Bureau of Health Information

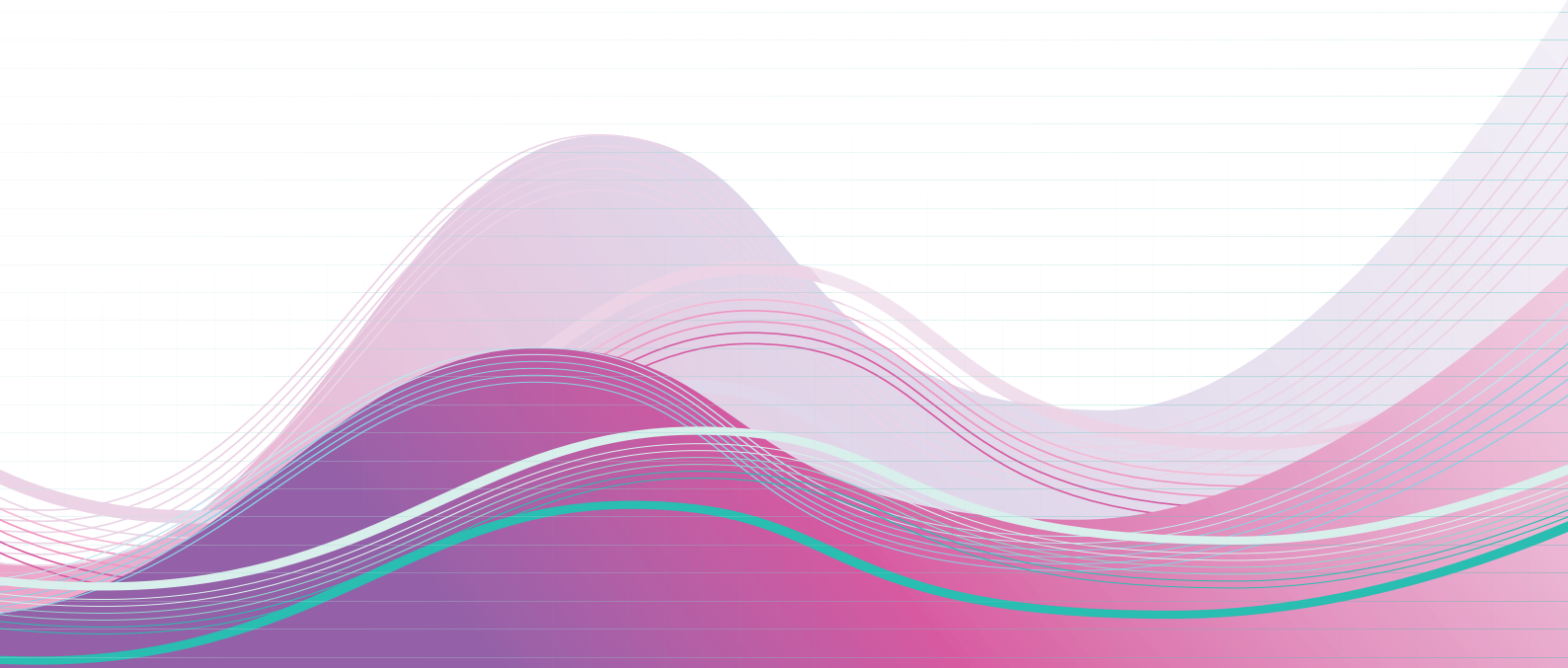
The Insights Series

Chronic Disease Care: Another piece of the picture

Hospitalisations and unplanned readmissions for Chronic Obstructive Pulmonary Disease (COPD) and Congestive Heart Failure (CHF)

July 2009 to June 2010

Volume 2, PART 2



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Summary

Hospitalisations and readmissions for adults with COPD or CHF, 2009–10

Chronic diseases are a major health concern in NSW. Understanding how people with these conditions access hospital is an important part of improving care. The Bureau of Health Information has undertaken a detailed study of how 71,700 adults with chronic obstructive pulmonary disease or congestive heart failure (including 8,298 adults with both conditions) use hospitals. Half of these adults were hospitalised during 2009–10. Altogether, they were hospitalised 99,699 times and spent 570,165 days in a NSW hospital bed, representing 8% of the total number of hospital bed days in the year. These adults were hospitalised for many different reasons.

Chronic obstructive pulmonary disease (COPD)

The Bureau conducted analyses of hospital stays among 42,967 adults with COPD.[#] In 2009–10, these adults were hospitalised for any reason 60,458 times for a total of 336,885 bed days. Most of these hospitalisations (46,622; 77%) and bed days (279,380; 83%) were in public hospitals.

In 2009–10, five in 10 of the adults with COPD (50%) had no admissions to any NSW public or private hospital. Two in 10 (22%) were hospitalised once, one in 10 (12%) were hospitalised twice, and almost two in 10 (16%) were hospitalised three or more times. Of the total number of hospitalisations, about two in 10 (24%) were for respiratory illnesses (with only 17% specifically for COPD). An additional 11% were for circulatory (or cardiovascular) conditions, and 5% were for cancer.

Nine in 10 of the adults with COPD (87%) were not hospitalised specifically for COPD in 2009–10. There was a small number of high intensity users of hospital - the most frequently hospitalised 4% of the group accounted for 62% of COPD-specific bed days (COPD the principal diagnosis).

Most of the COPD-specific bed days (92%) used by the adults with COPD were in public hospitals.

Of all COPD principal diagnosis hospitalisations in 2009–10, 13% were followed by an unplanned readmission for COPD within 28 days. There was approximately 2 to 3-fold variation in standardised (for age and sex) unplanned readmission rates among principal referral, major metropolitan and major non-metropolitan hospitals. Differences in socioeconomic status and clinical complexity of COPD patients between hospitals with high and low rates were modest.

The adults with COPD who were hospitalised frequently were more likely to experience unplanned readmissions for COPD.

Among the 5,312 adults with COPD who died during 2009–10, the majority (84%) were hospitalised at least once during the year.

(#) Adults who were alive on 1 July 2010 and who had been admitted into any NSW public or private hospital between 1 July 2005 and 30 June 2009 with COPD listed in the first 20 diagnostic codes were used to track hospitalisation patterns in 2009–10.

Most of their admissions were for reasons other than COPD. *Only a quarter (26%) were hospitalised one or more times for COPD.* Very few of those who died experienced long periods of hospital care in the year.

In summary, the reasons adults with COPD are hospitalised are diverse and reflect the complex health needs of these people. Improving care for the multiple conditions that COPD patients suffer may help to reduce their hospitalisations. Additionally, focusing improvements on care given to the 4% of COPD patients who are high intensity users of hospitals is likely to have the most impact on reducing COPD hospitalisations.

Congestive heart failure (CHF)

The Bureau conducted analyses of hospital stays among 37,031 adults with CHF.[#] In 2009–10, these adults were hospitalised for any reason 54,969 times for a total of 333,504 bed days. Most of these hospitalisations (41,498; 75%) and bed days (269,378; 81%) were in public hospitals.

In 2009–10, five in 10 of the adults with CHF (49%) had no admissions to any NSW public or private hospital. Two in 10 (22%) were hospitalised once, one in 10 (12%) were hospitalised twice and almost two in 10 (17%) were hospitalised three or more times. Of the total number of hospitalisations that occurred, fewer than one in 10 (7%) were specifically for CHF. An additional 11% were for respiratory conditions, and 5% were for cancer.

Nine in 10 of the adults with CHF (93%) were not hospitalised specifically for CHF in 2009–10. There was a small number of high intensity users - the most frequently hospitalised 2% of the group accounted for 43% of CHF-specific bed days (CHF the principal diagnosis).

Most of the CHF-specific bed days (87%) used by the adults with CHF were in public hospitals.

Of all CHF-principal diagnosis hospitalisations in 2009–10, 9% were followed by an unplanned readmission for CHF within 28 days. There was approximately 2 to 3-fold variation in standardised (for age and sex) unplanned readmission rates among principal referral, major metropolitan and major non-metropolitan hospitals. Differences in socioeconomic status and clinical complexity of CHF patients between hospitals with high and low rates were modest.

The adults with CHF who were hospitalised frequently were more likely to experience unplanned readmissions for CHF.

Among the 6,905 adults with CHF who died during 2009–10, the majority (81%) were hospitalised at least once during the year. Most of their admissions were for reasons other than CHF. *Only two in 10 (19%) were hospitalised one or more times for CHF.* Very few of those who died experienced long periods of hospital care in the year.

In summary, the reasons adults with CHF are hospitalised are diverse, and reflect the complex health needs of these people. Improving care for the multiple conditions that CHF patients suffer may help to reduce their hospitalisations. Additionally, focusing improvements on care given to the 2% of CHF patients who are high intensity users of hospitals is likely to have the most impact on reducing CHF-specific hospitalisations.

(#) Adults who were alive on 1 July 2010 and who had been admitted into any NSW public or private hospital between 1 July 2005 and 30 June 2009 with CHF listed in the first 20 diagnostic codes were used to track hospitalisation patterns in 2009–10.

Chronic obstructive pulmonary disease (COPD) – a brief description

Chronic obstructive pulmonary disease (COPD) is a progressive lung disease marked by shortness of breath. Breathlessness initially occurs with exertion and becomes worse over time. COPD is characterised by reduced airflow during exhalation. Narrowing of peripheral airways and enlargement of airspaces (alveoli) are a result of chronic inflammation often caused by tobacco smoke. This destruction of lung tissue, known as emphysema, makes the lungs floppy and less able to move air in and out, thereby limiting the ability of the lungs to function effectively.

No existing treatment reverses the destruction of lung tissue underlying COPD. Cessation of smoking has been shown to slow progression of the disease. Exercise-based rehabilitation programs improve the quality of life and exercise capacity of people with COPD. For people with more severe forms of the disease, certain medications improve exercise capacity and quality of life, reduce the frequency of disease exacerbations and reduce the rate of loss of lung function.

Congestive heart failure (CHF) – a brief description

Congestive heart failure is a complex syndrome that can result from a structural or functional cardiac disorder involving either or both sides of the heart. Left heart failure is a progressive condition in which the heart is unable to pump enough blood to meet the needs of the body. It can result from diseases that damage or overload the heart, including myocardial infarction (heart attack), hypertension (high blood pressure) or damaged heart valves. It can occur suddenly but more commonly develops over several years. Right heart failure most commonly results from low oxygen in the lungs due to chronic lung disease, chest wall disease and sleep apnoea and leads to swelling of the legs. Congestive heart failure is characterised by:

- *Reduced blood flow:* the heart cannot pump enough blood to the muscles and organs, resulting in difficulty exercising, fatigue and dizziness. In early stages of the disease, these signs are apparent only when physical activity is increased. In advanced heart failure, many tissues and organs may not receive enough oxygen to function at rest.
- *Fluid congestion:* as the heart's pumping becomes less efficient, the body tries to compensate for it, often by increasing blood volume through fluid retention in the kidneys. Blood and fluid pressure result in excess fluid entering the lungs and other body tissues. Symptoms associated with fluid retention include shortness of breath and oedema (pooling of fluid in the tissues).

Introduction

The NSW public health system faces significant challenges in coming decades with an aging population and increasing prevalence of chronic diseases. In response, the Bureau has undertaken analyses to identify people with chronic obstructive pulmonary disease (COPD) and congestive heart failure (CHF) and profile their use of hospitals to inform efforts to improve care.

The Bureau's first report on this topic, *Chronic Disease Care: A piece of the picture*[1] provided information about the number of potentially avoidable admissions for COPD and CHF. Potentially avoidable admissions were defined very broadly, in line with national and international practice, to include those amenable to disease prevention, often decades prior to the hospitalisation.

The first report revealed that in 2009–10, COPD and CHF accounted for almost 170,000 public hospital bed days in NSW and that for each disease, over 40% of admissions were for stays of six days or longer.

In this report, the Bureau provides new insights into care for people with COPD or CHF by offering more information on hospitalisation and unplanned readmission patterns.

Section one of the report adopts a population perspective. That is, the information is about a cohort of adults with COPD and a cohort of adults with CHF, and their hospitalisation patterns throughout 2009–10.* It counts the number of times these people were admitted to hospital (0, 1, 2, 3 or more) and the total number of days spent in hospital. It also describes the use of hospitals among the adults with COPD or CHF who died in the year.

Section two of the report adopts a healthcare provider perspective. That is, the information is about hospitals and the likelihood that an adult hospitalised with a principal diagnosis of COPD or CHF was readmitted within 28 days of discharge. We present the actual number of readmissions and rates standardised by age and sex to support fairer comparisons between hospitals.

Schematic diagrams of the Bureau's approach are shown in Appendix 2 on page 26.

Insights into care

Regional and hospital differences in admission and readmission rates are influenced by variations in clinical decisions and quality of hospital care. They are also influenced by factors that are outside a hospital's control – including referral practices, access to community and primary care, and patient characteristics that have not been included in standardisation. Individual hospitals in reviewing their rates, should consider the extent to which they reflect appropriate care and where their own practices and models of care require modification.

* Adults who were admitted into any NSW public or private hospital between 1 July 2005 and 30 June 2009 with COPD or CHF listed in the first 20 diagnostic codes were used to track hospitalisation patterns in 2009–10.

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Population perspective

Adults with COPD or CHF and their hospitalisations

This section of the report adopts a population perspective. That is, the information is about adults who have COPD or CHF, or both conditions: whether they were admitted to hospital in the year 2009–10, how often and for how long. Using a cohort of adults with COPD and a cohort of adults with CHF, the report examines:

- how many times these adults were hospitalised
- the main reason for those hospitalisations
- the number of hospital bed days
- demographic characteristics of adults hospitalised 0, 1, 2, 3 or more times.

Since use of hospitals may increase before death, this section examines separately hospitalisation patterns for the adults with COPD and CHF who died, from any cause, in 2009–10.

Use of hospitals throughout 2009–10 by the adults with COPD and the adults with CHF are described on pages 4 to 11. Pages 4–5 and 8–9 examine hospital stays for any reason, or *all-cause hospitalisations*. Pages 6–7 and 10–11 examine how many times these adults were hospitalised and the number of bed days when either COPD or CHF was listed as the principal diagnosis (main reason) for their stay.

The COPD and CHF cohorts

In NSW there are no registries of adults with COPD and CHF. Therefore, in order to determine whether hospitalisation patterns differ across the state, the Bureau created two anonymised cohorts, one for COPD and one for CHF.
To compile these cohorts, the Bureau assumed that any adult admitted to any NSW public or private hospital between 1 July 2005 and 30 June 2009 with COPD or CHF in their hospitalisation record had these chronic conditions in 2009–10. Data on people who died on or before 30 June 2009 were excluded.

The cohorts comprise 48,279 adults with COPD; and 43,936 adults with CHF. There were 10,400 adults who were in both groups. Data from patients who died in 2009–10 from any cause were analysed separately from data from those who lived through the whole year. Throughout this report, the cohorts are referred to as ***'the adults with COPD'*** and ***'the adults with CHF'***.

For further details, see Appendix 2 on page 26 and *Technical Supplement: Chronic disease care: another piece of the picture*, available at www.bhi.nsw.gov.au

Hospitalisations among adults with COPD

Half of adults with COPD are hospitalised each year

Of the 42,967 adults with COPD who were alive throughout 2009–10:

- 50% had no admissions to any NSW public or private hospital (21,538 adults)
- 22% were admitted once for any reason (9,625 adults)
- 12% were admitted twice for any reason (5,082 adults) and
- 16% were admitted three or more times (6,722 adults).

The adults with COPD were admitted to public or private hospital 60,458 times (for any reason except dialysis). Almost six in 10 (57%) were emergency admissions. Figure 1 illustrates the principal diagnoses recorded for these admissions. Only 17% were principally for COPD.

Figures 2a and 2b show hospitalisation and total bed day patterns throughout the year, distinguishing between COPD, and other principal diagnoses. The number of COPD hospitalisations ranged from 636 in February (representing 14% of all-cause hospitalisations that month) to 1,212 (representing 21%) in July (Figure 2a).

In 2009–10, the adults with COPD were in any hospital for 336,885 bed days which is 5% of the 7.1 million bed days (excluding dialysis) in NSW. COPD-specific bed days ranged from 4,298 in February (representing 15% of all-cause bed days that month) to 8,090 (24%) in July (Figure 2b).

Figure 1: Principal reasons for hospitalisation (public and private) among the adults with COPD (excluding dialysis), 2009–10#^

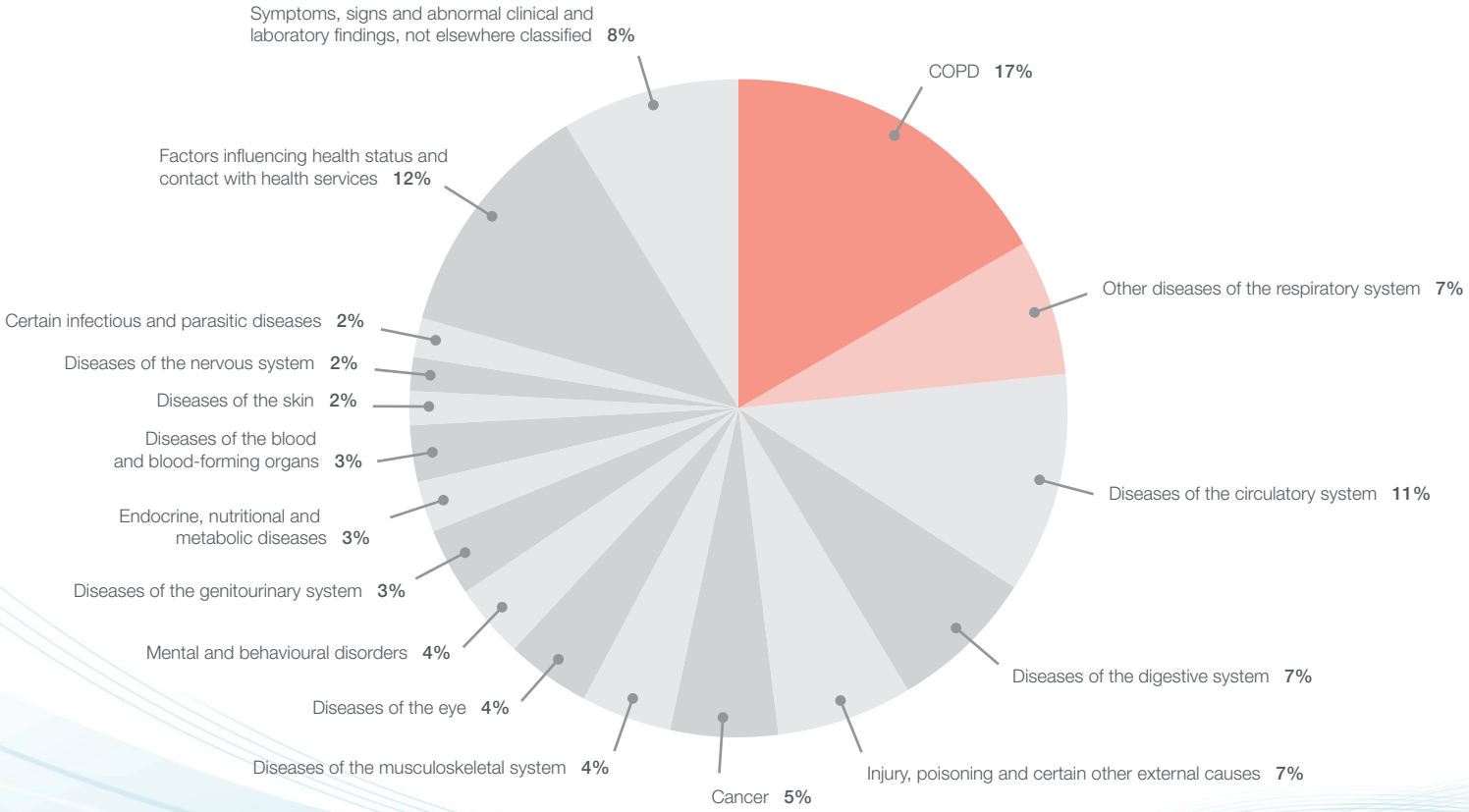


Figure 2a: Number of hospitalisations (public and private) excluding dialysis among the adults with COPD, by principal diagnosis, calendar months, 2009–10#^

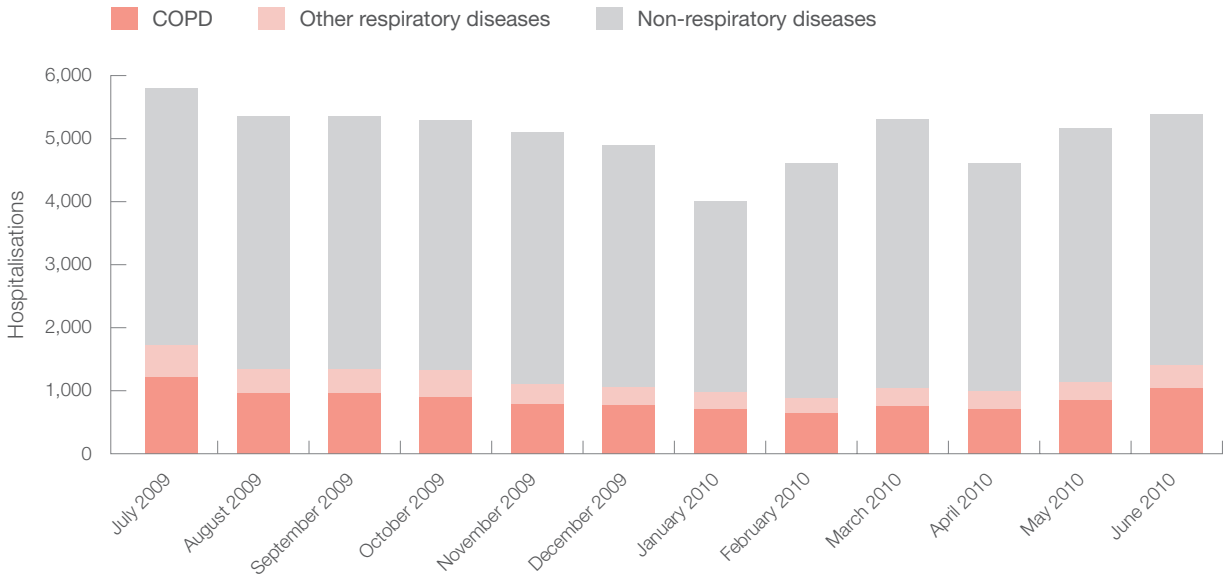
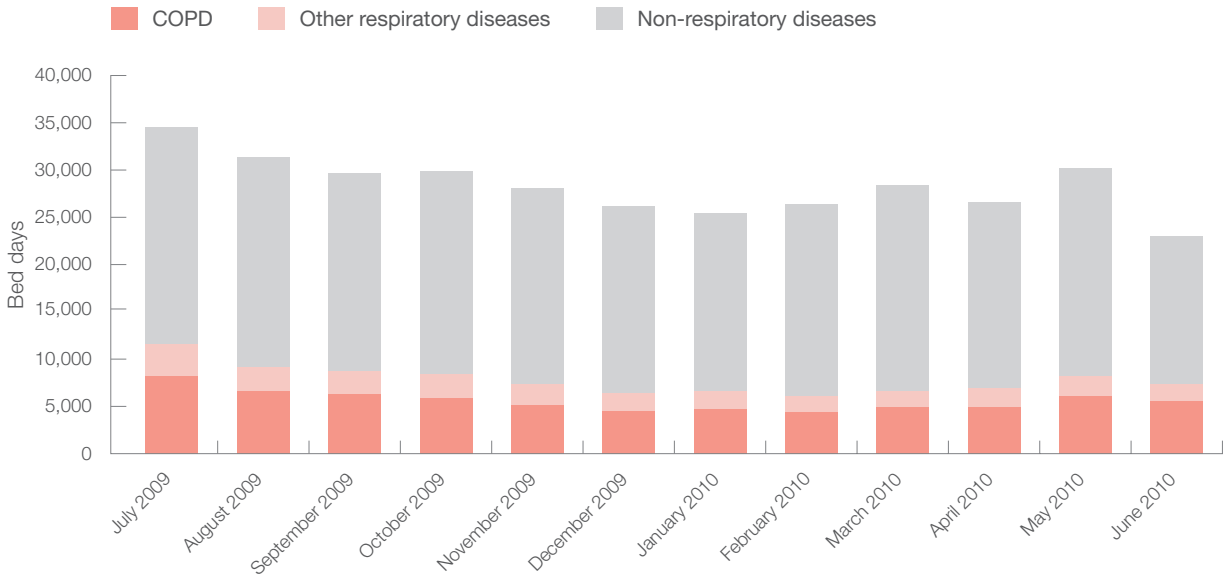


Figure 2b: Total bed days (public and private) excluding dialysis among the adults with COPD, by principal diagnosis, calendar months, 2009–10#^



(#) Principal diagnoses are aggregated to ICD-10 chapters, with the exception of diseases of the respiratory system, which are partially disaggregated to show COPD-specific hospitalisations.

(^) Anonymised records of adults admitted into hospital between July 2005 and June 2009, with COPD listed in the first 20 diagnostic codes were analysed for any admission in 2009–10.

Note: Total all-cause admissions (public and private) for adults with COPD (excluding dialysis) in 2009–10 were 60,458 (77% public and 23% private). There were a further 24,352 admissions for dialysis.

Note: June 2010 data only include patients discharged within the calendar month.

Source: HOIST, Centre for Epidemiology and Evidence, NSW Ministry of Health[2]. Data extracted 8 August, 2011.

How often are adults with COPD admitted for COPD?

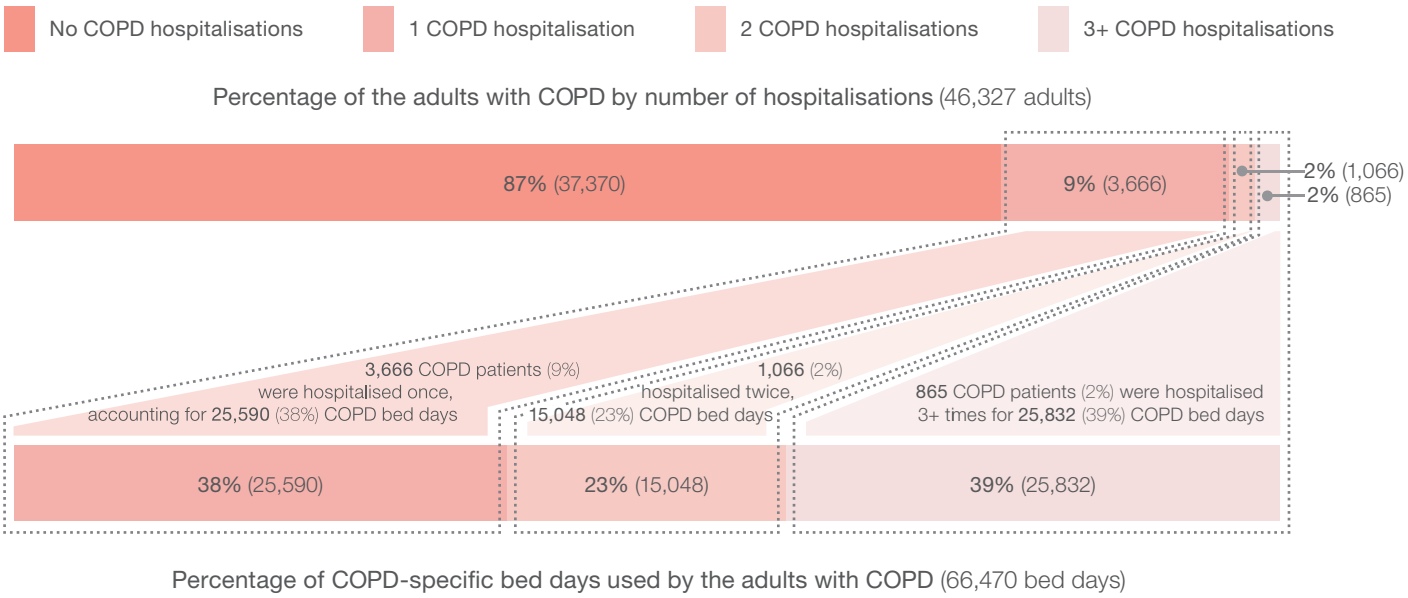
A small number of patients are hospitalised frequently

Of the 42,967 adults with COPD who were alive throughout 2009–10, there were 10,214 hospitalisations principally for COPD, accounting for 66,470 COPD-specific bed days in public or private hospitals. Among those who were hospitalised for COPD, a small number accounted for a lot of hospital time:

- Almost nine in 10 of the COPD cohort (37,370; 87%) had no COPD-specific hospitalisations in 2009–10
- Fewer than one in 10 (3,666; 9%) were admitted for COPD once and accounted for 25,590 (38%) COPD bed days
- A small number (1,066; 2%) were hospitalised twice and accounted for 15,048 (23%) of COPD bed days
- The remaining 865 adults (2%) were hospitalised for COPD three or more times in the year and this group accounted for 25,832 (39%) of COPD bed days (Figure 3).

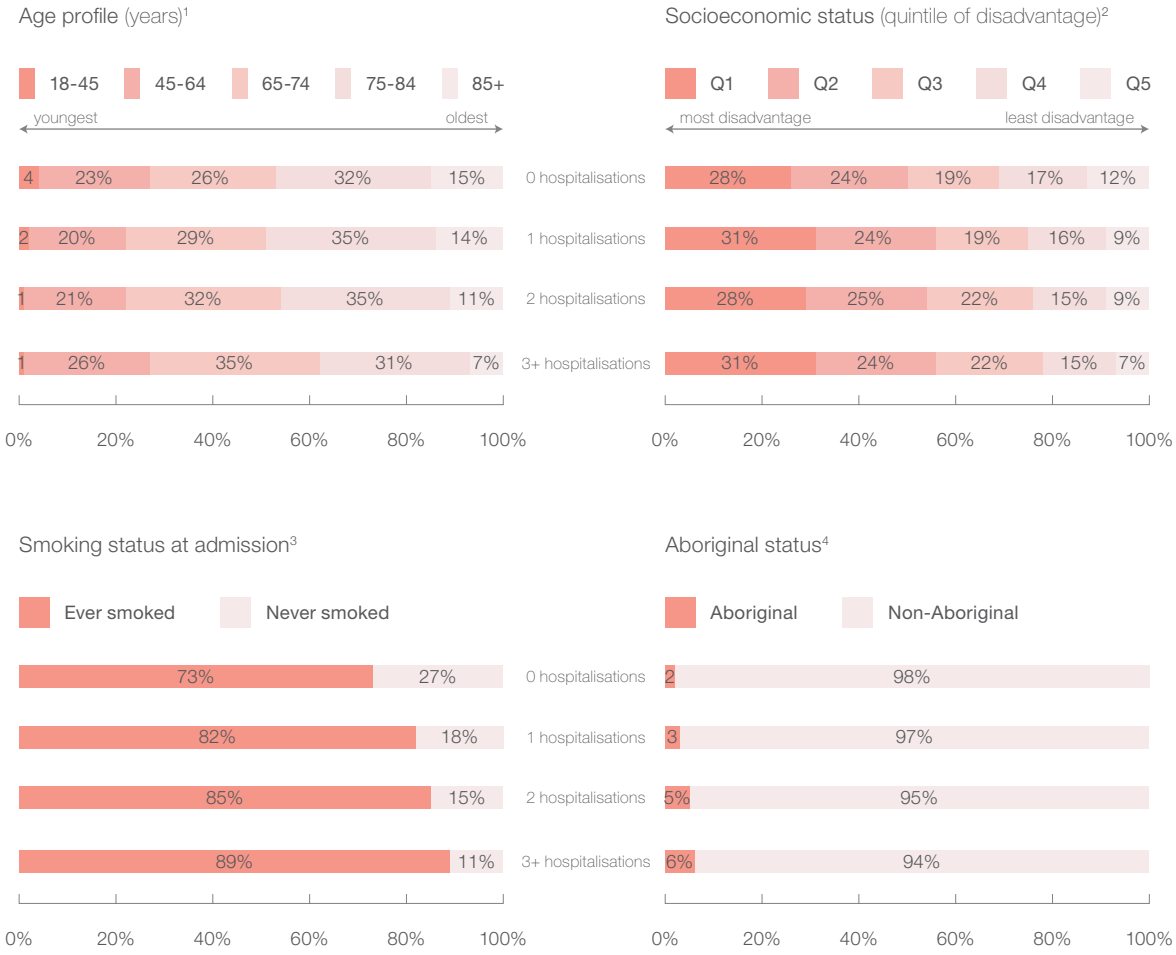
Those who had three or more hospitalisations were more likely to have smoked, and to live in disadvantaged socioeconomic areas (Figure 4).

Figure 3: Frequency of COPD hospitalisations throughout the year and associated bed days, adults with COPD, 2009–10



Note: Hospitalisation counts are episodes of care for which COPD was coded as the principal diagnosis (ICD codes are listed on page 26). Excludes admissions for dialysis. If two episodes of care with primary diagnosis of COPD were separated only by a type change separation or a transfer, then these two episodes were treated as one hospitalisation.
Note: Total COPD hospitalisations for adults with COPD was 10,214 (94% public and 6% private) in 2009–10.
Note: COPD-specific bed days are the number of days in hospital with a principal diagnosis of COPD. In 2009–10, there were 66,470 COPD-specific bed days (92% public and 8% private).
Source: HOIST, Centre for Epidemiology and Evidence, NSW Ministry of Health[2]. Data extracted 8 August, 2011.

Figure 4: Socio-demographic characteristics of the adults with COPD who were admitted zero, once, twice or three or more times for COPD, 2009–10



1. Age as at 1 July 2009; other demographic information is latest recorded in the cohort list of COPD patients.
2. Socioeconomic status defined as per Index of Relative Socioeconomic Disadvantage (IRSD) quintiles, based on patient postcode.
3. Smoking status *ever*: any diagnosis code indicating current OR previous smoker between July 2005 and June 2009; smoking status *never*: no current or previous smoker codes.
4. We use the term Aboriginal, rather than Aboriginal and Torres Strait Islander in line with NSW Health usage, which recognises that Aboriginal people are original inhabitants of NSW.

Note: For context, 2% of NSW adults are aged 85+; 20% of the population are in the most disadvantaged quintile; 19% of NSW people aged 16+ years currently smoke; 2% of the NSW population is Aboriginal.

Source: HOIST, Centre for Epidemiology and Evidence, NSW Ministry of Health[2]. Data extracted 8 August, 2011.

Hospitalisations among adults with CHF

Half of adults with CHF are hospitalised each year

Of the 37,031 adults with CHF who were alive throughout 2009–10:

- 49% had no hospitalisations (public or private) (18,169 adults)
- 22% were hospitalised for any reason once (8,164 adults)
- 12% were hospitalised twice (4,480 adults) and
- 17% were hospitalised three or more times (6,218 adults).

The adults with CHF were admitted to a public or private hospital 54,969 times (for any reason except dialysis). Almost six in 10 (57%) were emergency admissions. Figure 5 illustrates the principal diagnoses recorded for these hospitalisations. Only 7% were principally for CHF.

Figures 6a and 6b show hospitalisation and total bed day patterns throughout the year, distinguishing between CHF, and other principal diagnoses. The number of CHF hospitalisations ranged from 252 in January (representing 7% of all-cause hospitalisations that month) to 436 (representing 9%) in June (Figure 6a).

In 2009–10, the adults with CHF were in any hospital for 333,504 bed days which is 5% of the 7.1 million bed days (excluding dialysis) in NSW. CHF-specific bed days ranged from 1,643 in December (representing 7% of all-cause bed days that month) to 2,902 (9%) in August (Figure 6b).

Figure 5: Principal reasons for hospitalisation (public and private) among the adults with CHF (excluding dialysis), 2009–10#^

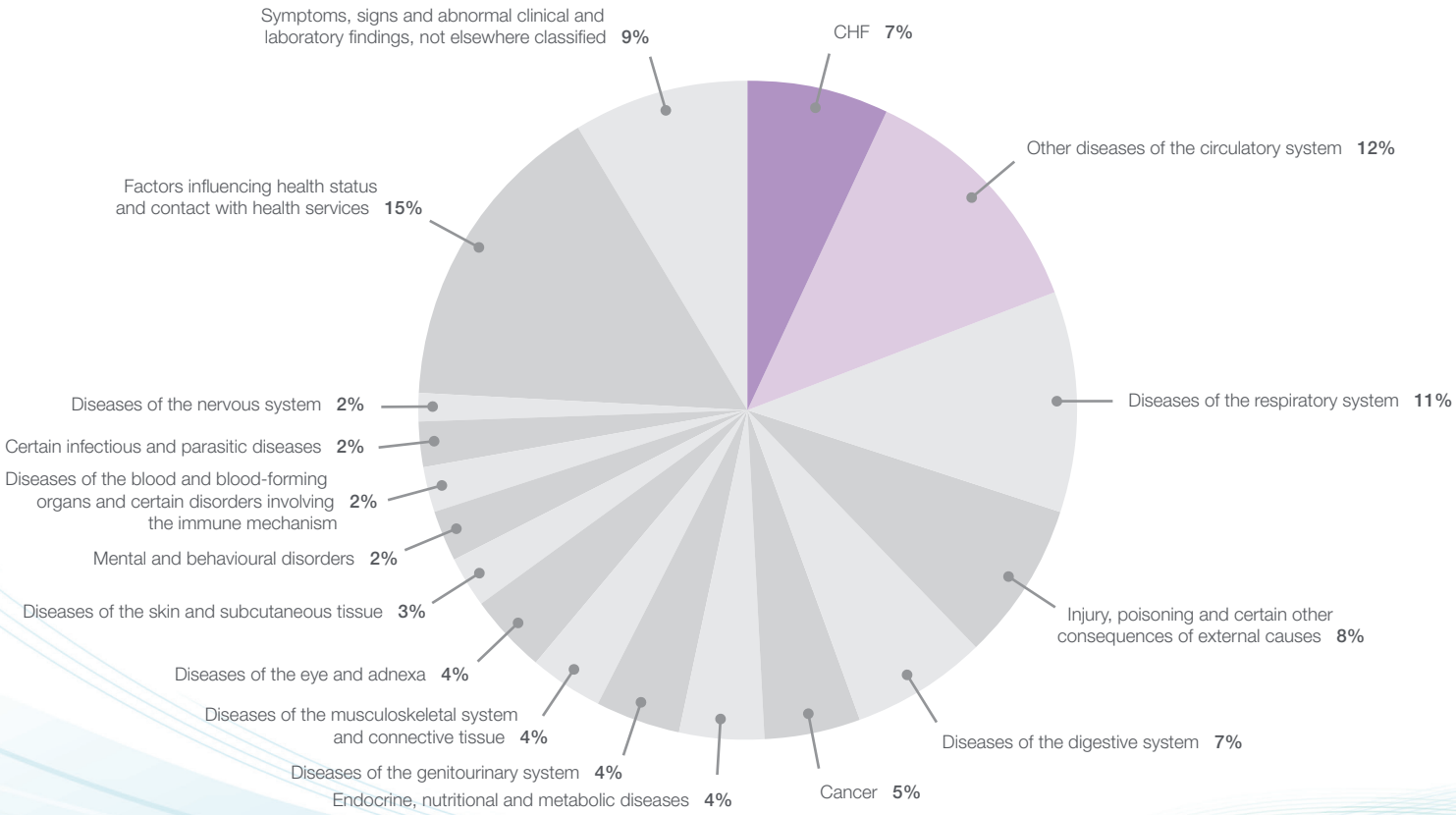


Figure 6a: Number of hospitalisations (public and private) excluding dialysis among the adults with CHF, by principal diagnosis, calendar months, 2009–10#^

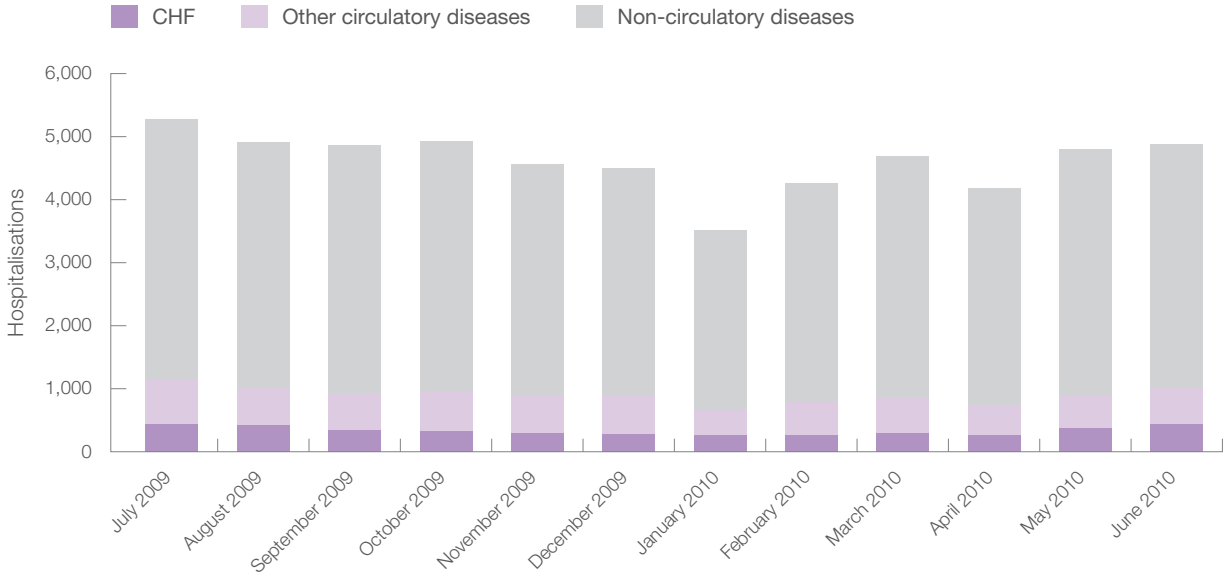
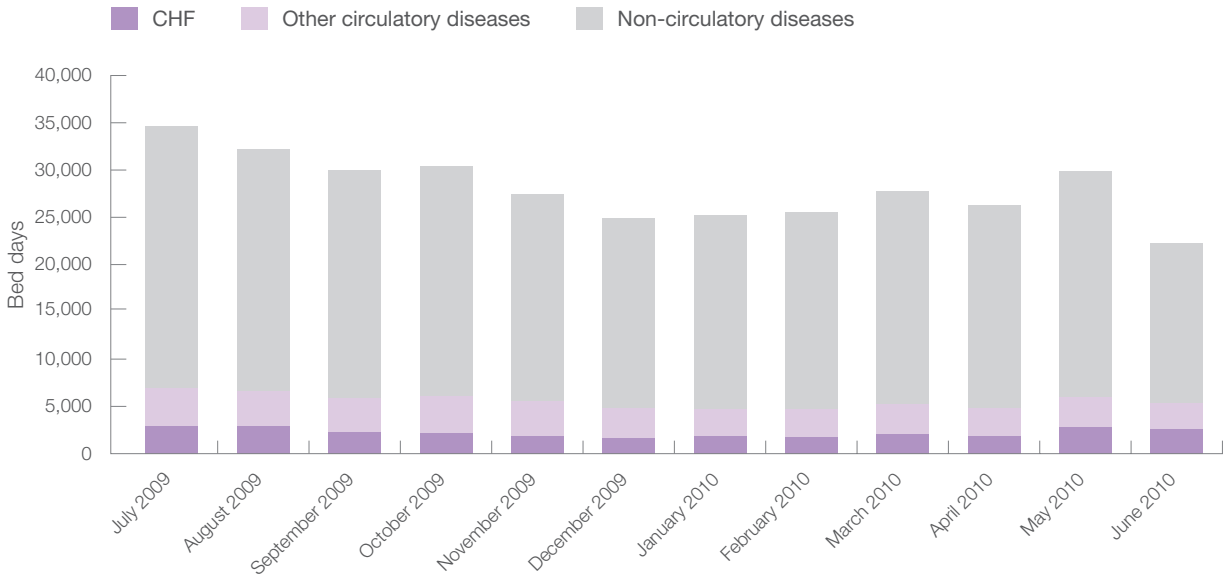


Figure 6b: Total bed days (excluding dialysis) among the adults with CHF, by principal diagnosis, calendar months, 2009–10#^



(#) Principal diagnoses are aggregated to ICD-10 chapters, with the exception of diseases of the circulatory system, which are partially disaggregated to show CHF-specific hospitalisations.

(^) Anonymised records of adults admitted into hospital between July 2005 and June 2009, with CHF listed in the first 20 diagnostic codes were analysed for any hospitalisations in 2009–10.

Note: Total all-cause admissions (public and private) for adults with CHF (excluding dialysis) in 2009–10 were 54,969 (75% public and 25% private). There were a further 66,594 admissions for dialysis.

Note: June 2010 data only include patients discharged within the calendar month.

Source: HOIST, Centre for Epidemiology and Research, NSW Ministry of Health[2]. Data extracted 8 August, 2011.

How often are adults with CHF admitted for CHF?

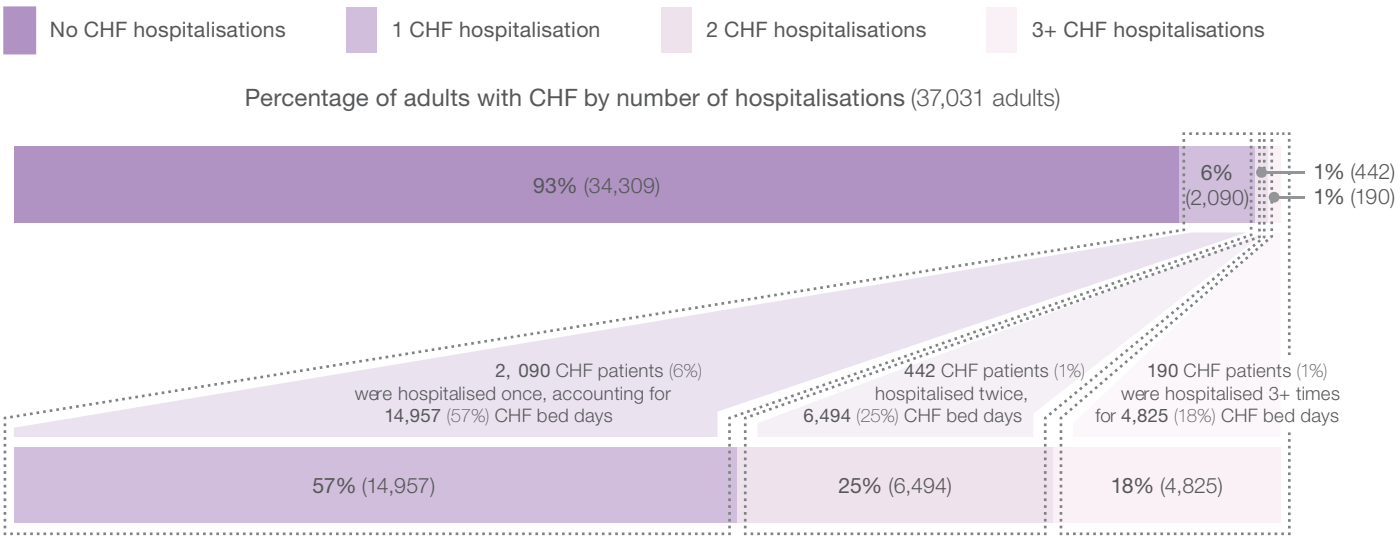
A small number of patients are hospitalised frequently

Of the 37,031 adults with CHF who were alive throughout 2009–10, there were 3,931 hospitalisations principally for CHF for a total of 26,276 CHF-specific bed days in public and private hospitals. Among those who were hospitalised for CHF, a small number accounted for a lot of hospital time:

- Over nine in 10 adults in the CHF cohort (34,309; 93%) had no CHF-specific hospitalisations in 2009–10
- About one in 20 (2,090; 6%) were admitted for CHF once and accounted for 14,957 (57%) of CHF bed days
- A small number (442; 1%) were hospitalised twice and accounted for 6,494 (25%) of CHF bed days
- The remaining 190 adults (1%) were admitted for CHF three or more times in the year and this group accounted for 4,825 (18%) of CHF bed days (Figure 7).

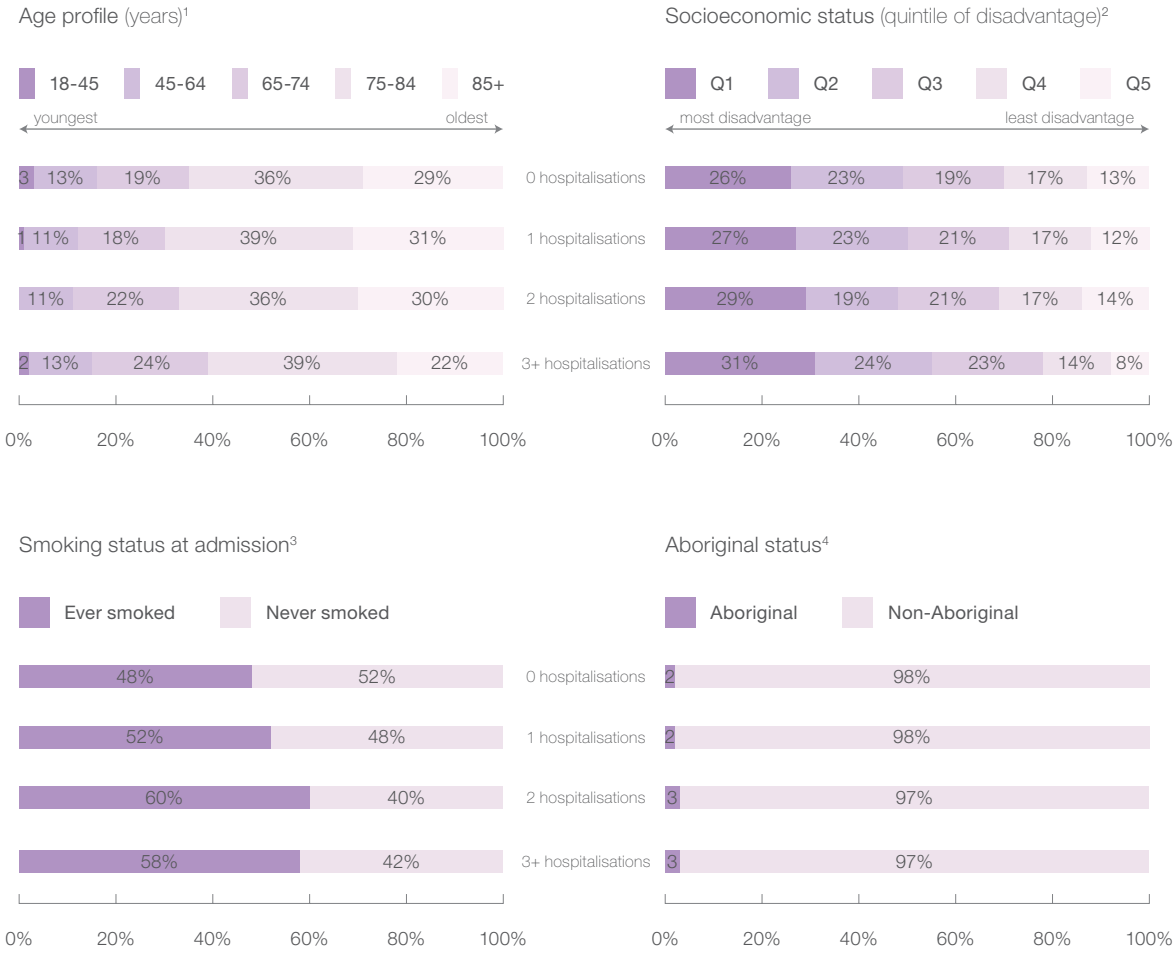
Those who had three or more hospitalisations in 2009–10 were more likely to live in disadvantaged socioeconomic areas (Figure 8).

Figure 7: Frequency of CHF hospitalisations throughout the year and associated bed days, adults with CHF, 2009–10



Note: Hospitalisation counts are episodes of care for which CHF was coded as the principal diagnosis (ICD codes are listed on page 26). Excludes admissions for dialysis. If two episodes of care with primary diagnosis of CHF were separated only by a type change separation or a transfer, then these two episodes were treated as one hospitalisation.
Note: Total CHF hospitalisations for adults with CHF was 3,931 (90% public and 10% private) in 2009–10.
Note: CHF-specific bed days are the number of days in hospital with a principal diagnosis of CHF. Total CHF bed days for CHF adults was 26,276 (87% public and 13% private) in 2009–10.
Source: HOIST, Centre for Epidemiology and Research, NSW Ministry of Health[2]. Data extracted 8 August, 2011.

Figure 8: Socio-demographic characteristics of the adults with CHF who were admitted zero, once, twice or three or more times for CHF, 2009–10



1. Age as at 1 July 2009; other demographic information is latest recorded in the cohort list of CHF patients.
2. Socioeconomic status defined as per Index of Relative Socioeconomic Disadvantage (IRSD) quintiles, based on patient postcode.
3. Smoking status *ever*: any diagnosis code indicating current OR previous smoker between July 2005 and June 2009; smoking status *never*: no current or previous smoker codes.
4. We use the term Aboriginal, rather than Aboriginal and Torres Strait Islander in line with NSW Health usage, which recognises that Aboriginal people are original inhabitants of NSW.

Note: For context, 2% of NSW adults are aged 85+; 20% of the population are in the most disadvantaged quintile; 19% of NSW people aged 16+ years currently smoke; 2% of the NSW population is Aboriginal.

Source: HOIST, Centre for Epidemiology and Evidence, NSW Ministry of Health[2]. Data extracted 8 August, 2011

Adults with COPD or CHF who died in 2009–10

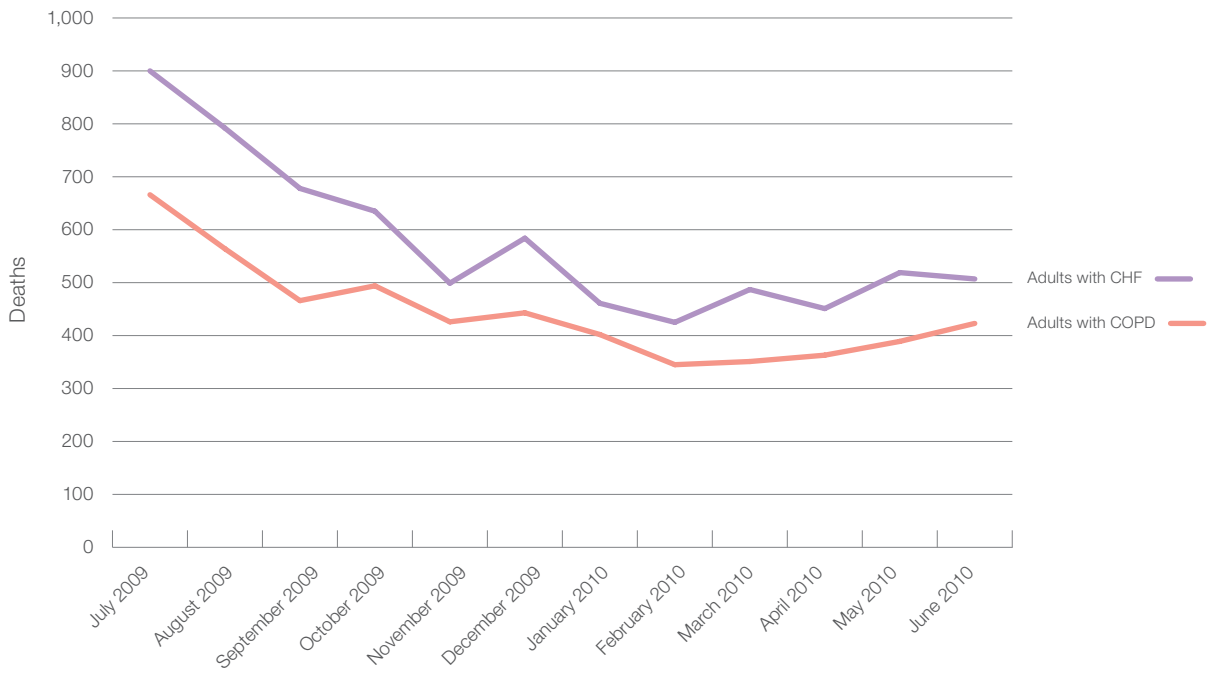
Few of the deceased were hospitalised for COPD or CHF

A total of 5,312 of the adults with COPD and 6,905 of those with CHF died during 2009–10. Of these adults, 2,102 had both COPD and CHF. Figure 9 shows seasonal variation in the monthly tally of deaths with twice as many deaths in July as in February.

Among the 5,312 adults with COPD who died, there were 13,622 hospitalisations (any cause, excluding dialysis) during the year; and 2,317 hospitalisations with a principal diagnosis of COPD. Around three-quarters of the deceased (74%) had no COPD-specific hospitalisations (Figure 10a). The total number of COPD-specific bed days was 21,447, with very few of those who died experiencing long periods of hospital care for their COPD (Figure 10b).

Among the 6,905 adults with CHF who died during 2009–10, there were 20,226 hospitalisations (any cause, excluding dialysis) and 1,830 hospitalisations with a principal diagnosis of CHF. Eight in 10 of the deceased (81%) had no CHF hospitalisations (Figure 10a). The number of CHF-specific bed days was 18,836, with very few of the deceased experiencing long periods of hospital care (Figure 10b).

Figure 9: Number of deaths among adults in the COPD and CHF cohorts, by calendar month, 2009–10



Note: Records for adults alive on 1 July 2009 who had been admitted into hospital between July 2005 and June 2009, with COPD or CHF listed in the first 20 diagnostic codes were analysed for those who died from any cause during 2009–10.
Source: HOIST, Centre for Epidemiology and Evidence, NSW Ministry of Health[2]. Data extracted 8 August, 2011.

Figure 10a: Hospitalisations among the adults with COPD and CHF who died during 2009–10

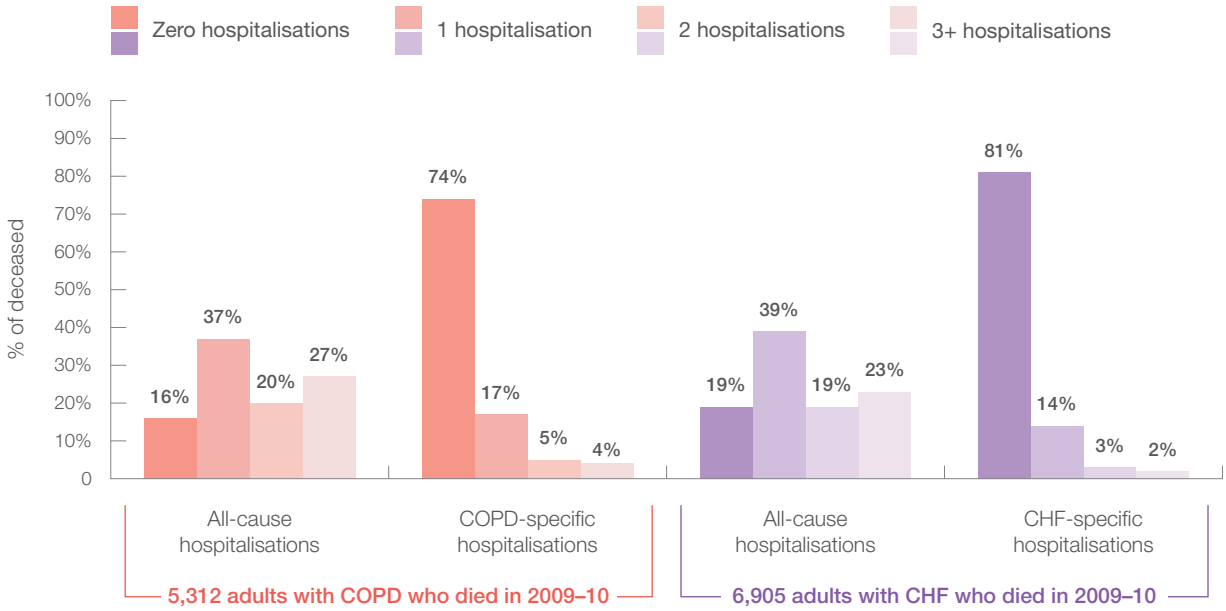
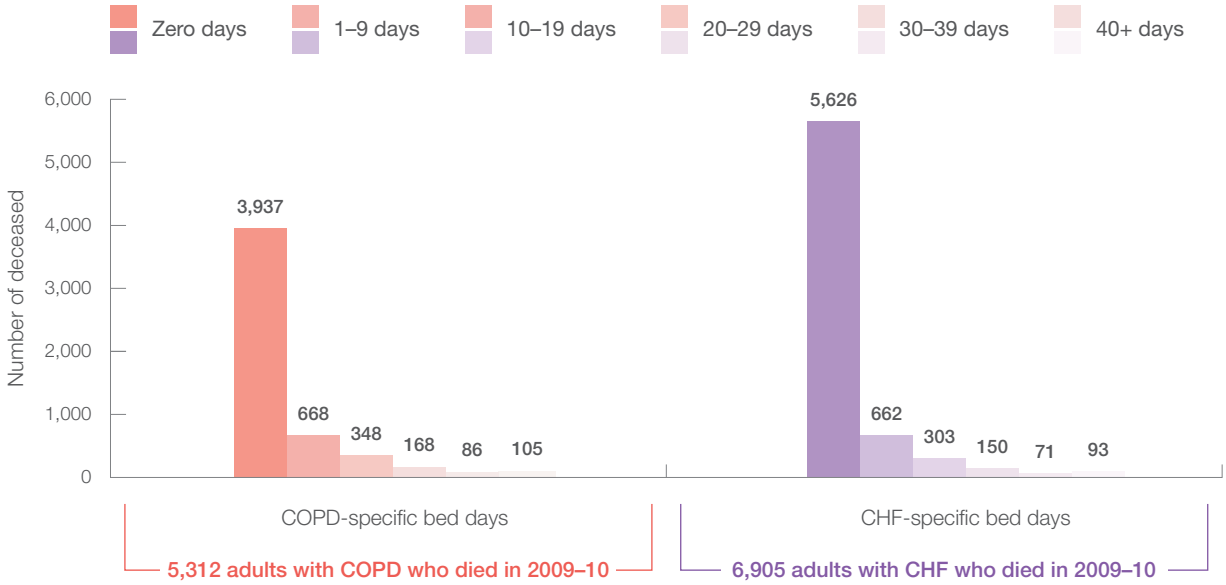


Figure 10b: Condition-specific bed day profile among the adults with COPD and CHF who died during 2009–10



Note: Anonymised lists of adults admitted into hospital between July 2005 and June 2009, with COPD or CHF listed in the first 20 diagnostic codes were analysed to identify those who died from any cause during 2009–10.

Note: Hospitalisation counts refer to episodes of care. Episodes where COPD or CHF are listed as principal diagnosis are deemed COPD-specific or CHF-specific hospitalisations (for relevant ICD codes, see page 26). Episodes of care that are only separated by a type change separation or transfer are treated as a single episode of care.

Note: Bed days are difference between the start and end of the period of care with a principal diagnosis of COPD or CHF (for relevant ICD codes, see page 26).

Source: HOIST, Centre for Epidemiology and Evidence, NSW Ministry of Health[2]. Data extracted 8 August, 2011.

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Hospital perspective

Unplanned readmission rates for adults with COPD and CHF

This second section of the report adopts a hospital perspective – looking at unplanned readmissions to hospital for COPD or CHF within 28 days of discharge. It examines all principal diagnosis hospitalisations for COPD and CHF, not only those for the cohorts used in section one.

Unplanned readmissions are regarded by many to present opportunities to improve care, for example in discharge planning, coordination of services or access to appropriate community-based care.[3, 4] Differences between hospitals in unplanned readmission rates are influenced by variations in clinical decision making and, potentially, quality of hospital care.

When comparing hospitals, be aware that:

- Not all unplanned readmissions are avoidable[5]
- Many readmissions are medically appropriate due to an unavoidable change in condition[6]
- Readmission rates are affected by patient characteristics that might differ between hospitals[7] or the propensity to admit a patient at all.[8]

Currently there is no method to identify ***avoidable*** readmissions and compare hospitals with complete accuracy.[5, 9, 10] The Bureau is working with researchers to improve approaches to measuring avoidable use of hospitals.

This section reports hospital data for unplanned readmission rates (standardised by age and sex). Further information on Local Health District results is available in Appendix 3 on page 30.

Standardisation to support fairer comparisons

To support fairer comparisons between hospitals, unplanned readmission rates have been standardised by age and sex to show how hospitals would rate if they served similar populations of patients.

There may be other characteristics of patients that differ between hospitals and influence rates, but the Bureau could not include them as the statistical models became unstable. The Bureau determined that there were only small differences in the socioeconomic status and clinical complexity of the admitted patients (as indicated by DRG coding*) between hospitals with high or low unplanned readmission rates.

Methods used to standardise unplanned readmissions and results of analyses to compare hospitals is available in the *Technical Supplement: Chronic disease care: another piece of the picture*, available at www.bhi.nsw.gov.au

* Diagnosis-related groups (DRG) are a way of classifying hospital cases. It includes codes for cases with catastrophic or severe comorbidities or complications.

Unplanned readmissions

Readmissions to any hospital within 28 days

Unplanned readmissions for COPD

In 2009–10, there were 17,469 hospitalisations in NSW for which COPD was the principal diagnosis.[#] Of these, 2,270 were followed by a subsequent unplanned hospitalisation for COPD within 28 days of discharge (condition-specific readmissions). The NSW unplanned readmission rate was 13.0 per 100 discharges.

The total number of ***adults*** hospitalised for COPD during 2009–10 was 11,927. Almost nine in 10 (88%) had no unplanned COPD readmissions within 28 days of discharge. About one in 10 (8%) had one COPD readmission. A very small proportion of adults hospitalised during the year for COPD (4%) were readmitted more than once. Across NSW, 95 adults were readmitted four or more times for COPD. Adults who are hospitalised frequently were more likely to experience unplanned COPD readmissions. However, there were no discernible patterns in the frequently readmitted group in geography or socio-demographics.

Figure 11 illustrates age- and sex-standardised readmission rates for COPD among larger NSW public hospitals.

Markers representing NSW public hospitals are:

- colour-coded according to peer group
- sized according to the relative number of COPD principal diagnosis hospitalisations in 2009–10
- grouped according to geographic location.

Unplanned readmission rates

Figures 11 and 12 illustrate unplanned readmission rates for COPD and CHF in NSW public hospitals, standardised for age and sex. In interpreting the graphs, it should be noted that:

- Some unplanned readmissions may be clinically appropriate
- Some factors that impact readmissions are outside the direct control of the hospital
- Other hospital-level factors may be amenable to local change and improvement efforts.

Individual hospitals, in reviewing their rates, should consider the context and local circumstances that shape unplanned readmissions and the extent to which they can be addressed.

Comparing within peer groups: unplanned readmissions for COPD

Standardised readmission rates for COPD in referral hospitals (A) ranged from 8.7 per 100 discharges at Royal North Shore to 15.5 per 100 discharges at Royal Prince Alfred hospital.

For major metropolitan hospitals (BM), readmission rates for COPD ranged from 6.4 per 100 discharges at Sutherland to 17.9 per 100 discharges at Mona Vale hospital.

(#) Most (93%) hospitalisations for COPD in NSW occurred in public hospitals.

Figure 11: Unplanned readmissions for COPD within 28 days of discharge, standardised rates, large NSW public hospitals, by geographical area, 2009–10

(†) **Interpret with caution:** rates with a relative standard error (RSE) ≥30% and <40% (rates with RSE of ≥40% are suppressed).

Note: Readmission rate is defined as COPD discharges followed by unplanned COPD readmissions to any NSW hospital within 28 days, as a proportion of total COPD principal diagnosis hospitalisations. Rates are directly standardised to the NSW admitted COPD patient population 2009–10 on the basis of age and sex.

Note: Relevant ICD codes for COPD are listed on page 26.

Note: Adults who died in 2009–10 are included in the analysis. The standardised rates for each hospital did not change in a significant way whether or not the analysis included adults who died during the year.

Source: HOIST, Centre for Epidemiology and Evidence, NSW Ministry of Health[2]. Data extracted 8 August, 2011.

Among major non-metropolitan hospitals (BNM), the lowest readmission rate for COPD was recorded at Wagga Wagga (8.5 per 100 discharges) and the highest was recorded at Orange hospital (17.2 per 100 discharges).

Unplanned readmissions for CHF

In 2009–10, there were 11,088 hospitalisations for which CHF was the principal diagnosis. Of these, 977 were followed by a subsequent unplanned CHF hospitalisation within 28 days of discharge (condition specific readmissions). The NSW unplanned readmission rate was 8.8 per 100 discharges.

The total number of ***adults*** hospitalised for CHF during 2009–10 was 8,864. Nine in 10 (92%) had no CHF readmissions within 28 days of discharge. Fewer than one in 10 (7%) had one CHF readmission. A very small proportion of adults hospitalised during the year for CHF (2%) had two or more CHF readmissions. Across NSW, only 19 adults were readmitted four or more times for CHF. Adults who are hospitalised frequently were more likely to experience unplanned CHF readmissions. However, there were no discernible patterns in the frequently readmitted group in geography or socio-demographics.

Figure 12 illustrates age- and sex-standardised readmission rates for CHF among larger NSW public hospitals.

Markers representing NSW public hospitals are:

- colour-coded according to peer group
- sized according to the number of CHF-principal diagnosis hospitalisations per year
- grouped according to geographic location.

Comparing within peer groups: unplanned readmissions for CHF

The standardised readmission rates for CHF in referral hospitals (A) ranged from 5.6 per 100 discharges at John Hunter to 11.9 per 100 discharges at Wollongong hospital.

For major metropolitan hospitals (BM), CHF readmission rates ranged from 6.1 per 100 discharges at Manly to 12.7 per 100 discharges at Auburn hospital.

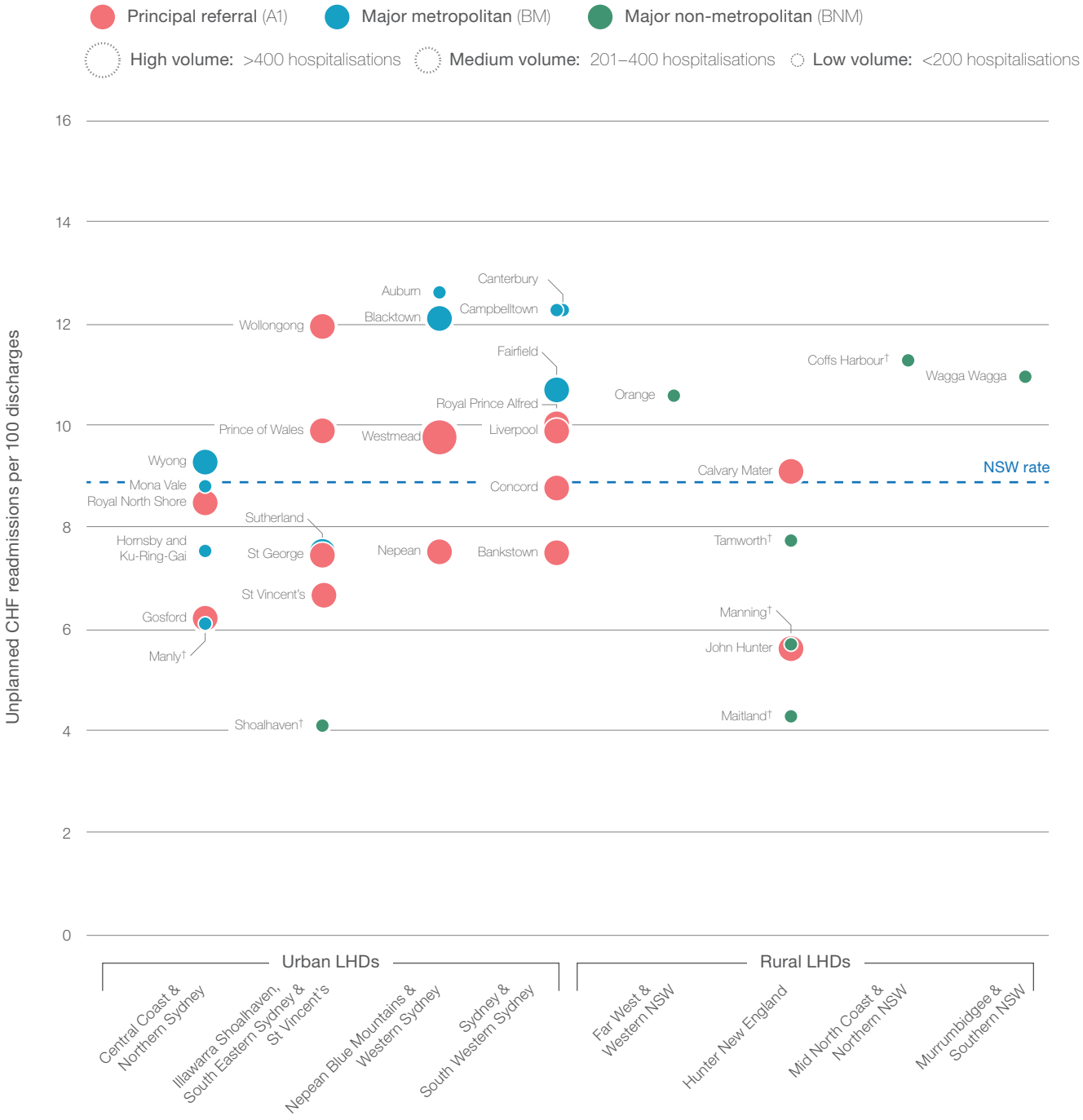
Among major non-metropolitan hospitals (BNM), the lowest CHF readmission rate was recorded at Maitland (4.3 per 100 discharges) and the highest was recorded at Coffs Harbour hospital (11.2 per 100 discharges).

Going forward

Improvements in community and hospital care help people who have COPD and CHF better manage their disease and avoid unplanned readmission to hospital.

Describing use of hospitals by adults with COPD and CHF and identifying hospitals and geographic areas that have high unplanned readmission rates can help inform efforts to improve patient care.

Figure 12: Unplanned readmissions for CHF within 28 days of discharge, standardised rates, large NSW public hospitals, by geographical area, 2009–10



(†) **Interpret with caution:** rates with a relative standard error (RSE) ≥30% and <40% (rates with RSE of ≥40% are suppressed).

Note: Readmission rate is defined as CHF discharges followed by unplanned CHF readmissions to any NSW hospital within 28 days, as a proportion of total CHF principal diagnosis hospitalisations. Rates are directly standardised to the NSW admitted CHF patient population 2009–10 on the basis of age and sex.

Note: Relevant ICD codes for CHF are listed on page 26.

Note: The standardised rates for each hospital did not change in a significant way whether or not the analysis included adults who died during the year.

Source: HOIST, Centre for Epidemiology and Evidence, NSW Ministry of Health[2]. Data extracted 8 August, 2011.

Appendix 1: Hospital and LHD comparison tables

Appendix table 1.1: Adults hospitalised, hospitalisation patterns and unplanned readmissions for COPD, by LHDs, July 2009 to June 2010

	COPD patients hospitalised[1]	Number of COPD hospitalisations[2]	Crude readmission rate[3]	Standardised readmission rate[4]	Percent coded as severe[5]	Percent most disadvantaged quintile[6]
Total NSW						
Public hospitals	11,671	17,071	13.0	13.0	34	31
Private hospitals	336	398	5.0	4.2	28	4
Total NSW	12,007	17,469	13.0	13.0	34	31
Central Coast Local Health District (CCLHD)						
Gosford Hospital	401	539	11.3	11.3	35	2
Wyong Hospital	449	650	10.6	10.4	40	42
Other CCLHD	0	0	n/a	n/a	n/a	n/a
Total CCLHD	836	1,189	10.9	10.9	38	24
Far West Local Health District (FWLHD)						
Other FWLHD	85	113	8.0	6.2†	28	95
Total FWLHD	85	113	8.0	6.2†	28	95
Hunter New England Local Health District (HNELHD)						
Calvary Mater Newcastle	268	326	10.7	10.4	48	52
John Hunter Hospital	321	434	13.8	13.0	34	14
Maitland Hospital	196	270	12.2	10.2	46	18
Manning Base Hospital	140	205	18.0	16.9	41	95
Tamworth Base Hospital	152	197	10.7	8.9	30	12
Other HNELHD	673	937	12.9	12.6	27	44
Total HNELHD	1,678	2,369	13.0	13.1	35	38
Illawarra Shoalhaven Local Health District (ISLHD)						
Shoalhaven & Dist. Memorial Hospital	209	276	11.6	10.5	22	36
Wollongong Hospital	325	439	13.0	13.0	30	32
Other ISLHD	351	506	15.6	15.5	27	39
Total ISLHD	828	1,221	13.8	13.6	27	36
Mid North Coast Local Health District (MNCLHD)						
Coffs Harbour Base Hospital	202	282	12.8	12.2	41	30
Port Macquarie Base Hospital	192	265	13.6	11.6	40	20
Other MNCLHD	224	307	12.7	12.5	34	85
Total MNCLHD	608	854	13.0	12.9	38	47
Murrumbidgee Local Health District (MLHD)						
Wagga Wagga Base Hospital	170	226	8.8	8.5	23	11
Other MLHD	530	803	16.6	15.9	38	22
Total MLHD	684	1,029	14.9	14.6	35	20
Nepean Blue Mountains Local Health District (NBMLHD)						
Nepean Hospital	317	458	13.5	13.6	23	16
Other NBMLHD	244	337	11.9	11.4	26	20
Total NBMLHD	551	795	12.8	12.9	24	18

	COPD patients hospitalised[1]	Number of COPD hospitalisations[2]	Crude readmission rate[3]	Standardised readmission rate[4]	Percent coded as severe[5]	Percent most disadvantaged quintile[6]
Northern NSW Local Health District (NNSWLHD)						
Lismore Base Hospital	154	196	9.7	9.2	28	21
The Tweed Hospital	253	363	12.9	11.9	23	30
Other **NNSWLHD**	364	493	14.0	13.5	31	45
Total **NNSWLHD**	**749**	**1,052**	**12.8**	**12.6**	**28**	**35**
Northern Sydney Local Health District (NSLHD)						
Hornsby and Ku-Ring-Gai Hospital	112	140	9.3	10.0†	48	2
Manly District Hospital	114	169	16.0	16.1	41	1
Mona Vale and District Hospital	115	164	17.1	17.9	47	0
Royal North Shore Hospital	190	245	8.2	8.7	42	1
Other **NSLHD**	171	240	14.2	14.1	39	0
Total **NSLHD**	**685**	**958**	**12.7**	**14.4**	**43**	**1**
South Eastern Sydney Local Health District (SESLHD)						
Prince of Wales Hospital	292	424	14.4	13.4	32	2
St George Hospital	283	382	10.2	10.4	26	3
Sutherland Hospital	152	189	6.3	6.4†	29	0
Other **SESLHD**	23	25	12.0	*	52	4
Total **SESLHD**	**739**	**1,020**	**11.3**	**11.2**	**30**	**2**
Southern NSW Local Health District (SNSWLHD)						
Other **SNSWLHD**	437	617	12.5	11.0	27	7
Total **SNSWLHD**	**437**	**617**	**12.5**	**11.0**	**27**	**7**
South Western Sydney Local Health District (SWSLHD)						
Bankstown / Lidcombe Hospital	319	430	11.2	11.1	44	62
Campbelltown Hospital	259	393	15.3	15.0	35	7
Fairfield Hospital	200	298	12.8	11.3	36	66
Liverpool Hospital	407	595	14.8	13.8	47	81
Other **SWSLHD**	92	121	9.9	9.0	42	1
Total **SWSLHD**	**1,249**	**1,837**	**13.4**	**13.3**	**42**	**53**
St Vincent's Health Network (SVHN)						
St Vincent's Hospital, Darlinghurst	176	236	11.0	9.5	47	10
Total **SVHN**	**176**	**236**	**11.0**	**9.5**	**47**	**10**
Sydney Local Health District (SYDLHD)						
Canterbury Hospital	160	227	15.4	14.7	53	47
Concord Hospital	217	292	10.6	11.7	46	9
Royal Prince Alfred Hospital	364	554	15.9	15.5	39	12
Other **SYDLHD**	*	*	n/a	n/a	n/a	n/a
Total **SYDLHD**	**728**	**1,076**	**14.3**	**14.2**	**44**	**19**

	COPD patients hospitalised[1]	Number of COPD hospitalisations[2]	Crude readmission rate[3]	Standardised readmission rate[4]	Percent coded as severe[5]	Percent most disadvantaged quintile[6]
Western NSW Local Health District (WNSWLHD)						
Dubbo Base Hospital	115	160	11.3	9.8	31	31
Orange Base Hospital	122	177	18.1	17.2	27	9
Other **WNSWLHD**	564	873	16.0	14.8	22	64
Total **WNSWLHD**	782	1,210	15.7	15.0	24	52
Western Sydney Local Health District (WSLHD)						
Auburn Hospital	140	198	15.2	15.0	30	92
Blacktown Hospital	458	682	13.8	13.5	34	28
Westmead Hospital (all units)	355	495	13.9	13.9	33	23
Other **WSLHD**	108	120	10.0	13.0†	18	74
Total **WSLHD**	999	1,495	13.7	13.8	32	39

1. COPD patients treated in each hospital; a single patient may have been hospitalised in multiple facilities.
2. Counts are episodes of care for which COPD was coded as the principal diagnosis (ICD codes are listed on page 26). If two episodes of care with primary diagnosis of COPD were separated only by a type change separation or a transfer, then these two episodes were treated as one hospitalisation.
3. COPD discharges followed by condition-specific readmissions to any NSW hospital within 28 days, as a proportion of total principal diagnosis hospitalisations.
4. Readmission rate per 100 discharges, standardised for age and sex.
5. Percentage of hospitalisations coded as having catastrophic or severe comorbidities or complications (DRG codes)
6. Percentage of COPD hospitalisations that were for adults living in the most disadvantaged socioeconomic quintile.

Note: *'Other'* includes all public hospitals in the LHD not individually listed.
Note: Data for private hospitals are reported separately.
(*) Suppressed due to small numbers or relative standard error ≥40%.
(†) Interpret with caution: relative standard error ≥30% and <40%.
(n/a) Not applicable because there were no readmissions.

Appendix table 1.2: Adults hospitalised, hospitalisation patterns and unplanned readmissions for CHF, by LHDs, July 2009 to June 2010

	CHF patients hospitalised[1]	Number of CHF hospitalisations[2]	Crude readmission rate[3]	Standardised readmission rate[4]	Percent coded as severe[5]	Percent most disadvantaged quintile[6]
Total NSW						
Public hospitals	8,591	10,687	8.8	8.8	26	27
Private hospitals	353	401	5.0	4.1	28	5
Total **NSW**	8,944	11,088	8.8	8.8	26	27
Central Coast Local Health District (CCLHD)						
Gosford Hospital	239	284	6.7	6.2	28	3
Wyong Hospital	196	246	10.2	9.3	23	33
Other **CCLHD**	0	0	n/a	n/a	n/a	n/a
Total **CCLHD**	432	530	8.3	7.8	25	17
Far West Local Health District (FWLHD)						
Other **FWLHD**	50	64	9.4	*	22	98
Total **FWLHD**	50	64	9.4	*	22	98
Hunter New England Local Health District (HNELHD)						
Calvary Mater Newcastle	168	207	9.7	9.1	41	58
John Hunter Hospital	301	337	5.9	5.6	38	12
Maitland Hospital	135	157	5.1	4.3†	34	20
Manning Base Hospital	110	134	6.7	5.7†	35	97
Tamworth Base Hospital	110	132	8.3	7.8†	17	14
Other **HNELHD**	464	546	8.4	8.5	16	35
Total **HNELHD**	1,247	1,513	7.5	7.5	28	35
Illawarra Shoalhaven Local Health District (ISLHD)						
Shoalhaven & Dist. Memorial Hospital	160	185	5.9	4.1†	28	36
Wollongong Hospital	240	305	12.5	11.9	27	31
Other **ISLHD**	168	202	7.9	9.2	23	36
Total **NSW**	547	692	9.4	9.2	26	34
Mid North Coast Local Health District (MNCLHD)						
Coffs Harbour Base Hospital	109	134	10.4	11.2†	30	40
Port Macquarie Base Hospital	118	126	3.2	*	25	23
Other **MNCLHD**	115	128	7.0	7.3†	14	82
Total **MNCLHD**	336	388	7.0	7.5	23	48
Murrumbidgee Local Health District (MLHD)						
Wagga Wagga Base Hospital	126	158	11.4	10.9	16	7
Other **MLHD**	357	430	10.2	9.9	13	24
Total **MLHD**	472	588	10.5	10.3	14	19
Nepean Blue Mountains Local Health District (NBMLHD)						
Nepean Hospital	219	275	8.0	7.6	26	20
Other **NBMLHD**	139	161	5.0	4.5†	21	20
Total **NBMLHD**	357	436	6.9	6.5	24	20

	CHF patients hospitalised[1]	Number of CHF hospitalisations[2]	Crude readmission rate[3]	Standardised readmission rate[4]	Percent coded as severe[5]	Percent most disadvantaged quintile[6]
Northern NSW Local Health District (NNSWLHD)						
Lismore Base Hospital	104	114	2.6	*	20	22
The Tweed Hospital	122	140	4.3	*	31	27
Other **NNSWLHD**	229	276	9.1	8.5	16	49
Total **NNSWLHD**	447	530	6.4	6.3	21	37
Northern Sydney Local Health District (NSLHD)						
Hornsby and Ku-Ring-Gai Hospital	131	154	8.4	7.5	48	0
Manly District Hospital	109	120	7.5	6.1†	40	0
Mona Vale and District Hospital	119	141	10.6	8.8	38	0
Royal North Shore Hospital	249	302	8.9	8.4	26	1
Other **NSLHD**	128	152	7.9	8.7†	27	1
Total **NSLHD**	720	869	8.7	9.1	34	0
South Eastern Sydney Local Health District (SESLHD)						
Prince of Wales Hospital	220	262	9.2	9.8	35	3
St George Hospital	323	376	8.0	7.4	26	3
Sutherland Hospital	177	208	7.7	7.5	23	0
Other **SESLHD**	22	25	12.0	*	32	16
Total **SESLHD**	732	871	8.4	8.4	28	3
Southern NSW Local Health District (SNSWLHD)						
Other **SNSWLHD**	339	414	7.5	6.9	14	4
Total SNSWLHD	339	414	7.5	6.9	14	4
South Western Sydney Local Health District (SWSLHD)						
Bankstown / Lidcombe Hospital	215	259	7.3	7.5	30	67
Campbelltown Hospital	140	176	11.9	12.3	28	7
Fairfield Hospital	162	203	10.8	10.7	34	64
Liverpool Hospital	332	400	9.8	9.9	36	69
Other **SWSLHD**	56	58	0.0	0.0	34	0
Total **SWSLHD**	883	1,096	9.2	9.1	33	54
St Vincent's Health Network (SVHN)						
St Vincent's Hospital, Darlinghurst	185	211	6.2	6.7	38	5
Total **SVHN**	185	211	6.2	6.7	38	5
Sydney Local Health District (SYDLHD)						
Canterbury Hospital	156	199	12.6	12.3	30	51
Concord Hospital	230	286	9.8	8.8	43	13
Royal Prince Alfred Hospital	277	356	10.1	10.0	39	9
Other **SYDLHD**	*	1	n/a	n/a	n/a	n/a
Total **SYDLHD**	649	842	10.6	10.3	38	20

	CHF patients hospitalised[1]	Number of CHF hospitalisations[2]	Crude readmission rate[3]	Standardised readmission rate[4]	Percent coded as severe[5]	Percent most disadvantaged quintile[6]
Western Sydney Local Health District (WSLHD)						
Auburn Hospital	127	171	15.2	12.7	10	90
Blacktown Hospital	247	306	11.4	12.1	26	6
Westmead Hospital (all units)	355	449	10.2	9.8	25	30
Other **WSLHD**	113	151	13.2	11.7	19	56
Total **WSLHD**	808	1,077	11.8	11.8	22	37
Western NSW Local Health District (WNSWLHD)						
Dubbo Base Hospital	95	113	5.3	*	25	28
Orange Base Hospital	92	122	14.8	10.6	15	13
Other **WNSWLHD**	266	331	11.8	10.9	9	49
Total **WNSWLHD**	445	566	11.1	10.0	14	37

1. CHF patients treated in each hospital; a single patient may have been hospitalised in multiple facilities.
2. Counts are episodes of care for which CHF was coded as the principal diagnosis (ICD codes are listed on page 26). If two episodes of care with primary diagnosis of CHF were separated only by a type change separation or a transfer, then these two episodes were treated as one hospitalisation.
3. CHF discharges followed by condition-specific readmissions to any NSW hospital within 28 days, as a proportion of total principal diagnosis hospitalisations.
4. Readmission rate per 100 discharges, standardised for age and sex.
5. Percentage of hospitalisations coded as having catastrophic or severe comorbidities or complications (DRG codes).
6. Percentage of CHF hospitalisations that were for adults living in the most disadvantaged socioeconomic quintile.

Note: *'Other'* includes all public hospitals in the LHD not individually listed.
Note: Data for private hospitals are reported separately.
(*) Suppressed due to small numbers or relative standard error ≥40%.
(†) Interpret with caution: relative standard error ≥30% and <40%.
(n/a) Not applicable because there were no readmissions.

Appendix 2: Methods

Data for this report were extracted on 8 August 2011 from HOIST, a centralised data warehouse administered by the Centre for Epidemiology and Evidence at the NSW Ministry of Health. The data comprised admitted patient and mortality data that had been probabilistically linked by the Centre for Health Record Linkage (CheReL).

The report is in two sections; each section adopted different analytic methods.

Section one: Hospitalisation patterns in 2009–10 for adults with COPD and CHF

In order to investigate hospitalisation patterns, the Bureau defined two anonymous cohorts, one for COPD and one for CHF. The cohorts comprise of adults who were admitted into any NSW hospital (public or private) between July 2005 and June 2009, whose hospital record had in the first 20 diagnostic fields either:

- ICD10-AM codes J41-J44, J47 and J20 for COPD
- ICD10-AM codes I11.0, I50 and J81 for CHF, but excluding records with procedure codes in blocks 600 to 693, 705 to 707 and 717 and procedure codes 38721-00, 38721-01 and 90226-00.

People with COPD and CHF diagnoses listed in their hospital records were included in both cohorts. People who died on or before 30 June 2009 were excluded from the cohorts.

A schematic diagram of the cohort development is shown in Appendix figure 2.1.

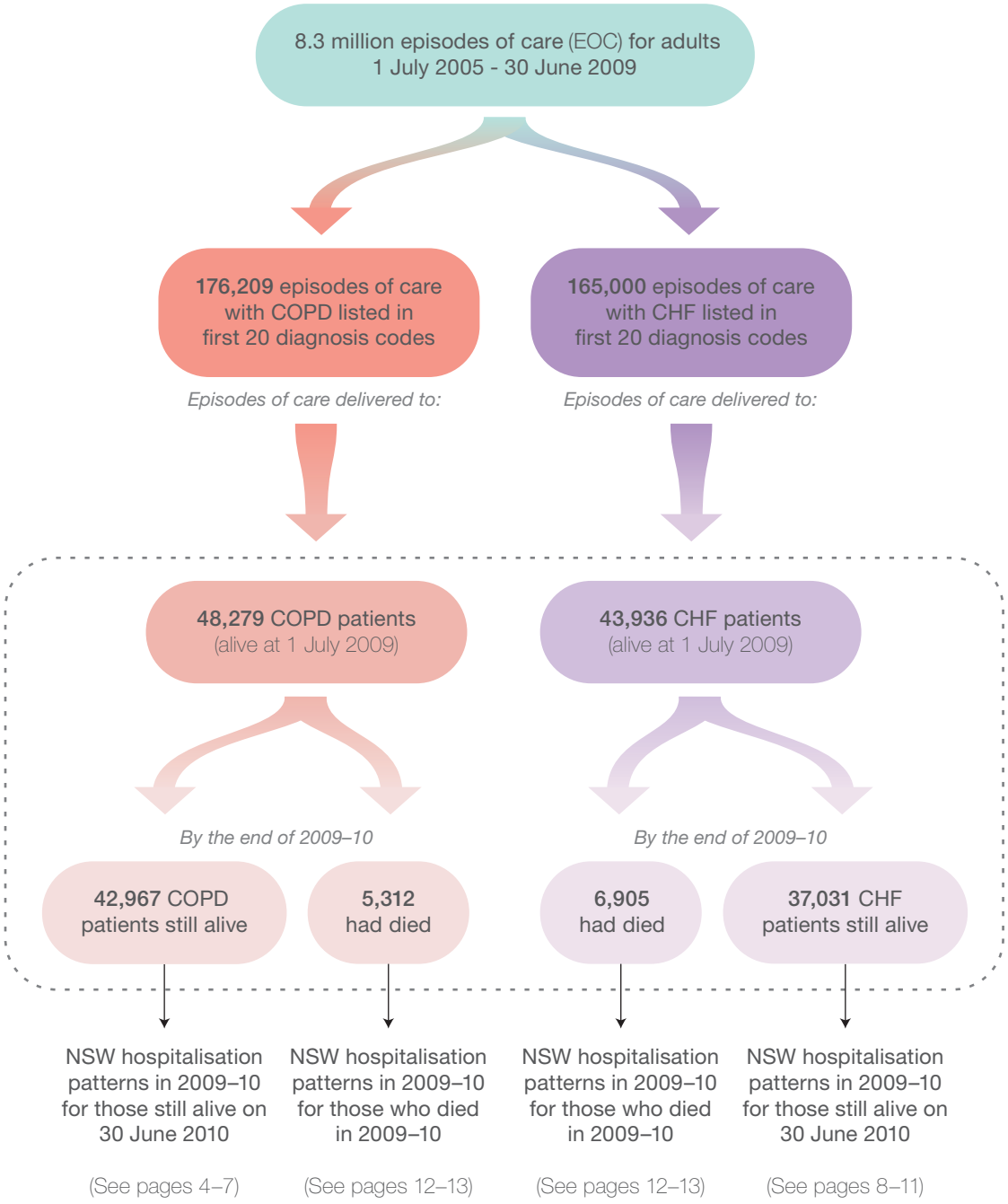
The report examines *'all-cause'* and *'COPD- or CHF-principal diagnosis'* hospitalisations for the cohorts. A principal diagnosis of COPD is identified by ICD-AM codes J41-J44, J47; and conditionally, J20 (only if there is a secondary diagnosis of J41-J44 or J47). A principal diagnosis of CHF was identified using the same codes as the cohort definition.

Hospitalisation counts are based on episodes of care. If two or more episodes of care with a primary diagnosis of COPD or CHF were separated only by a type change separation or a transfer, then these two episodes were treated as one hospitalisation.

The hospitalisation records of people who died during 2009–10 were analysed separately.

To explore the influence of patient socio-demographics on hospitalisation patterns, we used SAS© to quantify smoking status, SES and Aboriginality.

Appendix figure 2.1: Schematic representation of the Bureau's analysis for Section one



Note: Of the patients alive throughout 2009–10, there were 8,298 who had both COPD and CHF.
Note: Of the patients who died in 2009–10, there were 2,102 who had both COPD and CHF.

Section two: Unplanned readmissions within 28 days of discharge

To calculate readmission rates, the denominator comprises all unplanned hospitalisations with a principal diagnosis of COPD or CHF in NSW between July 2009 and June 2010. The numerator comprises readmissions (with a principal diagnosis COPD or CHF) to any hospital within 28 days of a previous discharge. Readmissions are assigned to the discharge hospital.

A schematic diagram of the unplanned readmission rate analysis is shown in Appendix figure 2.2.

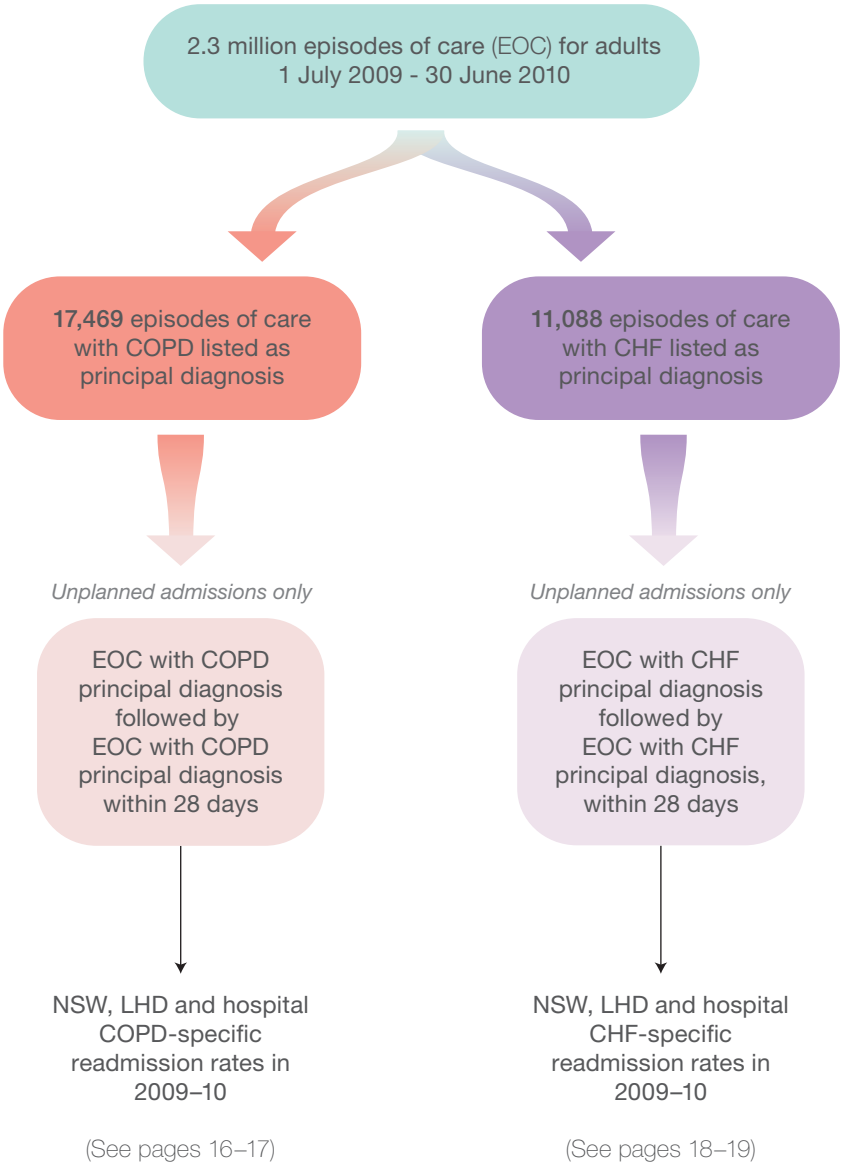
Rates are directly standardised to the NSW select medical patient population 2009–10 on the basis of age and sex.

For peer group analyses, Calvary Mater hospital is compared with A1 hospitals as it is a referral hospital for respiratory and cardiac conditions.

Albury Base Hospital was excluded from all analyses except when patients were readmitted there within 28 days of discharge from another NSW hospital.

For further details, see the Bureau's *Technical Supplement: Chronic Disease Care* available at www.bhi.nsw.gov.au

Appendix figure 2.2: Schematic representation of the Bureau's analysis for Section two



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Download our reports

The report, *Chronic Disease Care: Another piece of the picture - hospitalisations and unplanned readmissions for chronic obstructive pulmonary disease (COPD) and congestive heart failure (CHF), July 2009 to June 2010*, and related reports are available at www.bhi.nsw.gov.au

The suite of products includes:

- The *main report* presenting new insights into care for adults with COPD and CHF
- *Performance Profiles* (hospitalisation patterns, and readmissions for 16 Local Health Districts)
- *Technical Supplement* (presenting research methods and statistical analyses)
- The preceding report, *Chronic Disease Care* (PART 1), presenting information about the number of potentially avoidable admissions for COPD and CHF.

About the Bureau

The Bureau of Health Information provides the community, healthcare professionals and the NSW Parliament with timely, accurate and comparable information on the performance of the NSW public health system in ways that enhance the system's accountability and inform efforts to increase its beneficial impact on the health and wellbeing of the people of NSW.

The Bureau is an independent, board-governed statutory health corporation. The conclusions in this report are those of the Bureau and no official endorsement by the NSW Minister for Health, the NSW Ministry of Health or any other NSW statutory health corporation is intended or should be inferred.

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