0.1


ICMPDS V3.0: Outcome5
Date of discharge from your hospital (DDH)
Status at discharge from your hospital
Alive
Dead
(HDIS)
END
Destination post-discharge from your hospital
other Acute hospital
nOn-acute hospital
Not in hospital
(DESTH_V3)
Sector of other hospital (out) (SOHD)
Sector of other hospital (out) (SOHD)
Date of ultimate discharge from hospital (DUDH)
Status at ultimate discharge from hospital (UHDIS)
END
Residence post-discharge from acute hospital (RESD)
END
From: (Location (out) = W,B,M,R or P & Hospital housing location (out) = A) OR (Location (out) = I,H or U & Hospital housing location (out) = A & Status at ultimate discharge from ICU/HDU = A)
From: (Location (out) = W,B,M,R or P & Hospital housing location (out) = S) OR (Location (out) = I,H or U & Hospital housing location (out) = S & Status at ultimate discharge from ICU/HDU = A)
From: (Location (out) = W,B,M,R or P & Hospital housing location (out) = O) OR Location (out) = N
Doc.version 3.0.1

Appendix O

UK Department of Health Minimum Dataset

Department of Health (UK)

Critical Care Minimum Data Set

Showing HRG subset*

January 2006

Item	Variable	*Part of HRG subset?
1	NHS Number	No
2	Local Patient Identifier	No
3	Site Code (of treatment)	No
4	Code of GP Practice (Registered GMP)	No
5	Treatment Function Code	No
6	Birth Date	No
7	Postcode of Usual Address	No
8	Critical Care Local Identifier	Yes
9	Critical Care Start Date	Yes
10	Critical Care Start Time	No
10	Critical Care Unit Function	Yes
12	Unit Bed Configuration	No
13	Critical Care Admission Source	No
14	Critical Care Source Location	No
15	Critical Care Admission Type	No
16	Advanced Respiratory Support Days	Yes
17	Basic Respiratory Support Days	Yes
18	Advanced Cardiovascular Support Days	Yes
19	Basic Cardiovascular Support Days	Yes
20	Renal Support Days	Yes
21	Neurological System Support Days	Yes
22	Gastro-Intestinal System Support Days	No
23	Dermatological System Support Days	Yes
24	Liver Support Days	Yes
25	Organ Support Maximum	No
26	Critical Care Level 2 Days	Yes
27	Critical Care Level 3 Days	Yes
28	Critical Care Discharge Status	No
29	Critical Care Discharge Destination	No
30	Critical Care Discharge Location	No
31	Critical Care Discharge Ready Date	No
32	Critical Care Discharge Ready Time	No
33	Critical Care Discharge Date	Yes
34	Critical Care Discharge Time	No