HMA
HEALTHCARE MANAGEMENT ADVISORS

DEPARTMENT OF HUMAN SERVICES

Seasonal Analysis of Activity in Victorian Public Hospitals including Sameday Patients

FINAL REPORT

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Executive Summary

The Department of Human Services (DHS) wishes to understand the (seasonal) pattern of activity in Victorian public hospitals and to identify the factors that could be used to predict variations in hospital inpatient levels. This report (the "second phase report") represents the conclusion of the second phase of a project carried out by Healthcare Management Advisors (HMA) to analyse seasonal activity trends in Melbourne's public hospitals. The "first phase report" titled "*Seasonal Activity Analysis of Activity in Victorian Public Hospitals"* analysed overnight inpatients activity levels for the period 1994/95 to 1998/99. In November 2000, the DHS further engaged HMA to extend the original work to include 1999/00 overnight inpatient data and analyse sameday patient activity for the period 1994/95 to 1999/00.

This second phase report presents a series of charts highlighting activity trends in Victorian hospitals generated from two datasets, the "overnight inpatient daily-file" and the "sameday patient daily file". The daily files were generated by manipulating 1994/95 to 1999/00 data for public hospital inpatients from the Victorian Admitted Episodes Dataset (VAED). Consistent with the first phase of the work the methodology used was based on a report by the Manitoba Centre for Health Policy Evaluation (MCHPE) on *"Seasonal Patterns of Winnipeg Hospital Use"* (Menec et al 1999). The principal feature of the methodology was the use of the VAED data to construct a census of (in-scope) overnight and sameday inpatients in Melbourne's metropolitan public hospitals on each day in the study period.

Aggregate time series analysis – overnight inpatients

The aggregate (all in-scope overnight inpatients) time series analysis of the overnight inpatient census highlighted a number of trends as follows:

- A trough in activity levels occurs every year at Christmas and Easter (not as pronounced as Christmas) and major public holidays (again not as pronounced as Christmas);
- There has been a 17% decline in the absolute number of (in-scope) overnight inpatients accommodated each night in Melbourne's hospitals over the six-year period (the 1994/95 average was 4,643 compared with the 1999/00 average of 3,842).
- In the most recently completed year, the overnight inpatient census fell by 2% from an average of 3,982 in 1998/99 to 3,842 in 1999/00, thereby continuing the trend.
- The overnight inpatient census exhibits a distinct weekly pattern, peaking on Wednesdays with the minimum on Saturdays; the difference between the number of overnight inpatients on weekends compared to weekdays may represent an opportunity to increase patient throughput.

At the aggregate level, the analysis largely revealed expected trends. It was interesting to note that when the difference between admissions and separations was examined, there had been a trend towards smoothing the hospital workload over the six-year period. To illustrate, the range of the difference between weekly average admissions and separations was 156 in 1999/00, whereas it was 218 in 1994/95. These figures represent a 28% narrowing in the range, which suggests that smoothing hospital workload has been one response to the need to improve the efficiency of hospital operations.

Aggregate time series analysis – sameday patients

The aggregate time series analysis of the number of sameday patients highlighted a number of significant trends as follows:

- Peaks and troughs in activity match those for overnight inpatients with troughs every year at Christmas and Easter (not as pronounced as Christmas) and major public holidays (again not as pronounced as Christmas);
- There has been a 40% increase in the absolute number of sameday patients treated in Melbourne's hospitals over the six-year period (the 1994/95 average sameday patients each day was 653 compared with the 1999/00 average of 915).
- Sameday patient activity levels also exhibit a distinct weekly pattern, peaking on Wednesdays at 1,187 in 1999/00 with the minimum on Sundays at 230 in 1990/00;
- Aggregate admissions (overnight plus sameday) have increased by 16% from an average of 1,385 admission per day in 1994/95 to 1,612 admissions per day in 1999/00.

At the aggregate level, the analysis reveals a significant increase in sameday patient activity. By combining sameday patient admissions with overnight inpatient admissions an increase in the overall number of patients admitted to Melbourne's hospitals is revealed, notwithstanding the reduction in bed numbers reflected by the decreasing overnight inpatient census levels.

Analysis of admission type – overnight inpatients

The VAED variable "admission type" was used to differentiate emergency inpatients (defined as either Industrial (work) emergency, Road emergency, Other emergency) from planned inpatients (all other in-scope admission types). This variable was also combined with the variable that distinguishes between surgical and medical inpatients (assigned by using the DRG) to form the variable "case type". Case type therefore has four values: "Planned Medical", "Planned Surgical", "Emergency Medical", and "Emergency Surgical", which were used in the trend analyses. The key conclusions from the analysis of the 1999/00 data were:

- Emergency overnight inpatients represent a greater proportion of the in-scope workload than planned overnight inpatients; the 1999/00 average of the overnight inpatient census was 3,842 of which 2,397 (62.4%) were emergency cases and 1,445 (37.6%) were planned cases.
- The proportion of the overnight inpatient workload represented by emergency patients has increased again from 1998/99 (60.4%) to 1999/00 (62.4%). This rise reflects a consistent trend of increases from the base level of 56.6% set in 1995/96.
- The variability of the emergency workload (21% fluctuation around the mean) is much less than that of the planned workload (54% fluctuation around the mean).
- Emergency medical overnight inpatients represent the greatest proportion (44%) of the overnight inpatient workload and exhibit the smallest variability (26% fluctuation around the mean).
- Emergency surgical, planned surgical and planned medical overnight inpatients each represent around 19% of the workload, with planned surgical patients exhibiting the greatest fluctuation (79%) around the mean.

- Patients aged 75 years and over represent 38% of the workload generated by emergency medical admissions; there are around 673 inpatients aged 75 years or more in hospital on any given winter day due to an emergency medical condition.

These data highlight the lower variability of the emergency workload relative to the planned workload. The data suggest that within the general seasonal variations, hospital's use Planned Surgical cases to balance the work (ie lower planned surgical patients in times of high inpatient census) to the desired level.

Analysis of admission type – sameday patients

The key conclusions from the analysis of sameday patient numbers by admission type for 1999/00 data were:

- Planned patients represent a greater proportion of the sameday patient workload than emergency patients; the 1999/00 average number of sameday admissions was 915 per day of which an average of 743 (81%) were emergency and 172 (19%) were planned.
- As for overnight inpatients, the variability of the emergency sameday patient workload (34% fluctuation around the mean) is less than that of the planned workload (52% fluctuation around the mean).
- Planned medical patients represent the greatest proportion (63%) of the sameday patient workload and exhibit 37% fluctuation around the mean.
- Emergency medical and planned surgical sameday patients each represent around 18% of the workload, with planned surgical patients exhibiting the greatest fluctuation (107%) around the mean.
- Planned medical patients have moved from 59.4% of the sameday patient workload in 1994/95 to 63.4% in 1999/00. Planned surgical sameday patients have moved from 21.8% of the sameday patient workload to 17.9% in the same period.

These data highlight the dominance of planned medical cases in the sameday patient workload. In turn these cases are dominated by dialysis (which alone represents 29.9% of all sameday patients in 1999/00), chemotherapy and endoscopy sameday patients. The analysis highlights that it is misleading to consider overall sameday patient numbers when considering activity trends (particularly surgical activity) as trends in these data are masked by the large number of dialysis and chemotherapy cases.

Emergency medical overnight inpatients

Emergency medical overnight inpatients are the largest group (by volume). The MCHPE definitions of high-pressure level, which is when the inpatient census rises two standard deviations above the mean, and the warning level, which is defined as the inpatient census being one standard deviation above the mean. These concepts were used to examine bed-pressure issues. The key findings were:

- In 1999/00 the inpatient census did not exceed the high-pressure level and only spent five weeks above the warning level for the whole year.

- Across the six-year study period, the emergency medical overnight inpatient census exceeded the high-pressure level only once in weeks 3 and 4 of 1997 (the most severe flu season).
- The emergency medical overnight inpatient census in 1999/00 falls below average over the summer months starting at week 20 and does not exceed the average again until week 37.

These data illustrate the importance of emergency medical inpatients and the considerable difference in the overnight inpatient census in winter (average 1,744 in 1999/00) and summer months (average 1,548 in 1999/00).

Emergency influenza-related overnight inpatients

The proportion of the emergency medical overnight inpatient census that is influenza-related (defined using medical AN-DRGs) was also examined. The essential findings were:

- Influenza-related overnight inpatients consistently account for approximately 19% of all emergency medical overnight inpatients.
- Over the five-year period, the worst flu season was 1997 with a peak of 543 overnight inpatients in July; the "best" flu season was 1995 with a peak of 375 overnight inpatients in August 1995.
- In 1999/00, the July flu-related overnight inpatients peak was 437 patients and in January the flu-related overnight inpatients trough was 214; the range of 223 patients demonstrates the impact the flu can have on hospital bed pressures.
- In 1999/00, about 150 more beds were required in metropolitan Melbourne to accommodate flu patients in winter (average winter census of 392 overnight inpatients) relative to summer (average summer census of 242 overnight inpatients).
- Overnight inpatients aged 65 years and over account for 58% of the flu-related workload; understanding and perhaps predicting flu-related episodes for this age group would be a valuable addition to hospital bed planning in winter months.

The analysis of the flu-related overnight inpatients clearly demonstrates the impact of these patients on winter bed pressures.

Planned medical sameday patients

Planned medical sameday patients represent the largest sameday group (by volume). The key findings of the analysis were:

- Planned medical sameday cases climb from average of 391 admissions per day in 1994/95 to 580 admissions per day in 1999/00 (a 48% increase).
- Dialysis cases represent 47.2% of planned medical sameday cases followed by chemotherapy 12.4%; the top ten DRG groups cover 75.5% of all planned medical sameday cases.

The average overnight inpatient admissions for planned medical cases has fallen from 127 per day in 1994/95 to 116 per day in 1999/00. Based on this high-level review of the activity data, there appears to have been little substitution between overnight and sameday planned medical cases.

Planned surgical sameday patients

The key findings of the analysis of planned surgical sameday patients were:

- The average number of planned surgical sameday cases per day has increased by only 15% over the six years from 142 in 1994/95 to 164 in 1999/00.
- Gynaecology and ophthalmology specialties feature prominently in planned surgical sameday case numbers, with the top ten DRGs accounting for 57.3% of all planned surgical sameday cases.

The average overnight inpatient admissions for planned surgical cases has fallen from 193 per day in 1994/95 to 160 per day in 1999/00. When compared with the increase in planned surgical sameday cases some substitution between overnight and sameday cases is suggested. However, the overall increase in planned surgical sameday patients is relatively modest over the six-year period and there are likely to be further opportunities to increase sameday surgery as a means for improving hospital throughput.

Emergency medical sameday patients

The key findings of the analysis of emergency medical sameday patients were:

- The average number of emergency medical sameday cases per day has increased by 46% over the six years from 112 in 1994/95 to 163 in 1999/00.
- The top ten DRGs account for 33% of all emergency medical sameday patients with chest pain, abdominal pain and headache all having large numbers of cases.

The average overnight inpatient admissions for emergency medical cases has increased slightly from 333 per day in 1994/95 to 344 per day in 1999/00. When compared with the increase in emergency medical sameday cases, substitution between overnight and sameday cases is not suggested. The overall increase emergency medical sameday cases has gathered momentum in the last two years and it may be the result of specific policy initiatives and/or changes to the recording of these cases on the VAED.

Conclusion

The second phase of this project has again demonstrated the significant differences in hospital activity levels between seasons. The original daily file has been extended to include both 1999/00 overnight inpatient data and sameday patient data for the full six-year period. These files can be used to carry out further analysis of the seasonal activity trends. The most important findings of this second phase of the analysis were:

- The continually increasing proportion of the overnight inpatient census represented by emergency cases will further restrict the opportunity for hospitals to admit planned surgical cases thereby affecting waiting times for non-emergency surgery.
- Overall hospital activity levels have increased, notwithstanding the reduction in bed numbers evidenced by reductions in the inpatient census levels

- Sameday patient activity needs to be carefully analysed as some trends are masked by large numbers of planned medical sameday patients. In particular, there would appear to be scope to expand hospital throughput by increasing planned surgical sameday patients.

The initial analysis presented in this report indicates that the inpatient census data will be a valuable source of information on the performance of the public hospital system (particularly its response to winter bed-pressures). The further research and data analysis suggested in this document and in the first phase report should provide important insights into the efficiency of the public hospital system. Those insights should lead to the development of strategies that optimise the use of resources in times of high demand for hospital inpatient services.

1
Introduction

The Department of Human Services (DHS) engaged Healthcare Management Advisors (HMA) in March 2000 to investigate the (seasonal) pattern of overnight inpatient activity in Victorian public hospitals for the period 1994/95 to 1998/99. Part of that work involved the identification of the factors that could be used to predict (or at least provide early warning of) variations in inpatient admission levels. The report *"Seasonal Analysis of Activity in Victorian Public Hospitals"* (the first phase report) was completed and presented to the DHS in January 2001.

In November 2000, the DHS engaged HMA to extend the original work to include an analysis of sameday patients for the period 1994/95 to 1999/00 and to incorporate the 1999/00 overnight inpatient data into the seasonal activity analysis. Specifically, the objectives of the second project were to generate a unit record data set from Victorian Admitted Episodes Dataset (VAED) for the period 1994/95 to 1999/00, for both overnight and sameday patients, which involved:

- updating the time series analysis of overnight seasonal activity in Victorian hospitals to include 1999/00 data; and
- producing a time series analysis for sameday activity in Victorian hospitals for the full six-years.

The work involved taking six-years of sameday data from the VAED and manipulating the files to produce a dataset that could be used to analyse the characteristics of sameday patients in public hospitals in metropolitan Melbourne. The 1999/00 overnight inpatient data were added to the existing "daily file" to produce six-years of census data. The updated "daily file" was then used to extend the analysis in the first phase report for overnight inpatients.

This report represents the conclusion of the second phase of project. It presents a series of charts and tables highlighting activity trends in Victorian hospitals for both overnight and sameday patients for the period 1994/95 to 1999/00.

2
Methodology

As indicated in the first phase report, the methodology for constructing the "daily file" for overnight inpatients was heavily based on a report by the Manitoba Centre for Health Policy Evaluation (MCHPE) on *"Seasonal Patterns of Winnipeg Hospital Use"* (Menec et al 1999). The second phase of the project involved extracting data from the VAED to construct the equivalent dataset (termed the "sameday daily file") for sameday patients. The process for constructing the sameday daily file was identical (albeit simplified) to that used for overnight inpatients (see Appendix A). In brief, both daily files contain a distinct record for each patient in hospital on a given day (ie every patient appears on every day that they were in hospital). For the purposes of the census, overnight inpatients are taken to be in hospital at midnight on the day of admission and out of hospital before midnight on the day of separation.

The scope of the seasonal activity data analysis in this report is defined by the time-period, hospitals, and types of patients to be included in the daily files. Definitions for each of these variables are set out below.

Time period

The "daily files" are built from data on patients separated from hospitals in the period 29 June 1994 to 27 June 2000 (six financial years). In addition, data for patients admitted on or before 27 June 2000 and separated on or before 15 November 2000 were used so that the bed days that they accrued in the in-scope period could be included in the daily file. These data allow the "daily files" to be built, describing the sameday and overnight inpatient activity for the full six-years in the period 29 June 1994 to 27 June 2000 (there are 2,191 days in the period).

Hospitals

Data from all hospitals in metropolitan Melbourne were included in the daily file. Data from non-metropolitan hospitals were not used. A list of hospitals included in the analysis and the number of admissions/separations and bed days for the six-year period are shown in Appendix B (overnight inpatients) and Appendix C (sameday patients).

Types of patients

Data for overnight inpatients were included in the daily file and data for sameday patients were included in the sameday daily file. The following types of cases were excluded:

- Palliative;
- Maternity;
- Unqualified neonates;
- Mental health;
- Rehabilitation;
- Hospital in the Home; and
- Geriatric Evaluation and Management.

The rationale for excluding these cases is that the services are typically provided in facilities that are not substitutable for inpatient facilities. Consequently, inclusion of these services would have confounded the analysis of high-pressure periods (where the requirement for inpatient beds is higher than usual) in hospitals.

3

Aggregate time series analysis Overnight Inpatients

This chapter updates the analyses of the "overnight inpatients daily file" taken over the six-year period. In following chapters relating to overnight inpatients, the analyses are progressively narrowed down to examine patient characteristics such as episode types, medical emergencies and influenza emergencies. As the patterns for each of the six-years are similar, only 1994/95, 1998/99 and 1999/00 data are shown. The last two years are used to enable comparison with the first phase report. Unless otherwise specified all figures are produced using the overnight inpatient daily file.

3.1 TOTAL IN-SCOPE OVERNIGHT INPATIENTS IN HOSPITALS

The analysis starts by examining the number of overnight inpatients in at midnight in Melbourne's hospitals over the full six-year period by week (the weeks are numbered 1 through 312). The weekly average overnight inpatient census is calculated by averaging the number of in-scope patients in hospitals for each day in the week.

Figure 1: Weekly average overnight inpatient census, 1994/95 to 1999/00

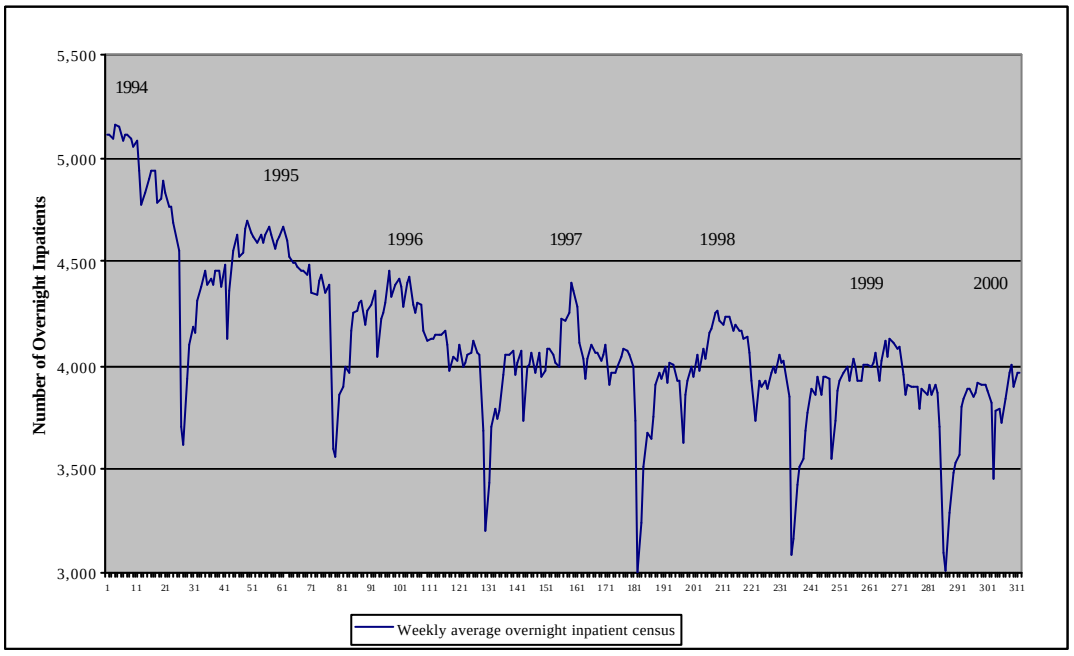
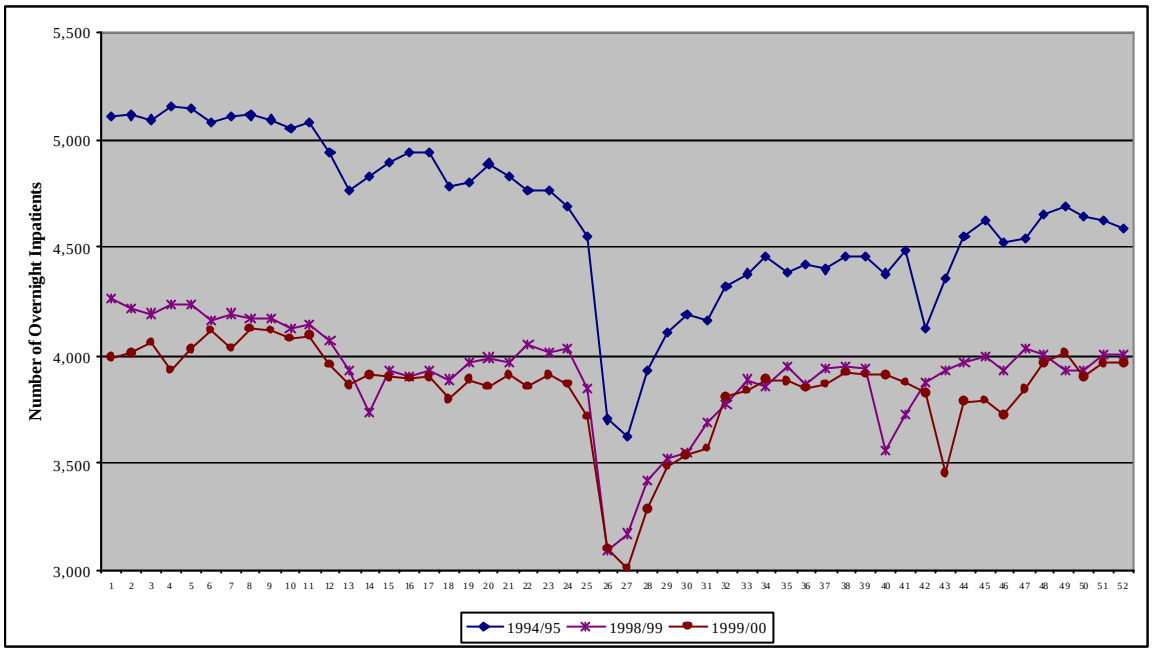


Figure 1 exhibits quite a consistent pattern with census peaks occurring around the middle of the year and troughs during the Christmas/New Year and Easter periods. The other dip that occurs in 1998 corresponds to the gas crisis experienced in Melbourne in September/October of that year. There is a noticeable decline in the overnight inpatient census in the six-year period, particularly in the early

years. Figure 2 highlights this shift plotting the weekly average overnight inpatient census for 1994/95, 1998/99 and 1999/00.

Figure 2: Weekly average overnight inpatient census, 1994/95, 1998/99 & 1999/00



Review of Figure 2 highlights the similarity of the weekly average overnight inpatient census patterns. Comparing the 1994/95 average of 4,643 overnight inpatients with the 1999/00 average of 3,842 overnight inpatients represents a 17% change in the number of patients in hospital on any given day across the six-year period. Even from 1998/99 (average 3,920) to 1999/00 (average 3,842), there has been a 2% reduction in the overnight inpatient census. Figure 3 highlights the same difference, as well as the similarity of the seasonal pattern by taking the monthly average overnight inpatients per day.

Figure 3: Monthly average overnight inpatient census, 1994/95, 1998/99 & 1999/00

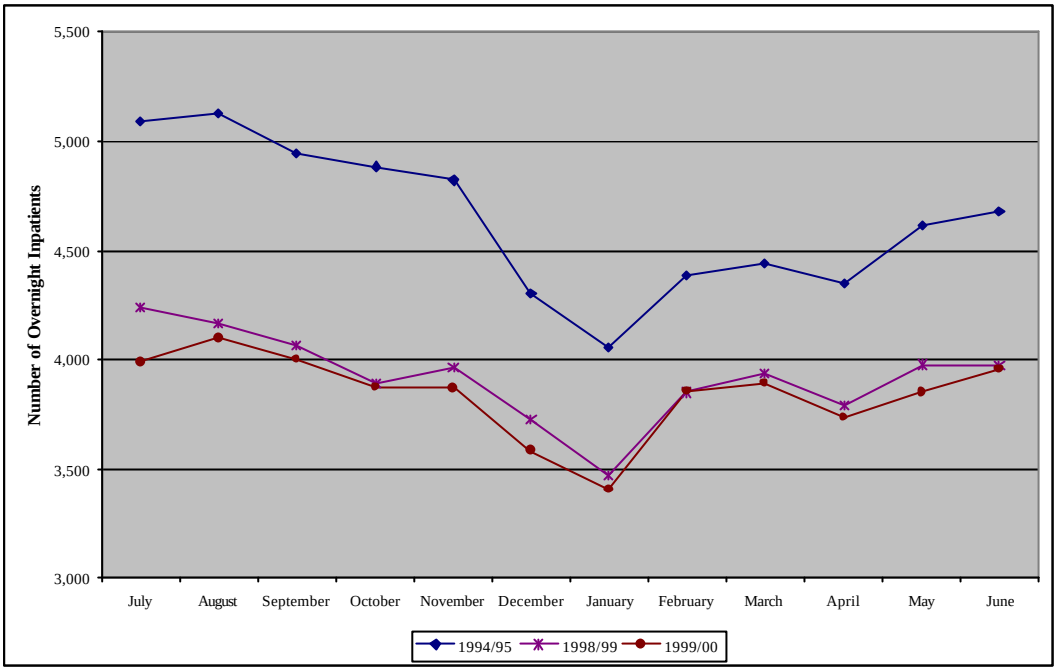
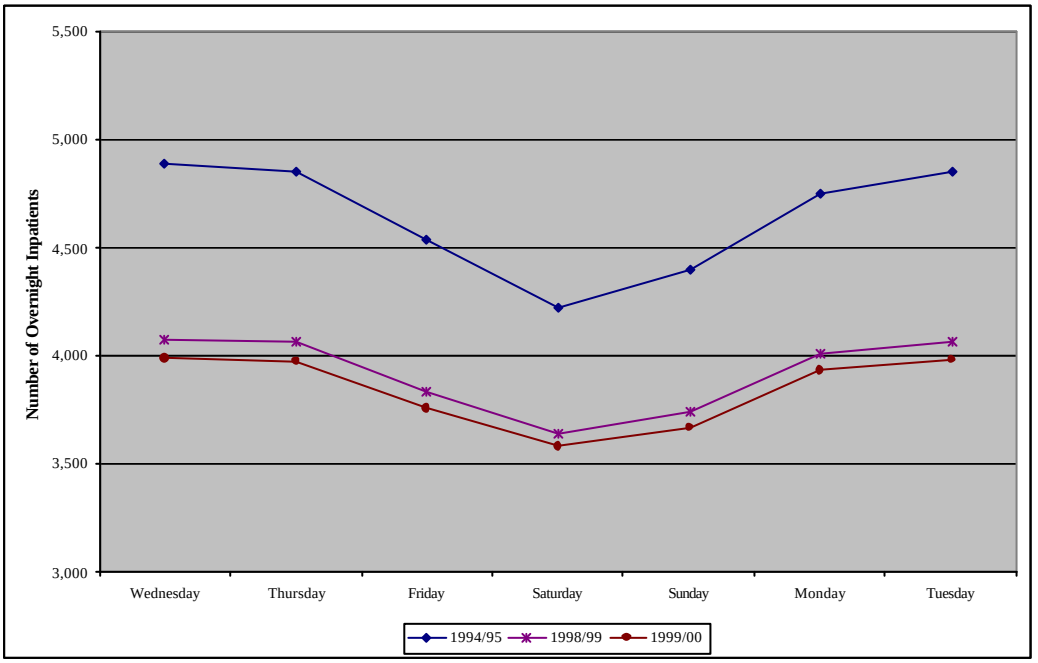


Figure 4 shows a remarkable similarity in the average overnight inpatient census by day of the week across the six-year period. The number of patients in hospital peaks on Wednesdays, with the trough being on a Saturday. Weekday patient levels are much higher than weekend patient levels.

Figure 4: Average overnight inpatient census by day of the week for 1994/95, 1998/99 & 1999/00



Review of Figure 4, shows that the difference between the trough on Saturday and the peak on Wednesday is narrowing with the range (highest census to lowest census) decreasing from 662 in 1994/95 to 408 in 1999/00. This variation represents a reduction of by 61.6% in the six-year period (or an average annual decrease 8.3%). When comparing the last two years the range has narrowed from 442 in 1998/99 to 408 in 1999/00 (decrease by 7.7%, slightly below the average annual decrease over the full period). Consistent with the first phase report, these data suggest that

smoothing hospital workload continues to be one response to bed-pressures being experienced in Melbourne's hospitals.

3.2 ADMISSIONS & SEPARATIONS

The weekly average admissions per day is calculated by averaging the daily number of (in-scope) admissions for the days in each week. Figure 5 shows that there has been a decrease in the average number of admissions per day over the six-year period from 732 in 1994/95 to 697 in 1999/00. Across the last two years, there has been a 1.6% reduction in average admissions per day from 708 in 1998/99 to 697 in 1999/00.

Figure 5: Weekly average admissions per day, 1994/95, 1998/99 & 1999/00

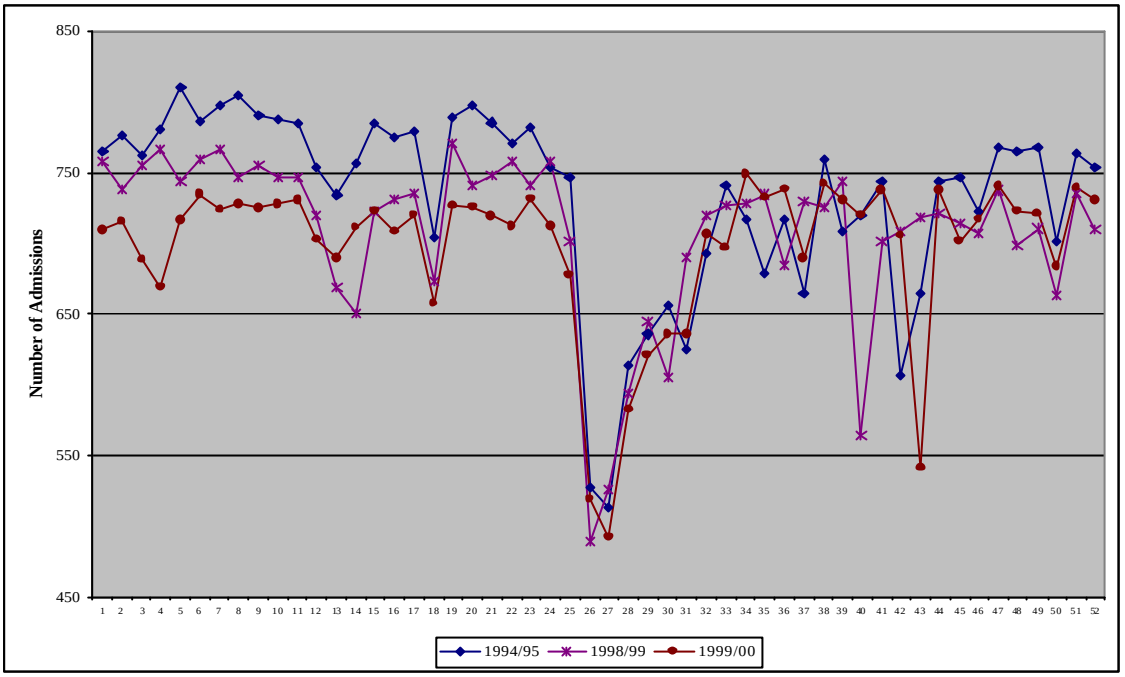


Figure 5 also measures the difference in the take-up of hospital patients. At the winter peak in 1999/00 the weekly average (in-scope) admissions per day was 735. This compares to the summer trough the weekly average admissions per day fell to around 600 (excluding the Christmas and New Years holiday weeks where it falls to around 500).

Figure 6 presents a similar analysis for the (in-scope) weekly average separations per day. Again, there is a lower level of separations per day in 1999/00 (average 697) and 1998/99 (average 709) relative to the level in 1994/95 (average 734).

Figure 6: Weekly average separations per day, 1994/95, 1998/99 & 1999/00

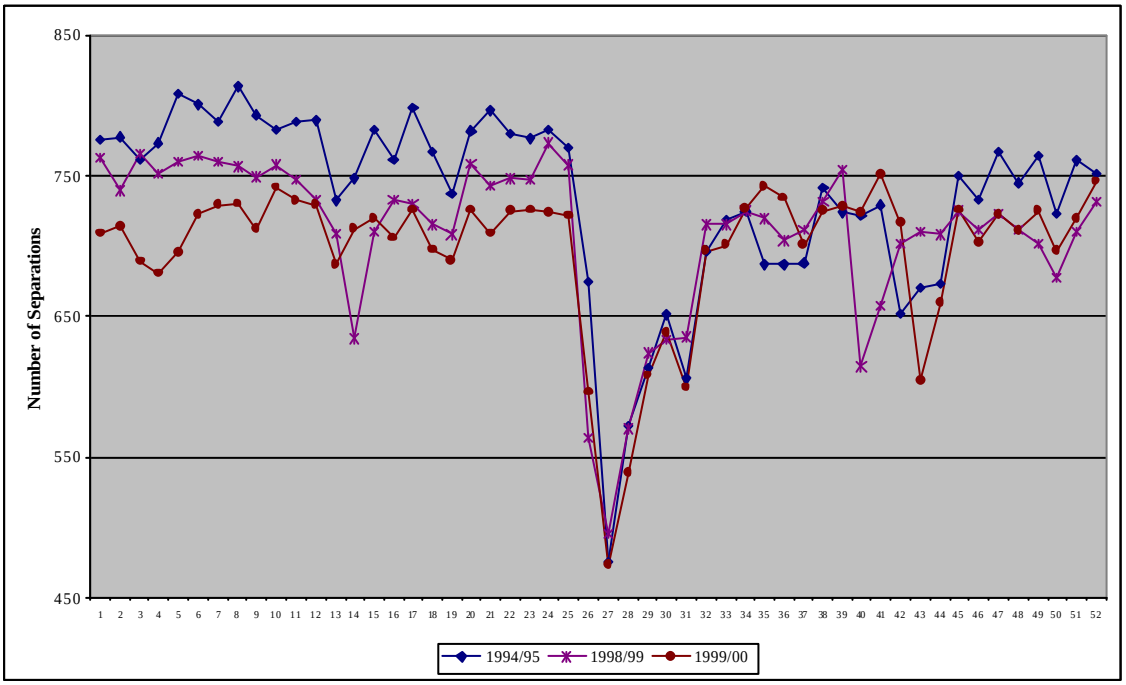
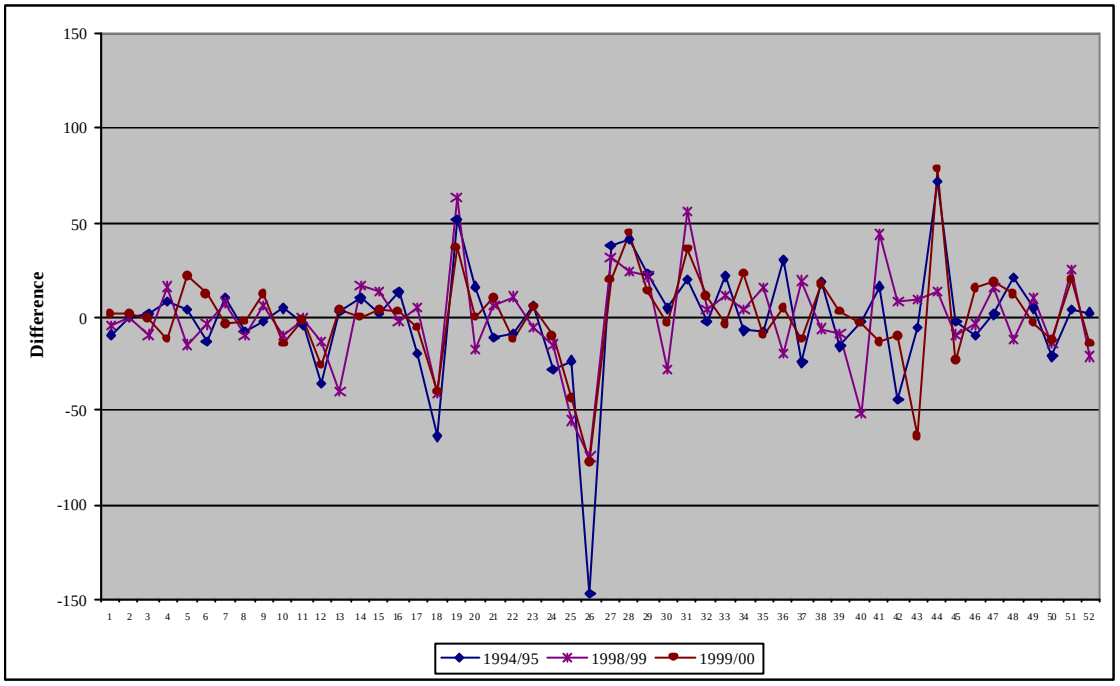


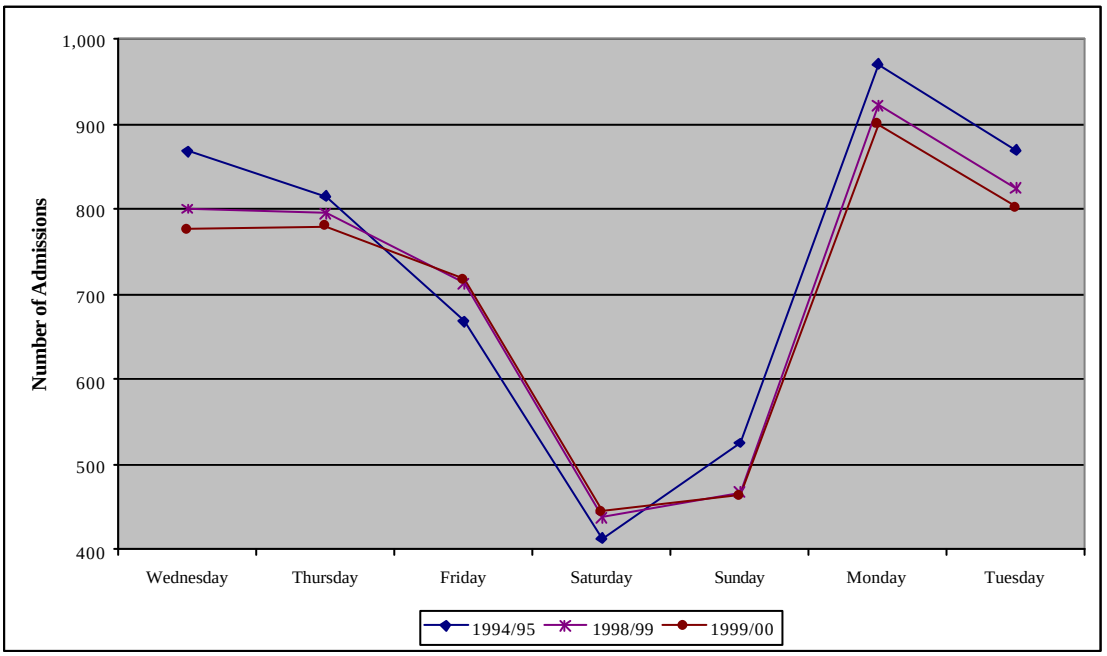
Figure 7 compares the difference between admissions and separations highlighting the fact that during holiday periods (particularly Christmas and Easter), separations tend to exceed admissions (the difference is negative), as hospitals are emptied. Equally, in the weeks just after holiday periods admissions exceed separations as hospitals are re-filled.

Figure 7: Weekly difference between average admissions & separations per day, 1994/95, 1998/99 & 1999/00



When the monthly average admissions and separations per day patterns are examined, they exhibit similar trends to those shown in the weekly graphs and have therefore not been produced. Figure 8 examines the pattern of admissions by day of the week.

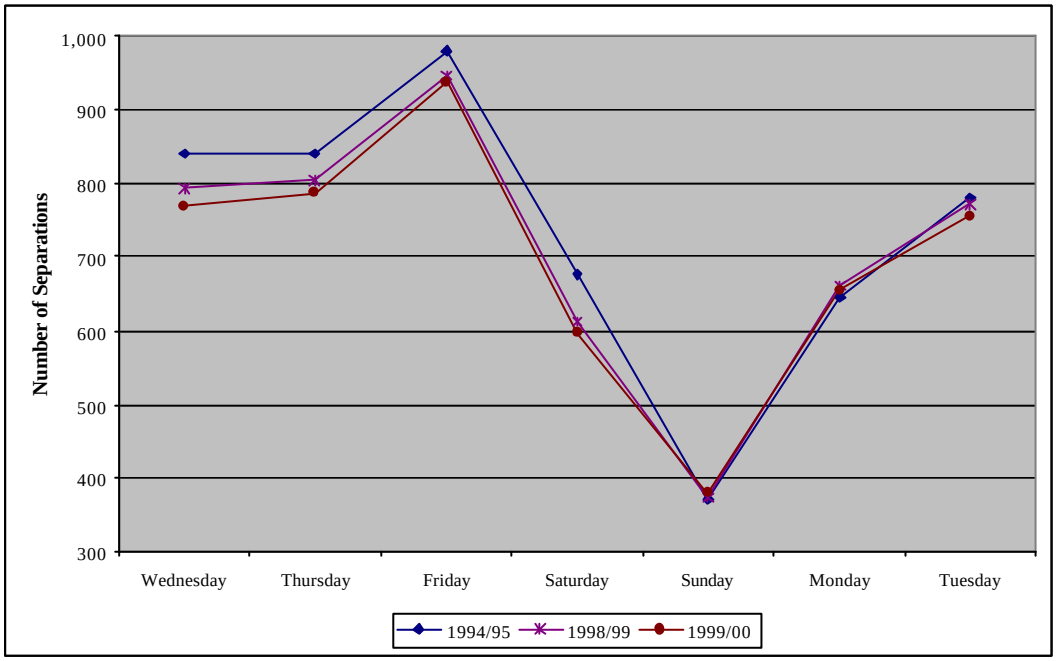
Figure 8: Average admissions per day, by week day, 1994/95, 1998/99 & 1999/00



Review of Figure 8 shows that there has been a narrowing of the range in average admissions per day. In 1994/95 the Monday admissions peak averaged 970 with the Saturday admissions trough averaging 413 (a range of 557). In 1999/00, the Monday admission peak averaged 899 with the Saturday admissions trough averaging 444 (a range of 455). This compares to a Monday admission peak averaging 922 and Saturday admission trough averaging 437 (a range of 485) in 1998/99. These figures reflect an 18% reduction in the range of admissions by day of the week across the six-year period, with a continuing reduction in the range in the last two-years of some 6%. Again, these data suggest some smoothing of hospital workload across the seven-day week has occurred.

Figure 9 presents the same data for average separations per day. Consistent with the admissions pattern there is a narrower range in average separations per day in 1999/00 (maximum, 938; minimum, 379; range 559) than there was in 1994/95 (maximum, 980; minimum, 371; range 609). The reduction in range represents some 8% compared to the reduction in the range of admissions of 18%.

Figure 9: Average separations per day, by week day, 1994/95, 1998/99 & 1999/00



Review of Figure 9 also shows that, as expected, the separations per day peak occurs on a Friday, with the trough being on a Sunday. The marked difference between the Friday peak and the Sunday trough suggests that there may be opportunities for further improvement in discharge practices (ie perhaps there are opportunities to discharge patients that are being missed on a Saturday or Sunday). Equally, it might be argued that Figure 9 points to a risk of early discharge on a Friday, as the hospitals seek to empty beds for the weekend.

Figure 10 further examines the (in-scope) admissions and separations pattern by day of the week by calculating the difference between the number of admissions and separations. The figure demonstrates the very high variability around zero (where admissions equal separations) with large negative results on Fridays and Saturdays and large positive results on Mondays.

Figure 10: Difference between average admissions & separations per day, by week day, 1994/95, 1998/99 & 1999/00

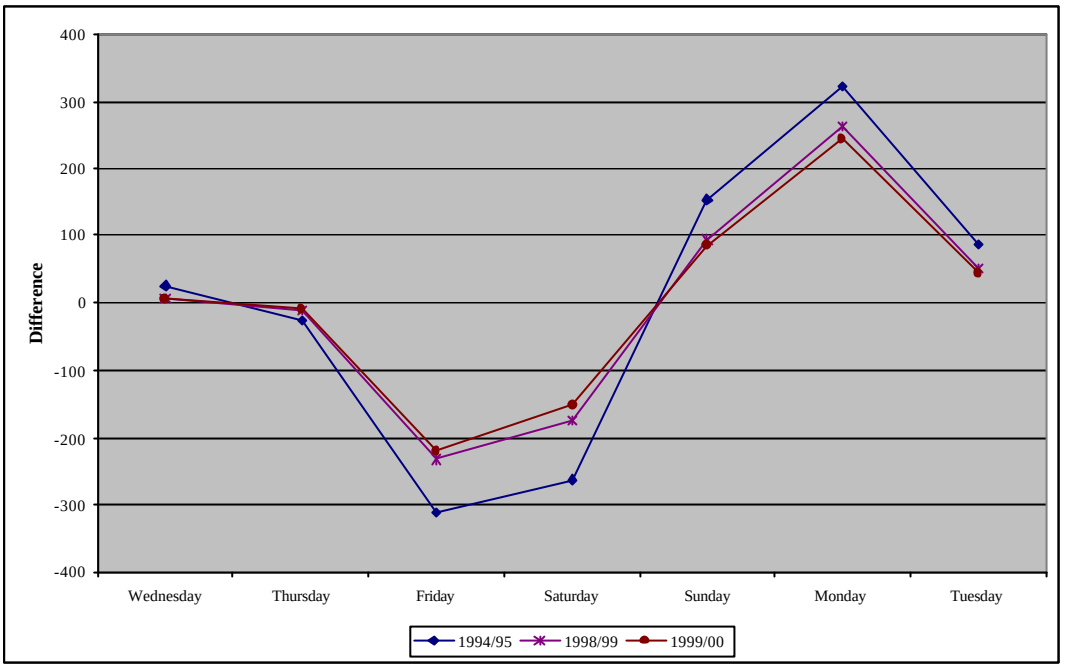


Figure 10 also demonstrates the smoothing of hospital workload effect that was highlighted earlier. The differences between admissions and separations in 1999/00 (maximum 245; minimum -220, range 465) and 1994/95 (maximum 323; minimum -312, range 635) are quite significant. The 27% narrowing in the range suggests that there has been a trend towards smoothing hospital workload in the six-year period. This trend may be related to the improvement in the efficiency (measured by cost per unit WIES or some equivalent indicator) in Melbourne's hospitals in the same period.

This analysis tends to confirm the value of examining opportunities for further smoothing in hospital workload as a measure to improve throughput (and possibly overall hospital efficiency) within the existing infrastructure.

4

Aggregate time series analysis Sameday Patients

This chapter presents aggregate analyses of the "sameday patients daily file" taken over the six-year period. In following chapters relating to sameday patients, the analyses are progressively narrowed down to examine patient characteristics such as episode type and planned and emergency medical and surgical admissions. As for the overnight inpatient analysis, data for the first and last two years are used for comparative purposes. Unless otherwise specified all figures are produced using the sameday patient daily file.

4.1 TOTAL IN-SCOPE SAMEDAY PATIENTS IN HOSPITALS

The analysis starts by comparing the number of sameday patients using hospital facilities in Melbourne's public hospitals over the full six-year period by week (the weeks are numbered 1 through 312). The weekly average sameday patients is calculated by averaging the number of sameday patients in the hospital for each of the seven days of the week.

Figure 11: Weekly average sameday patients, 1994/95 to 1999/00

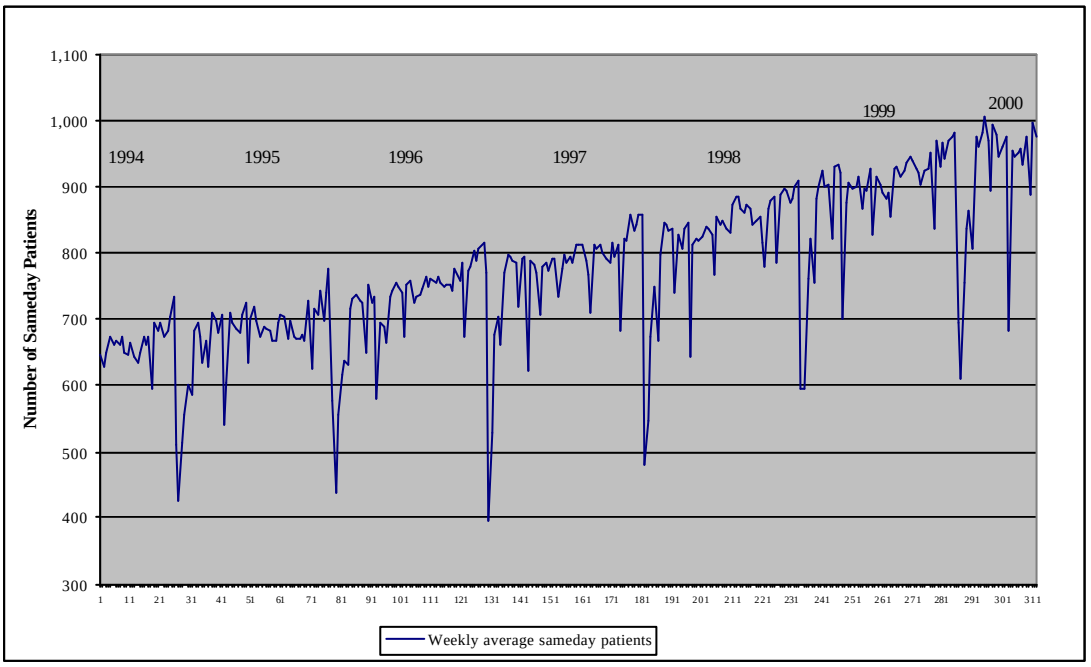
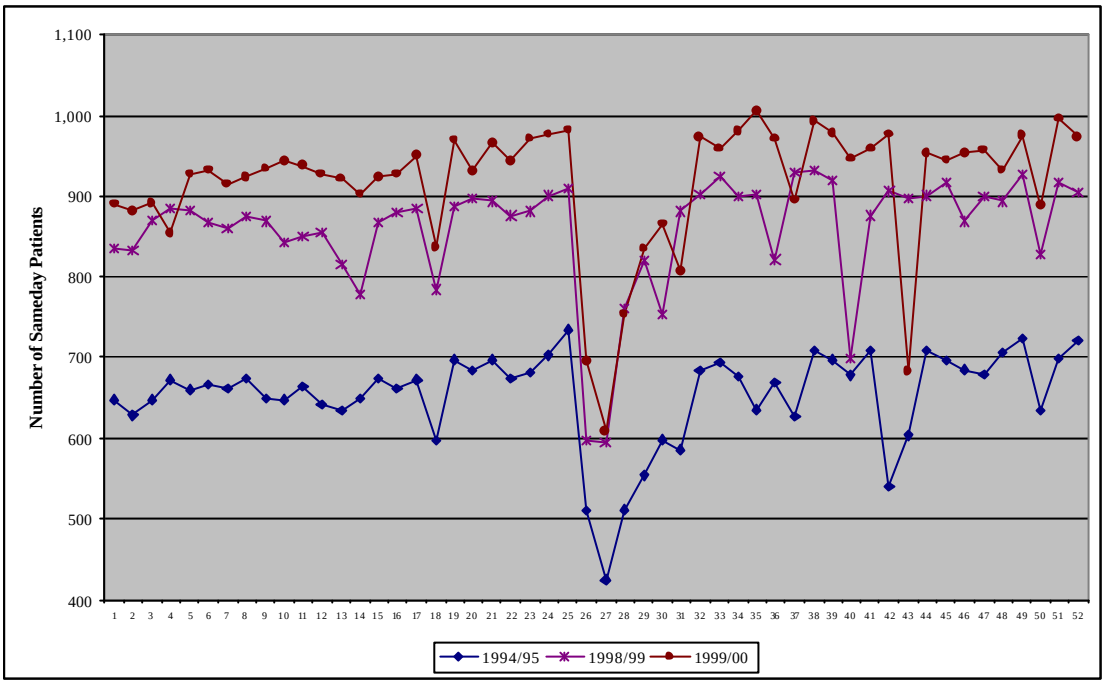


Figure 11 displays a very consistent pattern with the average number of sameday patients steadily increasing over the six-year period (in contrast to the overnight inpatient census, which steadily decreases over the period). Consistent with overnight inpatients, there are quite noticeable troughs in sameday patient activity levels in the Christmas and Easter holiday periods. Figure 12 highlights the

growth trend in sameday patients by comparing the weekly averages for 1994/95, 1998/99 and 1999/00.

Figure 12: Weekly average sameday patients, 1994/95, 1998/99 & 1999/00



Review of Figure 12 highlights the similar pattern over the full-year of the weekly average sameday patients. It also highlights the very considerable rise in sameday patient activity from an average of 653 patients in 1994/95 to an average of 915 patients in 1999/00. The difference of 262 patients represents a 40% increase in overall sameday patient activity levels. Figure 13 highlights the same difference, as well as the similarity of the seasonal pattern by taking the monthly average sameday patients per day.

Figure 13: Monthly average sameday patients, 1994/95, 1998/99 & 1999/00

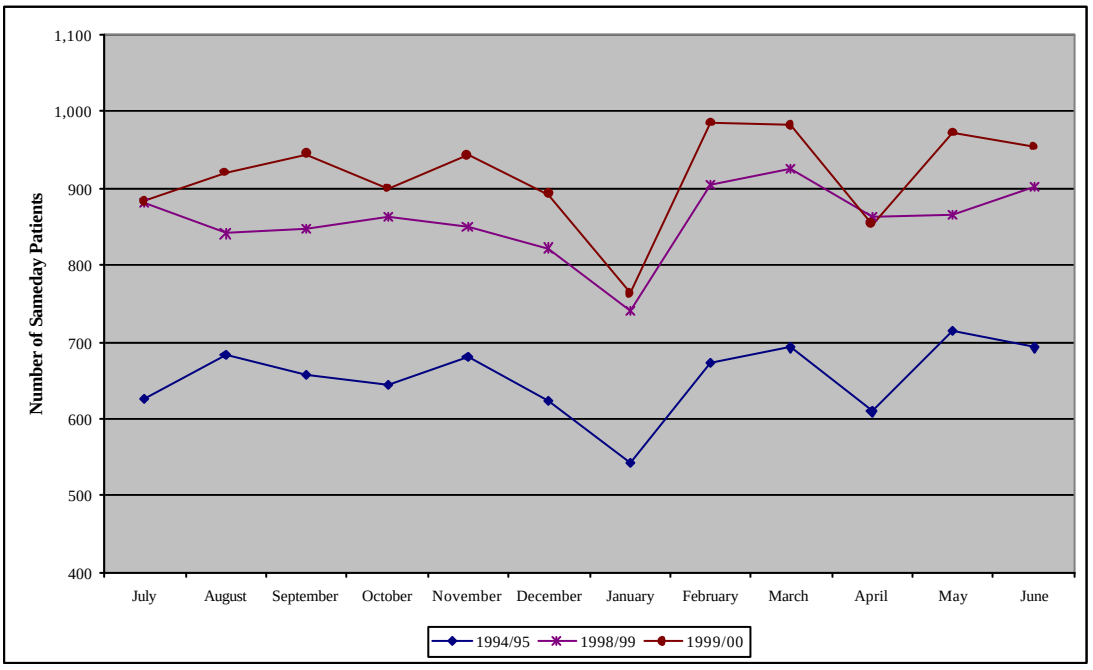
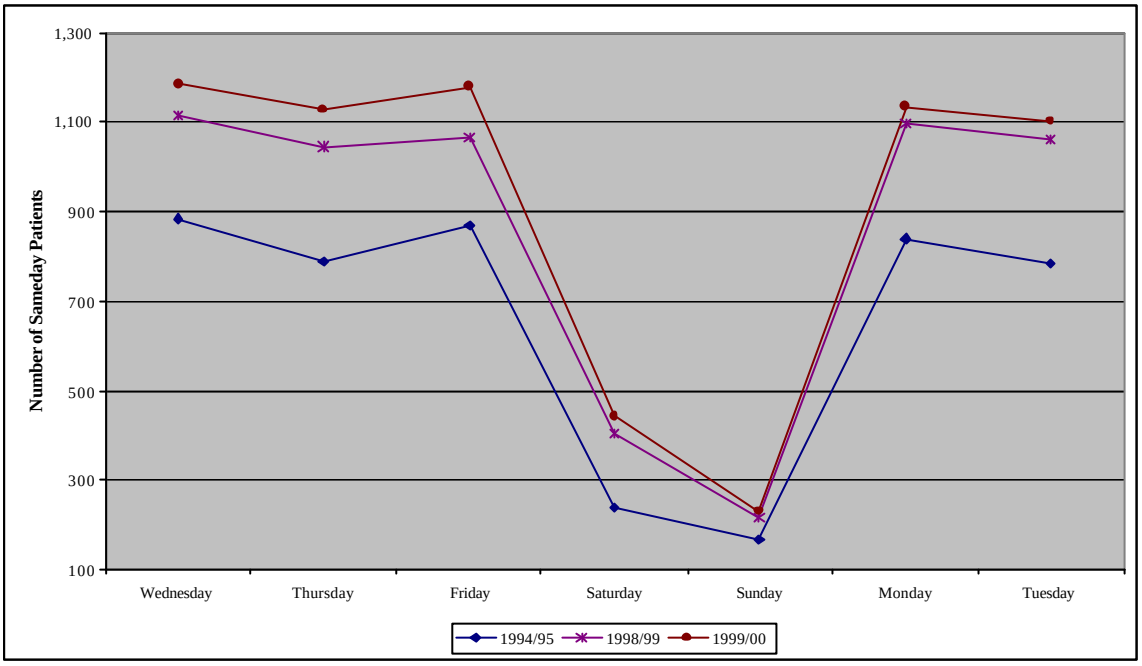


Figure 14 shows a remarkable similarity in the average number of sameday patients by day of the week across the six-year period. The number of sameday patients in hospital peaks on Wednesdays (as for overnight inpatients), with the trough being on a Sunday. Weekday patient levels are much higher than those on the weekend.

Figure 14: Average sameday patients by day of the week for 1994/95, 1998/99 & 1999/00



Review of Figure 14 suggests that there is significant scope, in terms of the existing hospital infrastructure to increase sameday patient throughput by spreading the workload over the full seven days of the week. Naturally, there are a number of issues to be considered if such a strategy were to be pursued, but the data make it clear that the required hospital facilities are available to service additional patients on weekends. Figure 14 shows that the sameday patient activity level in 1999/00 moves in a very wide range across the week from an average low of 230 on a Sunday to an average high of 1,187 on a Wednesday. The range of 957 sameday patients represents 105% of the average number of sameday patients treated each day (a wider range than the overnight inpatient census, see chapter three).

4.2 COMPARISON OF SAMEDAY & OVERNIGHT ADMISSIONS

Figure 15 presents the number of admissions over the six-year period for both sameday and overnight inpatients and the total admissions. It highlights the slow decline in the number of overnight admissions (by 5% over the six-year period) and the rapid increase in sameday admissions (by 40% over the six-year period). Taken together, the data demonstrate that the total number of inpatients admitted to Melbourne's hospitals has increased by 16%, from 1,385 admissions per day in 1994/95 to 1,612 admissions per day in 1999/00.

Figure 15: Average hospital admissions per day per month, 1994/95 to 1999/00

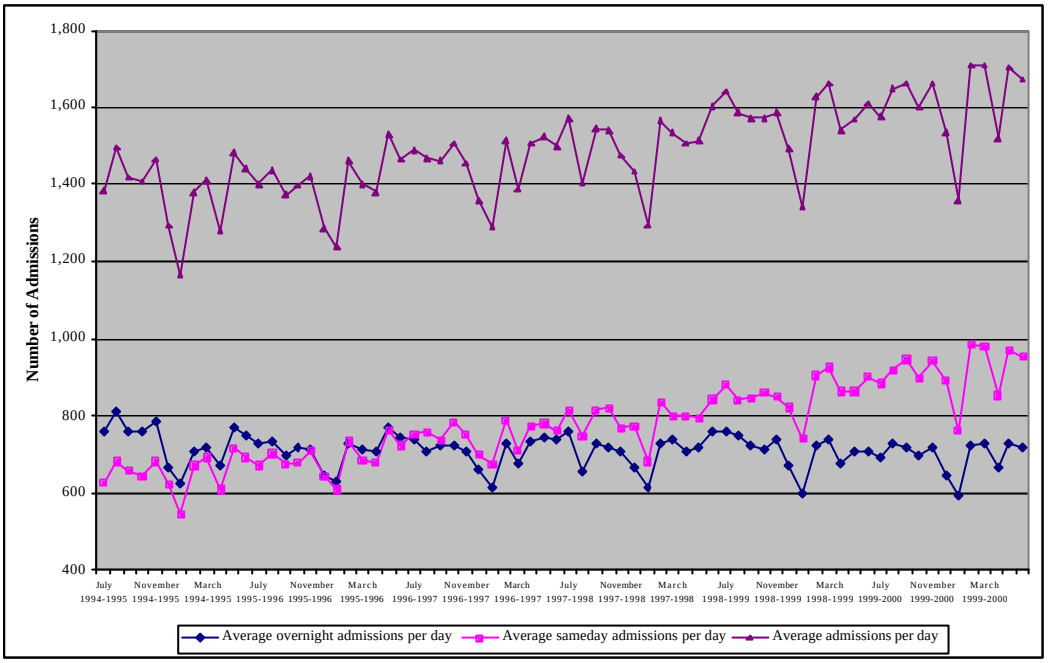


Figure 15 clearly highlights the changes in clinical practice that have resulted in a significantly greater number of inpatients being treated in Melbourne's hospitals in the six-year period. This increase is evident, notwithstanding the reduction in the overnight inpatients census levels (and consequently in the overall number of beds) that have occurred in the same period.

5

Analysis of admission type Overnight Inpatients

This chapter focuses on analysing the overnight inpatient data using the VAED variable admission type; in particular to differentiate emergency (defined as either Industrial (work) emergency, Road emergency, Other emergency admission) from planned (all other admission types excluding Maternity, which is out of scope). This variable is combined with the variable that distinguishes between surgical and medical cases (assigned by the DHS from the DRG) for some of the analyses. All analyses, unless otherwise specified, are on 1999/00 data.

5.1 PLANNED VS EMERGENCY CASES

The analysis commences by examining the weekly average overnight inpatient census by admission type. Figure 16 shows that of the in-scope overnight inpatients, emergency patients constitute a greater proportion of hospital workload than planned patients. The 1999/00 average of the overnight inpatient census was 3,842, of which 2,397 (62%) were emergency cases and 1,445 (38%) were planned cases. The 1999/00 ratio of 62:38 (emergency to planned) compares to the 1998/99 ratio of 60:40, thereby suggesting a that a greater proportion of hospital workload is being generated by emergency cases.

Figure 16: Weekly average overnight inpatient census by admission type, 1999/00

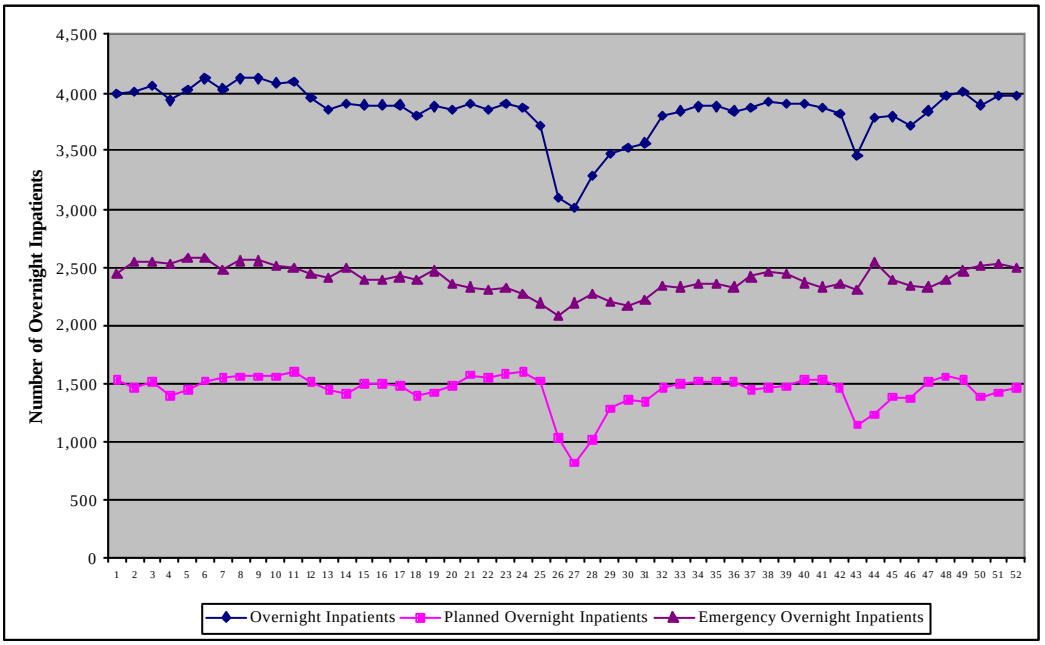


Figure 16 also shows that, as expected, the variability of the emergency workload is less than that of the elective workload. The maximum number of emergency inpatients in Melbourne's hospitals of

2,586 occurred in week 6 with the minimum of 2,074 occurring in week 26. The range for emergency inpatients is therefore 512 (21% of the average for emergency inpatients). For planned (in-scope) inpatients the maximum of 1,605 occurred in week 24 and the minimum of 819 occurred in week 27, representing a range of 786 inpatients or 54% of the average for planned inpatients.

Figure 17: Weekly average admissions per day by admission type, 1999/00

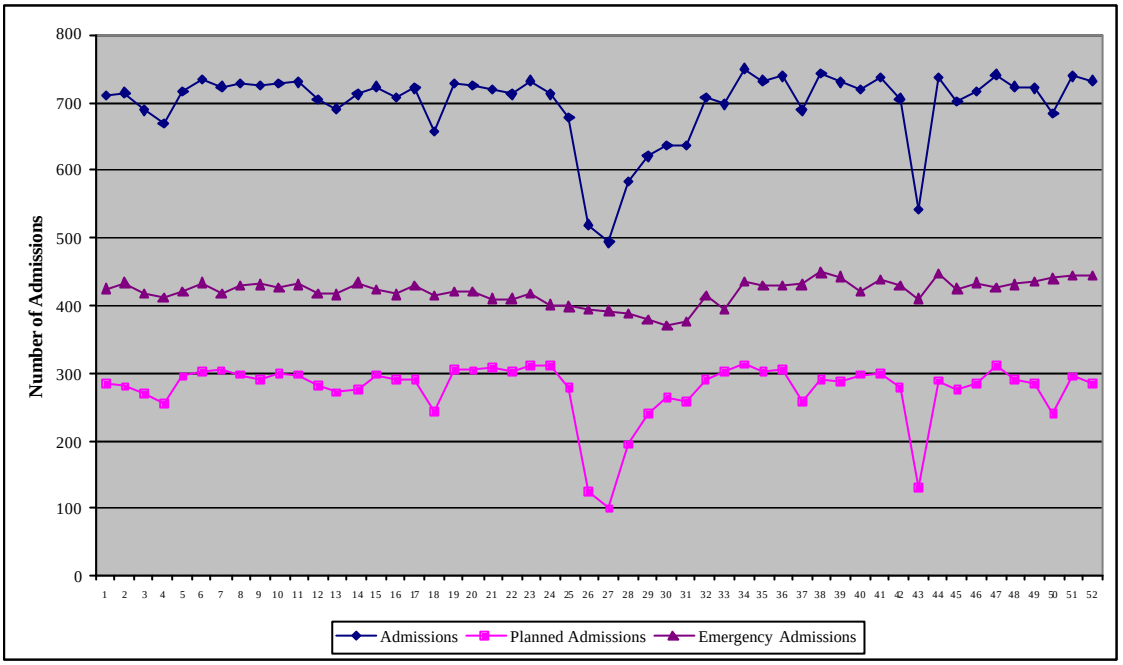


Figure 17 presents the pattern for (in-scope) admissions per day. The data highlight the variability of the planned admissions and their response to holiday periods. Aside from the usual troughs (Christmas, Easter), the trough in week 18 reflects the Melbourne cup holiday, week 31 the Australia day holiday, week 37 the labour day holiday, week 43 the nursing dispute and week 50 the Queen's Birthday holiday. Figure 18 presents the equivalent data for (in-scope) separations.

Figure 18: Weekly average separations per day by admission type, 1999/00

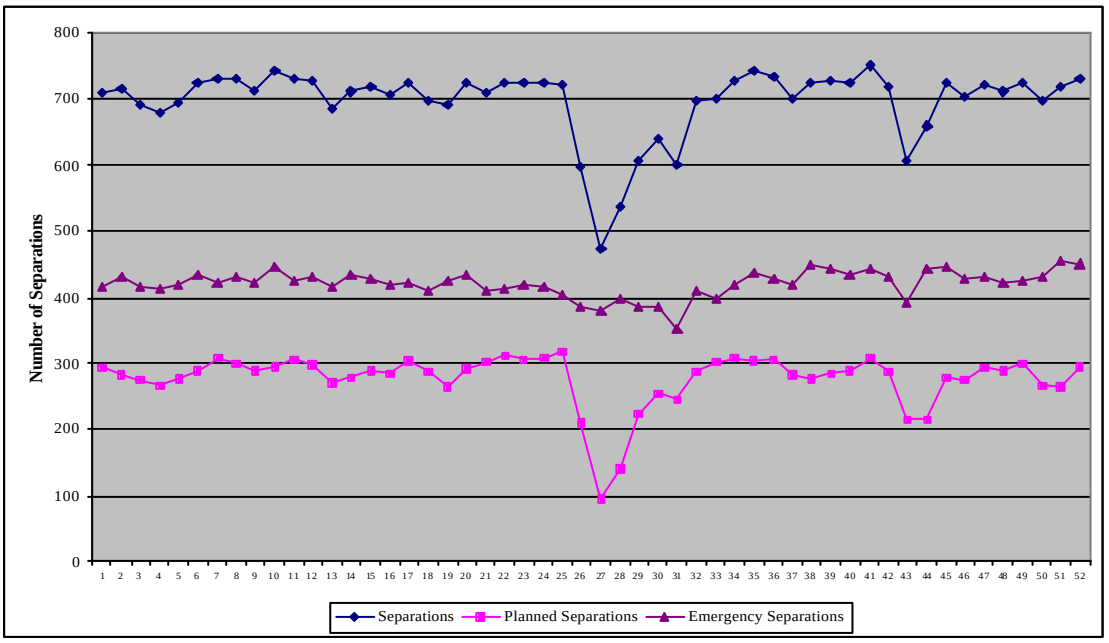
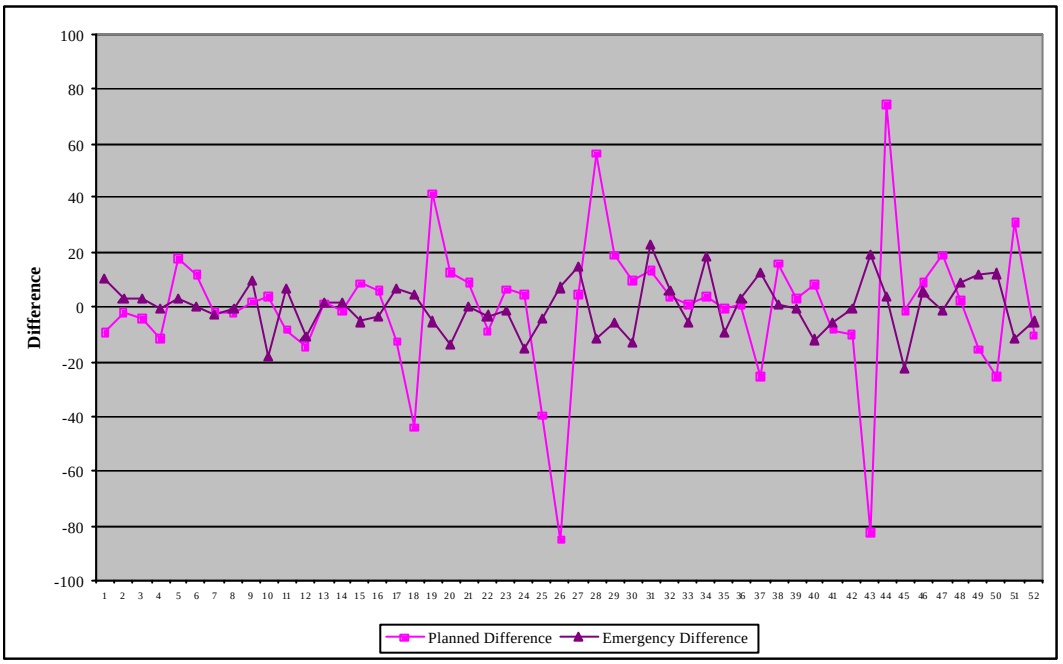


Figure 19 highlights the different nature of planned and emergency admissions and separations, by calculating the weekly average difference between the two. It is clear, as expected, that there is much more variability in the planned workload, than the emergency workload. The difference between planned admissions and separations oscillates from a maximum of 74 in week 44 to a minimum of -85 in week 26, a range of 159 cases. The difference for emergency admissions oscillates in a much smaller range from a maximum of 22 in week 31 to a minimum of -22 in week 45, a range of 44 cases.

Figure 19: Weekly average difference between admissions & separations by admission type, 1999/00



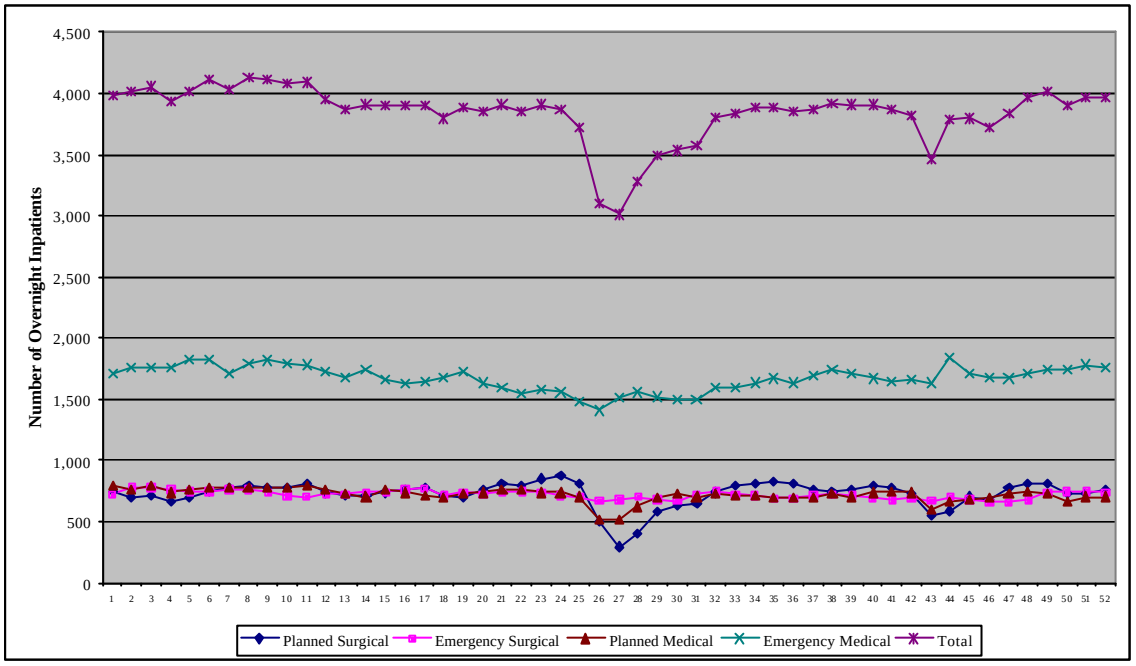
5.2 DIFFERENTIATING BETWEEN MEDICAL & SURGICAL CASES

The next set of analysis introduces the concept of medical and surgical cases as defined by the AN-DRG into which each case is grouped. The variable constructed by combining admission type and the medical/surgical flag as case type is referred to as "case type". The variable case type therefore has four values: "Planned Medical", "Planned Surgical", "Emergency Medical", and "Emergency Surgical", which are used in the analyses below.

Figure 20 illustrates the distribution of the in-scope overnight inpatient census by case type. It is clear that emergency medical overnight inpatients are the largest proportion of hospital workload. The figure shows that on any given day, there are between 1,845 (maximum in week 44) and 1,404 (minimum in week 26) emergency medical inpatients in hospitals. This is a fairly narrow range of 441 cases (only 26% of the mean number of emergency cases per day across the year), with the winter months (average 1,744) being clearly higher than the summer months (average 1,548). By way of contrast, the planned surgical overnight inpatients in hospitals range from a maximum of 872 in week 24 to a minimum of 295 in week 27. This range of 577 cases represents 79% (compared to 26% for emergency medical cases) of the mean number of planned surgical patients in hospitals, thereby highlighting the lower variability on the emergency medical workload.

It is worth contrasting these ranges with the equivalent data for 1998/99 where the range in emergency cases was 29% of the mean and the range of planned cases was 68% of the mean. The narrower range for emergency cases and the wider range for planned cases in 1999/00 suggests that hospitals have to become even more flexible in scheduling the planned workload to accommodate the increase in emergency cases (as a proportion of total cases).

Figure 20: Weekly average overnight inpatient census by case type, 1999/00



The total number of in-scope overnight inpatients in hospital for every day of the year (effectively the bed-days) is divided by the number of in-scope patients for each case type to provide a measure of hospital workload. Figure 21 shows that 43.6% of the in-scope overnight inpatients in 1999/00 (up from 42.1% in 1998/99) were in hospital because of an emergency medical admission. Planned surgical admissions represent the next highest proportion with 18.9% (down from 19.6% in 1998/99) ahead of emergency surgical at 18.8%. In aggregate, 62.4% of the hospital workload (bed-days) is generated by emergency admissions (up from 60.4% in 1998/99). The other interesting aggregate is that medical overnight inpatients represent 62.3% of the in-scope hospital workload with surgical overnight inpatients representing 37.7%.

Figure 21: Proportion of overnight inpatients by case type, 1999/00

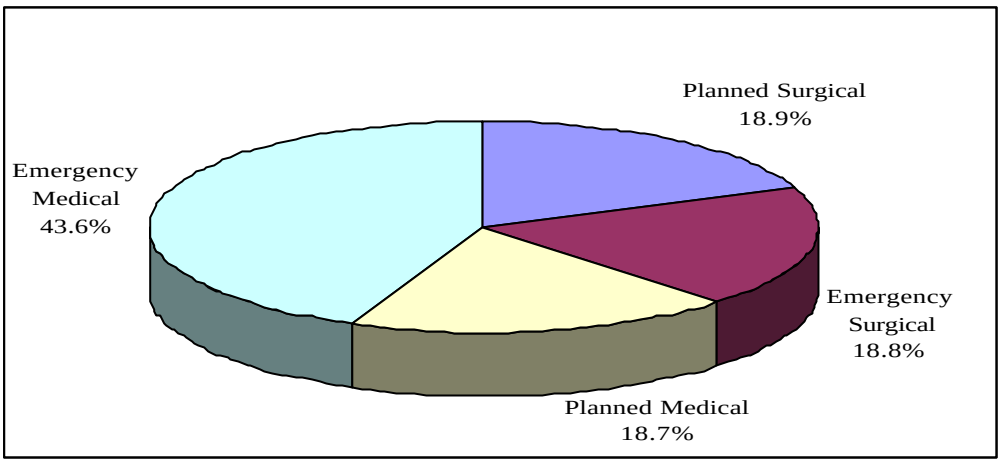


Figure 22 examines the workload in term of admissions. Review of Figure 22 shows that while emergency medical admissions account for 43.6% of all patients in hospital on a given day, they represent 49.3% of all admissions (up from 46.9% in 1998/99). The proportion of emergency surgical cases falls from 18.8% of inpatients in hospital to 11.0% of all admissions. These changes are because emergency medical cases have shorter than average length of stay while emergency surgical cases have longer than average length of stay. Overall, emergency cases represent 60.3% (up from 58.1% in 1998/99) of all admissions (compared with 62.4% of in-scope workload).

Figure 22: Proportion of admissions by case type, 1999/00

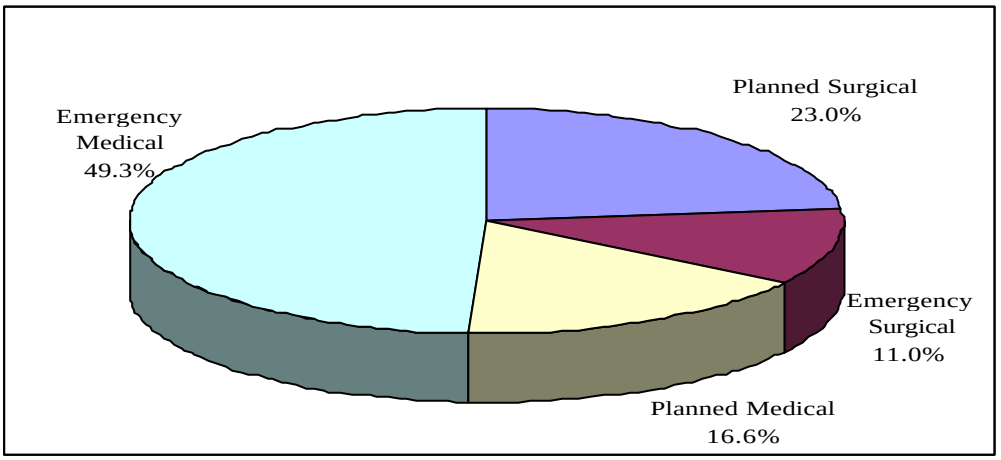
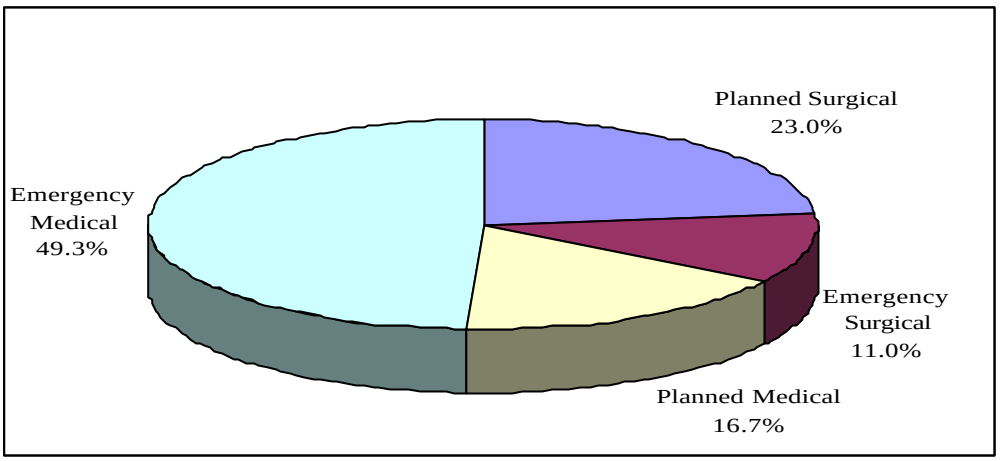


Figure 23 examines the same data for (in-scope) separations, highlighting, as expected, similar proportions. The minor difference between admissions and separations arises because not all inpatients that are admitted in 1999/00 are also separated in 1999/00.

Figure 23: Proportion of separations by case type, 1999/00



5.3 CHANGES IN THE WORKLOAD PATTERNS BY CASE TYPE

A relevant question is whether there have been significant changes in the mix of the in-scope inpatient workload over the six-year study period according to case type. Figure 24 shows that there has been an increase in the proportion of the workload accounted for by emergency medical inpatients from 41.9% in 1994/95 to 43.6% in 1999/00. The total workload from emergency inpatients has increased from 59.0% to 62.4% in the same period. These increases are evident even though there was a significant decline (59.0% to 56.6%) in the proportion of the workload generated by emergency inpatients from 1994/95 to 1995/96. Since the low point of 1995/96, there has been a steady increase in the proportion of the workload generated by emergency inpatients, with a rise of 2% in each of the last two years.

Corresponding to the increase in the in-scope overnight inpatient workload from emergency patients, there has been a reduction in planned surgical patients from 21.4% to 18.9% of the cases. Overall, planned patients account for 37.6% of the in-scope patient workload in 1999/00, down from 41.0% in 1994/95. Continuation of trend towards an increasing proportion of hospital workload being generated by emergency medical inpatients would make it even more difficult for hospitals to admit planned surgical inpatients.

Figure 24: Proportion of overnight inpatients by case type, 1994/95 to 1999/00

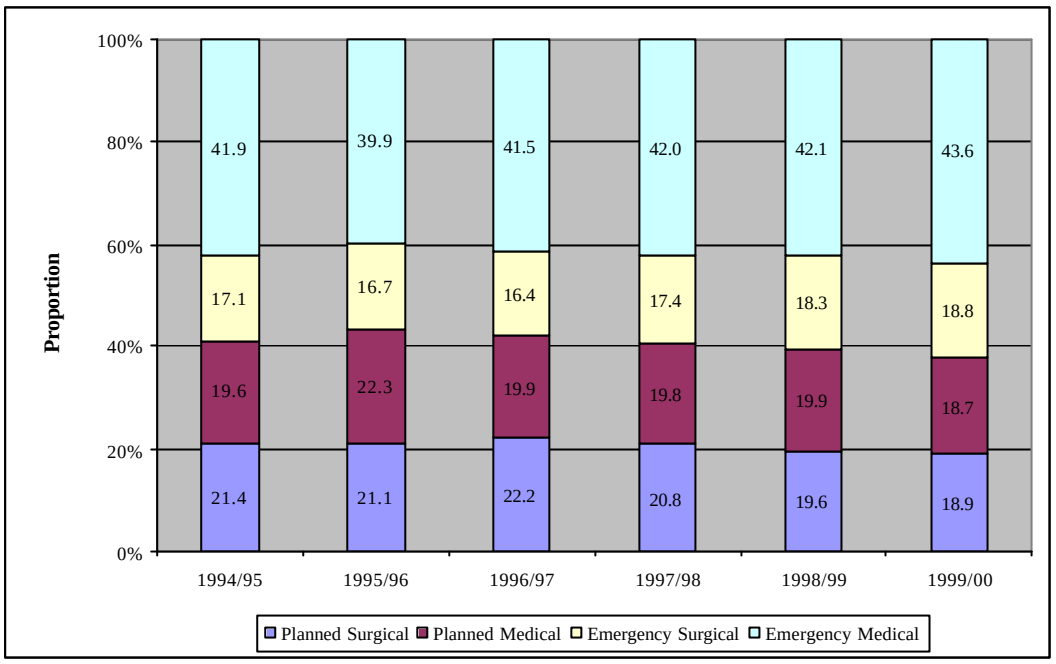
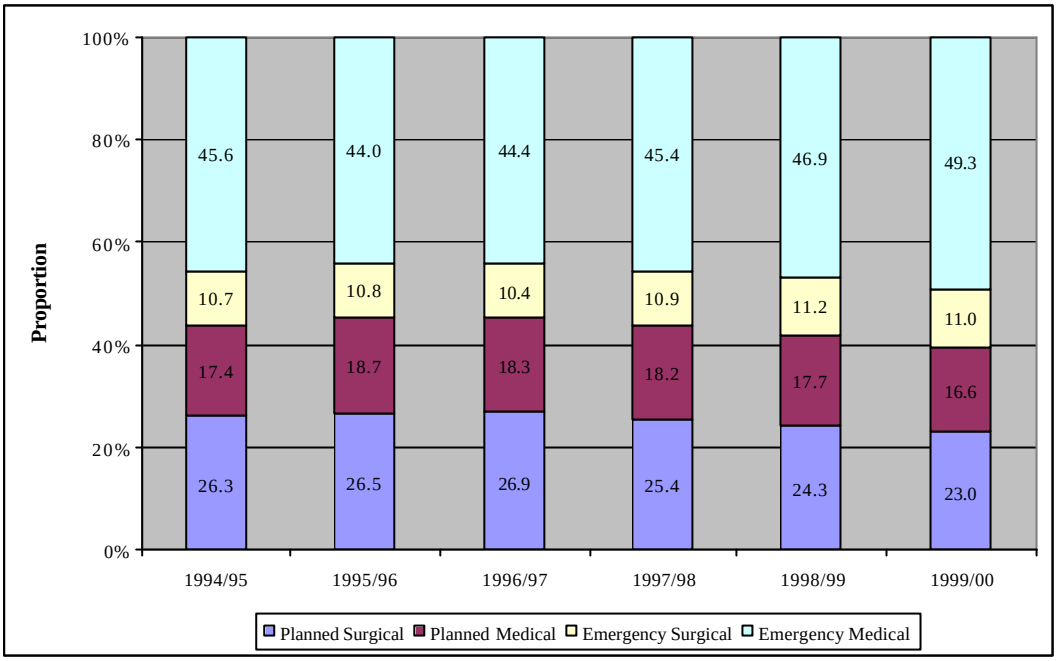


Figure 25 examines the trends of in-scope admissions by case type over the six-year study period. It shows that emergency admissions represent 60.3% of all admissions in 1999/00, up from 56.3% in 1994/95. Planned surgical patients are down from 26.3% of all admissions in 1994/95 to 23.0% of all admissions in 1999/00.

Figure 25: Proportion admissions by case type, 1994/95 to 1999/00

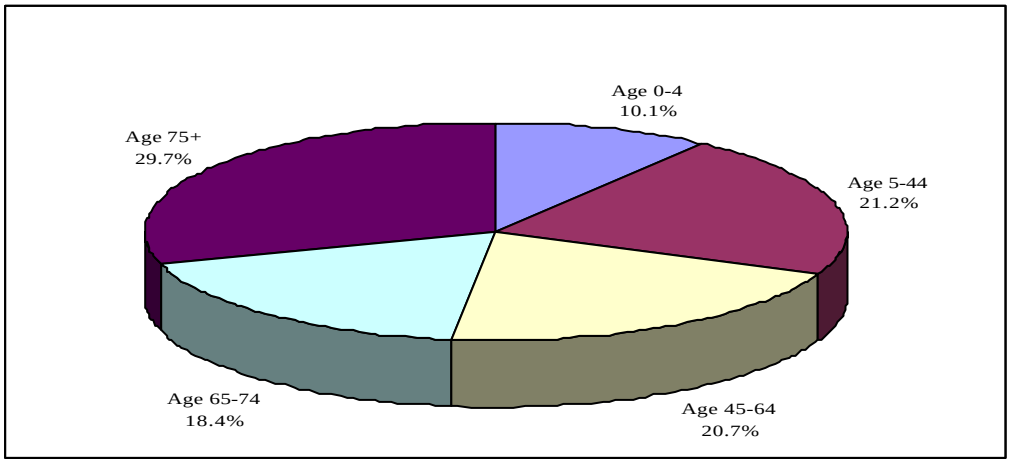


Overall, this analysis demonstrates that there has been some movement in the proportion of the overnight inpatient workload (bed-days) represented by the case types. The most significant change is the exchange of emergency inpatients (up from 59.0% to 62.4% of workload) with surgical inpatients (down from 41% to 37.6% of the workload) in the six year period. Of this change the most significant increase is for emergency medical inpatients (up from 41.9% to 43.6%) with the most significant decrease being for planned surgical inpatients (down from 21.4% to 18.9%).

5.4 IN-SCOPE OVERNIGHT INPATIENTS BY AGE AND CASE TYPE

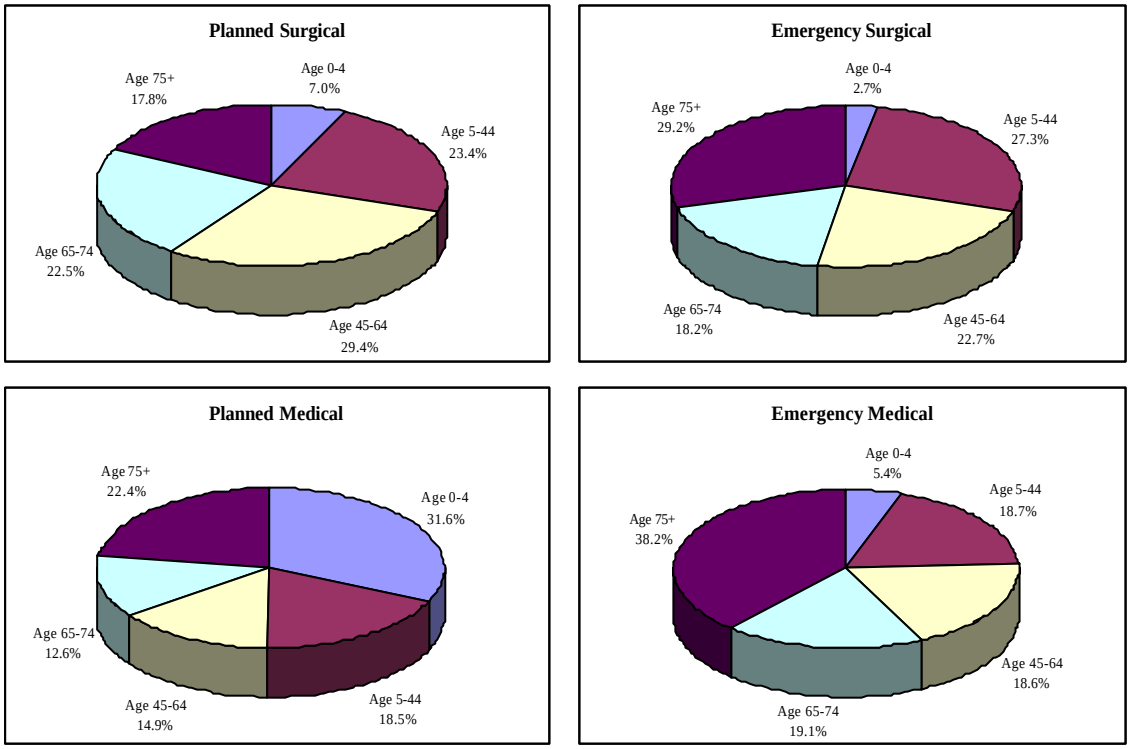
The next area for analysis is the distribution of overnight inpatients by age and case type. Figure 26 shows that overall, in-scope overnight inpatients aged 75 years and over represent the largest proportion (29.7%) of hospital workload (bed-days). In fact, (in-scope) inpatients aged 65 years and over account for 48.1% of hospital workload.

Figure 26: Proportion of overnight inpatients by age range, 1999/00



Figures 27 shows that when the age data are broken into the four case types, patients aged 75 years and over represent 38.2% and patients aged 65 years and represent 57.3% of the workload generated by emergency medical cases. Figure 27 also shows that the workload is more evenly distributed across the age groups for planned surgical inpatients, where the highest proportion (29.4%) is accounted for by inpatients aged 45-64 years.

Figure 27: Proportion of overnight inpatients by case type by age range, 1999/00



Given the relative importance of the 75 years and over age group, Figure 28 shows the weekly average number of inpatients per day for 1999/00. As expected, emergency medical inpatients account for the highest proportion of (in-scope) inpatients. In the winter months, there are around 673 inpatients aged 75 years or more in hospital on any given day due to an emergency medical condition. The actual figure varies from a high of 759 inpatients in week 5 to a low of 521 inpatients in week 25. The range of 238 inpatients represents 37% of the average compared with a range of 271 in 1998/99, which represented 43% of the average for that year. This finding is consistent with the other data, which suggest that emergency inpatients had a greater impact on hospital workload in 1999/00 than 1998/99.

Figure 28: Weekly average overnight inpatient census for patients aged 75+ by case type, 1999/00

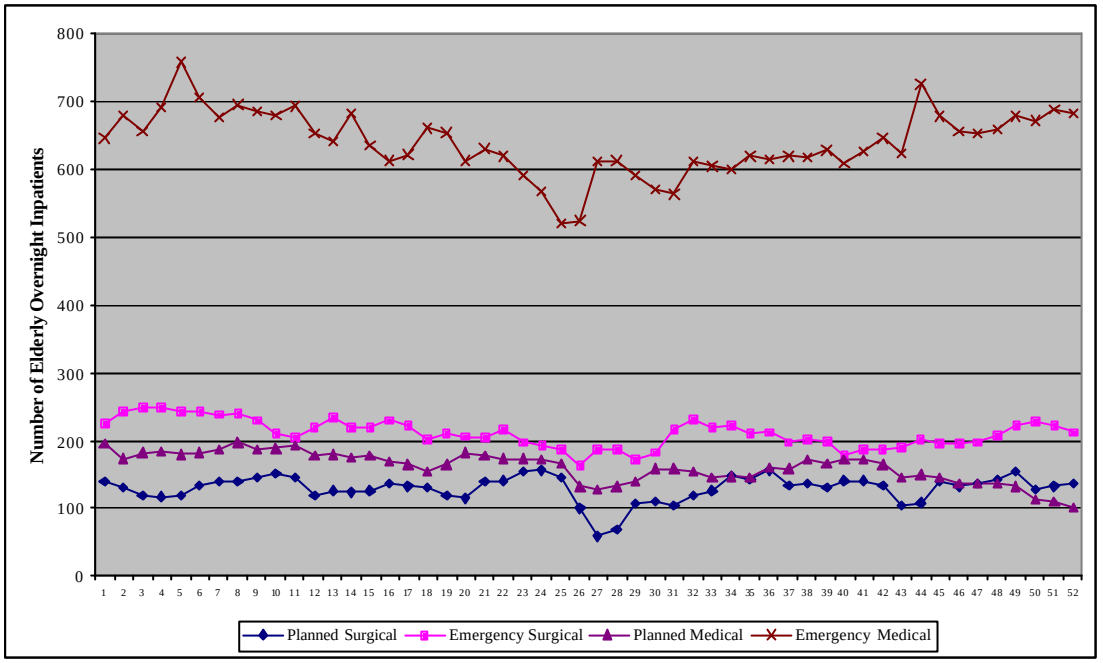


Figure 28 shows that, consistent with the other analyses, the planned surgical line shows the most variation for the 75+ inpatient group, moving from a high of 157 inpatients in week 24 to a low of 59 inpatients in week 27, a range of 98 inpatients representing 76% of the mean.

6

Analysis of admission type Sameday Patients

This chapter focuses on analysing the sameday patient data using the VAED variable admission type. As with the previous chapter, admission type is combined with the variable that distinguishes between surgical and medical cases (assigned by the DHS from the DRG) for some of the analyses. All analyses, unless otherwise specified, are on 1999/00 data.

6.1 PLANNED VS EMERGENCY SAMEDAY CASES

The analysis starts by examining the weekly average number of sameday patients by admission type. Figure 29 shows that of the total sameday patients, planned patients constitute a greater proportion of hospital workload than emergency patients. In 1999/00 the weekly average of the number of sameday patients admitted each day was 915, of which an average of 743 (81%) were planned and 172 (19%) were emergency.

Figure 29: Weekly average sameday patients by admission type, 1999/00

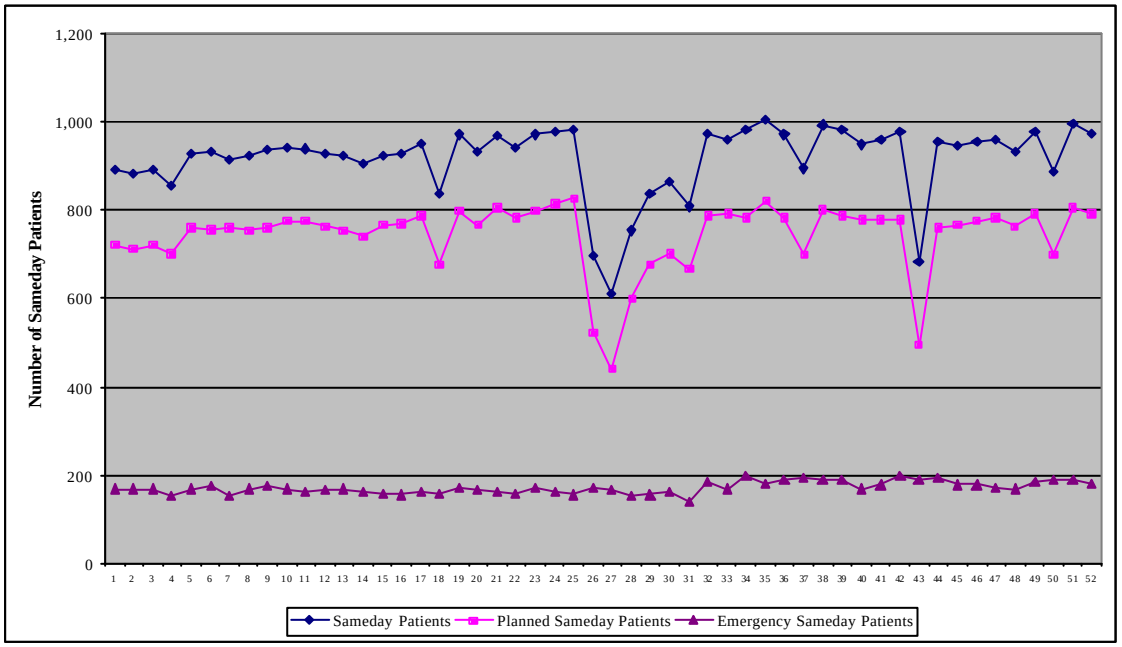


Figure 29 also shows that, as expected, the variability of the planned workload is much greater than that of the emergency workload. The maximum number of planned sameday patients in Melbourne's hospitals of 827 occurred in week 25 with the minimum of 442 occurring in week 27. The range for planned sameday patients is therefore 385 (52% of the average for planned sameday patients). For emergency sameday patients the maximum of 199 occurred in week 34 and the minimum of 141 occurred in week 31, representing a range of 58 patients (34% of the average).

As expected, Figure 29 demonstrates that all of the holiday period troughs in activity levels are as evident as they are when examining the overnight inpatient census. It also highlights the fact that the discretion that hospitals have is in relation to deciding when to admit planned sameday patients is not evident with respect to emergency sameday patients.

6.2 DIFFERENTIATING BETWEEN MEDICAL & SURGICAL SAMEDAY CASES

This section uses the variable case type as defined for the overnight inpatient analysis. Figure 30 illustrates the distribution of sameday patients by case type. It is clear that planned medical sameday patients are the largest proportion of hospitals' sameday patient workload. Figure 30 shows that on any given day, there are between 634 (maximum in week 25) and 417 (minimum in week 27) planned medical sameday patients in hospitals. These data represent a range of 217 cases (37% of the mean number of planned medical sameday cases per day across the year). By way of contrast, planned surgical sameday patients in hospitals range from a maximum of 199 per day in week 35 to a minimum of 25 per day in week 27. These data represent a range of 174 cases per day (or 107% of average) of the mean number of planned surgical sameday patients in hospitals (compared to a range of 37% of the average for planned medical cases). This analysis highlights the relatively high variability of the planned surgical workload compared to the planned medical workload for sameday patients.

Figure 30: Weekly average sameday patients by case type, 1999/00

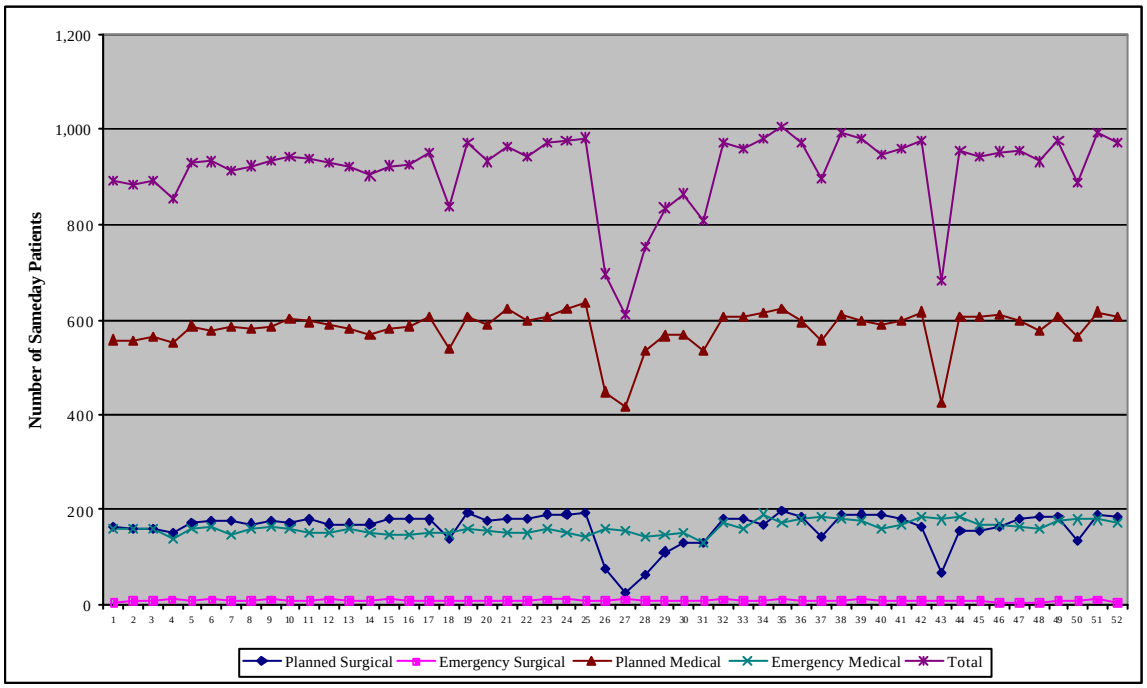
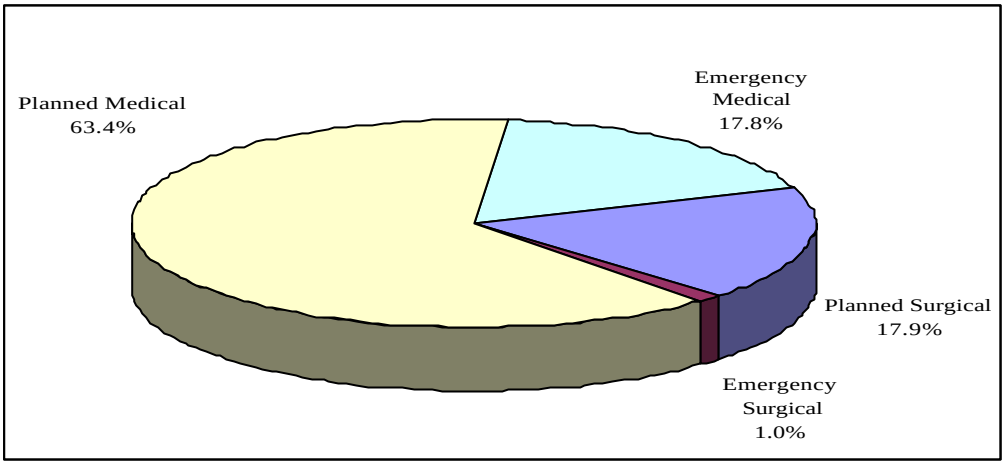


Figure 31 measures the hospital's sameday patient workload and shows that, 63.4% of the in-scope sameday patients in 1999/00 were planned medical cases. Planned surgical sameday patients represent the next highest proportion with 17.9% ahead of emergency medical at 17.8%. In aggregate, 81.3% of the hospitals' sameday patient workload is generated by planned patients. The

other interesting aggregate is that medical patients represent 81.2% of the in-scope hospital workload with surgical patients representing 18.9%.

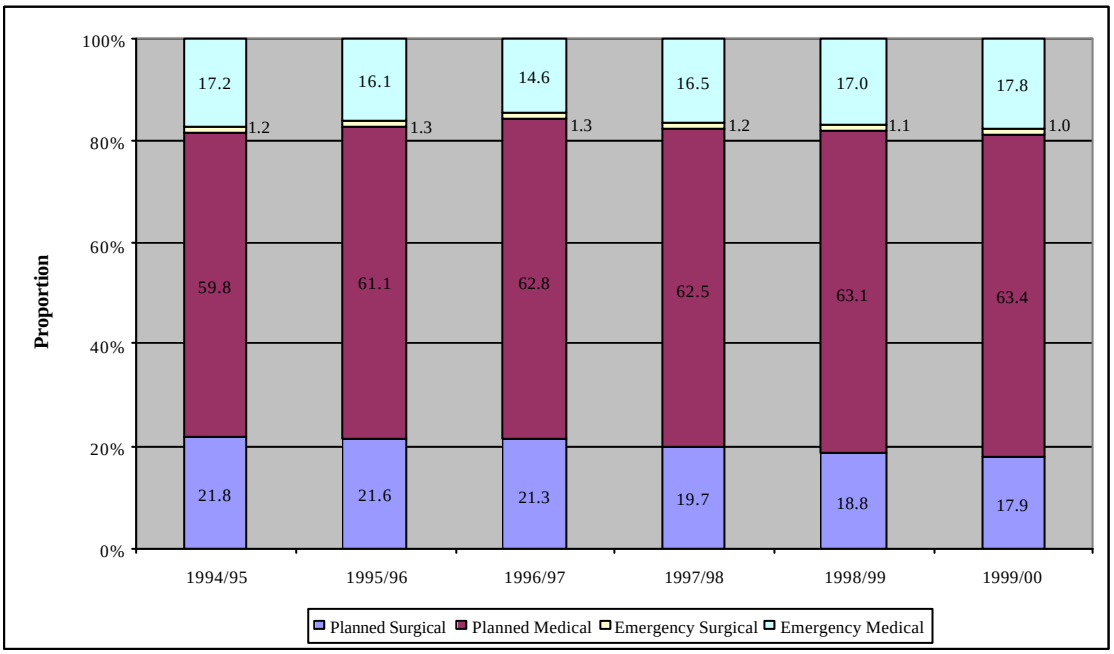
Figure 31: Proportion of sameday patients by case type, 1999/00



6.3 CHANGES IN THE WORKLOAD PATTERNS BY CASE TYPE

As with the overnight inpatients, it is useful to compare the workload by case type over the six-year period. Figure 32 shows that there has been an increase in the proportion of the sameday workload accounted for by planned medical patients from 59.8% in 1994/95 to 63.4% in 1999/00. The total sameday workload from emergency inpatients has increased from 18.4% to 18.8% in the same period. This increase is relatively small, although it is worth noting that there was a significant decline (18.4% to 15.9%) in the proportion of the sameday workload generated by emergency patients from 1994/95 to 1996/97 and then an increase back to 18.8% in 1999/00. It is worth noting that there was a similar decline for overnight inpatients in the same years. Reasons for these declines are not evident from the data, but it may prove to be a useful area for further investigation.

Figure 32: Proportion of sameday patients by case type, 1994/95 to 1999/00



Overall, this analysis demonstrates that there has been some movement in the proportion of the sameday patient workload by case type. The increase in the proportion of planned medical sameday

patients from 59.8% to 63.4% has been offset by a decrease in the proportion of planned surgical patients from 21.8% to 17.9% over the six-year period.

6.3 SAMEDAY PATIENTS BY MAJOR CLINICAL CATEGORY

The data clearly show that the largest portion of the sameday patient workload is accounted for by planned medical patients. This sameday patient group is dominated by renal dialysis and chemotherapy patients undergoing repeat admission for planned treatment. Figure 33 breaks down the 63.4% of sameday patient workload represented by planned medical patients into renal dialysis, chemotherapy and other planned medical.

Figure 33: Proportion of sameday patients by case type, including chemotherapy and renal dialysis, 1999/00

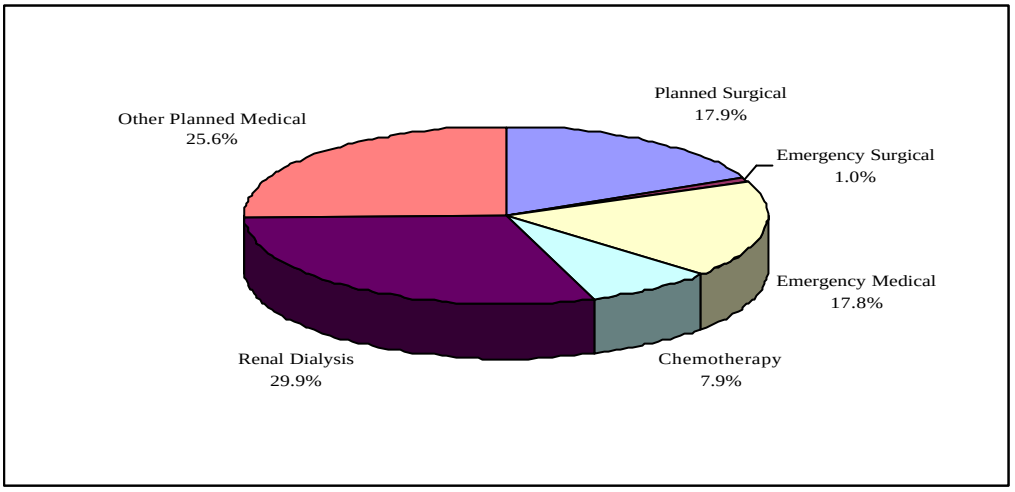


Figure 33 shows that the renal dialysis and chemotherapy DRGs account for 37.8% of the entire 1999/00 sameday workload. Renal dialysis cases alone represent 29.9% of all sameday patients (and 47.2% of all planned sameday medical patients). For this reason, subsequent analyses of sameday patients by case type consider renal dialysis and chemotherapy as separate categories.

6.4 SAMEDAY PATIENTS BY AGE AND CASE TYPE

The next area for analysis is the distribution of sameday patients by age. Figure 34 shows that overall, sameday patients aged 5-44 represent the largest proportion (34%) of hospital workload. In fact, sameday patients aged 5-64 account for 63.8% of the hospital's workload in contrast to the overnight inpatients where patients aged 65 or more represent 48.1% of hospital workload.

Figure 34: Proportion of sameday patients by age, 1999/00

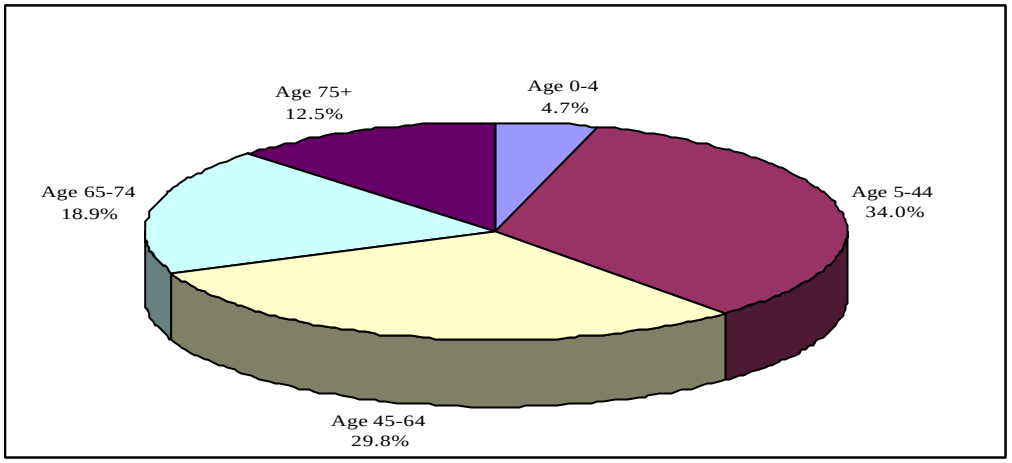
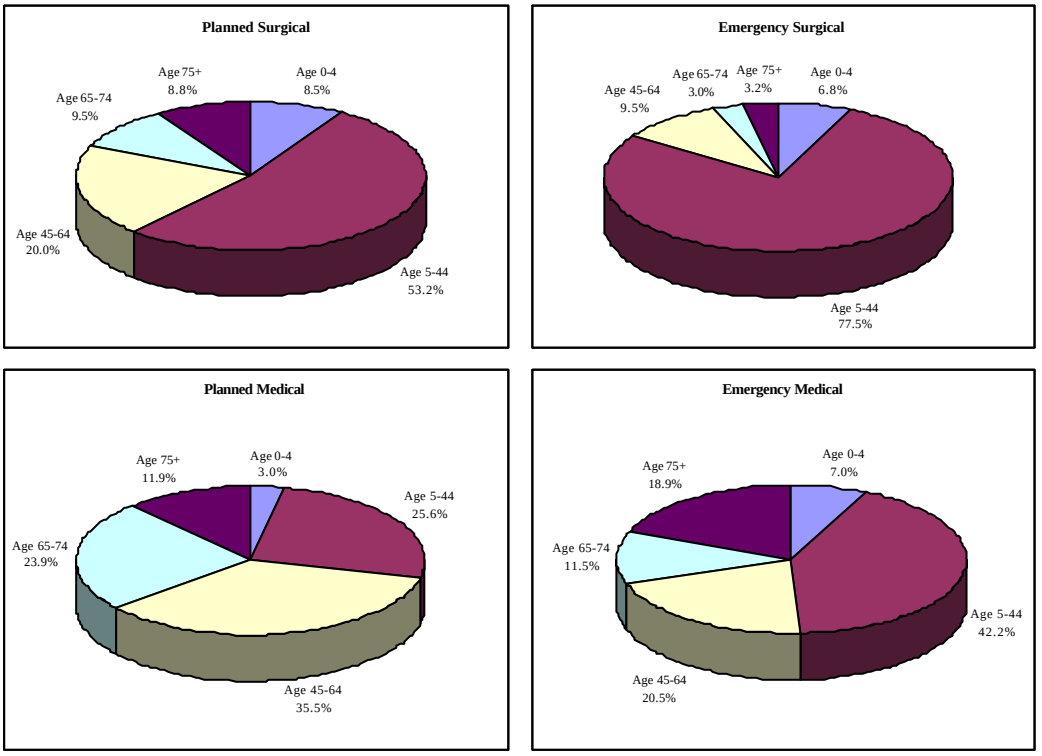


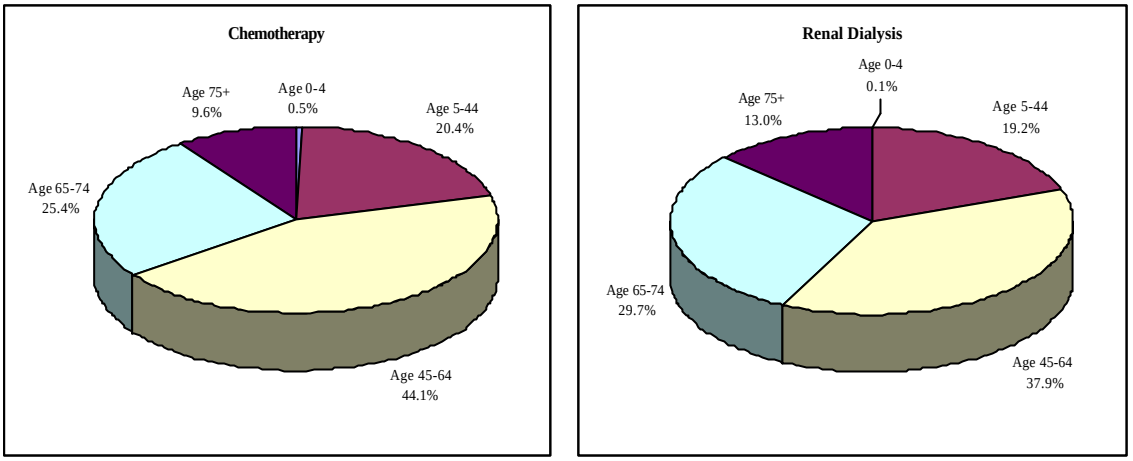
Figure 35 shows that when the age data are broken down by case type, patients aged 45-64 represent 35.5% of the sameday workload generated by planned medical cases. Patients aged 65 years and over account for 57.3% of the workload generated by emergency medical cases.

Figure 35: Proportion of sameday patients by case type by age, 1999/00



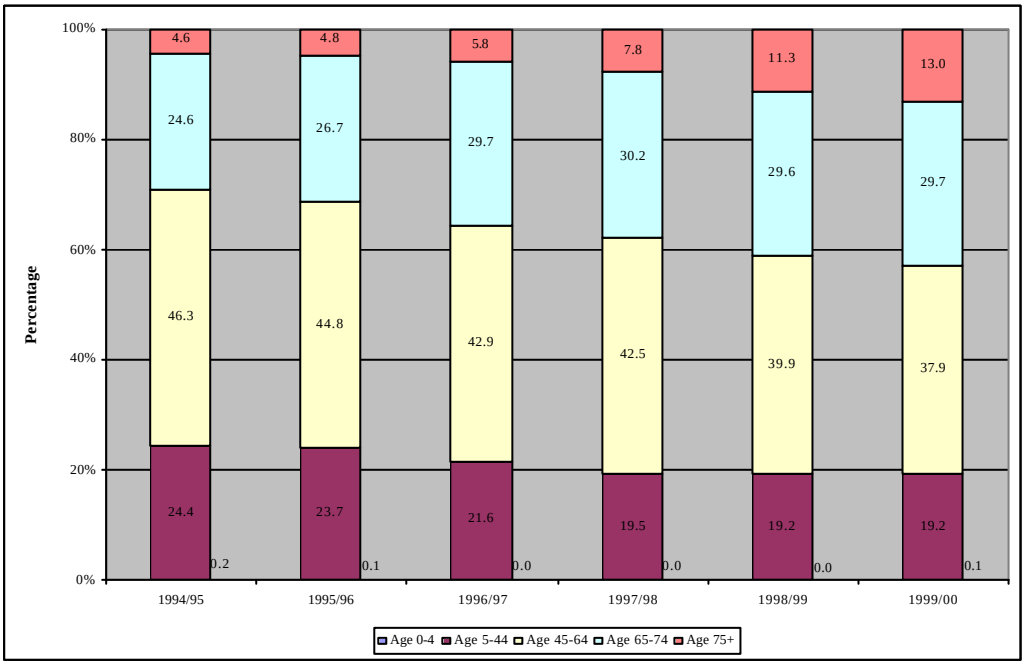
Consistent with the previous analysis, Figure 36 shows the age distribution for planned medical sameday patients undergoing chemotherapy or renal dialysis. For both datasets the 45-64 age group has the largest proportion with chemotherapy having 44.1% of patients and renal dialysis with 37.9%.

Figure 36: Proportion of sameday patients for chemotherapy and renal dialysis by age, 1999/00



As renal dialysis represents the largest proportion of sameday cases, the trend in the proportion of cases by age has been examined over the six-year period. Overall the average number of sameday dialysis cases per day has increased from 146 in 1994/95 to 275 in 1999/00 (an 88% increase). Figure 37 illustrates the ageing of the sameday dialysis population with the proportion of sameday admissions for patients aged 75 and over rising from 4.6% in 1994/95 to 13% in 1999/00. In the same period the proportion of dialysis admission accounted for by patients 65 and over has risen from 29.2% to 42.7%. This trend suggests that dialysis patients will become an increasingly larger component of the sameday patient workload (in terms of number of patients).

Figure 37: Proportion of sameday renal dialysis patients, 1994/95 to 1999/00



7

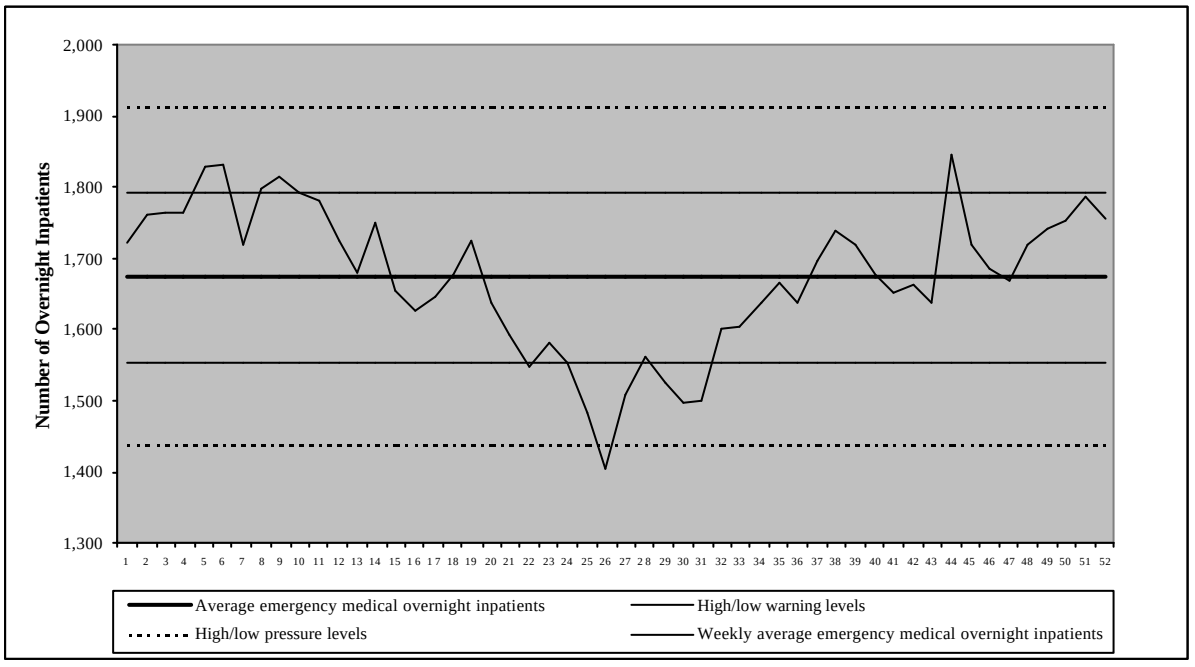
Emergency Medical Episodes Overnight Inpatients

This chapter analyses in-scope emergency medical overnight inpatients. This focus arises from the fact that emergency medical patients are the largest volume overnight inpatient group, and that hospitals have considerable control over the admissions of planned patients. Consistent with other parts of this report, the MCHPE definitions of high-pressure level, which is when the overnight inpatient census rises two standard deviations above the mean, has been used. The warning level is defined as the overnight inpatient census being one standard deviation above the mean.

7.1 IN-SCOPE EMERGENCY MEDICAL OVERNIGHT INPATIENTS OVERALL

Figure 38 presents the overnight inpatient census for emergency medical patients with the high-pressure and warning levels marked. It shows that the overnight inpatient census did not exceed the high-pressure level in 1999/00. In fact, the emergency medical patients census only went above the high warning level three times in the year for a total of five weeks.

Figure 38: Weekly average emergency medical overnight inpatient census, 1999/00



To understand whether there has been any change in the seasonal variations over time, an index number for the overnight inpatient census was calculated. The index was calculated by dividing the weekly average emergency medical census by the annual average census level. This process eliminates the effect of the different census levels over the six-year period (the 1994/95 average was 1,942 patients, while the 1999/00 average was 1,674 patients).

Figure 39 presents the data for 1994/95, 1998/99 and 1999/00. It clearly shows that there is considerable similarity in the census of emergency medical overnight inpatients. The census for the winter months (average 1,744 in 1999/00) is much higher than for the summer months (average 1,548 in 1999/00). Figure 39 shows that the highest pressure point in the most recent year was in April/May 2000, when the census level reached 10% above the mean.

Figure 39: Index of weekly average emergency medical overnight inpatient census, 1994/95, 1998/99 & 1999/00

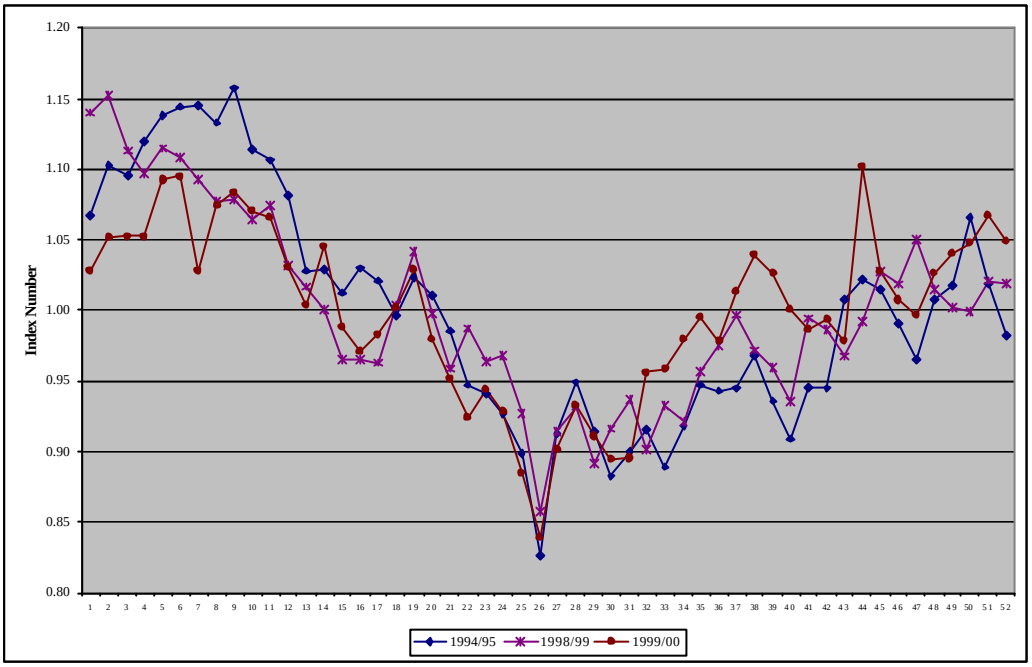


Figure 39 also shows that there is considerably less pressure on hospital beds in the summer months. For example, in 1999/00 the index falls below 1.0 (average census level) in week 20 and does not return above 1.0 until week 37.

Figure 40: Weekly average emergency medical admissions, 1998/99 & 1999/00

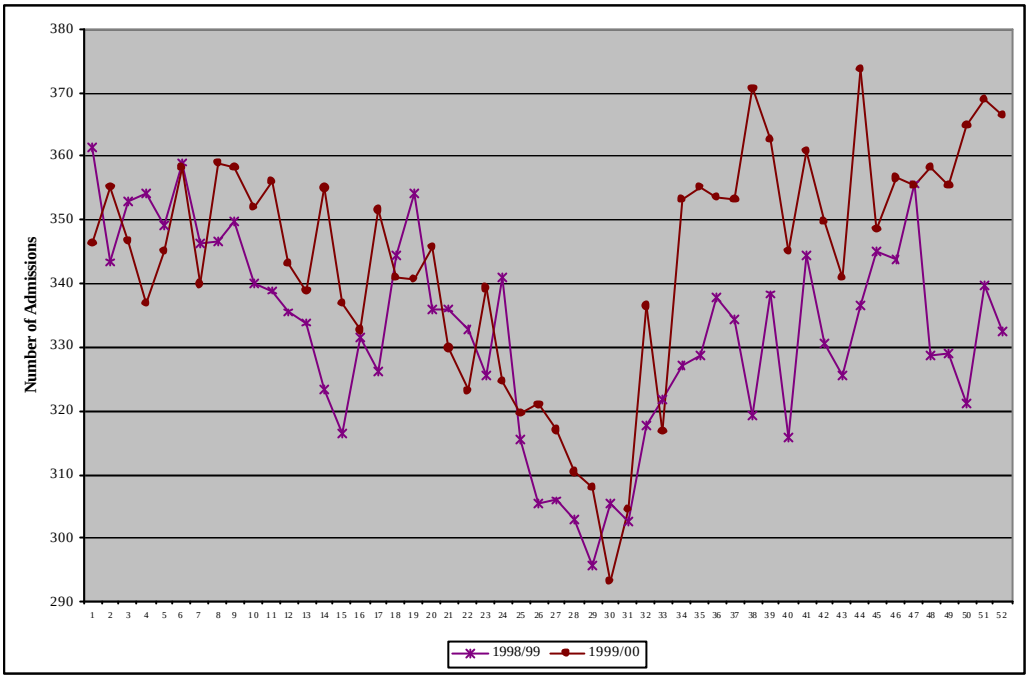


Figure 40 examines the (in-scope) emergency medical overnight inpatient admissions for 1998/99 and 1999/00. It shows that there is a consistent pattern in the number of emergency medical admissions over the course of the year. It also shows that there was a 3.6% increase in emergency medical admission from 1998/99 (average 332 admissions) to 1999/00 (average 344 admissions). In 1999/00, the number of emergency medical admissions ranges from a high of 374 in week 44 to a low of 293 in week 30. The low is in the Christmas/New Year period reflecting the general slow down in activity (particularly business) at that time.

7.2 INFLUENZA-RELATED EMERGENCY MEDICAL OVERNIGHT INPATIENTS

The next analysis examines the proportion of the emergency medical overnight inpatient census that is influenza-related. Influenza-related overnight inpatients are defined as any patient grouped to version 3.0 AN-DRGs 132-136, 170- 172, 176-177, 181-188, 193-201 and 814-817. This definition, which is consistent with that used by MCHPE, was reviewed by a highly experienced health information manager to ensure that the target group was appropriately defined. All the chosen AN-DRGs are considered medical.

Figure 41: Weekly average emergency overnight census, with flu-related illnesses, 1999/00

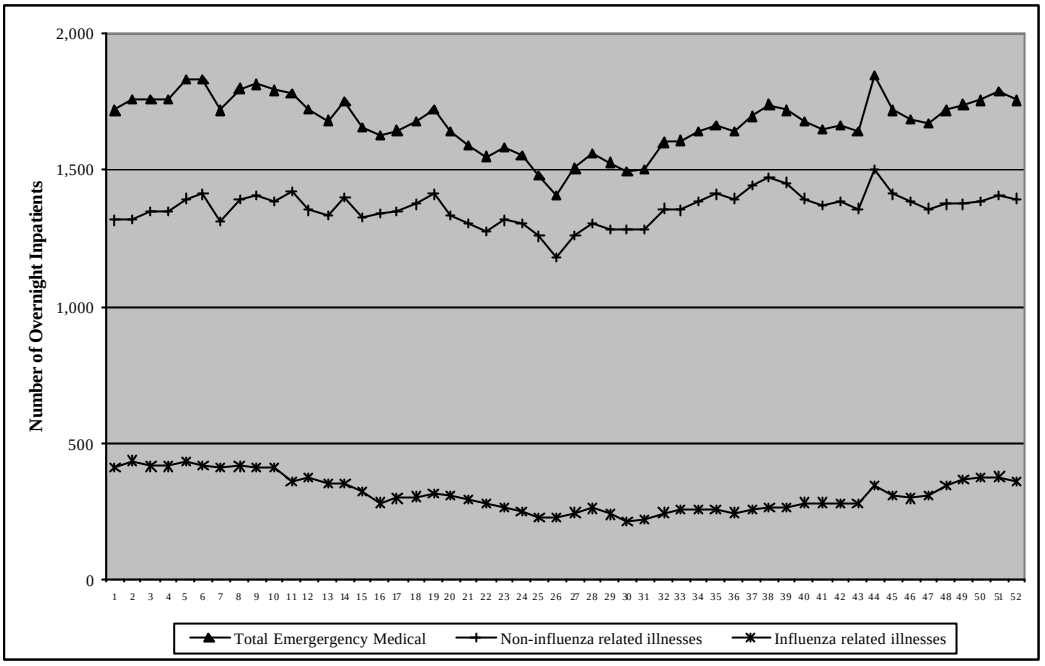


Figure 41 shows that influenza-related overnight inpatients account for approximately 19% (average census of 315, compared to overall average census of 1,674) of emergency medical inpatients. This figure compares to about 18% in 1998/99 (average census 298 compared to and overall average census of 1,651). The pattern is largely as expected, with flu-related patients representing a higher proportion of the census in winter months. The next chapter examines the characteristics of flu-related overnight inpatients in more detail.

8

Emergency influenza-related episodes Overnight Inpatients

This chapter analyses (in-scope) influenza-related emergency medical overnight inpatients. The rationale for this focus is that this group is expected to contribute most to the seasonal variation in the census.

8.1 SIX-YEAR ANALYSIS OF IN-SCOPE INFLUENZA RELATED PATIENTS

The analysis starts by examining the overnight inpatient census for "flu-related" patients for the six-year period of the study. Figure 42 demonstrates quite clearly the winter peak in flu-related patients. It also shows that the winter of 1997 was the worst flu season (in terms of overnight inpatients in hospital) over the five-year period with a peak of 543 inpatients in hospital in July 1997. In comparison, the winter of 1995 seems to have been much less severe in terms of flu with a peak of 375 inpatients in hospital in August 1995.

Figure 42: Weekly average emergency medical overnight inpatient census with flu 1994/95 to 1999/00

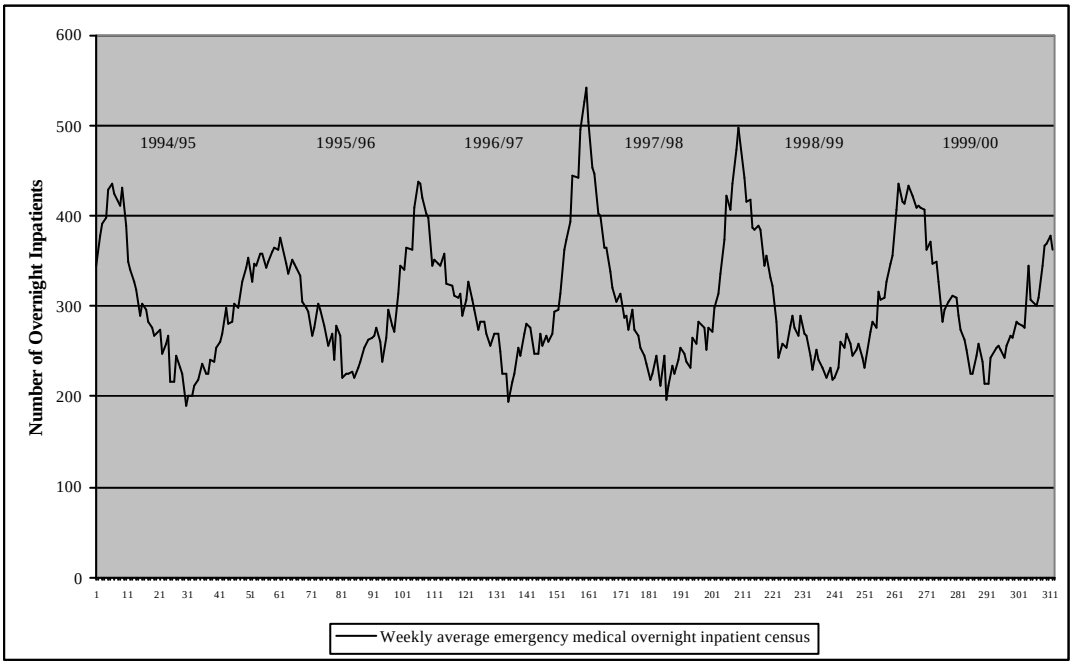
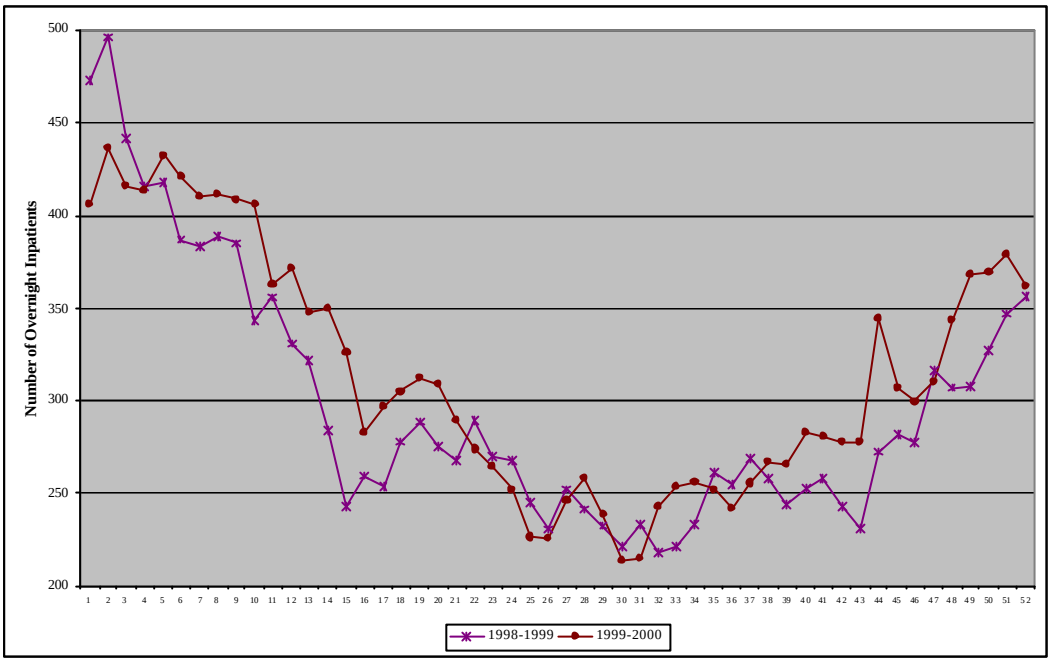


Figure 43 examines the data in more detail for 1998/99 and 1999/00. In 1999/00 there is a peak of 437 flu-related patients in July 1999 (week 2) with a trough of 214 patients in January 2000 (week 30). The range of 223 patients between high and low demonstrates the impact that the flu can have on hospital bed pressures. Essentially in 1999/00, 150 more beds were required in metropolitan Melbourne to accommodate flu patients in winter (average census of 392 patients) relative to summer (average census of 242 patients). While this figure is lower than the 1998/99 difference

(178 beds), the additional bed numbers still represent a requirement for an additional mid-size hospital in Melbourne over the winter months relative to the summer months.

Figure 43: Weekly average emergency medical overnight inpatient census with flu, 1998/99 & 1999/00

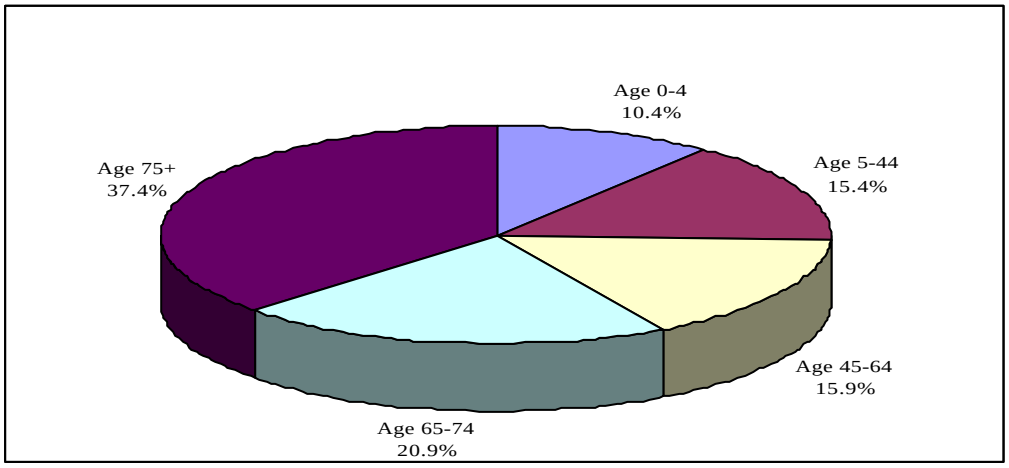


The data clearly suggest that if flu-peaks can be predicted, then it should be possible to arrange to reduce stress on hospitals and improve overall hospital efficiency.

8.2 ANALYSIS OF INFLUENZA RELATED PATIENTS BY AGE

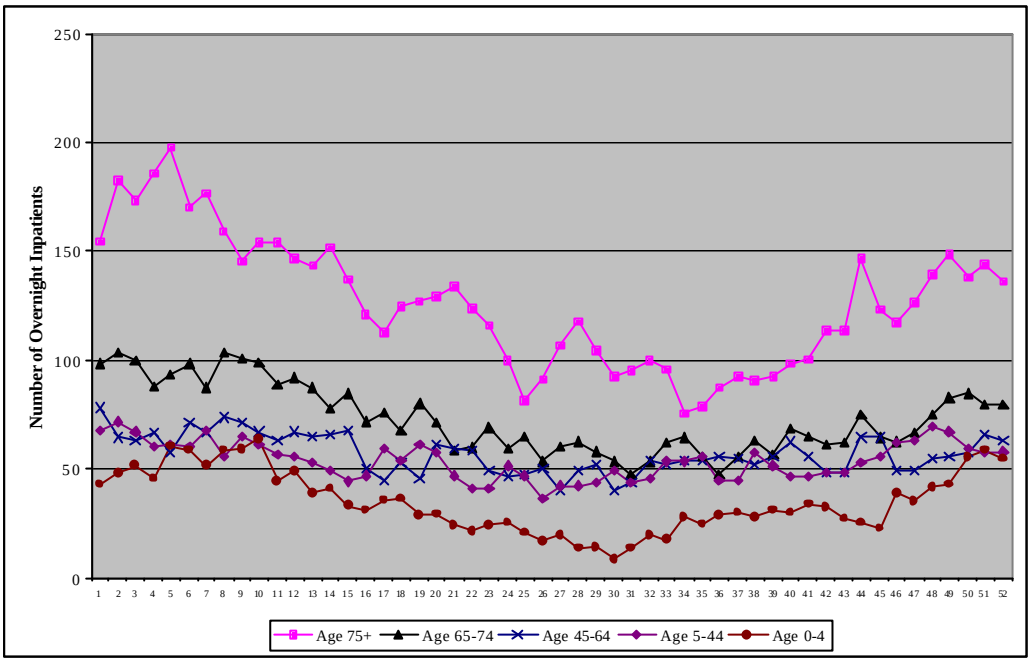
The analysis continues by examining the age distribution of influenza-related patients. Figures 44 shows that flu-related overnight inpatients aged 75 years and over represent 37.4% of the flu-related workload (bed-days) in 1999/00 compared to 36.8% in 1998/99.

Figure 44: Proportion of emergency medical overnight inpatient workload with flu-related illness, 1999/00



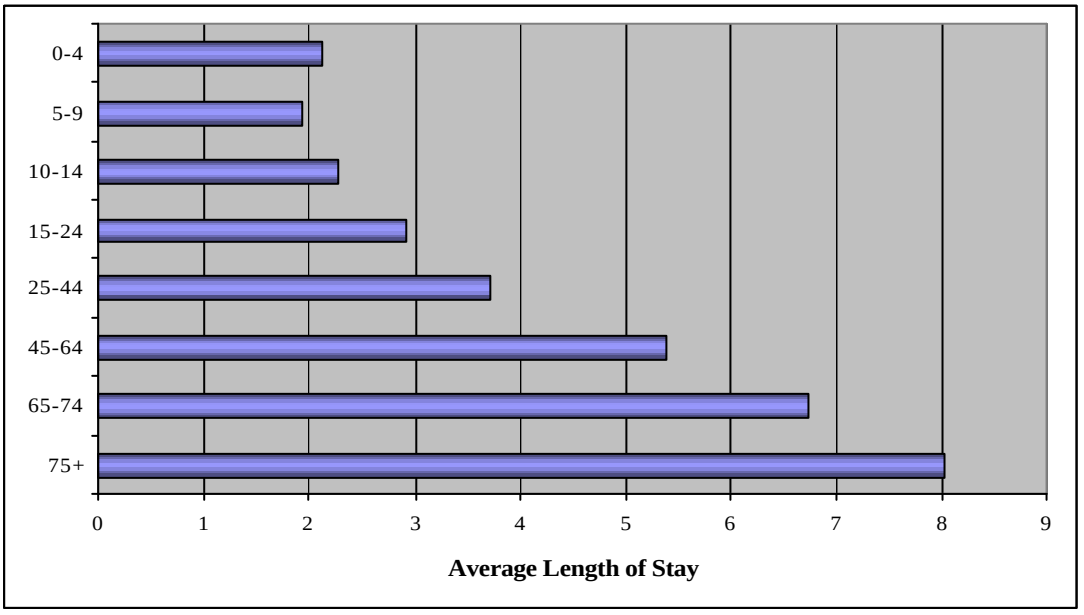
When those overnight inpatients aged 65 years and over are considered, 58.3% of the flu-related workload is accounted for. Figure 45 demonstrates the weekly census pattern for flu-related overnight inpatients by age.

Figure 45: Weekly average flu-related emergency medical overnight inpatient census, by age, 1999/00



As expected, Figure 45 shows that the variation in activity levels for patients aged 75 years and over is much greater than for the other age groups (peak of 198 patients in week 5 with a trough of 76 patients in week 34). Figure 46 highlights the importance of the 75 years and over age group, by comparing lengths of stay for flu-related overnight inpatients. It demonstrates the much higher lengths of stay associated with elderly flu patients.

Figure 46: Average length of stay for flu-related emergency medical inpatients, 1999/00



9

Planned Medical Episodes Sameday Patients

This chapter analyses planned medical sameday patients in more detail. This focus arises from the fact that planned medical sameday patients are the largest sameday patient group (by volume), and that hospitals have considerable control over the admissions of planned patients (as highlighted previously).

9.1 SIX-YEAR ANALYSIS OF PLANNED MEDICAL SAMEDAY PATIENTS

Figure 47 presents the number of planned sameday medical patients for each week of the six-year period of the analysis. It shows that planned medical sameday patients have been steadily increasing during the last six-years.

Figure 47: Weekly average planned medical sameday patients, 1994/95 to 1999/00

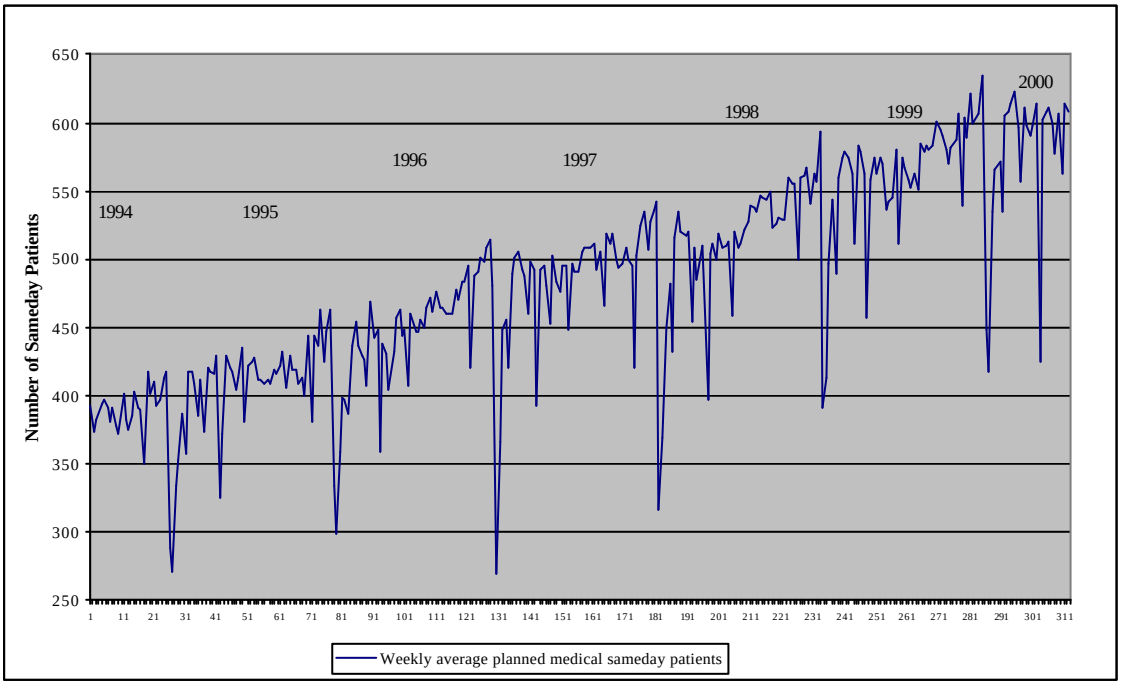
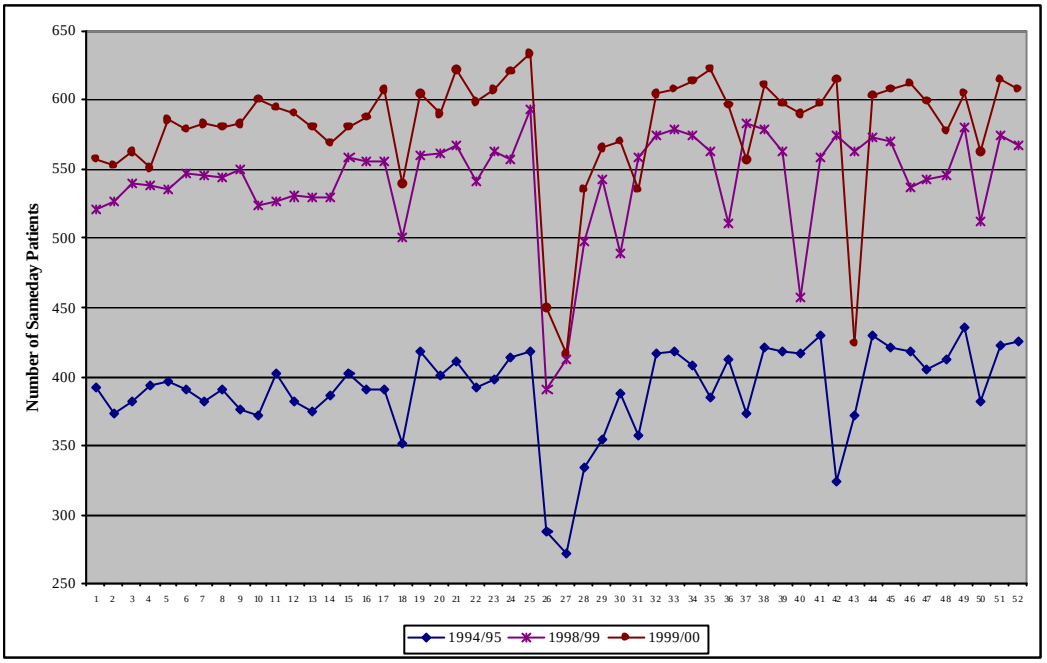


Figure 48 presents the data for 1994/95, 1998/99 and 1999/00. It clearly shows that there is considerable similarity in the pattern of planned medical sameday patients for the three years.

Figure 48: Weekly average planned medical sameday patients, 1994/95, 1998/99 & 1999/00



In Figure 48 the average number of planned medical sameday cases climbs from 391 in 1994/95 to 580 in 1999/00 (a 48% increase). Table 1 below shows the top ten sameday planned medical DRGs for 1999/00. As expected renal dialysis has the most admissions (47.2%) followed by chemotherapy (12.4%). Overall, the top ten DRGs account for 75.5% of all planned medical sameday admissions.

Table 1: Top ten planned medical DRGs for 1999/00

DRG	Description	Number of planned medical admissions	% of Total planned medical admissions
572	Renal Dialysis	99,708	47.2
780	Chemotherapy	26,272	12.4
332	Other gastroscopy for non-major digestive disease w/o CC	8,962	4.2
335	Other colonoscopy w/o CC	5,476	2.6
761	Red blood cell disorders age < 65 w/o CC	4,077	1.9
794	Lymphoma & non-acute leukaemia w/o CC	3,954	1.9
938	Planned sameday aftercare w/o sdx of history of malignancy	3,304	1.6
943	Other factors influencing health status age < 80 w/o CC	3,142	1.5
128	Dental extractions & restorations	2,394	1.1
936	Aftercare with sdx of history of malignancy with endoscopy	2,087	1.0
	Other DRGs	51,744	24.5
	Total	211,120	100

9.2 CHEMOTHERAPY AND RENAL DIALYSIS

The next analysis examines the proportion of the planned medical sameday patients that are admitted for either chemotherapy or renal dialysis. These patients are defined using AN-DRGs. Any patient grouped to version 3.0 AN-DRG 780 was labelled Chemotherapy and patients grouped to 572 were labelled renal dialysis. Both AN-DRGs are considered medical.

Figure 49: Weekly average planned medical sameday patients with chemotherapy or renal dialysis, 1999/00

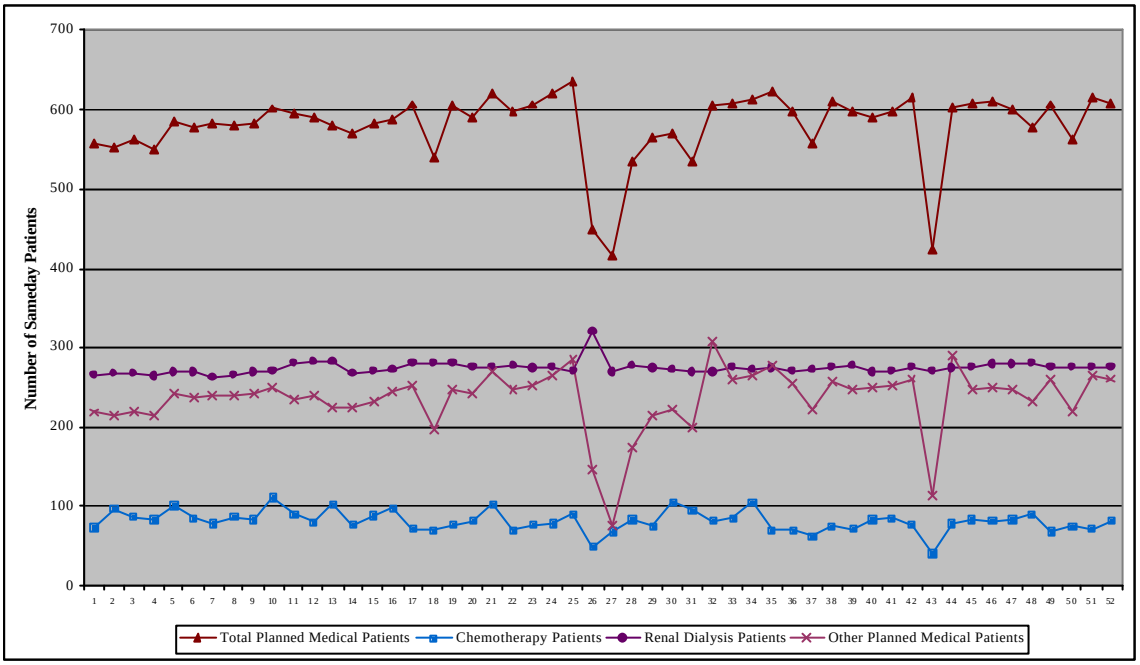
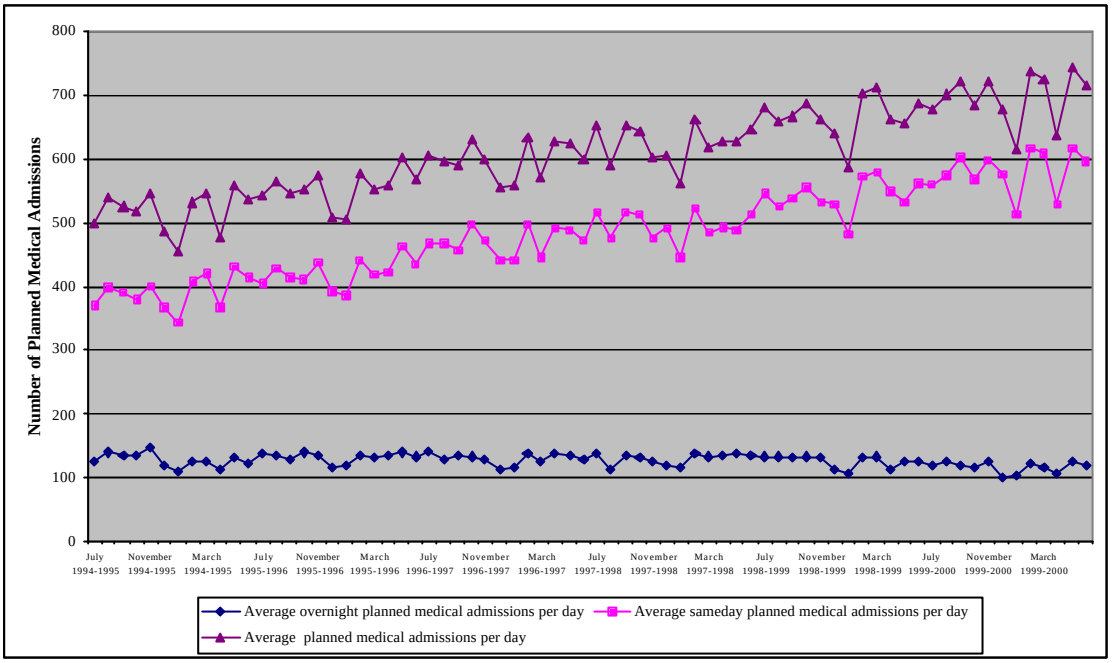


Figure 49 shows that the pattern of planned sameday admissions is largely as expected. There is very little variation in renal dialysis admissions (given the nature of the condition that is treated), although the peak in 26 (Christmas) is somewhat unexpected. The variation occurs mainly in the other planned medical sameday (endoscopies of various kinds) with the admission pattern following the usual holiday season trends.

9.3 SAMEDAY & OVERNIGHT PLANNED MEDICAL ADMISSIONS

Figure 50 shows the sameday and overnight inpatient trends for planned medical admissions over the six-year period. It demonstrates that while the sameday planned medical admissions have been increasing steadily over time, the overnight planned medical admissions have remained relatively constant (exhibiting a slight drop in the average over the period).

Figure 50: Average planned medical admissions per day, 1994/95 to 1999/00



Further review of Figure 50 shows that the average for overnight admissions has fallen from 127 in 1994/95 to 116 in 1999/00, a decrease of 11 admissions. This difference compares to an increase of 189 for the sameday admissions (391 in 1994/95 to 580 in 1999/00). At first glance, the data suggest that in respect of planned medical admissions there is little substitution between planned medical sameday and planned medical overnight cases. Rather the growth in planned medical sameday admissions can be largely attributed to significant increases in dialysis, chemotherapy and endoscopy (diagnostic) cases.

10

Planned Surgical Episodes Sameday Patients

This chapter analyses planned surgical sameday patients. This focus allows a comparison of planned surgical sameday cases with planned surgical overnight cases to examine the possibility of substitution.

10.1 SIX-YEAR ANALYSIS OF PLANNED SURGICAL SAMEDAY PATIENTS

Again, the analysis starts by examining the number of planned surgical sameday patients for each week of the six-year period of the study in Figure 51. As with most planned cases, there is high variability over the six-years due to holidays and high pressure periods (when planned surgical cases may be deliberately reduced to accommodate emergency medical cases).

Figure 51: Weekly average planned surgical sameday patients 1994/95 to 1999/00

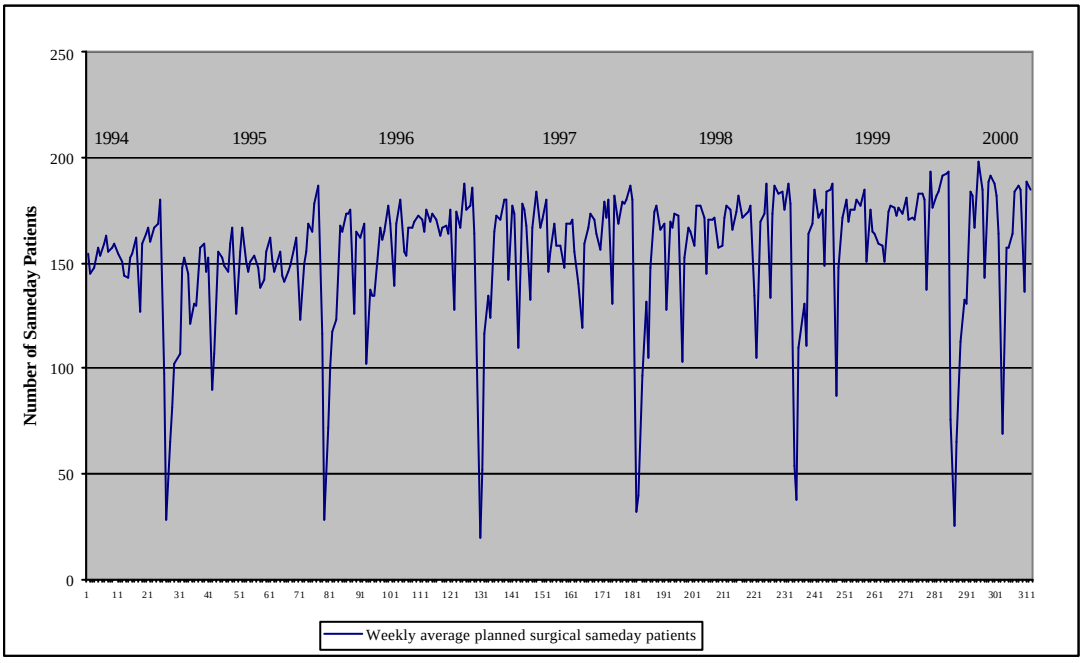


Figure 52 examines the data in more detail for 1994/95, 1998/99 and 1999/00. Unlike planned medical sameday patients the average number of planned surgical sameday cases per day has increased by only 15% over the six-years, from 142 in 1994/95 to 164 in 1999/00 (a somewhat surprising result).

Figure 52: Weekly average planned surgical sameday patients, 1994/95, 1998/99 & 1999/00

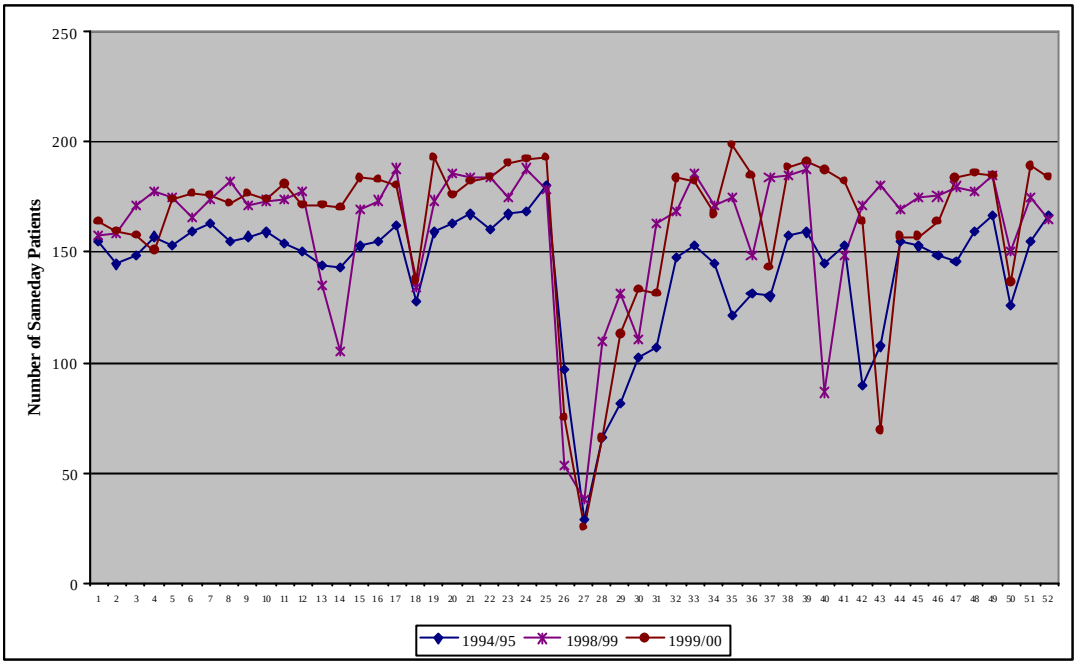


Table 2 shows the top ten planned surgical DRGs for 1999/00. Compared to the planned medical top ten, the surgical DRGs are more evenly distributed with no one DRGs taking up more the 9% of the total planned surgical DRGs. The more variable distribution is also illustrated by the fact that the top ten DRGs account for 57.3% of the planned surgical sameday cases whereas the top tend DRGs account for 75.5% of planned medical cases.

Table 2: Top ten planned surgical DRGs for 1999/00

DRG	Description	Number of Planned Surgical Admissions	% of Total Planned Surgical Admissions
683	Abortion w D&C, aspiration curettage or hysterotomy	5,370	9.0
099	Lens procedures w/o vitrectomy & w/o CC	5,063	8.5
659	Conisation, vagina, cervix & vulva procedures	4,734	8.0
484	Other skin, subcutaneous tissue & breast procedures	3,939	6.6
661	Diagnostic curettage &/or diagnostic hysteroscopy	3,721	6.2
660	Endoscopic procedures (gynaecology)	3,240	5.4
124	Myringotomy w tube insertion	2,460	4.1
424	Local excision & removal int fix devs exc hip & femur	2,044	3.4
657	Uterine, adnexa proc for non-malig age < 40 w/o CC	1,778	3.0
432	Hand or wrist procedures exc major joint	1,758	3.0
	Other DRGs	25,439	42.7
	Total	59,546	100

Review of Table 2 illustrates the significance of gynaecology and ophthalmology specialties in the planned surgical numbers.

10.2 SAMEDAY AND OVERNIGHT PLANNED SURGICAL ADMISSIONS

Figure 53 shows the sameday and overnight inpatient trends for planned surgical admissions over the six-year period. It demonstrated that sameday planned surgical admissions have been increasing steadily over time and overnight planned surgical admissions have decreased steadily. Overall, the number of planned surgical admissions has reduced slightly over the six-years moving from an average of 335 in 1994/95 to an average of 324 in 1999/00 (a reduction of 3.3%). Even this slight reduction is somewhat surprising and it may be worthy of further investigation.

Figure 53: Average planned surgical admissions per day, 1994/95 to 1999/00

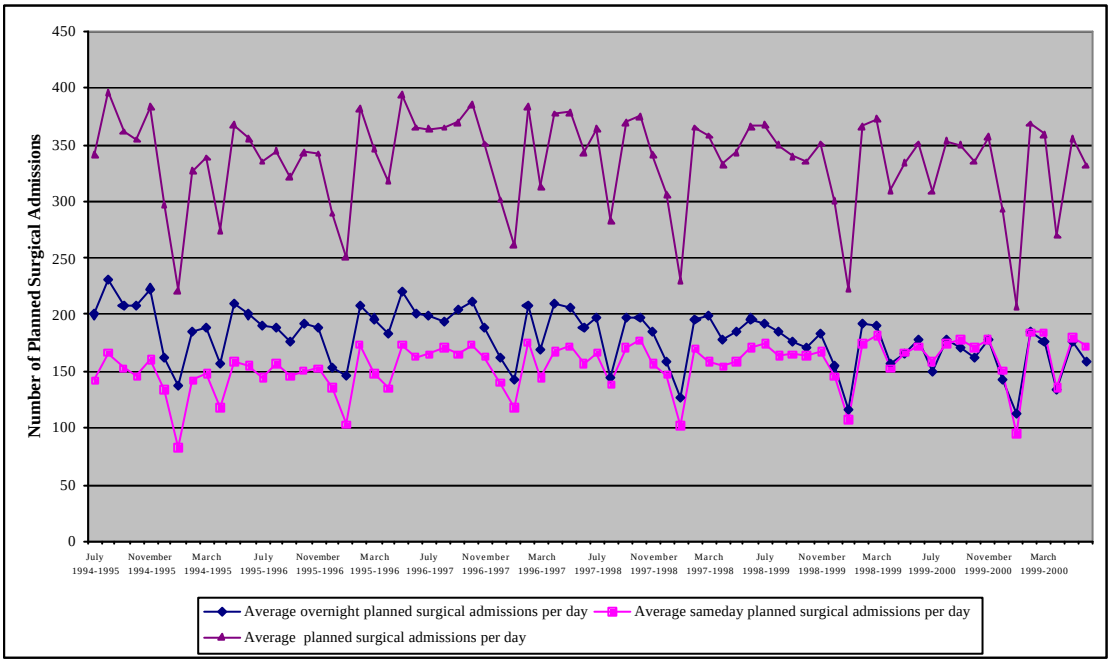


Figure 53 also illustrates a slow movement of planned surgical patients from overnight inpatients to sameday patients. The overnight planned surgical admissions have decreased from an average of 193 per day in 1994/95 to 160 per day in 1999/00. Over the same period planned surgical sameday admissions have risen from an average of 142 per day in 1994/95 to 164 per day in 1999/00.

11

Emergency Medical Episodes Sameday Patients

This chapter analyses emergency medical sameday patients. This focus allows a more complete picture of sameday patient activity levels to be developed (as planned medical and planned medical have already been analysed and emergency surgical represents a very small proportion of sameday patients).

11.1 SIX-YEAR ANALYSIS OF EMERGENCY MEDICAL SAMEDAY PATIENTS

The analysis starts by examining the number of emergency medical sameday patients for the six-year period of the study. Figure 54 shows that the number of emergency medical cases being treated on a sameday patients basis is increasing, particularly in the last few years. This trend may also merit further investigation as it may be partly due to a change in admission policies in hospital Emergency Departments

Figure 54: Weekly average emergency medical sameday patients 1994/95 to 1999/00

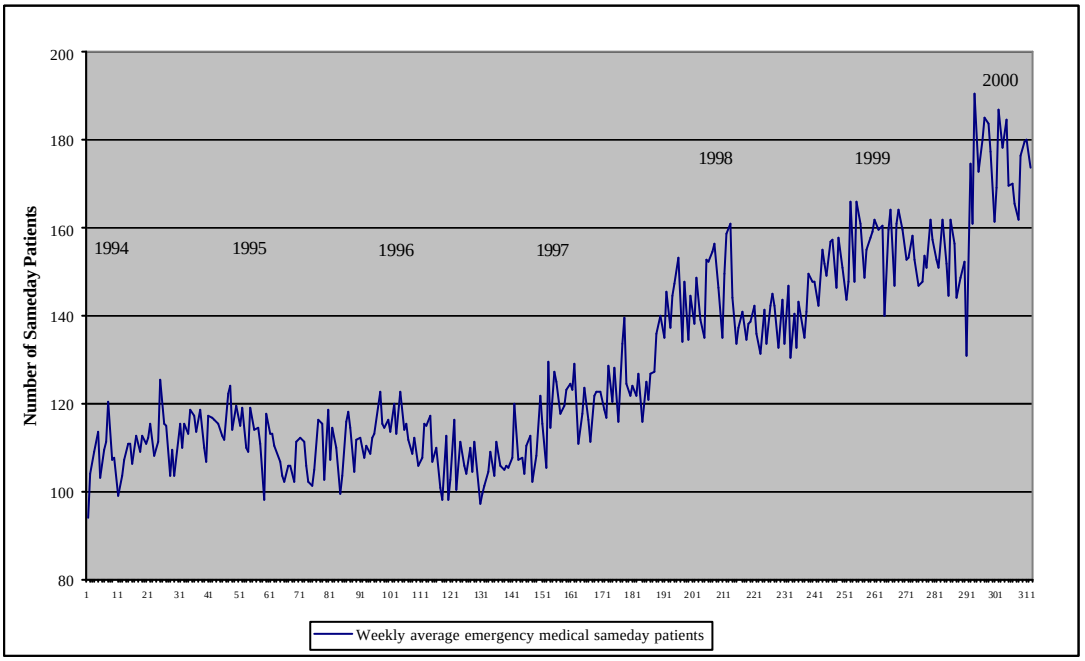


Figure 55 examines the data in more detail for 1994/95, 1998/99 and 1999/00. It clearly shows the rise in activity levels from 112 in 1994/95 to 146 in 1998/99 and 163 in 1999/00. These data represent an increase of 45.5% over the full six-year period. Even from 1998/99 to 1999/00 there has been an 11.6% increase. These numbers may reflect a response to the Winter Emergency Demand Strategy (WEDS) initiated in 1999/00 or some other policy initiative. Accordingly, further investigation may yield useful information.

Figure 55: Weekly average emergency medical sameday patients, 1994/95, 1998/99 & 1999/00

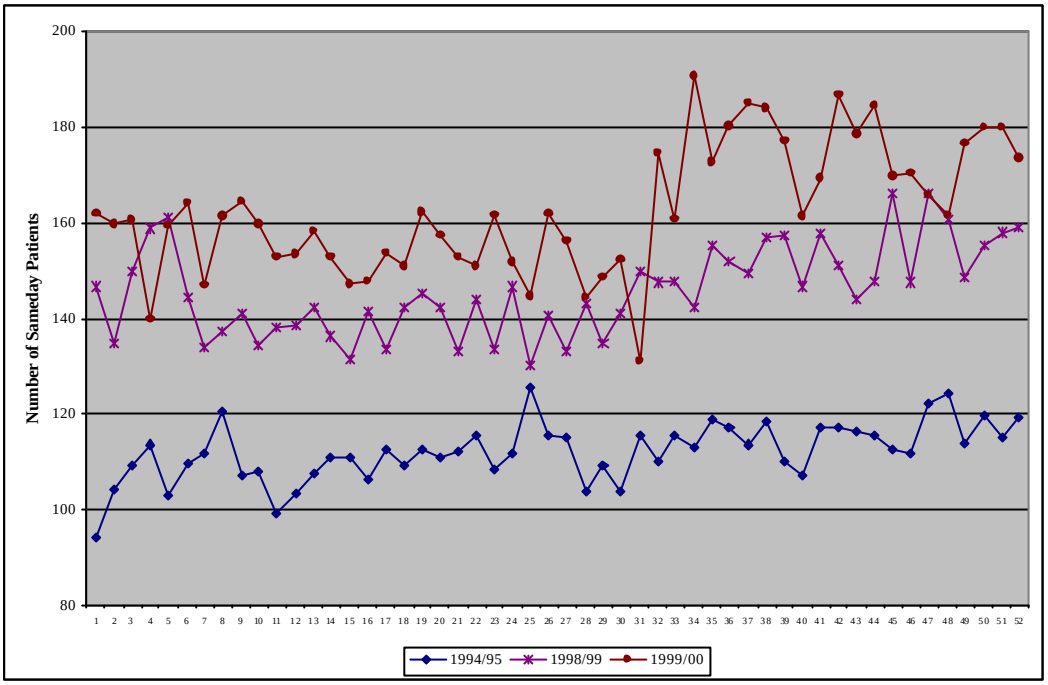


Table 3 shows the top ten sameday emergency medical DRGs by volume for 1999/00. Again, compared to the sameday planned medical top ten the emergency DRGs are more evenly distributed with no one DRGs taking up more than 6.3% of the total emergency medical DRGs. Overall, the top ten sameday emergency medical DRGs account for 32.7% of all sameday emergency medical cases (considerably less than planned medical and planned surgical sameday patients).

Table 3: Top ten emergency medical DRGs for 1999/00

DRG	Description	Number of Emergency Medical Admissions	% of Total Emergency Medical Admissions
261	Chest pain	3,729	6.3
347	Abdominal pain or mesenteric adenitis w/o CC	2,971	5.0
885	Injuries age < 65	2,299	3.9
349	Oesophagitis, gastroent & misc dig dis age 10-74 w/o CC	2,023	3.4
889	Poisoning/toxic effects of drugs age < 60 w/o CC	1,965	3.3
579	Urinary stones w/o esw lithotripsy	1,663	2.8
048	Headache	1,435	2.4
473	Fx, sprn, strn & disloc of frarm, hnd, ft age < 75 w/o CC	1,284	2.2
187	Bronchitis & asthma age < 50 w/o CC	1,053	1.8
260	Syncope & collapse w/o CC	1,048	1.8
	Other DRGs	40,157	67.3
	Total	59,627	100

11.2 SAMEDAY AND OVERNIGHT EMERGENCY MEDICAL ADMISSIONS

Figure 56 compares sameday and overnight emergency medical admissions over the six-year period of the analysis.

Figure 56: Average emergency medical admissions per day, 1994/95 to 1999/00

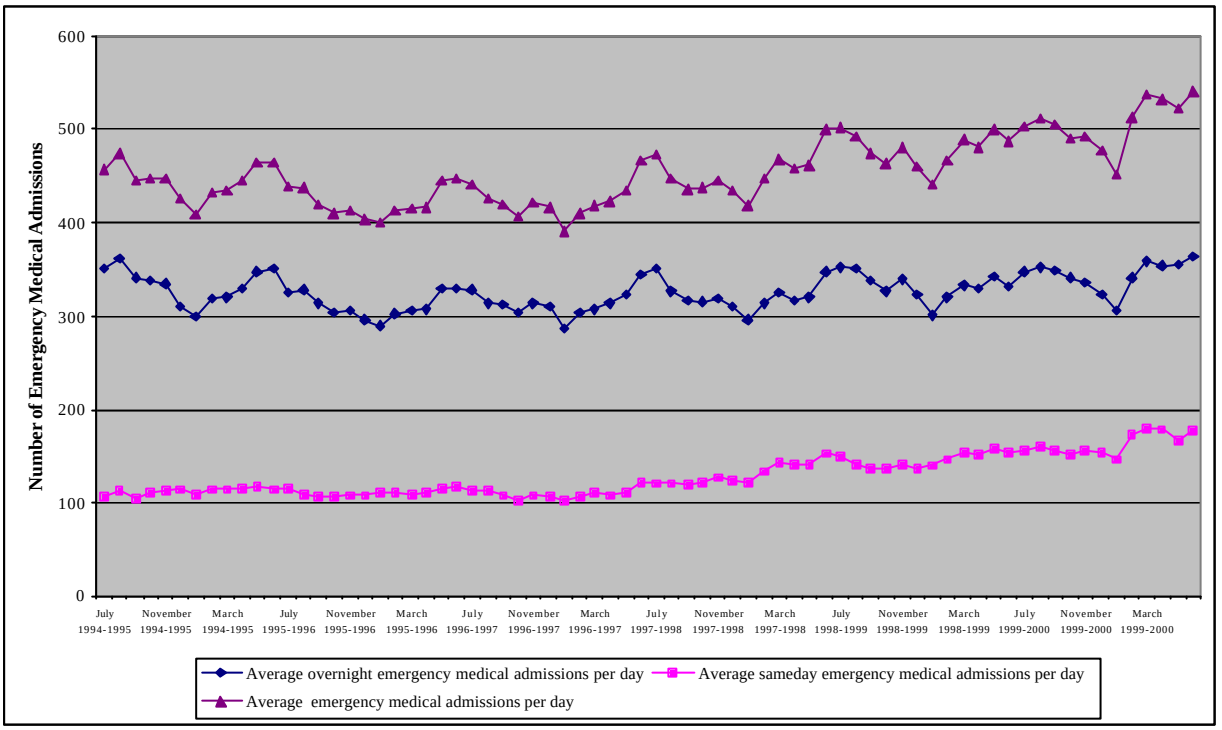


Figure 56 illustrates how the sameday emergency medical admissions are increasing over the six-years (from 112 per day to 163 per day) while the overnight emergency medical admissions are remaining reasonably steady (from 333 per day to 344 per day).

12
Conclusions

This second phase of the seasonal activity analysis project extension has constructed a dataset from the VAED that allows analysis of the overnight and sameday inpatient admissions, separations and overnight census trends over a six-year period from 1994/95 to 1999/00. The resultant dataset has been used to produce a series of analyses that focus on understanding bed-pressures on Melbourne's hospitals in the winter period. The analyses have been modeled on the work carried out by the Manitoba Centre for Health Policy and Evaluation in respect of Winnipeg hospital use.

Consistent with the findings in the first phase report, this work confirms the value of examining census trends as part of developing policy on hospital management and funding. The analysis confirms that there are significant differences in hospital activity levels between seasons in Melbourne. It also confirms that activity pressure on Melbourne's hospitals is increasing as emergency patients represent an increasing proportion of hospital workload.

This report summarises the analyses that have been carried out by presenting a series of descriptive statistics. It also highlights a number of areas (as did the first phase report) where further investigations may be beneficial. The daily-files developed as part of the project make it relatively simple to produce additional charts similar to those presented in this document. The production of descriptive data can be continued to address questions that may arise through consideration of this document.

Appendix A
Project Methodology

Detailed Dataset Development Methodology

The project concentrated on preparing the data for analysis and using the generated dataset to investigate various patterns and trends in the hospital activity levels. The methodology used was heavily based on a report by the Manitoba Centre for Health Policy Evaluation (MCHPE) on "Seasonal Patterns of Winnipeg Hospital Use" (Menec et al 1999). Further details on the methodology may be found in the first phase report.

1 DATA EXTRACTION FROM VAED

The second step in the project involved extracting data from the VAED to extend the existing overnight inpatient daily file to include data from 1999/00 and to construct the sameday patient daily file.

1.1 Scope of data

The key issues with respect to scope of the data are time period, hospitals, and types of patients to be included in the data extract. Each of these variables was considered in turn to arrive at the final data specification as set out below.

Time period

The "daily files" are built from data on patients separated from hospitals in the period 29 June 1994 to 27 June 2000 (six financial years). In addition, data for patients admitted on or before 27 June 2000 and separated on or before 15 November 2000 were used so that the bed days that they accrued in the in-scope period could be included in the daily file. These data allow the "daily files" to be built, describing the sameday and overnight inpatient activity for the full six-years in the period 29 June 1994 to 27 June 2000 (there are 2,191 days in the period).

Hospitals

Data from all hospitals in metropolitan Melbourne were included in the daily file. Data from non-metropolitan hospitals were not used. A list of hospitals included in the analysis and the number of admissions/separations and bed days for the six-year period are shown in Appendix B (overnight inpatients) and Appendix C (sameday patients).

Types of patients

Data for overnight inpatients were included in the daily file and data for sameday patients were included in the sameday daily file. The following types of cases were excluded:

- Palliative;
- Maternity;
- Unqualified neonates;
- Mental health;
- Rehabilitation;
- Hospital in the Home; and
- Geriatric Evaluation and Management.

The rationale for excluding these cases is that the services are typically provided in facilities that are not substitutable for inpatient facilities. Consequently, inclusion of these services would have confounded the analysis of high-pressure periods (where the requirement for inpatient beds is higher than usual) in hospitals.

2 BUILDING THE DAILY FILE

The VAED data was re-organised into a two datasets where there is a distinct record for each patient in hospital on a given day (ie every patient appears on every day that they were in hospital). For each day, the datasets are termed the "daily files". The "daily file" contains two types of record for each day (there are 2,191 days in the period, six full years, two of which are leap years) in the period 29 June 1994 to 27 June 2000. The full specification is set out in the first phase report.

3 DATA ADJUSTMENTS

In order to produce the "daily file" from the VAED dataset, some adjustments based on a set of reasonable assumptions were needed. The key areas where adjustments were considered and made and the rationale for the assumptions used are set out below.

3.1 Hospital in the Home cases

As indicated above, all records where the only accommodation type is hospital in the home (choice number 4 on VAED) are excluded. There were however, 21,357 records, 8,051 of those occurring in 1999-2000, which included hospital in the home days as well as hospital-based days. For these records, the hospital in the home component was omitted as follows:

- where the hospital in the home component of care occurred at the start of the episode, it was deleted from the daily file and the admission date was adjusted so that it became the day of admission to hospital (897 records);
- where the hospital in the home component of care occurred at the end of the episode, it was deleted and the discharge date was adjusted so that it became the date the patient left hospital (20,312 records); and
- where the hospital in the home component of care occurred in the middle of the episode, the hospital in the home days were treated as short term leave days (see below) and excluded from the "daily file" (148 records).

3.2 Contract leave

The possibility of making an adjustment for contract leave days was also considered. These days involve the provision of a service by one hospital to another during the course of the inpatient episode. In some instances, provision of the service is not in the hospital to which the patient is admitted (contract leave is fully defined in the PRS/2 Manual). Contract leave first appeared in the VAED in 1996/1997. After analysing the extent of the contract leave used in the in-scope period, it was found that only four hospitals were affected and in total, only 596 days were involved. As the dates of commencement and completion of any contract leave are not available on the VAED, and

the number of bed days involved is so small (0.006% of all days considered), it was decided that no adjustment would be made.

3.3 Short-term leave

The issues associated with making adjustments for short-term leave days were also examined. These days are when inpatients leave hospital for a short period (either on a trial basis or to be with family) and return within seven days (short-term leave is fully defined in the PRS/2 Manual). Short-term leave days totaled 25,122 days, which represents 0.3% of bed days. Short-term leave was used in 37 hospitals. Accordingly, particularly given that it affected some hospitals more than others, and that it was much more significant than contract leave days, it was considered that adjustments were required.

As with contract leave days, VAED does not collect the dates on which the short-term leave started and finished. VAED only collects data on the number of days involved. Accordingly, we made a series of assumptions regarding the dates on which short-term leave was taken based on an algorithm as follows:

- assigned all short-term leave days to weekend days from the weekend before the discharge date working back towards the admission date;
- if the short-term leave days were not exhausted then all Mondays next to weekends where short-term leave had been assigned were assumed to be short-term leave days;
- if the short-term leave days were still not exhausted then the same process was followed using the weekdays Friday, Thursday, Tuesday and Wednesday in order.

By definition this process had to exhaust the total short-term leave days as the number of days between the admission and separation dates must equal the sum of the bed days and short term leave days. As can be seen, the algorithm assumes that the principal use of short-term leave is for weekend leave.

4 TIME ADJUSTMENTS

Minor adjustments were also made to the dates for the study to achieve consistency between the years for comparison and trend analysis purposes. This adjustment was carried out on the same basis as that used by the MCHPE in their analysis of Winnipeg data. The purpose of the adjustment is to make the data for each week as comparable as possible across the six years. This comparability is achieved by labeling the weeks 1 through 52 according to the following algorithm:

- Week 1 of each year starts on the Wednesday closest to 1 July (in effect this means the actual time period for the study is from 29 June 1994 to 27 June 2000). Each week therefore contains the weekend in the middle and weeks with long weekends are more comparable across the years.
- Each year has only 52 weeks therefore one day extra each year (two days in 1996 due to leap year) needs to be absorbed into the average for the 52 weeks. This process results in one "long" week in at the end of June 1996.

- For comparative purposes the aggregate data for each year (1994/95, 1995/96 and so on) are compiled using the 52 weeks assigned to that year, rather than the period from 1st July to 30th June. This method of presentation allows the weekly data to be aggregated to produce the annual data.

For the long week, the averages are based on 14 actual days in week 52 of 1995/96. The total number of days covered by the analysis is therefore 2,191 (all days in the period 1st July 1994 to 27th June 2000 plus the days of 29th and 30th of June 1994, which have been included to provide the week by week comparability).

Appendix B
Total separations and bed-days for in-scope Hospitals - Overnight inpatients

Hospital Code	Hospital Name	1994-1995		1995-1996		1996-1997		1997-1998		1998-1999		1999-2000		Total	
		In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days
A05	Bethlehem Hospital Inc.	454	21,250	422	11,316	387	9,635	343	9,652	344	8,168	132	9,350	2,082	69,371
A08	Caritas Christi Hospice	111	7,714	72	5,041	10	890	9	757	28	2,751	12	483	242	17,636
A11	Royal Dental Hospital	808	833	521	578	30	1,204	9	11	3	20	2	2	1,373	2,648
A14	Hampton Rehabilitation Centre	0	0	0	0	0	0	0	0	1	7	0	0	1	7
A16	Mercy Hospital for Women	3,743	27,389	3,196	29,441	3,047	27,882	3,000	28,706	2,867	24,105	3,012	26,811	18,865	164,334
A17	Monash Medical Centre - Clayton	22,156	132,703	22,889	134,027	24,109	133,661	25,046	134,145	20,801	123,909	22,326	133,270	137,327	791,715
A19	Royal Children's Hospital	17,287	70,554	17,633	72,378	17,637	66,766	17,600	70,027	17,294	66,237	16,575	72,078	104,026	418,040
A22	Royal Talbot Rehabilitation Centre	0	0	0	0	11	508	6	202	1	46	1	45	19	801
A23	Royal Women's Hospital	8,454	46,744	6,046	35,931	5,301	31,235	4,954	31,425	4,329	27,965	4,154	31,452	33,238	204,752
A24	Royal Victorian Eye & Ear Hospital The	8,354	20,189	8,786	19,072	7,688	15,202	6,693	12,434	6,066	10,882	5,559	9,904	43,146	87,683
A32	Werribee Mercy Hospital	2,679	8,174	3,361	10,284	3,597	11,603	4,302	15,140	4,284	15,634	4,540	19,866	22,763	80,701
B01	The Alfred	17,247	132,221	17,026	129,089	17,776	127,063	18,604	131,090	18,174	131,511	19,422	146,070	108,249	797,044
B02	Altona Hospital	337	954	323	762	171	444							831	2,160
B03	Austin & Repatriation Medical Centre	14,522	122,010	14,383	112,367	23,284	176,356	23,327	166,795	22,940	155,946	21,832	176,290	120,288	909,764
B05	Box Hill Hospital	12,487	65,054	13,392	68,172	14,011	76,064	14,627	75,857	14,942	75,533	15,877	86,461	85,336	447,141
B07	Burwood & District Hospital	1,233	2,940	1,540	3,084	619	1,317							3,392	7,341
B11	Dandenong Hospital	13,317	75,019	13,205	70,185	13,690	66,496	14,098	68,985	15,017	69,171	15,143	72,923	84,470	422,779

Hospital Code	Hospital Name	1994-1995		1995-1996		1996-1997		1997-1998		1998-1999		1999-2000		Total	
		In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days
B17	Fairfield Hospital	2,971	26,892	2,333	46,536									5,304	73,428
B18	Western Hospital	20,166	124,514	21,495	135,575	21,650	126,407	22,519	127,194	20,273	109,688	18,678	112,559	124,781	735,937
B21	Maroondah Hospital	8,272	51,530	8,495	54,506	7,980	50,467	7,563	46,969	7,530	44,902	7,701	47,059	47,541	295,433
B22	Monash Medical Centre - Morrabbin	0	0	0	0	0	0	17	93	4,765	12,892	4,526	13,821	9,308	26,806
B23	Mordialloc Cheltenham Community Hospital	1,936	7,877	2,235	8,679	672	2,752	0	0	0	0	0	0	4,843	19,308
B28	The Northern Hospital	11,497	64,317	11,800	65,200	12,457	63,273	10,944	54,385	11,343	55,871	12,323	60,307	70,364	363,353
B33	Royal Melbourne Hospital	25,050	160,314	23,534	154,006	23,021	136,093	24,533	142,145	22,588	134,900	22,672	144,017	141,398	871,475
B36	Sandringham District Hospital	2,778	14,190	3,082	15,343	3,576	19,013	3,756	18,864	3,859	17,470	3,929	17,803	20,980	102,683
B37	Caulfield General Medical Centre – Royal SM	3,845	31,626	3,690	35,940	3,742	35,585	2,091	27,324	1,683	17,052	1,080	10,150	16,131	157,677
B39	Western Hospital - Sunshine	0	0	0	0	0	0	0	0	3,394	13,797	4,816	16,407	8,210	30,204
B44	St Georges Health Service	4,301	21,016	3,615	18,750	2,920	17,054	1,948	12,551	569	6,226	27	1,838	13,380	77,435
B45	St Vincent's Hospital (Melbourne) Ltd	15,215	103,997	16,056	98,061	15,228	94,491	14,777	89,273	14,863	90,165	16,157	95,134	92,296	571,121
B46	Williamstown Hospital	3,580	18,433	3,323	15,500	3,191	14,558	2,915	14,153	2,956	11,845	2,971	12,706	18,936	87,195
C01	St Georges Health Service - Vic Pde	321	7,867	229	6,188	29	839	0	0	0	0	0	0	579	14,894
C04	Caulfield General Medical Centre – Caulfield	206	5,678	14	261	34	897	73	917	11	137	0	0	338	7,890
E22	Frankston Hospital	12,259	66,258	12,925	67,293	14,097	69,739	14,672	75,567	15,062	77,156	14,828	74,161	83,843	430,174
E59	Angliss Hospital	5,186	25,279	4,991	24,885	6,233	29,224	7,632	31,294	6,351	24,552	7,018	26,579	37,411	161,813
F33	Yarra Ranges Health Services	779	3,240	684	3,508	672	3,489	678	3,087	492	2,410	443	2,409	3,748	18,143

Hospital Code	Hospital Name	1994-1995		1995-1996		1996-1997		1997-1998		1998-1999		1999-2000		Total	
		In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days	In-scope Seps	In-scope Bed-days
G25	Rosebud Hospital	1,225	6,762	1,645	9,762	1,969	12,822	2,287	15,954	2,481	17,903	2,548	17,927	12,155	81,130
G48	Kooweerup Regional Health Service	687	2,532	750	2,583	687	2,445	694	2,725	985	2,655	940	3,472	4,743	16,412
G97	Broadmeadows Health Service	0	0	0	0	0	0	0	0	37	1,417	8	249	45	1,666
H03	Kingston Centre	528	12,415	643	19,966	14	726	17	461	28	1,184	33	2,496	1,263	37,248
H06	North West Hospital	1,166	35,790	693	23,260	88	1,872	258	6,875	169	5,523	23	1,936	2,397	75,256
H08	Mount Eliza Aged Care and Rehabilitation Service	61	1,123	53	1,050	36	476	8	82	2	50	0	0	160	2,781
H09	Bundoora Extended Care Centre	474	10,364	124	4,058	378	6,609	331	4,510	352	5,174	162	4,400	1,821	35,115
H12	Peter James Centre The	100	2,302	102	4,179	34	1,816	19	742	44	1,369	61	2,590	360	12,998
H70	St George's Health Service	206	6,114	214	6,419	83	2,351	115	2,478	159	4,599	89	2,390	866	24,351
L01	O'Connell Family Centre	1,014	6,196	1,370	6,915	1,203	5,084	1,252	5,062	1,256	4,874	1,251	4,535	7,346	32,666
M11	Queen Elizabeth Centre	1,204	8,352	1,597	8,896	1,637	7,576	2,070	8,211	2,409	9,169	2,095	8,407	11,012	50,611
M12	Tweddle Child & Family Health Centre	2,144	7,345	2,045	6,806	2,557	7,231	2,479	6,962	2,503	6,780	2,559	7,059	14,287	42,183
Y01	Heidelberg Repat	12,160	116,512	10,127	84,636	0	0	0	0	0	0	0	0	22,287	201,148
Z55	Peter MacCallum Cancer Institute	4,953	33,644	4,997	35,221	4,889	30,006	5,194	31,150	5,002	32,672	5,127	34,776	30,162	197,469
Z82	Central East Area MHS (Upton House)	0	0	0	0	1	14	0	0	0	0	0	0	1	14
Total		**267,473**	**1,716,227**	**265,656**	**1,665,709**	**260,446**	**1,489,235**	**261,460**	**1,474,254**	**258,257**	**1,424,317**	**260,652**	**1,510,192**	**1,573,944**	**9,279,934**

Appendix C
Total separations and bed-days for in-scope Hospitals - Sameday Patients

Hospital Code	Hospital Name	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	Total
		In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps
A05	Bethlehem Hospital Inc.	4	2	5	2	1	0	14
A08	Caritas Christi Hospice	9	0	0	0	0	0	9
A11	Royal Dental Hospital	1,700	1,920	2,134	2,296	2,342	2,600	12,992
A16	Mercy Hospital for Women	3,135	3,581	3,338	3,764	4,243	3,862	21,923
A17	Monash Medical Centre - Clayton	24,492	27,590	32,263	36,744	19,462	21,532	162,083
A19	Royal Children's Hospital	9,218	10,558	11,015	11,766	11,749	11,921	66,227
A23	Royal Women's Hospital	11,173	11,540	11,806	11,101	11,211	10,716	67,547
A24	Royal Victorian Eye & Ear Hospital The	3,754	4,086	4,820	5,486	5,880	6,265	30,291
A32	Werribee Mercy Hospital	3,164	4,235	5,270	6,415	7,157	9,745	35,986
B01	The Alfred	20,742	23,176	25,605	21,452	26,299	26,503	143,777
B02	Altona Hospital	657	680	240	0	0	0	1,577
B03	Austin & Repatriation Medical Centre	19,371	19,787	35,095	37,539	40,326	41,530	193,648
B05	Box Hill Hospital	8,854	9,699	9,268	11,263	13,819	14,701	67,604
B07	Burwood & District Hospital	1,560	2,527	1,117	0	0	0	5,204
B11	Dandenong Hospital	6,154	7,278	7,898	7,776	8,420	8,405	45,931
B17	Fairfield Hospital	8,432	7,985	0	0	0	0	16,417
B18	Western Hospital	11,822	15,209	18,437	22,532	18,197	14,801	100,998
B21	Maroondah Hospital	6,238	6,082	6,192	6,362	6,328	6,596	37,798
B22	Monash Medical Centre - Morrabbin	0	0	0	16	17,341	17,488	34,845
B23	Mordialloc Cheltenham Community Hospital	1,619	1,661	513	0	0	0	3,793

Hospital Code	Hospital Name	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	Total
		In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps
B28	The Northern Hospital	6,546	6,759	7,385	7,071	7,485	8,088	43,334
B33	Royal Melbourne Hospital	35,760	31,619	30,831	34,087	33,840	36,215	202,352
B36	Sandringham District Hospital	2,367	2,401	2,482	2,149	4,896	6,500	20,795
B37	Caulfield General Medical Centre - Royal SM	2,236	2,257	2,018	621	517	495	8,144
B39	Western Hospital - Sunshine	0	0	0	0	7,233	11,018	18,251
B44	St George’s Health Service	2,342	2,389	2,110	1,892	405	0	9,138
B45	St Vincent's Hospital (Melbourne) Ltd	15,773	18,296	20,323	19,810	21,073	22,511	117,786
B46	Williamstown Hospital	1,833	1,976	2,372	1,972	2,023	2,708	12,884
C01	St George’s Health Service - Vic Pde	5	3	0	0	0	0	8
C04	Caulfield General Medical Centre - Caulfield	0	0	0	1	0	0	1
E22	Frankston Hospital	9,181	12,845	16,082	16,784	17,626	18,825	91,343
E59	Angliss Hospital	3,648	3,800	4,375	4,687	7,075	9,114	32,699
F33	Yarra Ranges Health Services	509	486	569	771	749	859	3,943
G25	Rosebud Hospital	1,066	1,067	1,234	1,335	1,245	1,193	7,140
G48	Kooweerup Regional Health Service	940	918	952	1,107	1,293	1,057	6,267
G97	Broadmeadows Health Service	0	0	0	0	1,017	3,421	4,438
H03	Kingston Centre	14	70	29	0	0	0	113
H06	North West Hospital	9	4	0	1	0	0	14
H09	Bundoora Extended Care Centre	4	0	1	0	0	0	5
H12	Peter James Centre The	0	0	1,589	3,503	5,377	5,473	15,942
H70	St George's Health Service	1	1	0	2	0	0	4

Hospital Code	Hospital Name	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	Total
		In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps	In-scope Seps
L01	O'Connell Family Centre	79	375	837	810	632	477	3,210
M11	Queen Elizabeth Centre	633	687	754	1,107	1,556	2,221	6,958
M12	Tweddle Child & Family Health Centre	198	379	80	118	123	728	1,626
Y01	Heidelberg Repat	8,656	9,459	0	0	0	0	18,115
Z55	Peter MacCallum Cancer Institute	3,862	3,214	4,154	5,692	6,011	6,485	29,418
Z82	Central East Area MHS (Upton House)	0	0	0	0	0	147	147
Total		**237,760**	**256,601**	**273,193**	**288,034**	**312,951**	**334,200**	**1,702,739**