NSW GOVERNMENT
ACTION PLAN
FOR HEALTH

Chronic and Complex Care State-wide Performance Measures

Methodology

'reconfiguring the way health services are provided'

NSW HEALTH
Working as a Team

NSW HEALTH DEPARTMENT

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Foreword

The care of people with chronic illness has assumed a greater importance in health care systems over the last 20 years. This domain of care will continue to increase as the population ages, coupled with increasing technological advances that result in survival from acute medical conditions.

However, unlike the care of acute illness the care of those with chronic illness assumes different dimensions. Firstly, the patient and their carer assume a greater burden of the illness and therefore a greater degree of responsibility for the self-management of the illness. Secondly, the delivery of care for these individuals occurs in multiple settings involving multiple providers over long periods of time.

As a result measurement systems of activity or performance, including quality of service provision are rudimentary. This paper has developed a set of methodologies that starts to identify those with chronic illness in three major domains of clinical care. It will serve as a baseline to be able to measure the impact of system changes on the delivery of health care for those with chronic illness.

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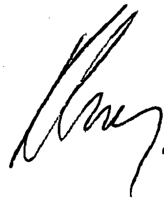

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Executive summary

Purpose

This paper outlines the performance indicators for regular quarterly reporting of the effectiveness and efficiency of the Chronic and Complex Care Priority Health Care Programs (PHCPs) at a State-wide level. This paper also discusses the underlying issues associated with the development of such performance indicators.

NSW Health and NSW Treasury have agreed that the areas of performance the PHCPs should address at a State-wide level are:

1. Reducing Unplanned Admissions
2. Reducing Unplanned Readmissions
3. Reducing Emergency Admissions
4. Reducing Length of Stay (LOS).

This information is required for NSW Treasury and NSW Health. It is expected that individual PHCPs performance will contribute to state-wide improvement in these performance areas. It is acknowledged that at the local Area Health Service (AHS) level, separate evaluations of individual PHCPs will be required to capture individual program specifics. Details of such local level separate evaluations are not covered in this paper.

In addition to the goal of measuring state-wide improvement, the methodology described in this document will be of use in developing funding models for Chronic and Complex Care programs. Moreover, it will be of use in establishing the base-line in terms of inpatient activity for the three Priority Health Care programs.

Background

The performance indicators are based on the data sources and resources that are currently available to the NSW Health Department. The performance indicators have attempted to provide a uniform system of reporting across all the PHCPs.

This paper has not commented on various measures of qualitative performance reporting.

Issues

Resource capabilities, feasibility and data quality have been extensively discussed. These are summarised briefly in Appendix A and discussed throughout the document.

The performance indicators adopted

The performance indicators that have been adopted by the Chronic and Complex Care Implementation Coordination Group (CCCICG) for state-wide quarterly reporting are:

- **Reduced Unplanned Admissions** measured by Unplanned Separations within a specific condition. Unplanned Separations are expressed as an age standardised separations ratio for the specific condition. (Unplanned separations are determined by the ISC variable Admission Status being not equal to 'Planned' and Readmission within 28 days variable being *equal to* 'No, not to any hospital within the last 28 days'.)

- **Reduced Unplanned Readmissions** measured by Unplanned Readmissions within 28 days for a specific condition. Unplanned Readmissions are expressed as an age standardised separations ratio for the specific condition. (Unplanned Readmissions are determined by the ISC variables Admission Status being not equal to 'Planned' and Readmission within 28 days variable being *not equal to* "No, not to any hospital within the last 28 days".) Unplanned Readmissions to the Emergency Department are also measured.
- **Reduced Unplanned Emergency Admissions** measured by Total Emergency Admissions (by Referral Source) and (Admission Status equal to Emergency). These are expressed as an age standardised separations ratio for the specific condition. Other Unplanned Admissions to the Emergency Department that are not emergency by nature are also measured.
- **Reduced Length of Stay** expressed as a Relative Stay Index (RSI).
- **Internal Financial Benefits** can be calculated by examining the difference between the RSI for separations across comparative quarters and multiply this difference in bed days by bed day costs that reflect inpatient resource use not related to episodic related costs.

Evolving process

The performance indicator methodology outlined in this paper will be under constant review and has been reviewed extensively to date. Several earlier drafts have been circulated to AHSs, NSW Health staff, members of the Senior Executive Forum, members of the ***Chronic and Complex Care Implementation and Coordination Group*** (CCCICG), members of the Clinical Expert Reference Groups (CERGs) and Special Interest Groups (SIGs).

Timetable of events

1. Paper circulated to all AHSs and CCCICG members for comment in March 2001
2. Feedback from AHSs received on an ongoing basis from late April, 2001
3. Extensive refinements and data analysis and validation exercises undertaken during May-June 2001
4. Methodologies for Performance Measures revised July-August 2001
5. Data Analysis conducted on incomplete Health Information Exchange (HIE) data set for illustrative purposes in July 2001
6. Base line data for 1999/2000 generated and checked April-September 2001
7. Automation of Report Generation – Ongoing at time of press – using Business Objects Software
8. Data Analysis on complete data set – dependant on all AHS records being complete. (Expected early 2002)

Introduction

NSW Health requires relevant indicators of performance in relation to the Government's Action Plan for Health to be provided on a regular basis. The ***Chronic and Complex Care Implementation and Coordination Group*** (CCCICG) is responsible for coordinating quarterly reporting to NSW Health which also report to NSW Treasury. An analysis of the 1999/2000 base line data was conducted in June 2001. This data has been of assistance in refining the methodology applied. Significant time delays have been experienced in obtaining data for the financial year 2000/2001 due to difficulties experienced in some AHSs having new patient administration systems installed throughout 2000 and 2001. It is expected that the first comparative report will be circulated to AHSs in mid early 2002. This report will make comparisons on a quarterly and annual basis. Quarterly comparisons will compare seasonal trends. The report will show comparisons for AHSs and Hospitals within their peer groups.

Why focus on inpatient activity?

State-wide improvement can be assessed by reductions in unplanned activity. A shift from Unplanned Admissions to Planned Admissions is a measure of improved patient management. A reduction in Unplanned Readmissions is also a measure of improved patient management, along with reductions in the numbers of Emergency Admissions. The reductions in the associated length of stay of the unplanned activity and improvements in overall length of stay can assess efficiency gains for all chronic and complex care patients. Most efficiency gains will be internalised financial benefits. That is, there will be a resource shift within hospitals associated with improvements.

Unplanned or Avoidable?

Are all Unplanned Admissions bad? Are all Unplanned Admissions avoidable? The answer is most probably no. The Cancer special interest group (SIG) identified that for Cancer, a significant amount of unplanned activity is largely unavoidable. This is because the nature of Cancer and its progression is often unpredictable. Associate Professor Paul Harnett, Co-Chair of the Cancer Clinical Expert Reference Group, has identified several reasons as to why an unplanned event may be avoidable. Details of this methodology are supplied in Appendix B.

The identification of unplanned activity that is avoidable and the reasons as to why such events are avoidable may provide valuable insight into the data analysis. In addition to improvements measured via reductions in unplanned activity, improvements can also be measured by reductions in unplanned 'avoidable' admissions and readmissions.

Whilst the inpatient activity data will be gathered and analysed by NSW Health, data pertaining to the avoidable or unavoidable nature of admissions will need to be gathered locally. For Cancer, A/Prof Paul Harnett, Co-Chair of the Clinical Expert Reference Group for Cancer and Director and Staff Specialist, Medical Oncology and Palliative Care Unit, Westmead Hospital, will coordinate analysis at local AHS level.

Identification of the 'avoidable' and 'unavoidable' nature of admissions may also prove useful in analysing 'avoidable' and 'unavoidable' admissions for Respiratory Disease and Cardiovascular Disease (including its risk factors, eg. Diabetes).

Data collections/sources

2

The main data collection presently used for tracking inpatient activity is the Inpatient Statistics Collection (ISC). The mechanism used to collect this data has been the Inpatient Statistics Collection On-line System (ISCOS). ISCOS is a tool for collecting, editing and reporting inpatient activity in public, private and psychiatric hospitals in NSW. This data collection has co-existed with other data collection systems, such as the Emergency Department Information System (EDIS). A new data collection mechanism, the Health Information Exchange (HIE), is a warehouse of information that allows a greater variety of variables to be collated. This means that the Inpatient Statistics Collection (ISC) will effectively have greater reporting capabilities.

The HIE receives feeds input from individual AHS HIEs. The frequency of reporting to the NSW Health Department's HIE occurs daily, weekly, or monthly depending on the AHS and the statistics collected. Data collected by the HIE is refined and reviewed via a series of data quality checks, before it is included as part of the ISC.

Who does the work?

Concern was expressed by some AHS staff who were under the impression from the draft Methodology Report circulated in March that AHSs would be required to prepare the data for reporting. This is not the case. The data comes from the HIE and ISC.

Until complete report automation is achieved using Business Objects Software, the process of report generation is as follows:

Data is supplied from the HIE and ISC by NSW Health Information and Data Services who have the most appropriately trained personnel to provide the data required. From a risk management point of view, this will ensure that the data is as free from error as possible before any analysis is conducted.

The Secretariat of the CCCICG (Clinical Excellence Branch, NSW Health) will analyse the data according to the performance indicators outlined in this paper, and will also compile the report. This process uses both Microsoft Access and Microsoft Excel software. As suggested by the Cancer SIG, consideration will be given to incorporating extra documentation and data collected at AHS level where it can be demonstrated that this will give added value and be provided in a timely fashion.

It is envisaged that Information and Data Services Branch, using Business Objects software, will eventually be able to automate the whole report. Such automation will not only speed up analysis and dissemination but remove the possibility of any human error. The report has been partially automated to date by Clinical Excellence Branch.

Data variables

Separations are a typical measure used in the ISC. Defined as *"a discharge, transfer or death of a patient. It is the process by which an episode of care ends for an inpatient or same day patient."* (NSW Health, 2000, 204). Separations can be considered as an indicator of the inpatient volume. The ISC collects a wide variety of statistics for each separation. Those statistics most relevant for the development of performance indicators for the Priority health care programs are:

- Diagnosis fields from Primary Diagnosis to 19th Secondary Diagnosis(ICD10-AM)
- AHS
- Hospital
- Peer Group
- Referral Source
- Admission Status
- Age Group

- Age
- Gender
- Readmission Status
- Length of Stay (LOS)
- Same-day LOS
- Medical Record Number (MRN)
- Date of Admission
- Date of Separation
- Financial Status

Data limitations/ resource issues

Data issues are of the most importance for assessing the feasibility and scope of performance reporting. Many discussions and input surrounding data limitations have occurred amongst NSW Health personnel who have contributed to this paper. AHS feedback on early drafts highlighted data issues were of paramount importance. Such feedback has been useful in refining the methodology adopted and described in this paper.

Variations other than performance

There will be several legitimate reasons why variations between AHSs are observed other than performance. These will include:

- Variation in information supplied for coding.
- Variation in emergency same-day admission counting – some hospitals count a far higher number of Emergency Department visits on a same-day basis as admissions than other hospitals.
- Differences in current service structures, eg. 'Hospital in the Home' service structures are larger in some areas and smaller in others. Depending on access to respite beds out of hospital, hospitals may be used for this role.
- Emergency Department attendances. There is a trend of rising Emergency Department attendances, eg. December 2000 recorded 10% higher attendances than December 1999. This may be related to the amount of services offered by General Practice out of hours but has not, as yet, been well studied.
- That numbers of patients at individual Attending Medical Officer (AMO) level can be small. Variations in sub specialisation between clinicians may account for variation between doctors. There will be a need for a longer sample period to get meaningful data at AMO level. The exact period will depend on volume of patients but probably needs to be 6-12 monthly for most doctors.
- Seasonal trends, eg. winter months can be more severe than warmer months.

How the data is organised

It has been discussed that the data recorded by separations should be organised and analysed at the patient level. The advantages of this are:

- Populations of chronic and complex care patients can be more accurately estimated
- Such estimates are useful in normalising the data for growth trends in the size of the chronic and complex care populations
- Unplanned Readmissions can be more accurately assessed over time.

The process involved in organising the data to the patient level is called 'probabilistic data matching'. Despite the advantages, there are some significant issues that need to be considered in progressing this way. Firstly, the variations observed which cannot be attributed to performance, will occur with reporting at patient or at separation level. Secondly and most importantly, probabilistic data matching is highly complex. Consultation with Epidemiology Branch has indicated that such matching is not yet able to be conducted in the timely and regular fashion required to support quarterly reporting requirements. These issues are discussed in the following Section 2 'Data matching' on page 7.

The performance indicators detailed in this paper rely upon information that is uniform across all AHSs and gathered in a timely and accurate fashion so as to support quarterly reporting requirements. As such, separations data will not be organised to the patient level. A summary showing the feasibility and risks of alternatives of organising and producing performance reports at both patient and separation level is provided in Appendix A.

Data matching

It is important to state that data matching is not concerned with identifying a patient's personal details. The process of data matching is required in the absence of a Unique Patient Identifier for:

- identifying hospital activity at the patient level
- to identify populations of chronic and complex care patients
- to more accurately analyse trends of hospital activity.

The use of the Medicare number in this task is problematic. The Medicare number is not a unique patient identifier. Children and spouses can all have the same individual number. Thus, the use of the Medicare number is only part of the data matching process. Other data fields such as date of birth can assist in identifying the individual record at patient level.

Information from Epidemiology Branch and the Information and Data Services Branch indicate that the Medicare number, whilst part of the HIE collection since July 2000, is not recorded in a systematic way and many AHSs are not actively capturing it. The Medicare number is expected to be absent for most Emergency Department presentations.

In the absence of reliable recording of the Medicare number, data matching involves using even more data fields and a process of problematic data matching. This type of analysis is highly technical and has been carried out by Epidemiology branch using annual ISC collections.

Epidemiology and Surveillance Branch has carried out a program of linkage of health related data collections since 1994 for the purpose of monitoring population health. As part of the Branch's linkage program, the ISC data for the financial years 1996-97 and 1997-98 was de-duplicated (internally linked) for each year separately to provide person-based data to enable patterns of severe morbidities to be examined.

This aim has only been partially achieved. As the ISC does not currently include name, for those people who change their address of residence and are subsequently admitted to another hospital, there may be insufficient information to successfully link records for the same person. Analysis of the linked data found that re-admission rates for asthma were substantially higher for Health Areas with Area-wide medical record numbers than for Health Areas without Area-wide medical record numbers. Re-admission rates calculated using the internally linked ISC data might therefore not be comparable between Health Areas. This has limited the use of the linked data. However, one example of its use is an estimate of the number of persons in NSW receiving haemodialysis by indigenous status which was described in the Report of the Chief Health Officer: *Health of the People of New South Wales*, (2000, p.118).

Whilst it may be desirable to obtain data at the patient level, given these issues and the significant human resource implications, performance reporting at the patient level would render impossible the production of quarterly reports.

3 Defining Chronic and Complex Care Conditions for Cardiovascular Disease, Respiratory Disease and Cancer

The starting point for developing state-wide performance indicators for CCCICG programs is to establish a data product for each of the three Priority Health Care Program streams. The data product should be made up of diagnoses that typically reflect the nature of the relevant chronic and complex illness. There may be other factors, such as age, ethnicity, Aboriginality and distance from home that may contribute to complexity, apart from diagnoses.

There are problems in documenting conditions in patients' medical records, particularly co-existing conditions such as diabetes, respiratory problems and cancer. Advice from NSW Health Casemix Branch indicates that this occurs for two reasons:

1. If the admission is for a purpose other than one of the key health priority areas, it may be overlooked by clinicians and inadvertently coded wrongly by medical records staff.
2. Co-existing conditions are generally only coded when they increase the length of stay of the patient. If there is a specific condition that is being looked for (eg. COPD), it may not be coded in some instances as the clinician may overlook it, and therefore the total inpatient population with that condition will not be captured.

The ideal approach to capturing and monitoring patients with chronic and complex conditions in specific areas would be to build up state-wide registers of the target problem areas and track the patients through the system. The development of a Unique Patient Identifier (UPI) would aid such a process. However, for the purposes and timeliness of reporting, this paper will focus on using existing resources.

Why not use DRGs?

A possible approach would be to select the top 20 Australian Refined Diagnosis Related Groups (ARDRGs) by volume associated with each of the three priority health programs. This approach may be reasonable for acute care patients. However, advice from NSW Health Casemix branch indicates that there is a fundamental problem with this approach for chronic and complex care patients. ARDRGs are classified as either surgical or medical. Surgical classifications are applied to patients based on a particular surgical procedure, and not a diagnosis. Medical DRGs are assigned to the patient for the reason of admission only. The very nature of patients suffering from chronic and complex illness may mean that their length of stay may be attributed to their chronic illness and its associated complexity and this may have little to do with the reason for admission. It should also be noted that DRGs only deal with complexity from a resource perspective, which limits the definition of severity. As discussed, complications and co-morbidities are generally only identified when they increase the LOS of the patient from the expected LOS. Patients may have similar lengths of stay, but have increased severity/complexity.

The method: using diagnosis ICD codes

An approach identified by Elixhauser, (1998), suggests that conditions that are long term and often have reported co-morbidities for inpatient conditions might be termed as 'chronic and complex and recurring conditions'. The paper gives some guidance as to the group of codes that can be considered 'respiratory' or 'cardiovascular' .

The current ICD-10-AM coding system has been used to define the targeted conditions, with a review from clinical experts. Initially separations were identified if the principal or secondary diagnosis codes matched a code defined by the review by clinical experts.

The identified ICD-10-AM codes that have been identified for Cardiovascular Disease, Diabetes and Respiratory Disease are:

- *For Cancer all ICD-10-AM codes associated with:* Oseophagus; Stomach; Colon; Pancreas; Larynx; Trachea, bronchus and lung; Melanoma of the skin; Other neoplasm of the skin; Female breast; Cervix; Uterus; Testes; Prostate; Bladder; Brain; Ill defined sites; Lymph nodes; Respiratory and digestive systems; Secondary Malignant neoplasm; Lymphosarcoma and reticulosarcoma; Hodgkin's disease; Other malignant neoplasms of lymphoid and histiocytic tissue; Multiple myeloma and immunoproliferativa neoplasms; Lymphoid Leukaemia; Myeloid leukaemia; Monocytic Leukaemia; Other specified leukaemia; Leukaemia of unspecified cell type.
- *For Respiratory Disease:* Emphysema, Other COPD, and Asthma (ICD-10-AM Codes J43, J44, J45).
- F*or CVD/Diabetes:* Heart Failure and Complications of Heart Disease (ICD-10-AM codes I50 and I51); Diabetes (ICD10 codes E10 and E11 and all sub categories).

Code selection

Associate Professor Steven Boyages (CCCICG Co-Chair) and Co-Chairs of the Clinical Expert Reference Groups (CERGs) were consulted concerning the selection of these codes.

Confirming separations as chronic and complex was done by examining the Commonwealth's Clinical Complicating Factor (CCF) Study that is used as the basis for defining severity in the Version 4 DRG classification. (Commonwealth Department of Health and Aged Care, 1998). This process does not suggest relying upon DRGs. The CCF study identified additional diagnoses that are likely to result in significantly greater resource consumption. Simply, these are a list of ICD-10-AM codes flagged as complication and or comorbidity (CC) codes. The method involved using the CC table provided by the Commonwealth to narrow the count of additional diagnoses to those contained in the list. At this level, separations with codes listed as additional procedures, were confirmed as chronic and complex.

Refining the population further

Psychiatric facilities separation's were not included due to the assumption that these separations have more to do with psychiatric illness rather than the chronic illnesses associated with the Priority Health Care Programs.

Mothercraft facilities and Corrections Health facilities were excluded due to extremely small numbers of separations.

Same day separations were excluded. This was to avoid any differences that AHSs and hospitals may have regarding admissions of patients whose inpatient treatment may be affected by lack of available services. This is discussed further in Section 4 'Reducing Emergency Admissions and Readmissions' on page 24.

Using the 1999/2000 ISC the following numbers of separations were identified for the Priority Health Care Program streams in table 1. Confirmed Chronic and Complex Care Separations were identified where any diagnosis field matched the ICD-10-AM codes specified and where secondary diagnosis was a CC code. Psychiatric, Mothercraft or Corrections Health separations were excluded. NSW Health Information and Data Services supplied the data. Same day separations have been excluded.

Table 1

Priority Health Care Program	Separations extracted using ICD-10-AM codes only	Confirmed as Chronic and Complex Separations
CVD/Diabetes	147,744	90,502
Respiratory Disease	115,719	56,071
Cancer	134,020	50,091

The following raw base line data for the year 1999/2000 was obtained for each of the three priority health care areas, using the methods already described. This data is 'raw', in that is has not yet been converted into standardised data that will be used for performance monitoring.

Raw data is provided for illustrative purposes to show the magnitude of Chronic and Complex conditions identified using the methodology described.

Raw Baseline Data 1999/2000

Source – Inpatient Statistics Collection (ISC) 1999/2000.

Respiratory disease (excludes same-day admissions)

Respiratory Disease Baseline Public Hospitals	Separations	% Total Separations	Length of Stay	% Total Separations
Planned Admissions	8,394	17.65%	119,692	23.34%
All Unplanned	39,162	82.35%	393,073	76.66%
Total	**47,556**	**100.00%**	**512,765**	**100.00%**
Unplanned Admissions	6,597	16.85%	98,592	25.08%
Unplanned Readmissions	2,683	6.85%	36,120	9.19%
Unplanned Emergency Admissions	25,656	65.51%	220,286	56.04%
Unplanned Emergency Readmissions	4,226	10.79%	38,075	9.69%
Total	**39,162**	**100.00%**	**393,073**	**100.00%**

Respiratory Disease Baseline Private Hospitals	Separations	% Total Separations	Length of Stay	% Total Separations
Planned Admissions	5,714	67.11%	60,699	64.47%
All Unplanned	2,801	32.89%	29,270	32.53%
Total	**8,515**	**100.00%**	**89,969**	**100.00%**
Unplanned Admissions	868	30.99%	10,262	35.06%
Unplanned Readmissions	199	7.10%	2,282	7.80%
Unplanned Emergency Admissions	1,534	54.77%	14,884	50.85%
Unplanned Emergency Readmissions	200	7.14%	1,842	6.29%
Total	**2,801**	**100.00%**	**29,270**	**100.00%**

Respiratory Disease is defined as Emphysema, Other COPD, and Asthma (ICD10 Codes J43, J44, and J45).

CVD/Diabetes (excludes same-day admissions)

CVD/Diabetes Baseline Public Hospitals	Separations	% Total Separations	Length of Stay	% Total Separations
Planned Admissions	12,934	17.02%	220,627	23.82%
All Unplanned	63,049	82.98%	705,675	76.18%
Total	**75.983**	**100.00%**	**926,302**	**100.00%**
Unplanned Admissions	12,387	19.65%	217,554	30.83%
Unplanned Readmissions	4,743	7.52%	64,384	9.12%
Unplanned Emergency Admissions	39,521	62.68%	363,451	51.50%
Unplanned Emergency Readmissions	6,398	10.15%	60,286	8.54%
Total	**63,049**	**100.00%**	**705,675**	**100.00%**

CVD/Diabetes Baseline Private Hospitals	Separations	% Total Separations	Length of Stay	% Total Separations
Planned Admissions	10,064	69.32%	107,654	68.58%
All Unplanned	4,455	82.98%	49,327	31.42%
Total	**14,519**	**100.00%**	**156,981**	**100.00%**
Unplanned Admissions	1,408	31.60%	17,789	36.06%
Unplanned Readmissions	318	7.14%	4,280	8.68%
Unplanned Emergency Admissions	2,436	54.68%	24,675	50.02%
Unplanned Emergency Readmissions	293	6.58%	2,583	5.24%
Total	**4,455**	**100.00%**	**49,327**	**100.00%**

CVD/Diabetes is defined by Heart Failure and Complications (ICD-10-AM codes I50 and I51); Diabetes (ICD-10-AM codes E10 and E11 and all sub categories).

Cancer (excludes same-day admissions)

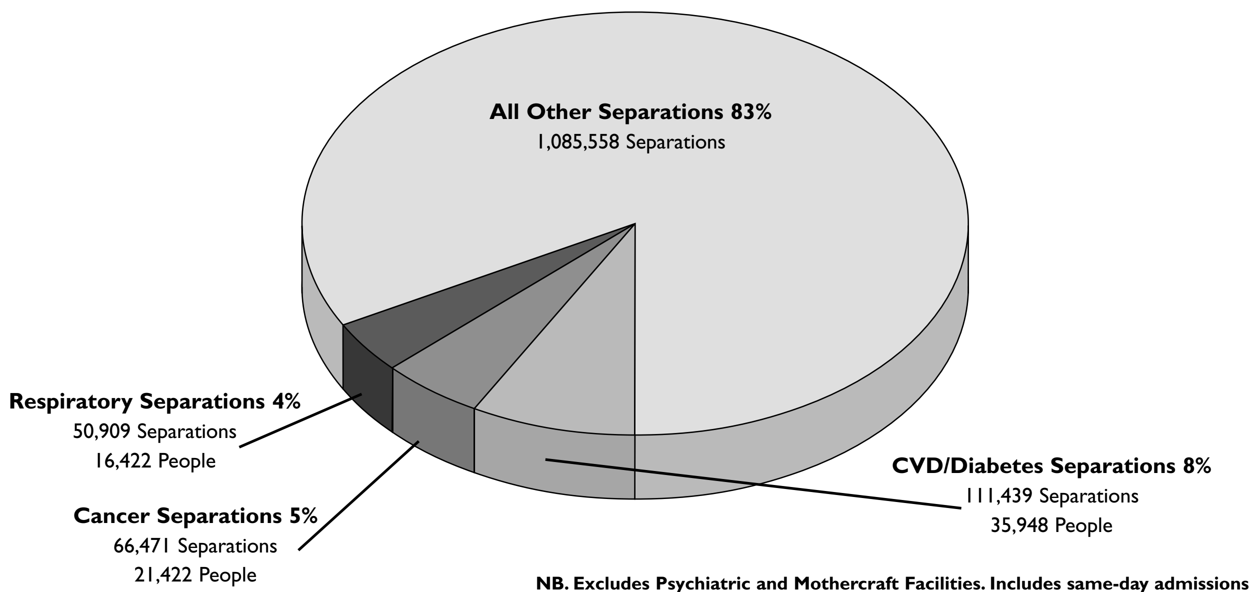
Cancer Baseline Public Hospitals	**Separations**	**% Total Separations**	**Length of Stay**	**% Total Separations**
Planned Admissions	13,860	34.44%	167,595	36.36%
All Unplanned	26,379	65.56%	293,306	63.64%
Total	**40,239**	**100.00%**	**460,901**	**100.00%**
Unplanned Admissions	6,243	23.67%	89,170	30.40%
Unplanned Readmissions	2,824	10.71%	35,665	12.16%
Unplanned Emergency Admissions	13,255	50.25%	132,403	45.14%
Unplanned Emergency Readmissions	4,057	15.38%	36,068	12.30%
Total	**26,379**	**100.00%**	**293,306**	**100.00%**

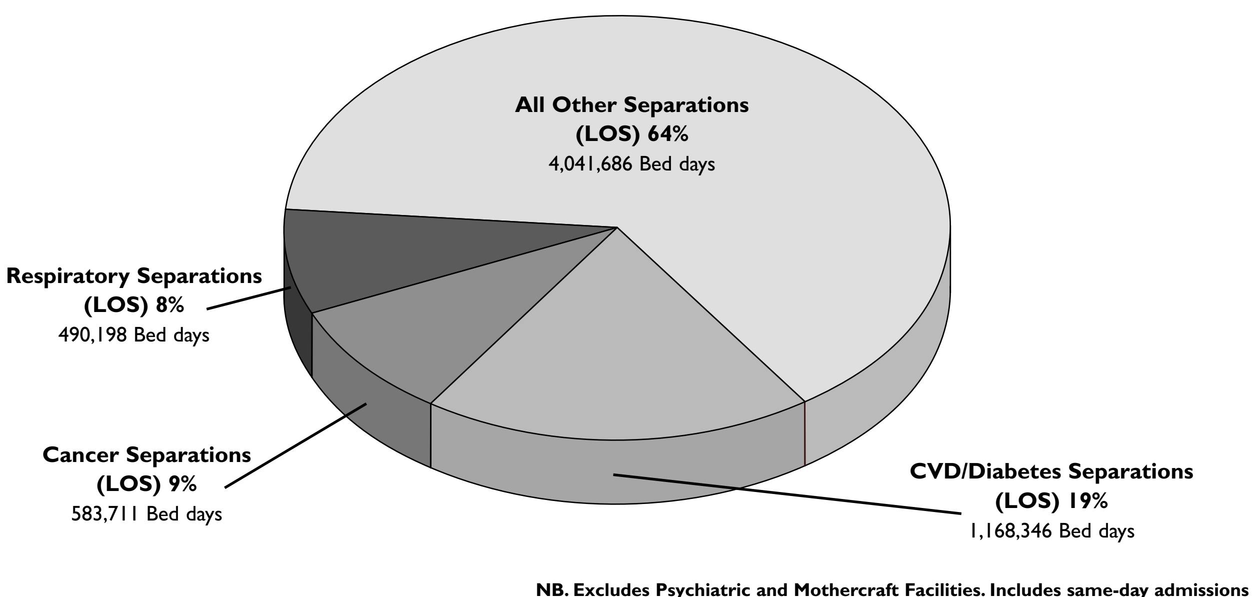
Cancer Baseline Private Hospitals	**Separations**	**% Total Separations**	**Length of Stay**	**% Total Separations**
Planned Admissions	7,347	74.57%	74,983	72.25%
All Unplanned	2,505	54.43%	28,806	27.75%
Total	**9,852**	**100.00%**	**103,789**	**100.00%**
Unplanned Admissions	1,078	43.03%	13,924	48.34%
Unplanned Readmissions	274	10.94%	3,203	11.12%
Unplanned Emergency Admissions	989	39.48%	10,254	35.60%
Unplanned Emergency Readmissions	164	6.55%	1,425	4.95%
Total	**2,505**	**100.00%**	**28,806**	**100.00%**

Cancer is defined by all ICD 10 codes associated with Cancer of the: Oesophagus; Stomach; Colon; Pancreas; Larynx; Trachea, bronchus and lung; Melanoma of the skin; Other neoplasm of the skin; Female breast; Cervix; Uterus; Testes; Prostate; Bladder; Brain; Ill defined sites; Lymph nodes; Respiratory and digestive systems; Secondary Malignant neoplasm; Lymphosarcoma and reticulosarcoma; Hodgkin's disease; Other malignant neoplasms of lymphoid and histiocytic tissue; Multiple myeloma and immunoproliferativa neoplasms; Lymphoid Leukaemia; Myeloid leukaemia; Monocytic Leukaemia; Other specified leukaemia; Leukaemia of unspecified cell type.

Size of Chronic and Complex Care

The size of the Chronic and Complex Care public hospital population as a portion of all public hospital separations and length of stay for 1999/2000 is illustrated in the two following charts. (Source is 1999/2000 ISC). The numbers of people associated with the separations are based on analysis provided by Structural Funding Policy Branch. This indicates that, on average, a Chronic and Complex care patient has 3.1 separations per annum.





3

Defining complexity

When assessing performance, areas that have large numbers of highly complex/severe patients may fare worse by direct comparison with those that have a mix of patients whose complexity/severity is low. Therefore a suitable method of measuring and defining complexity/severity is required after defining the conditions that make up a data product for each of the three priority health care streams. Assessing complexity will be of value for comparisons at hospital and AHS level, but may be of less value when reporting at a whole of system level.

Advice from NSW Health Casemix branch indicates that the level of complexity should be based on secondary diagnoses other than those defining the condition. The reason is that additional codes from the area of interest (eg. respiratory conditions) will not necessarily add to the complexity of the patient's condition. In fact, it is unlikely if the additional conditions are being treated within the same specialty. It is only when multiple specialties and clinicians are involved that the severity increases.

Using multiple ICD codes as an indicator of severity (the HIE allows up to 20 ICD codes to be recorded for each separation) requires selective choice about the codes that are used. This is because there are codes of different types, some of which indicate increased severity and some that do not. There are generally three types of diagnosis codes: (1) status diagnoses (eg. status of hip replacement); (2) history diagnoses (eg. history of smoking or family history of cancer) and (3) condition diagnoses (ie. presenting diagnosis, complications arising during the hospital stay and pre-existing conditions known as co-morbidities). The first two types of diagnosis should not be given equivalent weight for the purposes of defining severity.

Further to the above, the number of diagnoses may also be determined by the efficiency of the coding system. For example, some codes are all encompassing (eg. retinopathy in diabetes), whilst in other circumstances more than one code is required to describe related conditions (eg. infection plus infecting organism).

Complication and co-morbidity codes are unlikely to be coded for same day patients because of the definition, which requires that there is an increase in severity, usually measured by an increase in length of stay.

Three suggested approaches for defining patient complexity and severity were discussed in the earlier draft 'for comment' paper. These approaches were suggested by NSW Health Structural Funding Policy branch and Casemix Branch. These approaches were:

1. Using the CC codes of the Commonwealth's CCF study to define patient severity. At the simplest level, the method would be to use the CC table provided by the Commonwealth to narrow the count of additional diagnoses to those contained in the list. At a more sophisticated level, the combinations of codes can be of use. This is because in some instances, additional codes will have no additive effect on the condition (that is, because they are status or history codes, or they are closely related to the chronic and complex condition and can be treated using the same resources). In other cases, they will have an additive effect. Using such a methodology, the complexity/severity case load for each AHS, hospital, and perhaps AMO, could be established for comparison by summation of the total work load of patients by volume and associated complexity.
2. An alternative approach to defining severity, apart from restricting additional diagnosis codes in the way described in approach 1, is to classify the diagnoses according to clinical service areas and define severity based on the number of services being delivered (eg. cardiology plus oncology).
3. Another alternative to the first two approaches, and possibly the simplest, would be to establish a benchmark level of complexity for each of the hospitals based upon peer types. The benchmark would reflect a rating to represent the typical levels of complexity x/severity for the type of hospital. Comparison of performance would then proceed amongst hospitals with the same benchmark level, eg. Principal Referral hospitals compared only to other Principal Referrals. This means that individual patients complexity

would be defined by the hospital peer type for comparison. It is important to note that a benchmark would be required for performance comparison of the first two methods described in this Report. This method may therefore prove to be the most efficient.

The issue of a possible shift in complexity and the possibility of measuring it will depend on how robust the system is at estimating complexity from counts or combinations of diagnostic codes. There may be coding practice differences between Areas and there may be some shift in these coding practices over time.

The method adopted

Based on the merits and limitations of the approaches discussed, as well as resources available, the third method of adjusting for complexity, whereby complexity is assumed for each peer type of hospital may prove to be the most robust. This will be used for comparisons of hospitals within peer groups.

Other complexity issues

The issue of complexity in terms of casemix is also of importance for considering the internalised financial benefits associated with reductions in length of stay. To this end, the use of a Relative Stay Index (RSI) is beneficial.

From information provided by Casemix branch, *"an RSI is an indicator of comparative hospital performance for patients falling into similar categories of care. It is expressed as a single number (calculated to two decimal places) which can then be compared to a State average of 1.00. The measure used for comparison is the length of stay between the date of admission and the date of discharge, transfer or death (separation). The purpose of an RSI is to estimate differences in hospital utilisation resulting from variations in treatment and discharge procedures rather than from the diagnostic and demographic mix of the hospital's patients. It is recognized that every patient is different and that no individual can respond to treatment in exactly the same way. However, it is generally accepted that a given diagnostic and demographic group of patients can usually be expected to require a similar length of stay before they are fit to be discharged."*

"The RSI is merely a statistic. It does not imply that the length of stay experienced at a particular hospital is either good or bad. Rather, it demonstrates whether that length of stay is different to other hospitals after adjusting for variation in casemix. Further analysis is then required to determine why the variation exists."

Details of how RSIs are applied to length of stay are discussed in the following performance indicator section.

Standardising the data

As the lifespan of some patients with chronic and complex problems is growing (patients on Renal Dialysis growing at approximately 7% per annum) the proportion of the community that has chronic and complex medical problems, is increasing. The effects of ageing and developing other age related problems will also contribute to a trend of increasing complexity. Raw comparisons of performance indicators based on total admissions and readmissions will not take into account these underlying trends. All data for AHSs will be age standardised to address any growth in the ageing population.

Direct standardisation techniques apply. Direct Standardisation typically is applied to the 1991 Australian population. However, the standardised population that will be applied is the NSW 1998 population. This is available for each AHS. This population was published in the 'Report of the Chief Health Officer 2000' as a population pyramid. Further discussion on standardisation techniques used, is covered in Section 4.

Comparators

Essentially performance will be measured by an improvement of the current situation. The data is expressed in terms of peer types, so like institutions are compared and complexity of cases is assumed to be similar. Data for each peer group can be organised in histogram format showing upper and lower 95% confidence interval limits median and mean.

3

Special populations

The performance indicators suggested in this paper could be used to generate data for specific populations, eg. the data can be organised to identify:

- the Indigenous Populations
- private patients in private hospitals, private patients in public hospitals and public patients
- the Local Government Area (LGA) of residence of the patient.

The Indigenous Population

Two Area Programs focus specifically on Aboriginal Health. These are:

- Greater Murray AHS (GMAHS) Aboriginal diabetes project
- South Eastern Sydney AHS (SESAHS) Managing Chronic and Complex Disease in Aboriginal People.

Private patients

The performance indicators described in this paper can be produced for private and public patients in both private and public hospitals. This analysis may prove useful in analysing differences in effectiveness or efficiency between public and private patients. The inclusion of the Financial Status variable will be useful in this regard.

Dealing with variations other than performance

As outlined in Section 2 'Variations other than performance' on page 6, some variations will be observed for reasons other than performance. In the following sections that describe the performance indicators that have been adopted, discussion is included as to validation processes that have been conducted with some of the data in order to deal with variations and anomalies.

Seasonal trends

Whilst comparison across quarters may prove useful, comparison of quarters in seasonal terms will prove more beneficial. Therefore the reports generated will compare like quarters, eg. Jan-March 2001 will be compared with Jan - March 2000.

Unplanned or Planned – Is this logical – what are the coding standards?

Some of the criticism levied at this process was that for some Chronic and Complex Care Conditions the very nature of the illness can be termed as being at a crisis situation if any hospitalisation is required and that it is not logical to be making a distinction between Unplanned and Planned Admissions. Some clinicians do support the notion of the different types of admission and argue equally as strongly that a normal course of action may include booking patients for hospitalisation and this may be a routine measure and not a measure done solely for crisis situations. Guidelines do exist for the coding of such Unplanned and Planned events and these are detailed below.

NSW Inpatient Statistics Collection Section E: Other Admission Items E.6.1 Guidelines
6. Admission Status
Instruction Enter the patient's Admission Status, that is whether or not the patient's condition required immediate (time dependent) admission.
Coverage Complete this question for all admitted patients.
Source of information This information should be provided by: ● the admitting medical officer
Method of collection This information should be collected from: ● the patient's medical record, or ● an administrative file or system
Collection point This information should be collected: ● on admission
Questionnaire module The recommended questionnaire module is: Admission Status: 1 – Emergency 2 – Planned 3 – Other

NSW Inpatient Statistics Collection Section E: Other Admission Items E.6.1 Guidelines
Valid values   The valid values for the variable are provided below.   **Value Use for:**   **1. Emergency**   An admission of a patient who has a condition which requires treatment within 24 hours. This includes patients on the hospital's planned admission list (Waiting List) whose admission for the planned procedure is brought forward because the patient's condition meets the 'immediate treatment' criterion with the exception of obstetric cases (see obstetric rules below).   Note: This category is independent of the patient's 'Source of Referral'.   **2. Planned**   An admission of a patient who is on the hospital's planned admission list Waiting List) and who has a condition that is not an emergency.   **3. Other**   An admission of a patient whose condition does not require treatment within 24 hours and who is also not on the hospital's planned admission list (Waiting List). This includes: statistical type change admissions patients who are transferred between hospitals for non-emergency care, and non-emergency patients referred from Outpatients or Doctors' rooms and admitted without being added to the hospital's planned admission list (Waiting List).
Admission of emergency patients   Most emergency patients will be admitted through Accident and Emergency but some (for example, cardiac cases) may be admitted directly to the ward and not through Accident and Emergency. In some instances admissions which are classifiable to 'planned' or 'other' may nevertheless be admitted via the Emergency Department. The Admission Status for these patients must remain 'planned' or 'other' (as appropriate).
Newborns   All newborns must be classified as non-emergency cases unless they are specifically identified as an emergency admission by the attending medical officer.
Rules for Obstetric cases   All obstetric cases who are booked for a confinement on the hospital's waiting list but present to emergency must be classified as '2 – Planned' unless they are specifically identified as an emergency admission by the attending medical officer, or present with a completely unrelated condition.   Example: ● A woman is booked for a confinement at the hospital but presents two weeks early and has a normal delivery. The attending medical officer does not deem this to be an emergency and the patient is classified as '2 – Planned'   ● A woman is booked for a confinement at the hospital but presents three months early due to a miscarriage. The patient is admitted, the attending medical officer deems this to be an emergency admission. The patient is classified as '1 – Emergency'.   ● A woman is booked for a confinement at the hospital but presents six weeks early with a broken arm and is admitted. There is no delivery or direct impact on the pregnancy. The patient is classified as '1 – Emergency'.
Admissions from Outpatients and Diagnostic Clinics   A patient whose attendance at an outpatient or diagnostic clinic results in an admission on the same-day, is only an emergency admission if the condition requires immediate re-treatment.
Private Day Procedure Centres   All patients admitted to Private Day Procedure Centres will have an Admission Status of '2 – Planned'.
Purpose   This information is collected for the purpose of: · identifying whether or not the patient's condition required an immediate (time dependent) admission.
Date of Issue This topic was issued on: 1 July 1999

Standardisation techniques applied

Any population that is meaningful for comparison can be used. *"There is no uniquely correct standard population and each investigator is free to use judgement in choosing an appropriate standard. The choice made may affect the results obtained but generally not significantly."* (Pollard, Yusuf, Pollard, 1981, p27).

For analysis at AHS level, standardisation is to the NSW 1998 population. The population will be the resident population for each AHS. The standardised age groups used are: 0-29, 30-49, 50-59, 60-69, 70-74, 75-79, 80-84, 85+. These groups are larger for lower ages as lower age groups are associated with fewer chronic and complex care admissions. This does not affect standardisation results. Age groups applied in standardisation do not have to be uniform in terms of the blocks of age groups each contain.

Standardisation is more problematic however, for analysis at the hospital level. This is because unlike AHSs that have identified populations which are subsets of the NSW population, hospitals do not have such identified populations. It was suggested in an early version of this methodology paper, that standardisation at the hospital level could occur, as hospitals have populations of patients measured by separations for certain conditions. It was suggested that the standard population applied is the number of total separations for a particular priority health care program stream within a hospital's peer group. This is possible as each separation has an age assigned to it. This process however is intuitively flawed. This is because the process is standardising a population against itself. Results for each type of admission were represented as a portion of total admissions. These portions equate exactly with crude portions. For such standardisation to occur, the standardised population would be all hospital admissions across all peer groups. In doing so, this process would erode the value of comparison of like institutions within peer groups. Therefore, direct standardisation of hospitals within peer groups will not be conducted. Performance of individual hospitals against peers will show the types of admission as portions. In so doing so, differing volumes at different facilities will not impact on comparison. It is important to note that analysis of hospital level data will only provide additional information that might be helpful to AHSs. The main performance indicators will be standardised and at AHS level.

What about net flows?

Inflows to an AHS are when treatment is provided to a patient from outside that AHS's resident boundaries. Outflows occur when a patient who resides within an AHS resident boundaries receives treatment at another AHS. The difference between inflows and outflows within an AHS are net flows.

It has been suggested by some AHSs that the methodology applied in this paper does not consider net flows because standardisation is applied to the AHS resident population, and that such a population does not reflect net flows. This is not the case. Total inpatient activity is examined, and such activity includes an AHS's net flows. Advice from NSW Health Epidemiology Branch indicates that such standardisation to the AHS resident population is valid. The rationale is that standardisation is applied uniformly across all AHSs to effectively remove age effects and create a level field for comparison.

Admission and Readmission types

Essentially, admissions and readmissions fall into the two broad categories of either 'planned' or 'unplanned'. Beyond these two broad categories unplanned activity can be divided up into six sub-categories. It is anticipated that each category will help provide a greater detail of analysis. These are defined in the table on page 20.

Admission type definition table

Admission / separation type	Defined by
Planned Admissions (PA)	● where Admission Status equals 'Planned'
Unplanned Admissions that were not referred by the Emergency Department, and are not a readmission. (UA)	● where Admission Status does not equal 'Planned' ● where Readmitted within 28 days equals 'No, not to any hospital within the last 28 days' ● where Source of Referral does not equal 'Emergency Department'
Unplanned Admissions that are an emergency, and are referred by the Emergency Department, and are not a readmission. (UAED)	● where Admission Status equals 'Emergency' ● where Readmitted within 28 days equals 'No, not to any hospital within the last 28 days' ● where Source of Referral equals 'Emergency Department'
Unplanned Admissions that are not an emergency, but are referred by the Emergency Department, and are not a readmission. (OAED)	● where Admission Status equals 'Other' ● where Readmitted within 28 days equals 'No, not to any hospital within the last 28 days' ● where Source of Referral equals 'Emergency Department'
Unplanned Readmissions that were not referred by the Emergency Department. (UAR)	● where Admission Status does not equal 'Planned' ● where Readmitted within 28 days does not equal 'No, not to any hospital within the last 28 days' ● where Source of Referral does not equal 'Emergency Department'
Unplanned Readmissions that are an emergency, and are referred by the Emergency Department. (UARED)	● where Admission Status equals 'Emergency' ● where Readmitted within 28 days does not equal 'No, not to any hospital within the last 28 days' ● where Source of Referral equals 'Emergency Department'
Unplanned Readmissions that are not an emergency, but are referred by the Emergency Department. (OARED)	● where Admission Status equals 'Other' ● where Readmitted within 28 days does not equal 'No, not to any hospital within the last 28 days' ● where Source of Referral equals 'Emergency Department'

Readmissions error adjustment

Whilst the ISC collects a wide variety of statistics for each separation, there are items where the quality of the variable (ie. compliance with, collection of, and accuracy) is known to be unreliable. A key example is Readmission Status. The variable, Readmission within 28 days, is designed to report on previous admissions within 28 days of the current admission.

Information provided by coding staff in a number of AHSs indicates that the compliance with and the quality of the Readmission within 28 days variable is unknown and that the reporting of the statistic may be questionable. In the first draft Methodology Report issued for comment it was suggested that in the absence of probabilistic data matching, problems with coding of the Readmissions within 28 days flag may be overcome by notifying AHSs that the quality of the statistics collected will impact upon their own performance and that they should improve their own reporting accuracy of this statistic. Considerable feedback from AHSs criticised this approach. In light of this criticism NSW Health carried out a validation exercise on the entire Inpatient Statistics Collection for 1999/2000. Information and Data services branch indicated that this was a complete record set. The validation looked at Medical Record numbers (MRNs) for each hospital and looked at the corresponding separation dates and admission dates – both forward and backward 28 days.

The Report generated an error for every hospital in NSW in terms of the number of separations incorrectly coded as 'Yes, to this hospital within the last 28 days' that should have been recorded as 'No, not to any hospital within the last 28 days' (an over report of readmissions within the last 28 days). The report also generated an error for every hospital in NSW in terms of the number of separations

incorrectly coded as 'No, not to any hospital within the last 28 days' that should have been recorded as 'Yes, to this hospital within the last 28 days' (an under-report of readmissions within the last 28 days). It was not possible to validate for errors where the separation was recorded as a 'readmission within the last 28 days' to another hospital as MRNs are only unique to individual facilities. The sum of the errors of over-reported and under-reported 'readmissions within the last 28 days' allowed for an overall error to be calculated for each facility. It was assumed that this error would apply to all 'readmissions within 28 days', including those to other facilities. Analysis also suggested that the bulk of readmissions occur to the same hospital and not other facilities.

The number of unplanned readmissions within 28 days can be estimated using the ISC variable 'Admission Status' in combination with the 'Readmission within 28 days' variable adjusted for the error for each hospital. The Admission Status variable indicates if the separation was 'planned', via 'emergency' or 'other'. Should the admission status variable be flagged as 'emergency' or 'other' it should be considered as unplanned and the associated 'readmission within 28 days' will be an unplanned readmission.

The total error for all NSW hospitals was a 4.56% under report of readmissions within 28 days. The error for each hospital unit will be applied to each hospital's 'readmission within 28 days' data. For public hospitals within all AHSs, this error was found to be an under report of readmissions within 28 days of 4.87%.

Individual adjustments were made to the three types of readmissions (UAR, UARED, and OARED) based on the known AHS errors. The adjustments applied the AHS percentage error for each readmission statistic. The percentage adjustments were then applied to the corresponding admissions (UA, UAED, and OAED). For example, if AHS 'X' has 3% under report of readmissions, the readmission types UAR, UARED, and OARED for AHS X have an additional 3% applied to them. The admission types UA, UAED, and OAED for AHS ' X' have 3% deducted from them.

It may be more accurate to deduct the magnitude of the additional 3% added to the readmission statistics to the corresponding admissions. That is, if 3% equates to an additional 10 readmission separations then 10 admission separations should be deducted from the corresponding admissions. This method was applied for individual hospitals where age standardisation was not applied for peer hospital comparison. The problem in doing so for AHSs is that the associated age of the admission was not collected in the audit of readmission errors. As such, we do not know which age group the additional 10 separations, for example, are associated with and breaking down the separations into age groups is required for standardisation. So for the purposes of standardisation of AHS Admissions and Readmissions, applying percentages is the next best solution. It is also a practical solution as it is sensible to assume that errors in coding will not be biased towards differing ages of patients. The percentage adjustments were made for each age group, assuming that the percentage error was uniform across all age groups. Standardisation was then applied.

The percentage errors for all AHSs public hospital's for 1999/2000 are:

AHS	Readmission's percentage error (Separations)	Readmission's percentage error (LOS)
CCAHS	-5.57%	-5.72%
CSAHS	-10.70%	-7.39%
FWAHS	-3.99%	-1.83%
GMAHS	-3.36%	-1.49%
HAHS	-1.71%	-0.67%
IAHS	-2.93%	-3.13%
MAHS	-4.72%	3.31%
MNCAHS	-1.11%	-2.13%
MWAHS	-3.50%	2.48%
NEAHS	-1.67%	0.06%
NRAHS	-1.13%	1.13%
NSAHS	-0.51%	-2.42%
SESAHS	-3.88%	-2.38%
SWSAHS	-3.51%	-2.62%
SAHS	-2.31%	-1.54%
WAHS	-0.03%	-1.03%
WSAHS	-17.12%	-7.91%
Grand total	**-4.87%**	**-2.64%**

NB. Negatives are an under-report of Readmissions. It is hoped that the identification of these errors will emphasise the importance for AHSs to be vigilant with their own data quality issues and accuracy. Further error audits will be conducted to see if these errors are being addressed.

The audit of readmission errors included an error for each hospital. Each percentage error for each hospital was applied to the readmission types UAR, UARED, and OARED. Since hospitals data was not age standardised, the magnitude of these percentages were applied to the corresponding admission types UA, UAED, and OAED.

The audit of readmissions also identified the length of stay (LOS) associated with the readmission errors. As such the same methodology described for adjusting admissions was applied to the associated readmissions LOS.

Reducing Unplanned Admissions

Management of chronic and complex conditions before they require hospitalisation is an indicator that primary and community care is effective. Therefore, a reduction in the numbers of unplanned admissions can be considered as an indicator of effectiveness. This is also an indicator of efficiency as hospital costs for chronic and complex patients decline.

Admissions are the beginning of an episode of care. Separations are recorded at the end of episode of care. Total admissions can be approximated by total separations. The admission status variable indicates for separations if an admission was 'planned' via 'emergency' or 'other'. Separations flagged as 'emergency' or 'other' can be considered as unplanned.

Reducing Unplanned Admissions Indicator

Difference between time periods for:

Unplanned Separations expressed as age standardised separations ratio for the specific condition. (Unplanned separations are determined by the ISC variable Admission Status being not equal to 'Planned' and Readmission within 28 days variable being equal to 'No, not to any hospital within the last 28 days') ie.

UA 1 = Unplanned Separations for Specific Priority Health Program Directly Standardised for Age (SSR)

Minus

UA 2 = Unplanned Separations for Specific Priority Health Program Directly Standardised for Age (SSR)

SSR: Standardised Separations Ratio

Frequency: Quarterly

Purpose: AHS comparison

For hospital comparison, the portions of Unplanned Admissions from Total Admissions will be compared for hospitals within each peer group.

Reducing Unplanned Readmissions

Unplanned Readmissions Indicator

Difference between time periods for:

Unplanned Separations that have a readmissions within 28 days. These are expressed as age standardised separations ratio for the specific condition. (Unplanned Readmissions are determined by the ISC variable Admission Status being not equal to 'Planned' and Readmission within 28 days variable being equal to 'Yes, to this hospital within the last 28 days' or 'Yes, to another hospital within the last 28 days') ie.

UAR 2 = Unplanned Readmissions for Specific Priority Health Program Directly Standardised for Age (SSR)

Minus

UAR 1 = Unplanned Readmissions for Specific Priority Health Program Directly Standardised for Age (SSR)

SSR: Standardised Separations Ratio

Frequency: Quarterly

Purpose: AHS comparison

For hospital comparison, the portions of Unplanned Readmission from Total Admissions will be compared for hospitals within each peer group.

4 Reducing Emergency Admissions and Readmissions

Emergency attendances are made up of:

1. people who use the Emergency Department (ED) and are not admitted
2. those who are admitted.

For those persons who attend Emergency and are not admitted no diagnosis data exists on the Emergency Department Information System. This is a significant problem if there is a desire to examine Emergency Department use in terms of Chronic and Complex Care where treatment does not warrant admission.

Emergency Admissions can however, be assessed. Some people use the ED in place of other services that may be locally in short supply. Depending on how individual hospitals apply the 4-hour rule in ED, some of these people may end up being admitted. Typically the length of stay associated with these separations are same-day admissions, and typically the type of treatment is non-urgent. Given this, same-day separations are excluded.

The Admission status variable where it equals 'emergency' can indicate if a separation was an emergency. The Admission status variable, in combination with the Source of Referral variable equal to ED, can classify separations as Emergency Admissions that are unplanned and are urgent/emergency. Where the separation identified in this way is not a readmission within 28 days, the separation can be considered as Unplanned Emergency Admission. Where the separation does have a readmission within the last 28 days, the separation can be considered as an Unplanned Emergency Readmission.

As with both Unplanned Admissions and Unplanned Readmissions separations identified are age standardised.

Reduced Unplanned Emergency Admissions

Difference between time periods for:

Unplanned Emergency Admissions expressed as age standardised separations ratio for the specific condition. (Unplanned Emergency Admissions are determined by the ISC variable Admission Status being *equal* to 'Emergency', Source of Referral variable *equal* to 'Emergency Department' and Readmission within 28 days variable being equal to 'No, not to any hospital within the last 28 days') ie.

UAED 2 = Unplanned Emergency Admissions for Specific Priority Health Program Directly Standardised for Age (SSR)

Minus

UAED 1 = Unplanned Emergency Admissions for Specific Priority Health Program Directly Standardised for Age (SSR)

SSR: Standardised Separations Ratio

Frequency: Quarterly

Purpose: AHS comparison

This indicator is a subset of Unplanned Admissions.

For hospital comparison, the portions of Unplanned Emergency Admissions from Total Admissions will be compared for hospitals within each peer group.

Reduced Unplanned other Emergency Admissions

Difference between time periods for:

Unplanned Other Emergency Department Admissions expressed as age standardised separations ratio for the specific condition. (Unplanned Other Emergency Department Admissions are determined by the ISC variable Admission Status being *equal* to 'Other', Source of Referral variable *equal* to 'Emergency Department' and Readmission within 28 days variable being *equal* to 'No, not to any hospital within the last 28 days') ie.

OAED 2 = Unplanned Other ED Admissions for Specific Priority Health Program Directly Standardised for Age (SSR)

Minus

OAED 1 = Unplanned Other ED Admissions for Specific Priority Health Program Directly Standardised for Age (SSR)

SSR: Standardised Separations Ratio

Frequency: Quarterly

Purpose: AHS comparison

This indicator is a subset of Unplanned Admissions.

For hospital comparison, the portions of Unplanned Other Emergency Admissions from Total Admissions will be compared for hospitals within each peer group.

Reduced Unplanned Emergency Readmissions

Difference between time periods for:

Unplanned Emergency Readmissions expressed as age standardised separations ratio for the specific condition. (Unplanned Emergency Readmissions are determined by the ISC variable Admission Status being *equal* to 'Emergency', Source of Referral variable *equal* to 'Emergency Department' and Readmission within 28 days variable being *not equal* to 'No, not to any hospital within the last 28 days') ie.

UARED 2 = Unplanned Emergency Readmissions for Specific Priority Health Program Directly Standardised for Age (SSR)

Minus

UARED 1 = Unplanned Emergency Readmissions for Specific Priority Health Program Directly Standardised for Age (SSR)

SSR: Standardised Separations Ratio

Frequency: Quarterly

Purpose: AHS comparison

This indicator is a subset of Unplanned Readmissions.

For hospital comparison, the portions of Unplanned Emergency Readmissions from Total Admissions will be compared for hospitals within each peer group.

Reduced Unplanned Other Emergency Readmissions

Difference between time periods for:

Unplanned Other Emergency Department Readmissions are expressed as age standardised separations ratio for the specific condition. (Unplanned Other Emergency Department Readmissions are determined by the ISC variable Admission Status being *equal* to 'Other', Source of Referral variable *equal* to 'Emergency Department' and Readmission within 28 days variable being *not equal* to 'No, not to any hospital within the last 28 days') ie.

OARED 2 = Unplanned Other Emergency Department Readmissions for Specific Priority Health Program Directly Standardised for Age (SSR)

Minus

OARED 1 = Unplanned Other Emergency Department Readmissions for Specific Priority Health Program Directly Standardised for Age (SSR)

SSR: Standardised Separations Ratio

Frequency: Quarterly

Purpose: AHS comparison

This indicator is a subset of Unplanned Readmissions.

For hospital comparison, the portions of Unplanned Other Emergency Readmissions from Total Admissions will be compared for hospitals within each peer group.

Reducing Length of Stay (LOS) Performance Indicator

LOS can be used as a predictor of cost of chronic and complex patients. Typically chronic and complex care patients consume what could be described as maintenance care whilst in hospital as opposed to surgical care. Given this, the majority of cost for these patients is reflected more in the patients LOS than in the procedures or consumables used. It is desirable therefore to see a reduction in LOS over time. Thus LOS could be interpreted as an indicator of efficiency.

Costs could be assigned by multiplying the LOS by an average bed-day cost. This could be the average outlier cost for all DRGs that is calculated annually. Structural and Funding Policy Branch is using a bed day rate of $500 for benefits involving reductions in length of stay, savings are based on 'length of stay-related' costs that exclude costs that occur regardless of the patient's length of stay (eg operating theatre, imaging and prosthesis costs).

There is the potential where total bed days, which is equivalent to total LOS, could be reduced despite the average LOS actually increasing. For example, a program which enables patients with less severe episodes to be treated in the community may result in a significant decline in the number of patients with a very short LOS or in some cases inappropriate short admissions. This may result in an increase in the reported average LOS yet total LOS may have declined.

From a performance perspective of comparing AHSs and hospitals, it is logical to express average LOS so as to have meaningful comparison. All three Special Interest Group workshops acknowledged average LOS reductions as desirable outcomes for individual programs. It is suggested however, that total LOS be used in addition to calculate potential savings in conjunction with a relative stay index.

The performance indicator for LOS will be:

- difference in the total LOS measured by relative stay index multiplied by the rate of $500 per day as suggested by Structural and Funding Policy Branch.

Reduced relative stay index

As discussed in section 3 'Defining complexity' the use of a relative stay index is beneficial in assessing whether length of stay is different to other hospitals after adjusting for variation in casemix. Typically the method is similar to a standardisation exercise. For each separation, the associated age, ARDRG and admission status are assessed, by a pre calculated table of expected LOS and trimmed LOS for each ARDRG. Where the actual LOS is greater than the associated trimmed LOS, the LOS is trimmed to the trim point, eg.

ARDRG of Separation	Actual LOS of Separation	Pre-calculated Trimmed point LOS for E71A and Age Group and Admission Status	Derived Trimmed LOS =Trim point, because ALOS > Trimmed point	Pre-calculated Expected LOS for E71A and Age Group and Admission Status
E71A	50 days	22 days	= 22 days	9 days

With this information the RSI can be calculated for each hospital or AHS. Efficiency savings can be calculated.

RSI 1 = Trimmed LOS for all Separations / Expected LOS for all Separations

Minus

RSI 2 = Trimmed LOS for all Separations / Expected LOS for all Separations

= Difference in RSI. This is ratio that can be applied to total associated bed days and multiplied by per diem costs derived by Structural and Funding Policy ($500).

RSI(n): Relative stay index time period (1) and (2)

Frequency: Quarterly

Purpose: AHS and Hospital comparison.

Identified risks to LOS financial benefits

If 1000 bed days are saved in a hospital, systems need to be in place that lead to financial benefits. Even if the actual beds that these 1000 bed days represent are closed, little financial benefits may be realised. This is because the ward that these beds were in is still likely to be open and the marginal cost of the physical beds that are closed is very low compared with the total ward costs. In the case where beds are not closed, it is a statistical fact, know as Roemer's law, that a built hospital bed is a filled bed. (McGuire, Henderson and Mooney, 1988, 161). It may be possible to transfer physical beds from a chronic care setting to an acute setting, but this in itself will depend on the nature of the ward, hospital, and resources linked with the bed. In the case where this happens the costs are shifted from chronic care to acute care, so whilst benefits have occurred in the chronic setting, overall health system costs are similar.

The baseline data for comparison 1999/2000

Baseline data

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Base line data is provided for AHSs for each of the three Chronic and Complex Care streams. This data is broken down within the CVD/Diabetes program into Heart Failure/Heart Disease and Diabetes. It is also broken down within Respiratory Disease into Emphysema, Asthma, and COPD. Due to essentially all Cancers being included and the complexities of multiple cancer sites within patients, it is extremely difficult to breakdown cancer into base components without duplication occurring. As such, Cancer data has not been cut into components.

The data presented below is expressed for the whole 1999/2000 financial year. The comparison report due early 2002 will provide a breakdown by quarter, and will provide information for each hospital with peer groups.

The data presented were computed using Microsoft Access and Excel. Business Objects Software analysis will provide complete automation of the Chronic and Complex Care Performance Indicators, whereas Access and Excel rely upon partial automation. Differences in data presented here maybe found when full automation becomes available.

Glossary of abbreviations used in SSR and RSI.

ALL SEPS	All Separations – used as a proxy for all Admissions =Total Activity = PA + ALL UA no RA + ALL URA
ALL UA no RA	All Unplanned Admissions excluding Readmissions = UA + UAED + OAED
ALL URA	All Unplanned Readmissions = UAR + UARED + OARED
OAED	Unplanned Admissions that are not an emergency, but are referred by the Emergency Department, and are not a readmission.
OARED	Unplanned Readmissions that are not an emergency, but are referred by the Emergency Department.
PA	Planned Admissions – where Admission Status equals 'Planned'
UA	Unplanned Admissions that were not referred by the Emergency Department, and are not a readmission.
UAED	Unplanned Admissions that are an emergency, and are referred by the Emergency Department, and are not a readmission.
UAR	Unplanned Readmissions that were not referred by the Emergency Department.
UARED	Unplanned Readmissions that are an emergency, and are referred by the Emergency Department.

Standardised Separation Ratios (SSRs) Base line data 1999/2000 all AHS

The SSR can be interpreted as the rate of separations occurring within an AHS population. It is expressed as the rate per 1000 population. For example, say the rate is 0.569 for Unplanned Readmissions that do not involve the Emergency Department (UAR) for Cancer for an AHS. This means that for the AHS, 0.569 people per 1000 head of population, or if you like 5.69 people per 10,000 head of population, had an Unplanned Readmission for Cancer that was not via the Emergency Department .

1999/2000 Age Standardised Separations per 1,000 population – CANCER

AHS	UA	UAR	UAED	UARED	OAED	OARED	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.535	0.074	3.677	0.496	0.241	0.005	2.471	7.494	0.57	4.453
CSAHS	2.372	0.739	3.466	0.267	0.081	0.002	8.262	15.188	1.006	5.919
FWAHS	0.759	0.661	0.944	0.513	0.064	0	5.046	7.987	1.174	1.767
GMAHS	1.493	2.867	1.663	0.974	0.175	0.131	7.01	14.181	3.841	3.33
HAHS	0.657	0.419	2.964	0.941	0.186	0.002	3.455	8.622	1.36	3.807
IAHS	0.742	0.927	2.603	0.77	0.127	0.046	4.103	9.27	1.696	3.471
MAHS	1.86	1.524	1.059	0.253	0.081	0.02	1.918	6.695	1.777	3
MNCHS	0.896	0.642	1.408	0.673	0.068	0.041	1.114	4.802	1.316	2.372
MWAHS	1.465	0.572	1.973	0.804	0.152	0.106	2.496	7.462	1.376	3.59
NEAHS	1.738	0.896	1.365	0.603	0.263	0.049	3.723	8.588	1.499	3.366
NRAHS	1.359	0.731	1.569	0.768	0.168	0.044	2.389	6.985	1.499	3.097
NSAHS	0.507	0.205	1.689	0.799	0.039	0.006	9.326	12.565	1.004	2.235
SAHS	0.83	0.341	1.475	0.466	0.14	0.01	2.252	5.504	0.808	2.444
SESHS	1.699	1.597	2.686	0.485	0.079	0.001	8.772	15.318	2.082	4.464
SWSHS	1.002	0.228	2.723	0.498	0.251	0.002	3.371	8.072	0.726	3.975
WAHS	1.33	0.616	1.391	0.923	0.349	0.057	3.18	7.79	1.54	3.07
WSAHS	0.478	0.073	1.484	0.421	1.201	0.051	8.179	11.836	0.494	3.162
Grand Total	1.092	0.698	2.268	0.689	0.234	0.026	5.636	10.617	1.387	3.594
Median	1.002	0.642	1.663	0.603	0.152	0.02	3.455	8.072	1.36	3.33
Mean	1.16	0.771	2.008	0.627	0.216	0.034	4.533	9.315	1.398	3.384
95% CI	0.264	0.329	0.4	0.107	0.127	0.018	1.282	1.557	0.364	0.468
95% CI High	1.424	1.101	2.408	0.734	0.343	0.052	5.816	10.872	1.762	3.852
95% CI Low	0.896	0.442	1.609	0.519	0.088	0.015	3.251	7.758	1.034	2.915
Std Dev	0.555	0.693	0.841	0.226	0.268	0.038	2.698	3.276	0.766	0.985

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1999/2000 Age Standardised Separations per 1,000 population – CVD/Diabetes

AHS	UA	UAR	UAED	UARED	OAED	OARED	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.424	0.15	6.006	0.688	0.123	0.008	1.805	9.196	0.838	6.553
CSAHS	2.926	1.213	9.529	0.385	0.222	0.004	4.048	18.322	1.598	12.677
FWAHS	3.15	0.952	4.834	1.47	0.107	0	0.906	11.42	2.422	8.091
GMAHS	3.047	1.187	5.766	1.349	0.449	0.022	1.882	13.681	2.536	9.263
HAHS	1.609	0.764	6.149	1.255	0.284	0	1.432	11.494	2.019	8.043
IAHS	1.022	1.809	6.585	1.076	0.111	0.031	1.869	12.472	2.885	7.718
MAHS	4.531	2.019	3.274	0.773	0.199	0.08	2.017	12.812	2.792	8.003
MNCHS	1.229	0.42	2.824	0.845	0.156	0.03	0.43	5.903	1.265	4.209
MWAHS	2.818	0.638	5.024	0.88	0.384	0.029	1.09	10.835	1.518	8.226
NEAHS	3.007	1.187	4.045	1.087	0.435	0.089	1.47	11.231	2.274	7.487
NRAHS	2.167	0.815	4.45	1.172	0.219	0.032	1.452	10.274	1.987	6.836
NSAHS	0.579	0.215	4.033	0.703	0.335	0.004	1.421	7.286	0.919	4.947
SAHS	1.416	0.229	4.241	0.752	0.142	0.01	2.035	8.815	0.98	5.8
SESHS	0.811	0.322	6.355	0.592	0.249	0.001	2.733	11.062	0.914	7.415
SWSHS	1.604	0.34	8.276	1.21	0.638	0	2.135	14.203	1.55	10.517
WAHS	2.113	0.616	3.22	0.934	0.388	0.029	0.776	8.047	1.549	5.721
WSAHS	0.913	0.097	5.773	0.908	2.186	0.054	3.089	12.967	1.005	8.873
Grand Total	1.504	0.606	5.737	0.885	0.441	0.018	1.996	11.169	1.491	7.682
Median	1.609	0.638	5.024	0.908	0.249	0.022	1.805	11.231	1.55	7.718
Mean	1.963	0.763	5.317	0.946	0.39	0.025	1.799	11.178	1.709	7.669
95% CI	0.54	0.271	0.849	0.138	0.231	0.013	0.421	1.393	0.327	0.97
95% CI High	2.503	1.034	6.166	1.083	0.621	0.038	2.22	12.571	2.036	8.639
95% CI Low	1.422	0.492	4.468	0.808	0.159	0.012	1.378	9.785	1.382	6.699
Std Dev	1.137	0.57	1.786	0.289	0.485	0.027	0.886	2.93	0.688	2.041

1999/2000 Age Standardised Separations per 1,000 population – Respiratory Disease

AHS	UA	UAR	UAED	UARED	OAED	OARED	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.344	0.146	7.571	0.777	0.093	0.008	2.441	11.371	0.922	8.008
CSAHS	2.108	1.292	6.658	0.314	0.098	0.002	3.237	13.707	1.605	8.864
FWAHS	1.944	0.629	3.661	1.264	0.079	0	0.662	8.238	1.892	5.684
GMAHS	2.068	0.905	5.458	1.303	0.301	0.024	1.33	11.366	2.209	7.827
HAHS	0.932	0.422	4.547	0.85	0.096	0.01	1.554	8.4	1.272	5.574
IAHS	0.628	1.033	4.848	0.798	0.043	0.016	0.886	8.237	1.832	5.519
MAHS	3.746	1.619	2.242	0.307	0.211	0.04	1.226	9.35	1.926	6.198
MNCHS	0.721	0.212	2.294	0.649	0.073	0.011	0.288	4.237	0.861	3.088
MWAHS	1.757	0.367	4.447	0.792	0.208	0.006	0.965	8.535	1.159	6.412
NEAHS	1.944	0.693	3.773	0.975	0.344	0.057	0.962	8.692	1.668	6.061
NRAHS	1.169	0.421	3.285	0.859	0.157	0.021	0.859	6.75	1.28	4.611
NSAHS	0.31	0.087	3.028	0.466	0.189	0	1.073	5.153	0.553	3.526
SAHS	0.847	0.185	3.399	0.562	0.075	0	1.288	6.354	0.747	4.32
SESHS	0.49	0.239	5.069	0.462	0.151	0.004	2.097	8.508	0.701	5.71
SWSHS	0.711	0.19	5.707	0.825	0.262	0.002	1.716	9.412	1.016	6.68
WAHS	0.921	0.299	2.668	0.757	0.145	0.016	0.458	5.249	1.056	3.734
WSAHS	0.403	0.056	4.274	0.809	0.735	0.025	1.224	7.501	0.865	5.412
Grand Total	0.91	0.408	4.53	0.688	0.199	0.01	1.477	8.212	1.096	5.639
Median	0.921	0.367	4.274	0.792	0.151	0.01	1.224	8.4	1.159	5.684
Mean	1.238	0.517	4.29	0.751	0.192	0.014	1.31	8.298	1.268	5.719
95% CI	0.432	0.215	0.709	0.133	0.078	0.007	0.351	1.147	0.237	0.755
95% CI High	1.669	0.733	4.999	0.884	0.27	0.022	1.661	9.445	1.505	6.474
95% CI Low	0.806	0.302	3.581	0.618	0.114	0.007	0.959	7.15	1.032	4.965
Std Dev	0.908	0.453	1.492	0.28	0.164	0.016	0.738	2.414	0.498	1.588

1999/2000 Age Standardised Separations per 1,000 population – COPD

AHS	UA	UAR	UAED	UARED	OAED	OARED	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.233	0.088	4.64	0.531	0.046	0.004	1.503	7.042	0.619	4.92
CSAHS	1.502	1.082	4.693	0.245	0.092	0.002	1.869	9.484	1.327	6.287
FWAHS	1.619	0.529	3.024	1.001	0.079	0	0.474	6.726	1.53	4.722
GMAHS	1.308	0.496	3.435	0.903	0.21	0	0.734	7.085	1.399	4.953
HAHS	0.456	0.225	2.904	0.587	0.077	0.002	0.638	4.888	0.812	3.438
IAHS	0.445	0.741	3.287	0.592	0.035	0.013	0.475	5.575	1.332	3.767
MAHS	2.729	1.221	1.653	0.25	0.112	0.02	0.941	6.906	1.471	4.494
MNCHS	0.534	0.188	1.773	0.576	0.062	0.006	0.197	3.33	0.764	2.369
MWAHS	1.542	0.344	3.746	0.678	0.18	0.006	0.821	7.312	1.022	5.468
NEAHS	1.589	0.648	2.908	0.842	0.279	0.051	0.865	7.129	1.489	4.776
NRAHS	0.852	0.329	2.206	0.702	0.118	0.012	0.521	4.729	1.031	3.176
NSAHS	0.216	0.051	1.851	0.325	0.145	0	0.484	3.072	0.376	2.212
SAHS	0.71	0.165	2.946	0.547	0.069	0	1.113	5.55	0.712	3.725
SESHS	0.315	0.128	3.377	0.314	0.118	0.002	1.097	5.349	0.442	3.81
SWSHS	0.503	0.12	3.697	0.584	0.202	0.002	0.948	6.054	0.705	4.401
WAHS	0.684	0.254	1.894	0.65	0.109	0.01	0.323	3.914	0.904	2.687
WSAHS	0.289	0.046	3.122	0.662	0.597	0.024	0.75	5.466	0.708	4.008
Grand Total	0.641	0.296	3.064	0.521	0.156	0.007	0.834	5.51	0.816	3.86
Median	0.684	0.254	3.024	0.587	0.112	0.004	0.75	5.575	0.904	4.008
Mean	0.913	0.391	3.009	0.588	0.149	0.009	0.809	5.859	0.979	4.071
95% CI	0.329	0.168	0.437	0.103	0.063	0.006	0.202	0.774	0.181	0.522
95% CI High	1.243	0.559	3.447	0.69	0.212	0.015	1.011	6.633	1.16	4.594
95% CI Low	0.584	0.224	2.572	0.485	0.086	0.003	0.607	5.085	0.798	3.549
Std Dev	0.693	0.353	0.92	0.216	0.132	0.013	0.424	1.628	0.38	1.099

1999/2000 Age Standardised Separations per 1,000 population – Emphysema

AHS	UA	UAR	UAED	UARED	OAED	OARED	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.034	0.013	0.804	0.064	0.005	0	0.339	1.259	0.077	0.843
CSAHS	0.104	0.047	0.309	0.019	0.002	0	0.314	0.795	0.066	0.415
FWAHS	0.041	0	0.044	0.04	0	0	0.081	0.207	0.04	0.085
GMAHS	0.104	0.064	0.269	0.08	0.023	0	0.103	0.644	0.144	0.397
HAHS	0.049	0.029	0.198	0.035	0.002	0	0.132	0.444	0.063	0.249
IAHS	0.037	0.09	0.39	0.047	0	0	0.131	0.695	0.137	0.427
MAHS	0.447	0.271	0.218	0.028	0.02	0	0.167	1.151	0.298	0.685
MNCHS	0.025	0.014	0.081	0.014	0.003	0	0.016	0.153	0.028	0.109
MWAHS	0.059	0.011	0.094	0.029	0.012	0	0.065	0.27	0.041	0.165
NEAHS	0.078	0.034	0.104	0.039	0.022	0.006	0.05	0.328	0.074	0.205
NRAHS	0.055	0.027	0.173	0.022	0.006	0	0.048	0.331	0.049	0.234
NSAHS	0.03	0.01	0.231	0.043	0.02	0	0.174	0.508	0.053	0.282
SAHS	0.03	0.01	0.071	0.005	0	0	0.026	0.143	0.015	0.101
SESHS	0.045	0.014	0.261	0.027	0.01	0	0.219	0.577	0.041	0.316
SWSHS	0.059	0.021	0.581	0.09	0.033	0	0.157	0.941	0.111	0.673
WAHS	0.075	0.013	0.206	0.03	0.005	0	0.05	0.377	0.042	0.285
WSAHS	0.032	0.002	0.292	0.044	0.084	0	0.139	0.593	0.046	0.408
Grand Total	0.057	0.028	0.292	0.041	0.017	0	0.154	0.589	0.069	0.366
Median	0.049	0.014	0.218	0.035	0.006	0	0.131	0.508	0.053	0.285
Mean	0.077	0.039	0.254	0.039	0.014	0	0.13	0.554	0.078	0.346
95% CI	0.047	0.03	0.092	0.011	0.01	0.001	0.045	0.158	0.032	0.103
95% CI High	0.124	0.07	0.347	0.049	0.024	0.001	0.175	0.712	0.11	0.449
95% CI Low	0.03	0.009	0.162	0.028	0.005	0	0.086	0.396	0.046	0.243
Std Dev	0.098	0.064	0.194	0.022	0.021	0.001	0.094	0.332	0.067	0.217

1999/2000 Age Standardised Separations per 1,000 population – Asthma

AHS	UA	UAR	UAED	UARED	OAED	OARED	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.076	0.044	2.127	0.182	0.042	0.004	0.598	3.07	0.226	2.245
CSAHS	0.501	0.163	1.656	0.05	0.004	0	1.054	3.428	0.212	2.161
FWAHS	0.283	0.1	0.594	0.223	0	0	0.106	1.306	0.322	0.877
GMAHS	0.656	0.345	1.753	0.32	0.068	0.024	0.493	3.636	0.665	2.478
HAHS	0.426	0.168	1.445	0.229	0.016	0.008	0.784	3.069	0.397	1.888
IAHS	0.146	0.203	1.171	0.16	0.008	0.002	0.279	1.968	0.363	1.326
MAHS	0.57	0.127	0.37	0.029	0.079	0.02	0.118	1.294	0.157	1.019
MNCHS	0.161	0.01	0.44	0.059	0.008	0.004	0.075	0.755	0.07	0.61
MWAHS	0.155	0.012	0.607	0.084	0.017	0	0.079	0.953	0.096	0.779
NEAHS	0.277	0.011	0.76	0.095	0.043	0	0.048	1.234	0.105	1.081
NRAHS	0.261	0.065	0.906	0.136	0.033	0.008	0.29	1.691	0.2	1.2
NSAHS	0.063	0.026	0.945	0.099	0.024	0	0.416	1.573	0.124	1.033
SAHS	0.106	0.009	0.382	0.01	0.006	0	0.148	0.661	0.019	0.494
SESHS	0.13	0.097	1.431	0.122	0.023	0.001	0.781	2.582	0.218	1.584
SWSHS	0.149	0.049	1.429	0.151	0.028	0	0.611	2.418	0.2	1.606
WAHS	0.163	0.032	0.568	0.078	0.031	0.006	0.085	0.958	0.11	0.762
WSAHS	0.082	0.008	0.861	0.102	0.054	0.001	0.335	1.442	0.11	0.997
Grand Total	0.212	0.084	1.174	0.126	0.027	0.003	0.49	2.113	0.21	1.413
Median	0.161	0.049	0.906	0.102	0.024	0.001	0.29	1.573	0.2	1.081
Mean	0.248	0.086	1.026	0.125	0.029	0.005	0.371	1.885	0.212	1.302
95% CI	0.087	0.044	0.253	0.038	0.011	0.003	0.145	0.46	0.074	0.284
95% CI High	0.335	0.13	1.279	0.163	0.039	0.008	0.516	2.344	0.286	1.586
95% CI Low	0.16	0.043	0.773	0.087	0.018	0.001	0.226	1.425	0.137	1.018
Std Dev	0.183	0.092	0.533	0.08	0.023	0.007	0.305	0.967	0.156	0.597

1999/2000 Age Standardised Separations per 1,000 population – Heart Failure

AHS	UA	UAR	UAED	UARED	OAED	OARED	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.202	0.082	2.92	0.31	0.027	0.002	0.633	4.174	0.392	3.149
CSAHS	1.368	0.587	5.03	0.197	0.13	0.002	1.09	8.402	0.784	6.528
FWAHS	2.181	0.572	2.474	0.928	0.043	0	0.373	6.572	1.5	4.699
GMAHS	1.877	0.775	3.812	0.97	0.272	0.011	0.425	8.131	1.745	5.962
HAHS	0.857	0.421	3.684	0.804	0.17	0	0.559	6.494	1.224	4.711
IAHS	0.543	1.071	3.753	0.698	0.065	0.018	0.358	6.488	1.769	4.361
MAHS	2.677	1.392	1.972	0.397	0.171	0.04	0.702	7.311	1.79	4.819
MNCHS	0.678	0.22	1.64	0.562	0.101	0.014	0.171	3.373	0.782	2.42
MWAHS	1.527	0.3	2.908	0.52	0.182	0.023	0.308	5.745	0.821	4.617
NEAHS	1.815	0.731	2.503	0.759	0.286	0.078	0.515	6.61	1.491	4.604
NRAHS	1.208	0.411	2.665	0.78	0.155	0.028	0.539	5.758	1.191	4.028
NSAHS	0.383	0.112	2.411	0.446	0.241	0	0.513	4.107	0.558	3.036
SAHS	0.928	0.138	2.544	0.494	0.116	0.01	1.198	5.419	0.633	3.589
SESHS	0.421	0.158	3.638	0.356	0.15	0	0.801	5.525	0.514	4.21
SWSHS	0.846	0.153	4.536	0.741	0.359	0	0.588	7.223	0.894	5.741
WAHS	1.033	0.334	1.662	0.495	0.183	0.005	0.26	3.967	0.829	2.878
WSAHS	0.5	0.045	3.227	0.538	1.153	0.017	0.987	6.449	0.583	4.879
Grand Total	0.826	0.333	3.254	0.549	0.252	0.009	0.627	5.841	0.882	4.332
Median	0.928	0.334	2.908	0.538	0.17	0.01	0.539	6.449	0.829	4.604
Mean	1.12	0.441	3.022	0.588	0.224	0.015	0.589	5.985	1.029	4.366
95% CI	0.332	0.179	0.453	0.105	0.121	0.01	0.138	0.688	0.226	0.53
95% CI High	1.453	0.62	3.475	0.693	0.345	0.024	0.727	6.673	1.255	4.897
95% CI Low	0.788	0.262	2.569	0.483	0.103	0.005	0.452	5.297	0.804	3.836
Std Dev	0.699	0.376	0.953	0.22	0.255	0.02	0.29	1.448	0.475	1.116

1999/2000 Age Standardised Separations per 1,000 population – Diabetes

AHS	UA	UAR	UAED	UARED	OAED	OARED	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.222	0.068	3.086	0.378	0.096	0.006	1.172	5.022	0.446	3.404
CSAHS	1.558	0.626	4.499	0.188	0.092	0.002	2.957	9.921	0.814	6.149
FWAHS	0.968	0.38	2.361	0.542	0.063	0	0.533	4.848	0.922	3.392
GMAHS	1.17	0.412	1.954	0.38	0.177	0.011	1.457	5.55	0.792	3.301
HAHS	0.752	0.344	2.465	0.451	0.114	0	0.873	5	0.795	3.332
IAHS	0.479	0.738	2.832	0.378	0.046	0.014	1.511	5.983	1.116	3.357
MAHS	1.854	0.627	1.302	0.375	0.028	0.04	1.315	5.501	1.002	3.184
MNCHS	0.551	0.2	1.184	0.283	0.055	0.016	0.258	2.53	0.483	1.789
MWAHS	1.291	0.337	2.117	0.36	0.202	0.006	0.783	5.09	0.698	3.609
NEAHS	1.192	0.456	1.542	0.328	0.149	0.01	0.956	4.622	0.783	2.883
NRAHS	0.959	0.404	1.785	0.391	0.064	0.004	0.913	4.516	0.795	2.808
NSAHS	0.196	0.103	1.622	0.257	0.094	0.004	0.908	3.179	0.361	1.911
SAHS	0.488	0.091	1.697	0.257	0.027	0	0.838	3.397	0.348	2.211
SESHS	0.389	0.164	2.716	0.236	0.099	0.001	1.932	5.537	0.4	3.205
SWSHS	0.758	0.187	3.74	0.47	0.279	0	1.547	6.979	0.657	4.776
WAHS	1.08	0.282	1.558	0.439	0.205	0.023	0.516	4.08	0.721	2.843
WSAHS	0.413	0.051	2.546	0.37	1.033	0.037	2.102	6.517	0.422	3.993
Grand Total	0.678	0.273	2.483	0.336	0.189	0.008	1.368	5.328	0.609	3.35
Median	0.758	0.337	2.117	0.375	0.096	0.006	0.956	5.022	0.721	3.301
Mean	0.842	0.322	2.294	0.358	0.166	0.01	1.21	5.193	0.68	3.303
95% CI	0.226	0.099	0.423	0.044	0.111	0.006	0.318	0.796	0.111	0.489
95% CI High	1.068	0.421	2.718	0.402	0.277	0.016	1.528	5.988	0.791	3.792
95% CI Low	0.617	0.223	1.871	0.314	0.055	0.004	0.892	4.397	0.568	2.814
Std Dev	0.475	0.208	0.89	0.092	0.234	0.012	0.67	1.674	0.234	1.029

Relative Stay Index (RSI) Base line data 1999/2000 all AHSs

The interpretation of the RSI is as follows. The RSI is an indicator of whether or not an AHS or hospital's length of stay (LOS) is different from other AHS or hospital's LOS after adjustment for casemix and patient's age. The RSI for the state is 1.00 and all AHSs and hospital's LOS is measured to this figure. If an AHS or hospital's RSI=1.10, this indicates that an average patient's LOS within an AHS or hospital is 10% higher than would be expected, given the age and the casemix distribution of the AHS or hospital's patients. For Chronic and Complex Care patients, the RSI would be expected to be greater than 1.00, given the complex nature of the patient. This is indeed the case for all three chronic and complex care streams included within the Priority health care programs. The RSI is normally calculated to 2 decimal places. It is shown here to 3 decimal places.

1999/2000 RSI – All Cancers

AHS	UA	UAR	UAED	UARED	OAED	OARED	Sum UA	Planned	All SEPS	All URA	All UA no RA
CCAHS	1.225	1.270	1.003	1.026	1.417	0.000	1.030	1.190	1.070	1.053	1.026
CSAHS	1.315	1.236	1.083	0.996	1.211	0.000	1.144	1.194	1.167	1.143	1.144
FWAHS	0.811	1.508	1.358	1.192	0.000	0.000	1.202	1.477	1.244	1.337	1.111
GMAHS	1.050	1.064	0.880	0.901	1.412	0.511	0.973	1.141	1.003	0.991	0.963
HAHS	1.272	1.047	1.086	1.089	1.266	0.000	1.102	1.021	1.081	1.077	1.113
IAHS	1.212	1.505	0.957	0.940	1.659	1.645	1.092	1.125	1.097	1.243	1.021
MAHS	1.036	1.019	0.969	0.753	0.000	0.000	1.001	1.554	1.087	0.969	1.020
MWAHS	1.136	1.139	1.002	1.007	0.969	1.407	1.060	1.195	1.086	1.080	1.053
NEAHS	1.390	1.040	0.949	0.910	1.097	1.615	1.106	1.023	1.087	0.999	1.166
NRAHS	1.099	1.270	0.991	0.983	1.123	1.797	1.073	1.153	1.091	1.150	1.037
NSAHS	1.903	1.343	0.995	0.996	0.000	1.027	1.083	1.288	1.144	1.064	1.093
SAHS	1.411	1.150	0.902	0.943	1.719	0.000	1.069	1.428	1.177	1.029	1.085
WAHS	1.194	1.114	1.016	1.012	1.292	1.204	1.084	1.288	1.127	1.060	1.099
WSAHS	1.279	1.272	1.022	0.979	1.311	1.796	1.141	1.342	1.242	1.088	1.152
SWSAHS	1.400	1.294	1.007	0.978	0.000	0.000	1.074	1.406	1.177	1.050	1.080
SESAHS	1.586	1.270	1.080	1.020	1.149	0.625	1.217	1.257	1.231	1.157	1.232
MNCAHS	1.084	1.027	1.008	0.942	0.458	1.154	1.016	1.078	1.026	0.981	1.033
Grand Total	1.331	1.203	1.028	0.997	1.315	1.463	1.105	1.243	1.148	1.087	1.111
Median	1.225	1.236	1.003	0.983	1.149	0.625	1.083	1.195	1.097	1.064	1.085
Mean	1.259	1.210	1.018	0.980	0.946	0.752	1.086	1.245	1.126	1.087	1.084
95% CI High	1.375	1.283	1.068	1.023	1.234	1.101	1.117	1.319	1.160	1.132	1.116
95% CI Low	1.143	1.137	0.969	0.938	0.658	0.403	1.056	1.171	1.092	1.041	1.052
CI	0.116	0.073	0.050	0.043	0.288	0.349	0.031	0.074	0.034	0.046	0.032
Std Dev	0.245	0.154	0.104	0.090	0.606	0.734	0.065	0.156	0.072	0.096	0.066

1999/2000 RSI – CVD/Diabetes

AHS	UA	UAR	UAED	UARED	OAED	OARED	Sum UA	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.942	0.920	1.028	1.078	2.523	1.125	1.028	1.096	1.040	1.044	1.025
CSAHS	1.135	1.100	0.975	1.072	1.893	0.000	1.013	1.156	1.035	1.090	1.004
FWAHS	1.089	1.032	1.002	1.102	0.000	0.000	1.049	1.255	1.062	1.072	1.043
GMAHS	1.182	0.958	0.900	0.870	0.896	1.694	0.990	1.112	0.996	0.928	1.010
HAHS	1.209	1.093	1.091	1.069	0.000	0.000	1.105	1.098	1.104	1.079	1.113
IAHS	1.070	1.062	1.037	1.047	1.333	1.175	1.048	1.060	1.049	1.058	1.044
MAHS	1.090	1.228	0.995	1.140	1.559	0.864	1.096	1.479	1.148	1.199	1.059
MWAHS	1.177	1.179	1.052	1.077	1.526	1.400	1.105	1.243	1.115	1.129	1.100
NEAHS	1.153	1.088	1.062	0.995	1.126	1.087	1.088	1.142	1.094	1.050	1.104
NRAHS	1.092	1.056	1.013	1.063	1.151	1.160	1.048	1.368	1.084	1.063	1.044
NSAHS	1.110	1.018	1.036	1.044	0.872	0.000	1.040	1.066	1.043	1.043	1.040
SAHS	1.237	0.950	0.995	1.089	1.069	0.000	1.058	1.435	1.148	1.065	1.056
WAHS	1.124	1.287	1.018	1.026	1.688	0.000	1.078	1.472	1.112	1.133	1.059
WSAHS	0.996	0.928	1.034	1.081	1.234	2.117	1.075	1.274	1.109	1.091	1.072
SWSAHS	1.066	1.226	1.033	1.008	0.000	0.000	1.039	1.214	1.056	1.050	1.036
SESAHS	1.378	1.136	1.083	1.012	1.301	0.556	1.103	1.188	1.114	1.052	1.109
MNCAHS	1.107	1.100	1.075	0.993	0.858	1.163	1.071	1.207	1.082	1.038	1.082
Grand Total	1.149	1.081	1.033	1.033	1.226	1.380	1.058	1.195	1.074	1.056	1.058
Median	1.110	1.088	1.033	1.063	1.151	0.864	1.058	1.207	1.084	1.063	1.056
Mean	1.127	1.080	1.025	1.045	1.119	0.726	1.061	1.227	1.082	1.070	1.059
95% CI High	1.173	1.132	1.047	1.074	1.440	1.061	1.077	1.293	1.102	1.096	1.075
95% CI Low	1.081	1.029	1.004	1.016	0.799	0.391	1.045	1.162	1.062	1.043	1.043
CI	0.046	0.051	0.022	0.029	0.321	0.335	0.016	0.066	0.020	0.026	0.016
Std Dev	0.097	0.108	0.046	0.060	0.675	0.704	0.034	0.138	0.042	0.055	0.034

1999/2000 RSI – Respiratory

AHS	UA	UAR	UAED	UARED	OAED	OARED	Sum UA	Planned	All SEPS	All URA	All UA no RA
CCAHS	1.284	0.887	0.974	0.981	0.400	0.000	0.982	1.113	1.010	0.959	0.986
CSAHS	1.089	1.103	0.971	1.035	0.889	0.000	1.002	1.092	1.021	1.080	0.992
FWAHS	0.978	1.159	0.932	0.989	0.000	0.000	0.973	1.362	1.001	1.037	0.946
GMAHS	1.053	1.000	0.919	0.923	0.946	0.925	0.962	1.049	0.969	0.957	0.964
HAHS	1.215	1.070	1.037	1.045	2.093	1.500	1.064	1.010	1.057	1.056	1.066
IAHS	0.985	1.086	1.003	0.954	1.993	1.034	1.013	1.040	1.015	1.035	1.004
MAHS	1.050	1.077	1.029	1.098	0.000	0.923	1.054	1.389	1.099	1.079	1.044
MWAHS	1.020	1.179	1.034	1.172	1.951	0.000	1.062	1.077	1.064	1.175	1.038
NEAHS	1.126	1.051	0.992	1.084	1.344	1.434	1.059	1.163	1.070	1.076	1.053
NRAHS	1.100	1.164	1.001	1.079	1.509	1.096	1.061	1.144	1.069	1.117	1.045
NSAHS	0.957	1.040	0.993	0.901	0.000	0.000	0.980	1.062	0.991	0.931	0.992
SAHS	1.355	1.514	0.967	1.087	1.138	0.000	1.062	1.234	1.098	1.186	1.041
WAHS	1.028	0.943	1.007	1.160	1.024	1.368	1.029	1.595	1.087	1.072	1.013
WSAHS	1.080	1.157	0.995	0.969	1.105	1.331	1.014	1.262	1.052	1.005	1.016
SWSAHS	1.139	1.159	0.996	1.035	0.000	1.200	1.016	1.200	1.041	1.061	1.007
SESAHS	1.447	1.244	1.050	1.083	1.436	1.068	1.098	1.183	1.112	1.144	1.091
MNCAHS	1.116	1.011	0.994	1.064	0.792	0.875	1.030	1.156	1.043	1.046	1.024
Grand Total	1.128	1.089	1.000	1.016	1.167	1.159	1.027	1.141	1.043	1.045	1.022
Median	1.089	1.086	0.995	1.045	1.024	0.925	1.029	1.156	1.052	1.061	1.016
Mean	1.119	1.108	0.994	1.039	0.978	0.750	1.027	1.184	1.047	1.060	1.019
95% CI High	1.183	1.174	1.010	1.075	1.316	1.034	1.046	1.256	1.067	1.094	1.037
95% CI Low	1.055	1.043	0.977	1.002	0.640	0.466	1.009	1.113	1.028	1.026	1.001
CI	0.064	0.066	0.016	0.037	0.338	0.284	0.018	0.072	0.020	0.034	0.018
Std Dev	0.135	0.139	0.035	0.077	0.711	0.597	0.039	0.151	0.041	0.072	0.037

1999/2000 RSI – COPD

AHS	UA	UAR	UAED	UARED	OAED	OARED	Sum UA	Planned	All SEPS	All URA	All UA no RA
CCAHS	1.296	0.774	0.978	0.994	0.400	0.400	0.985	1.082	1.005	0.945	0.992
CSAHS	1.090	1.120	0.952	0.998	0.894	1.095	0.989	1.086	1.007	1.080	0.977
FWAHS	1.005	1.143	0.927	0.960	0.000	0.000	0.969	1.443	0.996	1.011	0.951
GMAHS	1.037	0.981	0.887	0.916	0.921	0.930	0.940	1.010	0.945	0.943	0.939
HAHS	1.240	1.056	1.030	1.057	2.090	3.000	1.060	0.984	1.053	1.057	1.060
IAHS	0.980	1.046	0.984	0.964	2.764	1.077	0.995	1.089	1.002	1.014	0.987
MAHS	1.051	1.063	1.046	1.054	1.439	0.444	1.057	1.374	1.104	1.056	1.058
MWAHS	1.020	1.178	1.023	1.164	1.907	0.000	1.055	1.097	1.059	1.170	1.030
NEAHS	1.107	1.068	1.013	1.096	1.409	1.429	1.069	1.100	1.072	1.090	1.061
NRAHS	1.100	1.147	0.999	1.107	1.372	1.096	1.058	1.141	1.066	1.124	1.039
NSAHS	0.967	1.041	1.001	0.888	0.000	0.000	0.984	1.042	0.991	0.917	0.999
SAHS	1.321	1.509	0.958	1.087	1.188	0.000	1.051	1.233	1.088	1.178	1.028
WAHS	1.047	0.922	1.023	1.174	1.105	1.389	1.044	1.693	1.105	1.074	1.030
WSAHS	1.086	1.181	0.993	0.965	1.063	1.336	1.010	1.247	1.041	1.008	1.010
SWSAHS	1.145	1.111	0.964	1.015	0.000	0.286	0.988	1.214	1.016	1.033	0.978
SESAHS	1.486	1.218	1.051	1.073	1.529	1.068	1.100	1.157	1.108	1.123	1.096
MNCAHS	1.137	1.000	0.996	1.080	0.804	0.875	1.037	1.152	1.047	1.052	1.031
Grand Total	1.130	1.073	0.992	1.016	1.141	1.148	1.020	1.135	1.035	1.038	1.016
Median	1.090	1.068	0.996	1.054	1.105	0.930	1.037	1.141	1.047	1.056	1.028
Mean	1.124	1.092	0.990	1.035	1.111	0.848	1.023	1.185	1.041	1.052	1.016
95% CI High	1.190	1.164	1.010	1.074	1.470	1.211	1.044	1.270	1.064	1.087	1.036
95% CI Low	1.059	1.019	0.969	0.996	0.751	0.486	1.002	1.100	1.019	1.016	0.996
CI	0.066	0.072	0.020	0.039	0.360	0.362	0.021	0.085	0.022	0.036	0.020
Std Dev	0.138	0.152	0.043	0.082	0.757	0.762	0.044	0.178	0.047	0.075	0.042

1999/2000 RSI – Emphysema

AHS	UA	UAR	UAED	UARED	OAED	OARED	Sum UA	Planned	All SEPS	All URA	All UA no RA
CCAHS	1.003	1.579	0.912	0.957	0.000	0.000	0.937	1.201	0.991	1.079	0.914
CSAHS	1.208	1.211	1.070	0.783	0.000	0.000	1.093	0.992	1.057	1.084	1.094
FWAHS	2.000	0.000	0.471	1.063	0.000	0.000	1.040	1.294	1.143	1.063	0.998
GMAHS	1.140	0.880	0.795	0.875	1.000	0.000	0.895	1.041	0.908	0.877	0.901
HAHS	1.054	0.995	0.941	1.024	0.000	0.000	0.977	1.262	1.044	1.010	0.966
IAHS	0.964	1.179	1.121	0.793	0.000	0.000	1.091	0.752	1.055	1.089	1.092
MAHS	1.061	1.196	0.964	2.111	0.467	0.000	1.070	1.282	1.083	1.247	1.003
MWAHS	1.026	0.000	1.033	1.950	0.000	0.000	1.141	1.092	1.127	1.950	1.031
NEAHS	1.138	1.273	0.960	1.286	0.750	0.000	1.068	1.527	1.151	1.283	1.020
NRAHS	0.955	1.471	1.099	1.024	2.545	0.000	1.141	1.000	1.124	1.323	1.087
NSAHS	1.052	1.109	0.964	0.814	0.000	0.000	0.953	1.083	0.975	0.885	0.968
SAHS	2.138	2.125	0.917	0.000	0.000	0.000	1.228	1.204	1.221	2.125	1.174
WAHS	0.885	1.150	0.811	0.902	0.000	0.000	0.853	1.105	0.894	0.984	0.834
WSAHS	0.952	1.077	0.976	1.043	1.369	0.000	1.039	1.353	1.103	1.046	1.039
SWSAHS	0.645	1.230	1.051	1.040	0.000	0.000	1.036	1.205	1.059	1.082	1.027
SESAHS	1.280	1.290	1.000	0.739	0.769	0.000	1.032	1.104	1.045	1.063	1.027
MNCAHS	1.106	0.976	0.937	0.868	0.000	0.000	0.953	1.101	0.983	0.890	0.980
Grand Total	1.066	1.174	0.986	0.946	1.275	0.000	1.010	1.131	1.033	1.043	1.003
Median	1.054	1.179	0.964	0.957	0.000	0.000	1.039	1.105	1.057	1.079	1.020
Mean	1.153	1.102	0.943	1.016	0.406	0.000	1.032	1.153	1.057	1.181	1.009
95% CI High	1.330	1.341	1.014	1.237	0.740	0.000	1.078	1.235	1.098	1.346	1.048
95% CI Low	0.976	0.864	0.871	0.795	0.071	0.000	0.987	1.071	1.015	1.016	0.971
CI	0.177	0.238	0.071	0.221	0.335	0.000	0.046	0.082	0.041	0.165	0.039
Std Dev	0.373	0.502	0.150	0.465	0.704	0.000	0.096	0.172	0.087	0.348	0.081

1999/2000 RSI – Asthma

AHS	UA	UAR	UAED	UARED	OAED	OARED	Sum UA	Planned	All SEPS	All URA	All UA no RA
CCAHS	1.358	0.955	1.005	0.921	0.000	0.000	1.008	1.188	1.050	0.929	1.018
CSAHS	1.048	0.889	1.030	1.367	0.857	0.000	1.037	1.150	1.071	1.082	1.033
FWAHS	0.678	1.263	0.990	1.235	0.000	0.000	0.995	1.083	1.004	1.245	0.906
GMAHS	1.108	1.092	1.070	0.973	1.115	0.900	1.069	1.137	1.077	1.035	1.080
HAHS	1.192	1.125	1.087	0.997	1.200	1.200	1.099	0.972	1.074	1.064	1.110
IAHS	1.032	1.245	1.035	0.953	1.356	0.667	1.063	1.036	1.060	1.131	1.038
MAHS	1.035	0.986	0.970	0.000	0.746	2.000	1.009	1.563	1.084	1.038	1.003
MWAHS	1.001	1.235	1.208	0.958	2.286	0.000	1.155	0.880	1.114	1.031	1.177
NEAHS	1.280	0.685	0.863	0.913	1.240	1.500	0.976	1.616	1.026	0.852	1.004
NRAHS	1.181	1.044	0.972	0.890	1.683	0.000	1.040	1.200	1.066	0.960	1.059
NSAHS	0.878	1.008	0.978	1.019	0.000	0.000	0.981	1.108	1.003	1.016	0.973
SAHS	1.441	0.833	1.144	0.000	0.900	0.000	1.181	1.272	1.202	0.833	1.189
WAHS	1.029	1.048	1.039	1.136	0.818	1.000	1.045	1.548	1.100	1.092	1.033
WSAHS	1.123	0.923	1.015	0.971	1.279	1.000	1.028	1.265	1.083	0.968	1.037
SWSAHS	1.313	1.330	1.104	1.143	0.000	2.000	1.133	1.161	1.139	1.196	1.122
SESAHS	1.347	1.293	1.059	1.183	1.593	0.000	1.113	1.256	1.147	1.232	1.091
MNCAHS	0.930	1.212	1.013	1.114	0.500	0.000	1.018	1.231	1.051	1.141	0.989
Grand Total	1.144	1.130	1.044	1.049	1.296	1.300	1.065	1.162	1.085	1.085	1.061
Median	1.108	1.048	1.030	0.973	0.900	0.000	1.040	1.188	1.074	1.038	1.037
Mean	1.116	1.069	1.034	0.928	0.916	0.604	1.056	1.216	1.079	1.050	1.051
95% CI High	1.209	1.154	1.071	1.105	1.231	0.955	1.085	1.311	1.104	1.106	1.085
95% CI Low	1.023	0.983	0.997	0.751	0.601	0.253	1.027	1.120	1.055	0.993	1.017
CI	0.093	0.086	0.037	0.177	0.315	0.351	0.029	0.096	0.024	0.057	0.034
Std Dev	0.196	0.180	0.077	0.372	0.664	0.739	0.061	0.201	0.051	0.119	0.072

1999/2000 RSI – Heart Failure

AHS	UA	UAR	UAED	UARED	OAED	OARED	Sum UA	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.934	1.003	1.017	1.131	1.623	1.125	1.026	1.129	1.043	1.104	1.013
CSAHS	1.072	1.075	0.973	1.074	1.880	0.000	1.001	1.129	1.016	1.075	0.993
FWAHS	1.129	1.060	1.022	1.111	0.000	0.000	1.067	1.408	1.087	1.092	1.058
GMAHS	1.206	0.952	0.898	0.870	0.978	1.865	0.996	1.128	1.002	0.927	1.019
HAHS	1.195	1.076	1.099	1.079	0.000	0.000	1.107	1.085	1.105	1.078	1.116
IAHS	0.994	1.054	1.044	1.003	1.225	0.894	1.036	1.094	1.039	1.032	1.037
MAHS	1.076	1.139	0.998	1.246	1.419	0.897	1.075	1.414	1.114	1.150	1.049
MWAHS	1.155	1.196	1.087	1.075	1.458	1.682	1.119	1.409	1.136	1.134	1.115
NEAHS	1.186	1.081	1.074	0.972	1.075	0.946	1.094	1.277	1.111	1.031	1.120
NRAHS	1.093	1.014	1.015	1.088	1.197	1.372	1.052	1.399	1.085	1.068	1.047
NSAHS	1.113	1.011	1.037	1.015	0.920	0.000	1.035	1.075	1.039	1.014	1.040
SAHS	1.293	1.013	0.991	1.165	1.361	1.952	1.080	1.445	1.163	1.141	1.069
WAHS	1.087	1.332	1.006	0.977	1.727	0.000	1.055	1.526	1.086	1.110	1.036
WSAHS	1.005	0.813	1.020	1.067	1.187	2.323	1.055	1.318	1.088	1.074	1.051
SWSAHS	1.058	1.223	1.016	1.003	0.000	0.000	1.023	1.215	1.039	1.035	1.020
SESAHS	1.370	1.170	1.048	0.955	1.295	0.556	1.069	1.217	1.085	1.019	1.075
MNCAHS	1.138	1.114	1.077	0.993	0.832	0.486	1.074	1.380	1.096	1.026	1.091
Grand Total	1.142	1.068	1.026	1.023	1.190	1.323	1.049	1.213	1.065	1.043	1.050
Median	1.113	1.075	1.020	1.067	1.197	0.894	1.055	1.277	1.086	1.074	1.049
Mean	1.124	1.078	1.025	1.048	1.069	0.829	1.057	1.273	1.078	1.065	1.056
95% CI High	1.175	1.134	1.048	1.091	1.345	1.205	1.073	1.344	1.099	1.092	1.074
95% CI Low	1.073	1.023	1.002	1.006	0.794	0.453	1.040	1.203	1.058	1.038	1.038
CI	0.051	0.056	0.023	0.042	0.276	0.376	0.016	0.071	0.020	0.027	0.018
Std Dev	0.107	0.117	0.048	0.089	0.580	0.791	0.035	0.149	0.043	0.056	0.038

1999/2000 RSI – Diabetes

AHS	UA	UAR	UAED	UARED	OAED	OARED	Sum UA	Planned	All SEPS	All URA	All UA no RA
CCAHS	0.988	0.682	1.060	0.930	8.096	1.125	1.035	1.025	1.033	0.881	1.061
CSAHS	1.382	1.169	0.982	1.065	2.000	0.000	1.052	1.195	1.085	1.137	1.042
FWAHS	1.057	0.971	0.929	1.032	0.000	0.000	1.014	0.983	1.012	0.990	1.017
GMAHS	1.083	0.990	0.908	0.871	0.513	0.800	0.965	1.070	0.973	0.935	0.973
HAHS	1.251	1.143	1.058	1.033	0.500	0.000	1.097	1.127	1.100	1.084	1.101
IAHS	1.284	1.083	1.020	1.183	1.505	2.500	1.083	1.008	1.075	1.126	1.062
MAHS	1.129	1.525	0.982	0.943	2.266	0.600	1.164	1.585	1.248	1.348	1.092
MWAHS	1.240	1.141	0.969	1.086	1.743	1.179	1.072	1.006	1.066	1.117	1.063
NEAHS	1.063	1.115	1.015	1.084	1.275	1.433	1.068	0.945	1.045	1.118	1.049
NRAHS	1.086	1.134	1.007	0.970	1.044	0.571	1.038	1.318	1.083	1.049	1.034
NSAHS	1.099	1.055	1.035	1.162	0.780	1.814	1.064	1.042	1.060	1.163	1.037
SAHS	1.067	0.771	1.008	0.901	0.630	0.000	0.989	1.411	1.106	0.866	1.016
WAHS	1.197	1.187	1.045	1.183	1.667	1.667	1.129	1.418	1.169	1.195	1.110
WSAHS	0.960	1.127	1.077	1.140	1.351	1.655	1.137	1.225	1.162	1.156	1.135
SWSAHS	1.092	1.229	1.092	1.030	0.000	0.000	1.093	1.212	1.111	1.097	1.092
SESAHS	1.400	1.063	1.216	1.210	1.328	0.000	1.225	1.134	1.208	1.148	1.237
MNCAHS	1.046	1.078	1.070	0.991	0.955	5.333	1.063	0.958	1.051	1.072	1.060
Grand Total	1.169	1.116	1.058	1.070	1.320	1.507	1.089	1.166	1.102	1.097	1.087
Median	1.092	1.115	1.020	1.033	1.275	0.800	1.068	1.127	1.083	1.117	1.061
Mean	1.143	1.086	1.028	1.048	1.509	1.099	1.076	1.156	1.093	1.087	1.069
95% CI High	1.204	1.172	1.061	1.098	2.373	1.739	1.106	1.245	1.127	1.144	1.097
95% CI Low	1.081	1.000	0.994	0.998	0.646	0.459	1.045	1.068	1.060	1.031	1.042
CI	0.061	0.086	0.033	0.050	0.863	0.640	0.030	0.088	0.033	0.056	0.028
Std Dev	0.129	0.182	0.070	0.105	1.816	1.347	0.064	0.185	0.070	0.119	0.058

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Appendix A

Three Options considered for Chronic and Complex Care Performance Reporting. Separations Vs Patient Level data.

Strategy / Benefits	Risks / Issues	Feasibility
1. Report at the separation level. Use suggested performance indicators within this paper. ***Benefits*** • ease of reporting • timely reports	• Populations will not be as well defined using separations as if patient level data was used. • Observed variations over quarters may not demonstrate significant progress (longer time period may show this). ***Some variations will be attributed to:*** • different coding practices • variation in Emergency Same-day admission counting • differences in current service structures (hospital in the home is large in some areas and small in others, depending on access to respite beds out of hospital) • Emergency Department attendances – there is a trend of rising attendances.	• **Quarterly reporting is feasible.** • The process draws upon data supplied to the HIE. ***Risks / Issues could be addressed by:*** • assuming uniform variations occur across the system. • considering known trends in the growth of chronic and complex populations in examining results. • considering that populations of chronic and complex care patients can never be completely defined since inpatient activity will not capture patients who are treated solely in outpatient settings. • problems with coding may be addressed if AHS/s show poor performance and expect otherwise. • quarterly reporting should comment on combined performance of successive quarters.
2. Adjust the suggested performance indicators from this paper so that they report at individual patient level. ***Benefit:*** • Patient level information means populations are better defined.	• The same reasons for variations listed above still exist. • Linked data matching is required. Process is extremely complex. Currently only Epidemiology branch has acquired skill within NSW Health to do so. • Data resources are not available in a timely fashion for creating linked data sets for quarterly reports • Linked data sets contain inaccuracies due to variations listed above • Re-admission rates calculated using the internally linked ISC data might not be comparable between Health Areas. • **Lack of quarterly reports is unsatisfactory to treasury.**	• **Quarterly reporting is not feasible.** ***Risks / Issues could be addressed by:*** Implementation of a Unique patient Identifier would negate the need of probabilistic data matching for patient level statistics.
3. Use alternative 2 to produce annual reports and produce quarterly reports using data specific to AHS Area Programs. ***Benefits:*** Unknown	• **Linked data matching is required. Process is extremely complex.** Currently only Epidemiology branch has acquired skill within NSW Health to do so. • Data resources may not be available in a timely fashion for creating linked data sets for annual reporting. The annual ISC for a financial year is currently released about a year in arrears. • Linked data sets contain inaccuracies due to variations listed above • Re-admission rates calculated using the internally linked ISC data might not be comparable between Health Areas. • Areas supplying specific data may not have the capacity to do so.	• Unknown as to whether annual reports will be achievable relying on linked data sets supplied by Epidemiology Branch. **Timeliness remains questionable.** • Timeliness, accuracy and capacity to produce quarterly reports based on AHSs providing Area Program specific information is unknown.

Note: It is important to state that no methodology will be perfect, and both patient level data and separation level data will have their share of anomalies.

Appendix B

B

Methodology for determining Avoidable Admissions

Associate Professor Paul Harnett has compiled a series of reasons that can be examined to determine if an admission or readmission for a cancer patient was avoidable. These situations need to be assessed by individual clinicians with respect to the patient.

Reason 1. Better inter-referral between specialists

Hypothesis:
Rapid efficient referral to specialist services within or associated with the hospital will allow assessments and procedures to be carried out as an outpatient (or as an inpatient under someone else's care).

Example:

- Jaundiced patient seen in clinic and sent for ERCP and stenting within a few days.
- breathless patient sent to radiology for pleural aspiration.

Definition:
Where a specialist referral conducted promptly as an outpatient would have avoided admission or shortened admission.

Reason 2. Better GP education and communication

Hypothesis:
Well informed GPs will provide better care for our (their) patients. Problems potentially leading to hospital admission will be anticipated and either avoided or dealt with at a stage when outpatient care is appropriate.

Example:
A GP notes increasing ascites in a patient. She calls the consultant or registrar and the patient is booked in for a tap on a weekday morning.

Definition:
Where more appropriate action by or information to a community-based doctor would have avoided admission or shortened admission.

Reason 3. Single contact point required

Hypothesis:
A single telephone triage system will allow patients and GPs rapid access to the appropriate source of advice about symptoms and side-effects. Easy access to specific, relevant advice will result in better management of medical problems and better use of resources in the community and thus fewer hospital admissions.

Example:
Patient is confused about where the next Palliative Care clinic appointment is (physical location) and is getting constipated because of analgesics. Contact point identifies clinic and pages Pall Care CNC who speaks to patient about medications.

Definition:
Where better patient access to information within the hospital would have avoided admission or shortened admission.

Reason 4. Improved systems of hospital-based care

Hypothesis:
Better-structured clinics, less busy health care providers and clearly delineated clinical management protocols will avoid inappropriate admissions or rapid readmissions.

Example:
A busy clinician is an hour behind in the clinic and is confronted by a known patient who has developed new symptoms. These require imaging and new medications and the patient is sent to the ward for admission. A patient is constipated when sent home and comes back into hospital with pain, vomiting and constipation.

Definition:
Improved systems of hospital-based care would have avoided admission or shortened admission.

Reason 5. Better patient education

Hypothesis:
Better patient understanding of disease and treatment will result in more prompt seeking of medical attention (either us in person or by phone or with GP) and fewer hospital admissions.

Example:
A woman has first cycle of AC and is experiencing lots of vomiting. Over the next few days she has effectively no antiemetic and little fluid intake. She ends up being hospitalised on day 7. With better education she could ring us, be advised to try stemetil suppository from the GP, or come for a litre of saline and some IV dex and tropisetron.

Definition:
where more appropriate action by a patient would have avoided admission or shortened admission.

Reason 6. Better community support

Hypothesis:
Better access to or more appropriate referral to nursing and other support will avoid admissions.

Example:
Elderly woman, living alone with bone pain. Poor pain control. Develops constipation and vomiting.

Definition:
where better access to or improved quality of community support would have avoided admission or shortened admission

Reason 7. Existence of an acute referral service

Hypothesis:
Ability to manage assessments and procedures outside of A & E will reduce admissions.

Example:
Unscheduled review for assessment of breathlessness leads to CXR, pleural tap and clinic appointment for review the following week.

Definition:
where better resourced assessment or procedure in ambulatory setting would have avoided admission or shortened admission.

Reason 8. Technological improvements

Hypothesis:
Foreseeable improvements in drug delivery, symptom control and other aspects of clinical management will reduce admissions.

Example:
Admissions for head and neck chemotherapy – better antiemetics or outpatient infusion treatments or oral chemo could avoid admissions.

Appendix C

C

Glossary of terms used

AHS(s)	Area Health Service(s)
ALL SEPS	All Separations – used as a proxy for all Admissions = Total Activity = PA + ALL UA no RA + ALL URA
ALL UA no RA	All Unplanned Admissions excluding Readmissions = UA + UAED + OAED
ALL URA	All Unplanned Readmissions = UAR + UARED + OARED
AMO	Attending Medical Officer
ARDRG V4.1	Australian Refined Diagnosis Related Groups Version 4.1
CC	Complication and Comorbidity
CCCICG	Chronic and Complex Care Implementation Coordination Group
CCF	Clinical Complicating Factor
CERG	Clinical Expert Reference Group
DRG	Diagnosis Related Group
EDIS	Emergency Department Information System
HIE	Health Information Exchange
ICD-10-AM	International Statistical Classification of Diseases, and Related Health Problems, 10th Revision, Australian Modification
ISC	Inpatient Statistics Collection
ISCOS	Inpatient Statistics Collection On-line System
LOS	Length of Stay
MRN	Medical Record Number
OAED	Unplanned Admissions that are not an emergency, but are referred by the Emergency Department, and are not a readmission.
OARED	Unplanned Readmissions that are not an emergency, but are referred by the Emergency Department.
PA	Planned Admissions – where Admission Status equals 'Planned'
PHCP(s)	Priority Health Care Program(s)
UA	Unplanned Admissions that were not referred by the Emergency Department, and are not a readmission.
UAED	Unplanned Admissions that are an emergency, and are referred by the Emergency Department, and are not a readmission.
UAR	Unplanned Readmissions that were not referred by the Emergency Department.
UARED	Unplanned Readmissions that are an emergency, and are referred by the Emergency Department.
RSI	Relative Stay Index
SEPS	Separations
SIG	Special Interest Group
SSR	Standardised Separations Ratio
TRIG	Teaching and Research Implementation Group
UPI	Unique Patient Identifier

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