



Queensland Government
Queensland Health

Clean and Healthy Air for Gladstone Project

Interim Report

**Health Assessment Phase 1:
Summary of data analysis from existing health
datasets**

27 November 2008

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Introduction

This report provides results from information extracted and analysed from hospitalisation, death, cancer and perinatal (birth) registries for the Gladstone area (the area bounded by the former local governments of Gladstone City and Calliope Shire). Where possible, comparisons are made with Queensland and Australia. For each condition, either seven or eight years of the latest available data are provided, depending on data availability.

This is a plain language interim report. A final report including the results of the telephone-based survey completed in early October and a full technical report will be available in February 2009.

Summary:

- Between 1999 and 2006, there was an average of 173 deaths per year from all causes in Gladstone. Each year and overall, rates of deaths in Gladstone from all causes were similar to rates of deaths in Queensland and Australia.
- For heart disease and diabetes, rates of deaths in Gladstone were similar to rates in Queensland and Australia. For deaths due to respiratory diseases, the Gladstone rates were similar to the Queensland rates except in 2005 when the Gladstone rate was higher.
- Between 1999/2000 and 2006/2007, hospitalisations for the following conditions were in some years, but not consistently, greater than the Queensland rate:
 - Heart attack and abnormal heart rhythms
 - Chronic airways disease and respiratory tract infections
 - Diabetes
- Hospitalisations for the following conditions were similar to the Queensland rates:
 - Angina and heart failure
 - Asthma
- Between 1999 and 2006, fetal deaths (stillbirths) and deaths due to congenital malformations and chromosomal abnormalities occurred at rates that were similar to or slightly lower than the Queensland rates.

Between 1999/2000 and 2006/2007, cancers of the lung and major airways, prostate, liver, stomach and ovary, and acute myeloid leukaemia all occurred in Gladstone at rates that were similar to the Queensland rates.

Conclusions:

- Overall, the health of the population of the Gladstone area as measured by these key health outcomes and presented in this Interim Summary Report, does not show consistent variation from Queensland as a whole.
- Deaths and cancers generally occurred at rates similar to the Queensland rates.
- There were fluctuations for some conditions in some years which indicated rates for hospitalisations higher than the Queensland rates. There was no consistent pattern in these fluctuations. Higher rates of hospitalisations do not necessarily indicate higher rates of disease as hospitalisations also reflect hospital access.

- The final health assessment report will include additional information from existing health datasets and include the analysis of the community survey.
- The health assessment, by itself, cannot draw any conclusions about the contribution of air pollution to each condition; those questions will be considered in a process called Human Health Risk Assessment, once the data from the Environmental Protection Agency's program of enhanced air monitoring are available.

Selection of health conditions

The health conditions included in the health assessment were chosen on the basis that they may be caused or aggravated by pollutants that may be present in the air. For many conditions, there are various factors which contribute to an individual's risk of disease. For example, a person's risk of heart disease depends on factors such as genetics, smoking, diet, blood pressure and weight. However, some air pollutants have been shown to exacerbate heart problems. The health assessment cannot draw any conclusions about the contribution of air pollution to each condition; those questions will be considered in a process called health risk assessment once the data from the Environmental Protection Agency's program of enhanced air monitoring are available (discussed further at the end of this report).

The identification of pollutants of interest and the choice of health conditions to be assessed in the study are discussed at length in the discussion paper available at: www.epa.qld.gov.au/gladstone. Print copies are also held in libraries, council offices and the offices of local politicians in the Gladstone area.

Terms used in this report:

Incidence: The incidence of a condition is the number of new cases of the condition in a given time period (eg a year). It is usually expressed per 100,000 people.

Prevalence: Prevalence is the proportion of the population that has a disease at any given point in time.

Standardisation: Standardisation is a method applied to health data to adjust for differences between populations for important factors such as age distributions, to allow valid comparison between the populations. The Gladstone population has a higher proportion of young people and a lower average age than Queensland as a whole.

How to read the graphs

Each graph shows rates of the described condition, per 100,000 people, over time.

The dashed red line shows the rates for Queensland. If Australian rates are available they are shown as a dotted green line.

The solid blue line shows the Gladstone rate calculated from the numbers for each condition each year. For a city the size of Gladstone, the numbers of people affected by any condition will naturally fluctuate more from year to year than numbers for a large population such as Queensland. Rates calculated from these numbers cannot reliably be used to monitor trends or compare Gladstone with other populations. To monitor trends and allow more reliable comparisons with other populations, the coloured blue strip shows the range in which we are quite confident, even with the

fluctuations, that the true rate for Gladstone lies. These coloured strips are calculated using standard statistical methods and are called “confidence intervals” (CI).

If the coloured strip contains the Queensland/Australian lines, then the rate in Gladstone is considered not significantly different from the Queensland/Australian rates. If the coloured strip does not cover the Queensland/Australian lines, then the rate in Gladstone is considered different from the Queensland/ Australian rates.

Example:

In Gladstone, the number of deaths due to diseases of the respiratory system in Gladstone was 11 in 1999 and 13 in 2006, but in between reached two peaks of 20 and 26, and went as low as seven. These numbers have been converted into rates in Graph 10. The blue shaded area shows the confidence intervals for the calculated rates. For every year except 2005, the blue shaded area contains the Australian and Queensland lines, so the rate in Gladstone is considered similar to the Queensland/ Australian rates. In 2005, the blue shaded area goes above the Queensland/ Australian rates, indicating that the rate of deaths in Gladstone in that year was higher than the Queensland/Australian rates.

How to read the tables

For each condition described, each table presents numbers and rates by year, for Gladstone, Queensland, and where available, Australia. The rates for each are directly standardised to adjust for the variations in age distribution between Gladstone and Queensland. The Australian population 2001 has been used as a standard population.

Comparisons of Gladstone rates with Queensland rates are provided as Ratios. For deaths, these are provided as Standardised Mortality Ratios (SMR); for hospitalisations these are provided as Indirect Rate Ratios (IRR). Indirect standardisation involves weighting the age distribution of the Gladstone population to enable valid comparison with Queensland.

Confidence intervals (95%CI) have been calculated for each Ratio, to show the range of values for each Ratio in which we are quite confident that the true Ratio lies. If the confidence interval range includes the value one, then it is reasonable to conclude there is no statistically significant difference between the rates. This is described in the report as being similar. If the confidence interval range is less than or greater than one, then the difference in the rates can be described as statistically significant.

Technical note: graphs versus tables

Close scrutiny will show that at some points, slight differences exist between what is statistically significant in the Graphs, and what is statistically significant in the Tables. This is due to the accepted and established practice of using different statistical methods for calculating rates and for calculating rate ratios.

The confidence intervals for each rate shown for Gladstone in the Graphs have been calculated using direct standardisation methods, which indicate a measure of confidence at that point.

The rate ratios shown in the Tables have been calculated using indirect standardisation methods, which indicate a measure of confidence in the ratio.

The graphs have been chosen as the clearest and simplest way to explain complex information to the community. Rate ratios are the most accurate method of describing the relationship between rates in Gladstone and rates in Queensland.

Data sources:

Hospitalisations: Queensland Health receives data from all public and private hospitals which provide acute care services. Hospitalisations count “separations” which are episodes of care that include total hospital stays, and parts of hospital stays which result in a change of status (eg transfer from acute care to rehabilitation).

Deaths: The Queensland Death Registry keeps records of deaths based on the year in which the death was registered, according to the residential address at that time.

Cancers: The Queensland Cancer Registry keeps records of notifications of cancer at the time of diagnosis, based on the person’s residential address at the time of diagnosis.

Perinatal data: The Queensland Perinatal Data Collection keeps records of perinatal (birth) data on every child born in Queensland, based on the residential address of the mother at the time of birth.

Deaths due to all causes

Graph 1: Deaths due to all causes in Gladstone, Queensland and Australia

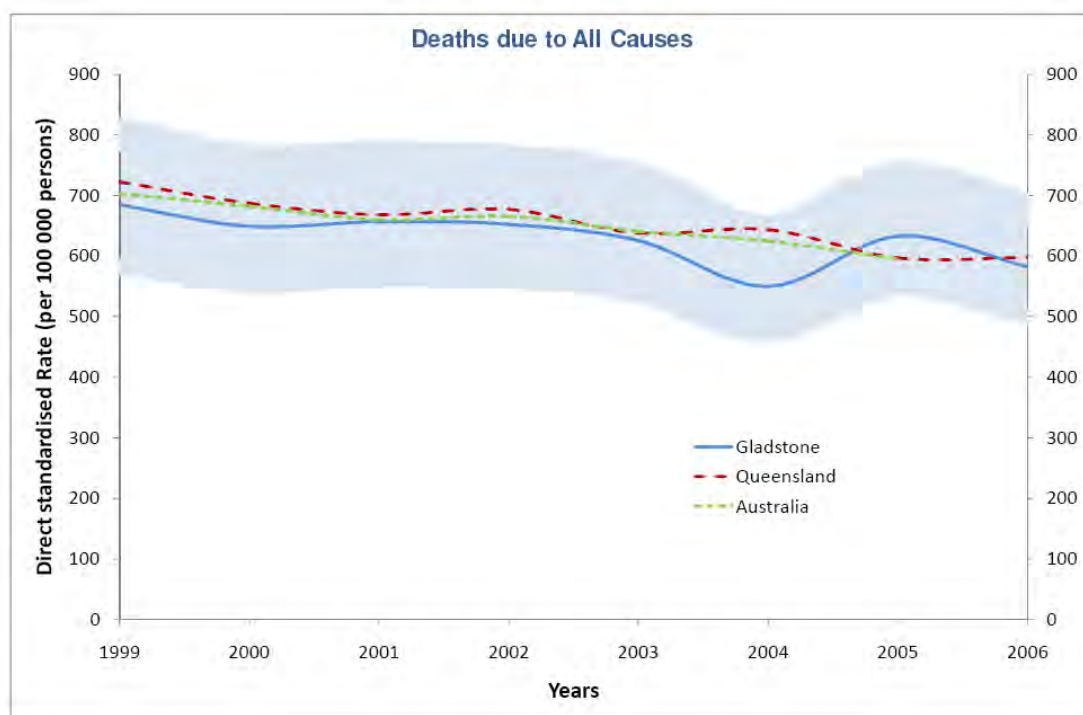


Table 1 : Deaths due to all causes

Year	Gladstone area		Queensland		Australia		SMR (95%CI) †
	number	rate*	number	rate*	number	rate*	
1999	157	684.7	22759	722.2	127701	703.4	0.9(0.8-1.1)
2000	163	649.4	22315	687.6	127894	682.0	1(0.8-1.1)
2001	174	656.8	22749	668.3	128159	660.2	1(0.8-1.1)
2002	177	652.2	23876	676.9	133262	665.5	1(0.8-1.1)
2003	174	625.3	23389	637.9	131942	640.6	1(0.8-1.1)
2004	169	550.0	24433	643.4	132194	624.7	0.9(0.8-1)
2005	194	632.6	23508	596.8	130397	595.3	1.1(0.9-1.2)
2006	177	582.4	24386	597.4			0.9(0.8-1.1)

Data extracted from the Australian Bureau of Statistics Cause of Death File by the Health Statistics Centre

*Direct standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Standardised Mortality Ratio (SMR) with 95% Confidence Intervals (CI) using Queensland as the reference population

Australian mortality rates not available for 2006

Commentary: Deaths due to all causes

- In the years 1999 to 2006, there was an average of 173 deaths per year due to any cause in Gladstone. Rates of deaths in Gladstone due to all causes were similar to the rates of deaths in Queensland and Australia.

Heart and Vascular Disease

Graph 2: Deaths due to heart and vascular diseases in Gladstone, Queensland and Australia

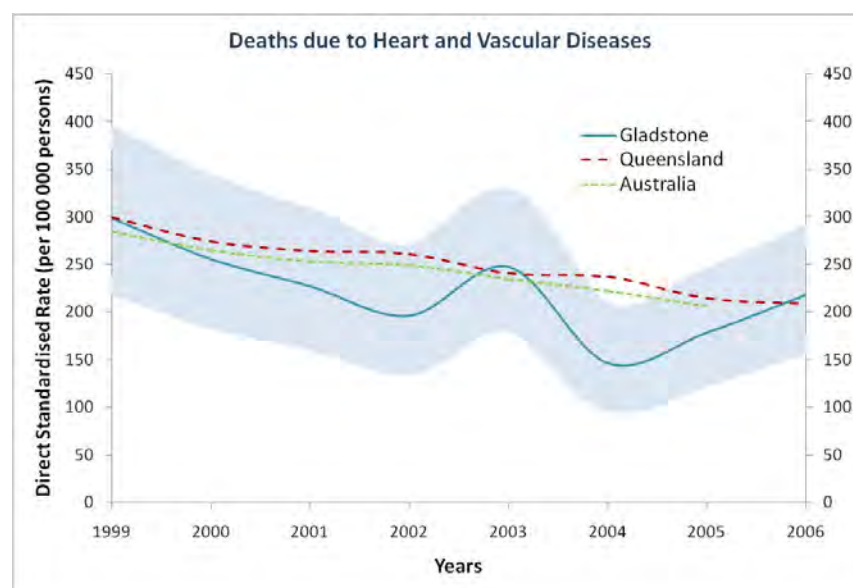


Table 2 : Deaths due to heart and vascular diseases in Gladstone, Queensland and Australia

Year	Gladstone area		Queensland		Australia		SMR (95%CI)†
	number	rate*	number	rate*	number	rate*	
1999	61	298.6	9262	299.9	51126	284.6	1.0 (0.8-1.3)
2000	56	255.9	8751	274.6	49536	265.5	1.0 (0.7-1.2)
2001	54	227.4	8882	264.4	49175	253.3	0.9 (0.6-1.1)
2002	49	195.8	9122	261.2	50121	249.3	0.8 (0.6-1.0)
2003	62	247.6	8768	241.0	48707	234.9	1.0 (0.8-1.3)
2004	43	146.7	8969	237.1	47488	222.3	0.7 (0.5-0.9)
2005	52	178.2	8446	214.4	45997	206.6	0.9 (0.6-1.1)
2006	62	218.2	8523	208.7	-	-	1.0 (0.8-1.3)

Data extracted from the Australian Bureau of Statistics Cause of Death File by the Health Statistics Centre

*Direct standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Standardised Mortality Ratio (SMR) with 95% Confidence Intervals (CI) using Queensland as the reference population

Australian mortality rates not available for 2006

Commentary: Deaths due to heart and vascular diseases

- Heart and vascular diseases includes conditions such as heart attack, stroke, heart failure, abnormal heart rhythms and high blood pressure.
- In the years 1999 to 2006, there was an average of about one death per week in Gladstone due to heart and vascular diseases.
- Rates of deaths due to heart and vascular diseases in Gladstone were similar to or lower than rates in Queensland and Australia.

Graph 3: Hospitalisations for heart disease in Gladstone and Queensland

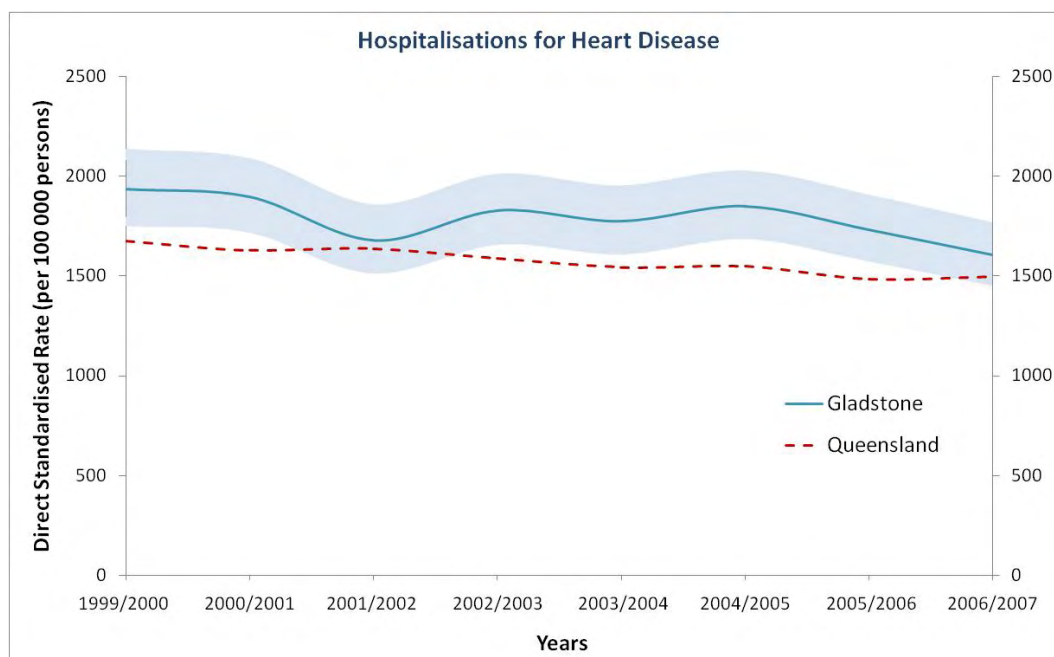


Table 3 : Hospitalisations for heart disease in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	516	1936.3	54009	1675.7	1.1 (1.0-1.2)
2000-2001	547	1897.7	54046	1628.7	1.2 (1.1-1.3)
2001-2002	512	1678.2	56721	1636.7	1.0 (0.9-1.1)
2002-2003	570	1828.0	56970	1588.3	1.2 (1.1-1.3)
2003-2004	567	1774.0	57503	1544.4	1.1 (1.0-1.2)
2004-2005	632	1850.6	59605	1549.5	1.2 (1.1-1.3)
2005-2006	598	1732.6	58942	1484.5	1.2 (1.1-1.3)
2006-2007	588	1603.6	61439	1496.9	1.1 (1.0-1.2)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for heart disease

- The term “heart disease” here includes conditions such as ischaemic heart disease (Graph 4); arrhythmias (Graph 7) and heart failure (Graph 8).
- In the years 1999/2000 to 2006/2007, there was an average of about 10 hospitalisations per week in Gladstone due to heart disease.
- For most years the rate of hospitalisations due to heart disease was slightly higher than the Queensland average; this was due to higher numbers of hospitalisations for heart attack and abnormal heart rhythms (eg cardiac arrest, atrial fibrillation), in some years. There is no consistent year to year pattern in these variations (see Graph 9).

Graph 4: Hospitalisations for ischaemic heart disease in Gladstone and Queensland

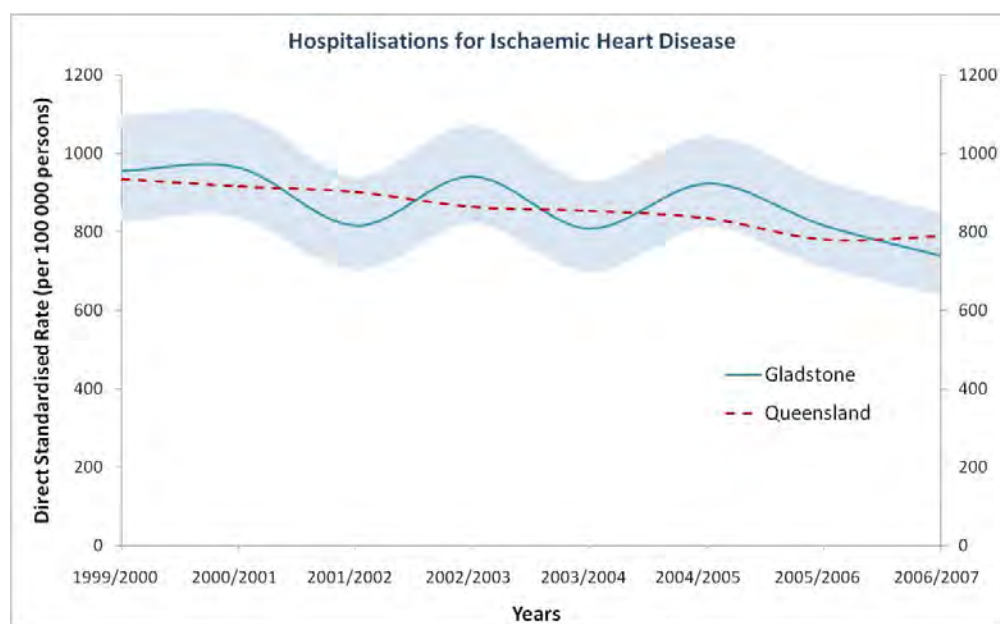


Table 4: Hospitalisations for ischaemic heart disease in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	258	956.9	30219	935.1	1.0 (0.9-1.1)
2000-2001	276	964.9	30496	915.9	1.0 (0.9-1.2)
2001-2002	254	816.5	31389	902.3	0.9 (0.8-1.0)
2002-2003	298	942.4	31126	863.8	1.1 (1.0-1.2)
2003-2004	266	808.9	31939	853.7	0.9 (0.8-1.1)
2004-2005	330	923.6	32257	834.4	1.1 (1.0-1.3)
2005-2006	290	815.6	31145	780.6	1.1 (0.9-1.2)
2006-2007	274	740.2	32508	788.5	0.9 (0.8-1.0)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for ischaemic heart disease

- Ischaemic heart disease is a broad term including angina (Graph 5), heart attack (Graph 6), and other conditions related to disease of the arteries in the heart.
- In the years 1999/2000 to 2006/2007, there was an average of 280 hospitalisations for ischaemic heart disease in Gladstone each year.
- Rates of hospitalisations for ischaemic heart disease in Gladstone were similar to the rates in Queensland.

Graph 5: Hospitalisations for angina in Gladstone and Queensland.

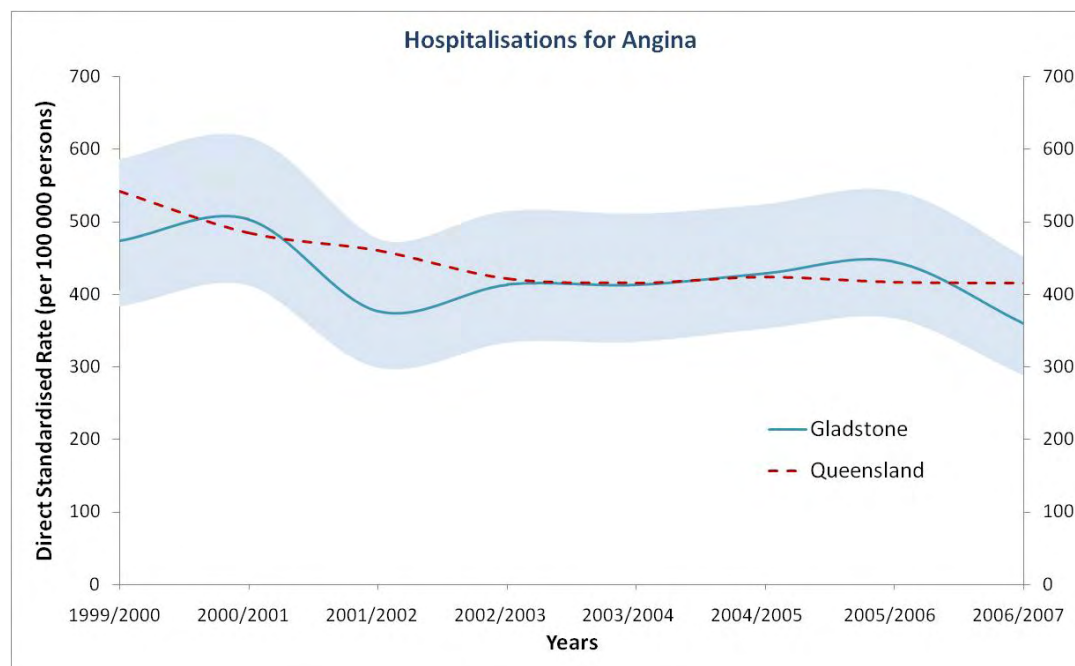


Table 5: Hospitalisations for angina in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	125	474.0	17496	541.8	0.8 (0.7-1.0)
2000-2001	139	503.6	16089	484.2	1.0 (0.8-1.2)
2001-2002	111	377.0	15991	460.1	0.8 (0.6-0.9)
2002-2003	125	413.6	15168	421.5	0.9 (0.8-1.1)
2003-2004	131	412.6	15561	416.1	1.0 (0.8-1.1)
2004-2005	152	429.3	16396	424.4	1.0 (0.9-1.2)
2005-2006	156	445.2	16623	416.7	1.1 (0.9-1.2)
2006-2007	128	360.1	17109	415.2	0.8 (0.7-1.0)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for angina

- Angina is one form of ischaemic heart disease.
- In the years 1999/2000 to 2006/2007, there was an average of 133 hospitalisations for angina in Gladstone each year.
- Rates of hospitalisations for angina in Gladstone were similar to the rates in Queensland.

Graph 6: Hospitalisations for myocardial infarction in Gladstone and Queensland.

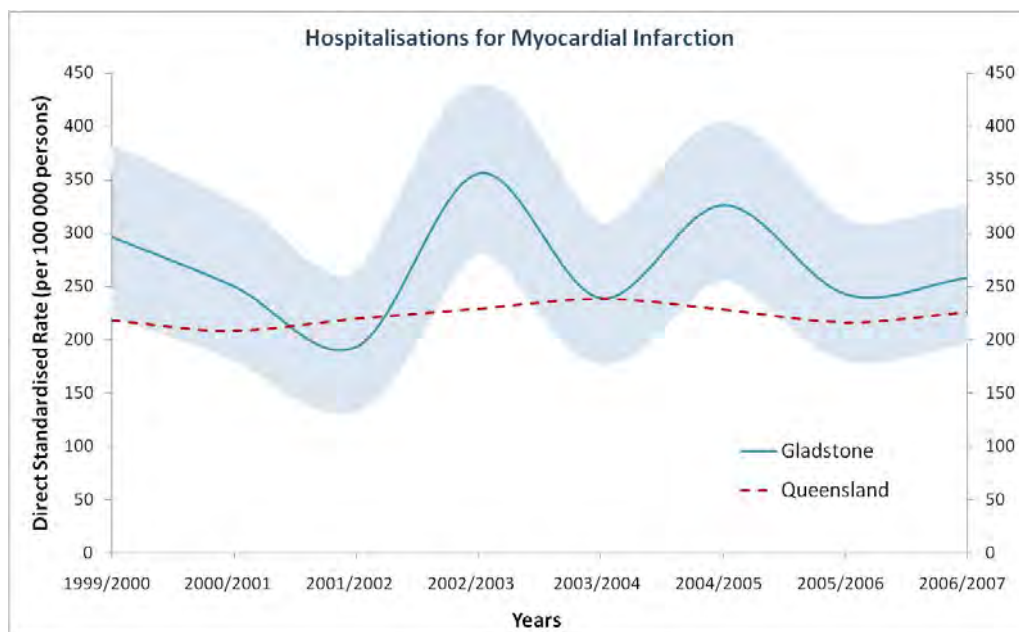


Table 6: Hospitalisations for myocardial infarction in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	80	296.4	7026	218.5	1.3 (1.0-1.6)
2000-2001	71	250.4	6903	208.5	1.2 (0.9-1.5)
2001-2002	60	193.6	7605	219.7	0.9 (0.7-1.2)
2002-2003	118	356.0	8226	229.0	1.6 (1.4-2.0)
2003-2004	83	239.0	8921	238.8	1.1 (0.8-1.3)
2004-2005	115	326.1	8798	228.0	1.5 (1.2-1.8)
2005-2006	86	242.9	8624	216.5	1.1 (0.9-1.4)
2006-2007	100	258.0	9325	226.4	1.2 (1.0-1.4)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for myocardial infarction (heart attack)

- Myocardial infarction is one form of ischaemic heart disease.
- In the years 1999/2000 to 2006/2007, there was an average of 90 hospitalisations for heart attack in Gladstone each year. There was considerable year to year variation (see Graph 9).
- Rates of hospitalisations for myocardial infarction in Gladstone exceeded those for Queensland in 2002/2003 and 2004/2005. For the other years of the study, the rates were similar.

Graph 7: Hospitalisations for arrhythmias in Gladstone and Queensland.

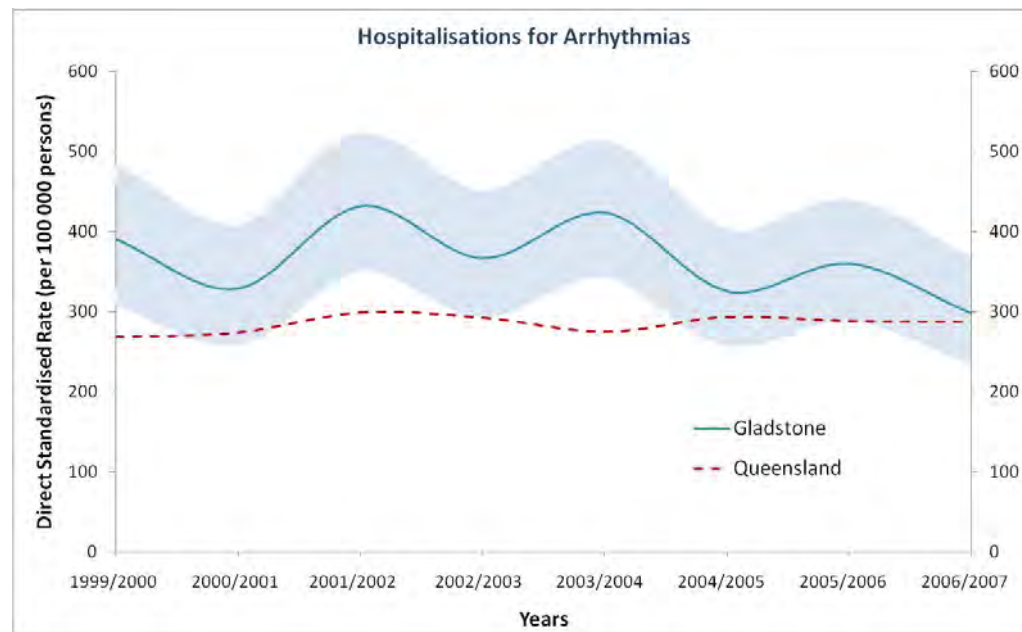


Table 7: Hospitalisations for arrhythmias in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	106	390.3	8714	268.8	1.4 (1.1-1.7)
2000-2001	108	328.6	9124	274.1	1.4 (1.1-1.6)
2001-2002	133	431.6	10357	298.6	1.5 (1.2-1.7)
2002-2003	118	366.9	10484	292.4	1.3 (1.1-1.5)
2003-2004	134	423.4	10210	274.6	1.5 (1.3-1.8)
2004-2005	114	325.4	11277	293.4	1.1 (0.9-1.4)
2005-2006	126	360.0	11432	288.7	1.3 (1.0-1.5)
2006-2007	122	297.5	11799	287.7	1.1 (0.9-1.4)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for arrhythmias

- Arrhythmias are abnormal rhythms of the heart including cardiac arrest, atrial fibrillation and other disorders. Arrhythmias may be due to underlying ischaemic heart disease.
- In the years 1999/2000 to 2006/2007, there was an average of 120 hospitalisations for arrhythmias in Gladstone each year.
- From 1999/2000 to 2003/2004, rates of hospitalisations for arrhythmias in Gladstone exceeded those for Queensland. From 2004/2005 to 2006/2007, rates were similar.

Graph 8: Hospitalisations for heart failure in Gladstone and Queensland.

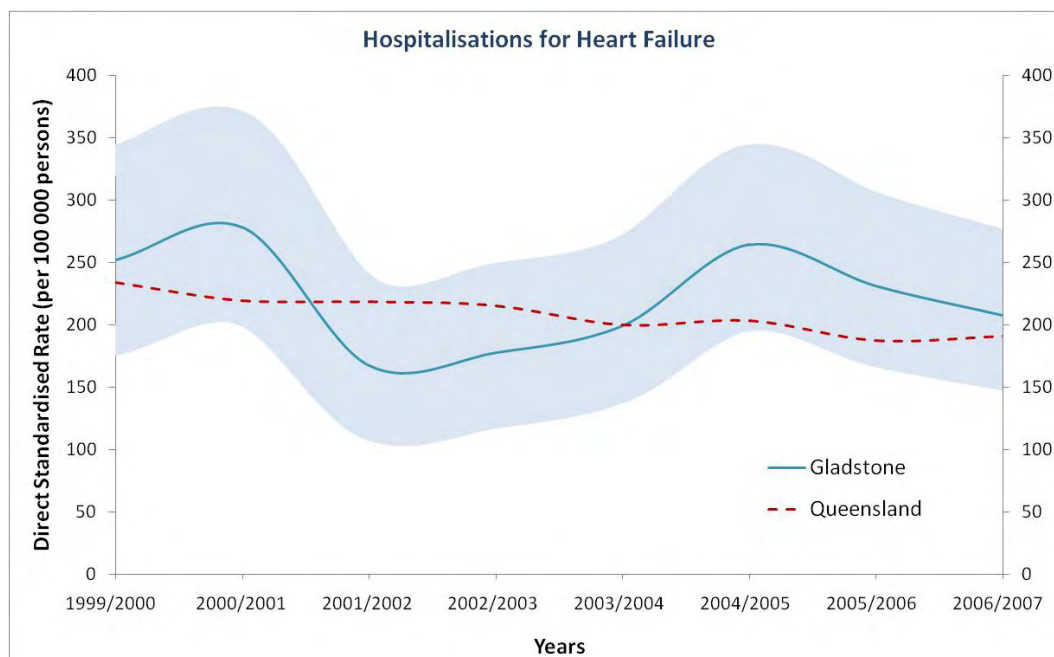


Table 8: Hospitalisations for heart failure in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	51	251.9	7285	233.9	1.0 (0.7-1.3)
2000-2001	60	278.1	7064	219.7	1.2 (0.9-1.6)
2001-2002	42	167.1	7381	218.6	0.8 (0.6-1.1)
2002-2003	45	177.4	7557	215.5	0.8 (0.6-1.1)
2003-2004	56	199.3	7299	200.0	1.0 (0.8-1.4)
2004-2005	74	264.4	7682	203.1	1.3 (1.0-1.6)
2005-2006	67	231.0	7345	187.2	1.2 (1.0-1.6)
2006-2007	65	207.3	7732	190.7	1.1 (0.8-1.4)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for heart failure

- Heart failure describes conditions where the pumping action of the heart is impaired. It is often associated with underlying ischaemic heart disease or disease of the heart valves.
- In the years 1999/2000 to 2006/2007, there was an average of about one hospitalisation per week for heart failure in Gladstone.
- Rates of hospitalisations for heart failure in Gladstone were similar to those in Queensland.

Graph 9: Hospitalisations for arrhythmias, myocardial infarction and heart failure in Gladstone.

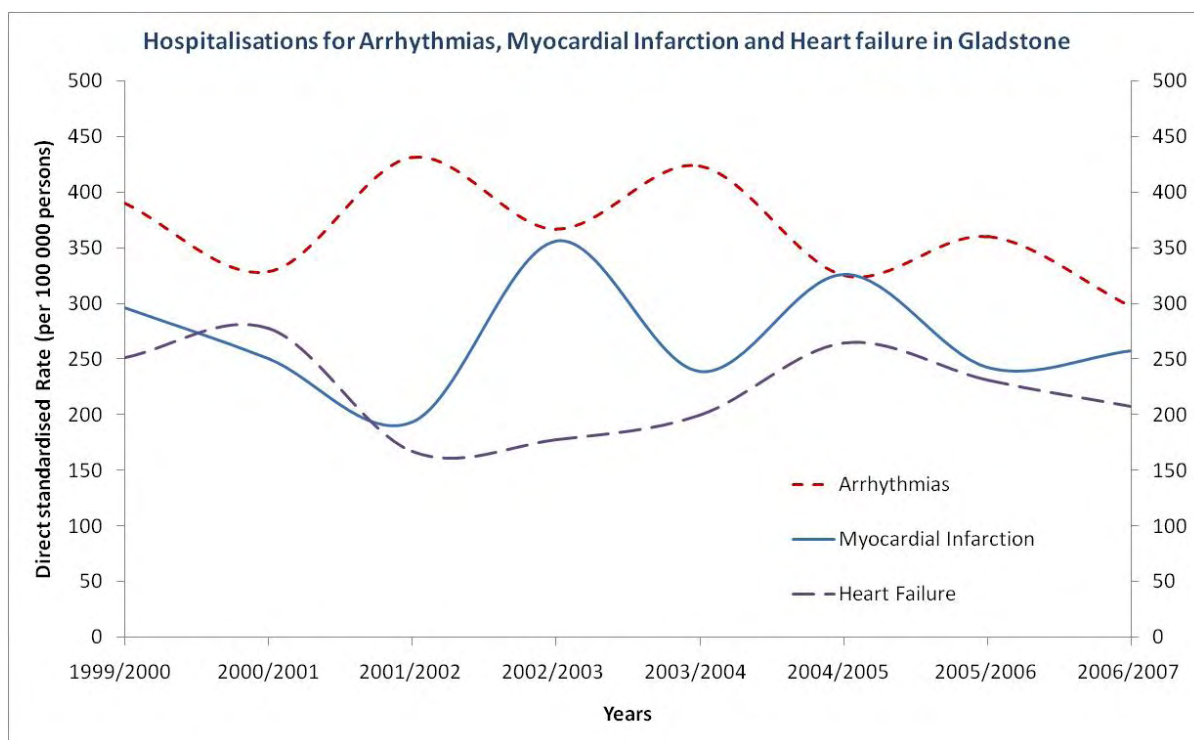


Table 9: Hospitalisations for arrhythmias, myocardial infarction and heart failure in Gladstone.

Year	Arrhythmias rate*	Myocardial Infarction rate*	Heart Failure rate*
1999-2000	390.3	296.4	251.9
2000-2001	328.6	250.4	278.1
2001-2002	431.6	193.6	167.1
2002-2003	366.9	356.0	177.4
2003-2004	423.4	239.0	199.3
2004-2005	325.4	326.1	264.4
2005-2006	360.0	242.9	231.0
2006-2007	297.5	258.0	207.3

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

Commentary: Hospitalisations for heart failure, arrhythmias and myocardial infarction

- This graph shows the rates for Gladstone for the years 1999/2000 to 2006/2007. It shows the year to year fluctuations for each heart condition. Note that the peaks and troughs for each condition occurred in different years. If there was an external cause for the peaks of these related conditions, the pattern would be expected to be consistent.

Respiratory Diseases

Graph 10: Deaths due to diseases of the respiratory system in Gladstone, Queensland and Australia

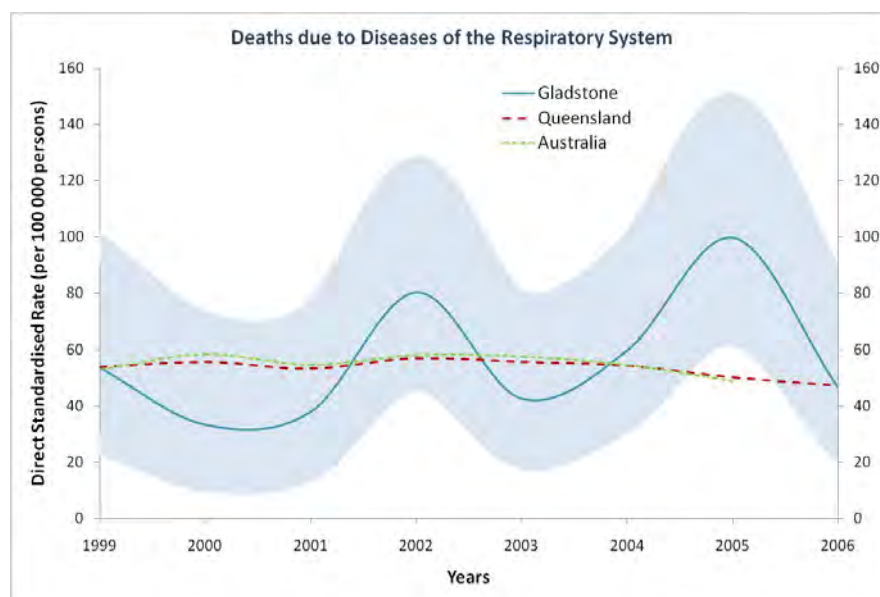


Table 10: Deaths due to diseases of the respiratory system in Gladstone, Queensland and Australia

Year	Gladstone area		Queensland		Australia		SMR (95%CI)†
	Number	rate*	number	rate*	number	rate*	
1999	11	53.5	1675	53.8	9599	53.1	1.0 (0.5-1.7)
2000	7	33.3	1782	55.7	10889	58.3	0.6 (0.2-1.2)
2001	9	37.8	1797	53.4	10610	54.7	0.7 (0.3-1.3)
2002	20	80.4	1988	57.0	11654	58.1	1.4 (0.9-2.2)
2003	11	42.5	2024	55.7	11877	57.4	0.8 (0.4-1.4)
2004	17	59.5	2044	54.3	11633	54.7	1.1 (0.7-1.8)
2005	26	99.9	1960	50.2	10802	48.8	1.9 (1.2-2.7)
2006	13	46.5	1917	47.4			0.9 (0.5-1.6)

Data extracted from the Australian Bureau of Statistics Cause of Death File by the Health Statistics Centre

*Direct standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Standardised Mortality Ratio (SMR) with 95% Confidence Intervals (CI) using Queensland as the reference population

Australian mortality rates not available for 2006

Commentary: Deaths due to diseases of the respiratory system

- Between 1999 and 2006, there was an average of 14 deaths per year due to diseases of the respiratory system in Gladstone.
- For most of the study period, deaths due to respiratory diseases occurred at rates similar to the Queensland and Australian rates.
- In 2005, the rate was higher than the Queensland and Australian rates. In this year, there were 26 deaths from respiratory disease. Of these, 11 were due to chronic airways disease.

Graph 11: Deaths due to chronic obstructive pulmonary disease (COPD) in Gladstone, Queensland and Australia.

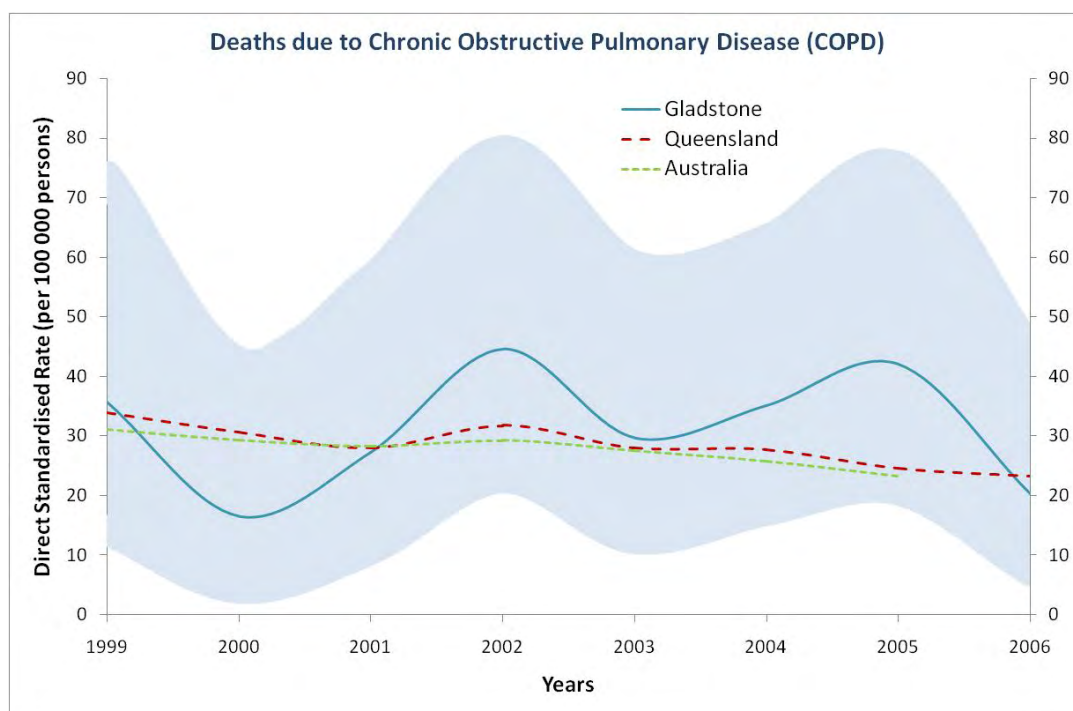


Table 11: Deaths due to chronic obstructive pulmonary disease (COPD) in Gladstone, Queensland and Australia

Year	Gladstone area		Queensland		Australia		SMR (95%CI)†
	number	Rate*	number	rate*	number	rate*	
1999	7	35.7	1061	33.9	5665	31.2	1.0 (0.4-2.0)
2000	4	16.6	983	30.6	5502	29.4	0.6 (0.2-1.5)
2001	7	27.3	945	28.0	5488	28.3	1.0 (0.4-2.1)
2002	12	44.6	1109	31.8	5856	29.3	1.5 (0.8-2.6)
2003	8	29.7	1018	28.0	5667	27.5	1.1 (0.5-2.1)
2004	11	35.1	1041	27.7	5470	25.8	1.4 (0.7-2.6)
2005	11	42.1	955	24.6	5103	23.3	1.6 (0.8-2.8)
2006	6	20.4	934	23.3			0.9 (0.3-1.9)

Data extracted from the Australian Bureau of Statistics Cause of Death File by the Health Statistics Centre

*Direct standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Standardised Mortality Ratio (SMR) with 95% Confidence Intervals (CI) using Queensland as the reference population

Australian mortality rates not available for 2006

Commentary: Deaths due to chronic obstructive pulmonary disease (chronic bronchitis and emphysema)

- In the years 1999 to 2006, there was an average of 8 deaths in Gladstone per year due to chronic obstructive pulmonary disease.
- Deaths due to chronic obstructive pulmonary disease occurred in Gladstone at rates similar to the rates in Queensland and Australia.

Graph 12: Hospitalisations for chronic obstructive pulmonary disease (COPD) in Gladstone and Queensland.

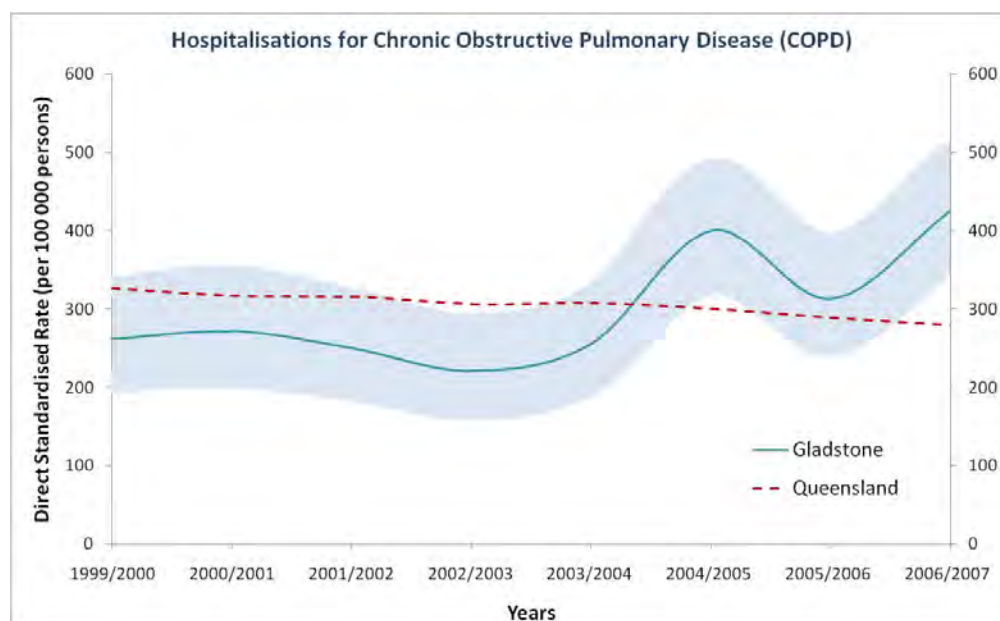


Table 12: Hospitalisations for chronic obstructive pulmonary disease (COPD) in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	Number	rate*	number	rate*	
1999-2000	75	262.4	10465	326.4	0.9 (0.7-1.1)
2000-2001	71	272.0	10439	317.4	0.9 (0.7-1.1)
2001-2002	73	250.3	10850	315.8	0.8 (0.6-1.0)
2002-2003	66	221.5	10892	306.4	0.7 (0.6-1.0)
2003-2004	79	255.7	11324	307.6	0.9 (0.7-1.1)
2004-2005	121	400.2	11436	300.2	1.3 (1.1-1.5)
2005-2006	94	313.3	11381	289.4	1.0 (0.8-1.2)
2006-2007	144	426.1	11361	279.6	1.5 (1.3-1.8)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for chronic obstructive pulmonary disease (chronic bronchitis and emphysema)

- In the years 1999/2000 to 2006/2007, there was an average of 90 hospitalisations for chronic obstructive pulmonary disease in Gladstone each year.
- From 1999/2000 to 2003/2004, rates of hospitalisations for chronic obstructive pulmonary disease were similar to the Queensland rates. In 2004/2005 and 2006/2007, Gladstone rates were above the Queensland rates.

Graph 13: Hospitalisations for acute upper respiratory tract infections in Gladstone and Queensland.

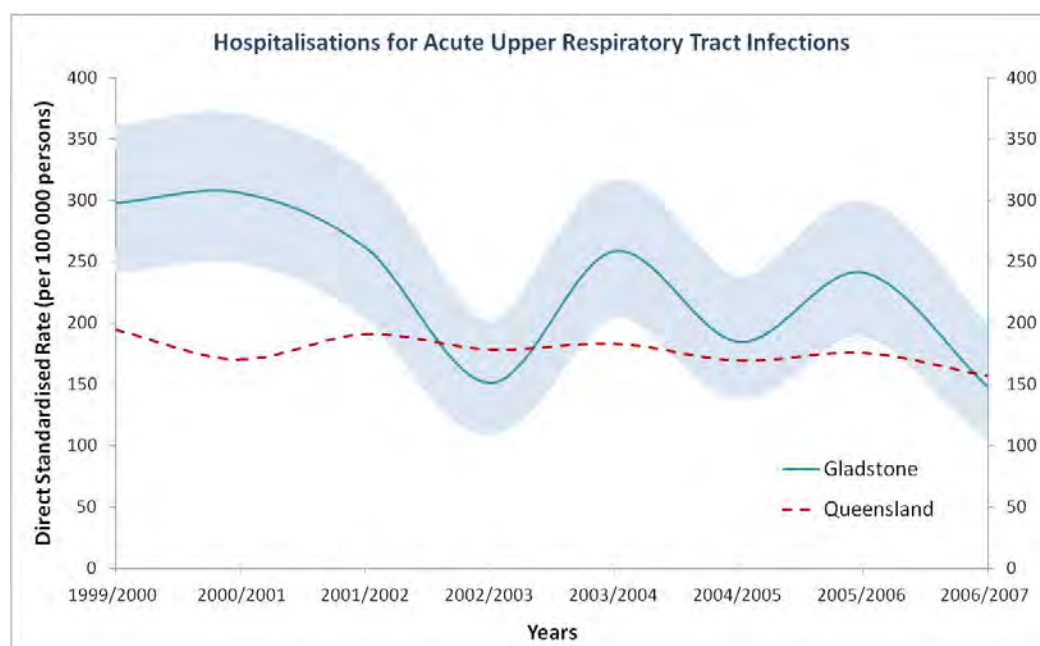


Table 13: Hospitalisations for acute upper respiratory tract infections in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	139	297.7	6986	194.0	1.5 (1.3-1.8)
2000-2001	145	306.2	6181	170.4	1.8 (1.5-2.2)
2001-2002	119	261.4	7091	190.9	1.3 (1.1-1.6)
2002-2003	71	151.5	6668	178.6	0.9 (0.7-1.1)
2003-2004	126	258.1	6938	183.3	1.4 (1.2-1.7)
2004-2005	88	184.5	6486	169.3	1.1 (0.9-1.3)
2005-2006	115	241.2	6838	175.3	1.4 (1.1-1.6)
2006-2007	78	147.5	6361	156.5	1.0 (0.8-1.2)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for acute upper respiratory tract infections

- Acute upper respiratory tract infections include infections of the sinuses, throat, tonsils, larynx and trachea.
- In the years 1999/2000 to 2006/2007, there was an average of 110 hospitalisations for acute upper respiratory tract infections in Gladstone each year.
- Rates of hospitalisations for acute upper respiratory tract infections show year to year variation and in five of the eight years, rates in Gladstone were above the Queensland rates.

Graph 14: hospitalisations for **asthma** in Gladstone and Queensland.

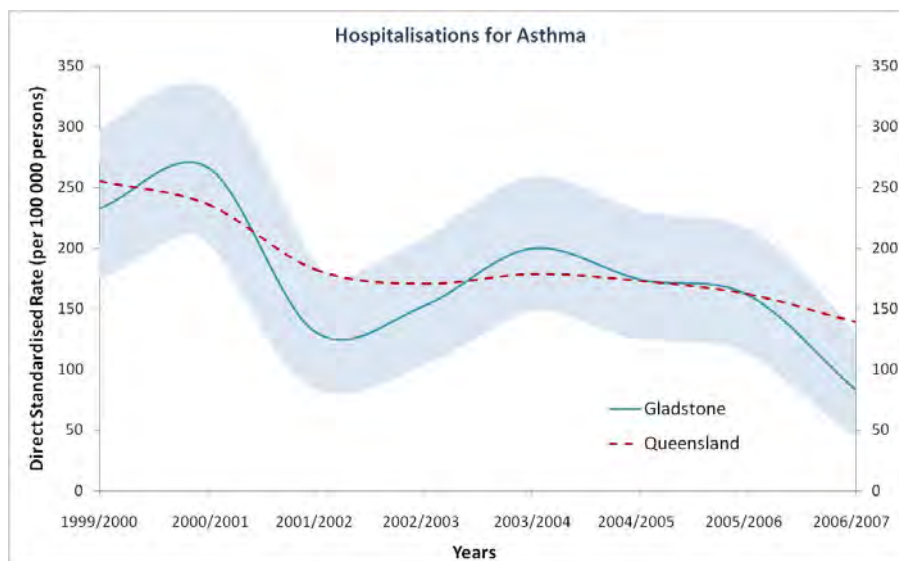


Table 14 : Hospitalisations for **asthma** in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	99	232.4	9066	255.2	0.9 (0.7-1.1)
2000-2001	121	266.6	8509	236.2	1.1 (0.9-1.4)
2001-2002	57	130.7	6690	182.2	0.7 (0.5-0.9)
2002-2003	67	152.2	6361	170.7	0.9 (0.7-1.1)
2003-2004	92	200.1	6767	178.6	1.1 (0.9-1.4)
2004-2005	81	174.3	6672	173.4	1.0 (0.8-1.2)
2005-2006	79	161.7	6367	162.3	1.0 (0.8-1.3)
2006-2007	43	82.8	5663	138.9	0.6 (0.4-0.8)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for asthma

- In the years 1999/2000 to 2006/2007, there was an average of 80 hospitalisations for asthma in Gladstone each year.
- Rates for Gladstone were similar to or lower than the Queensland rates.

Deaths due to asthma (no graph)

- Asthma deaths are rare, with 2 deaths due to asthma in Gladstone during the 8 years.

Graph 15: Hospitalisations for **influenza** in Gladstone and Queensland.

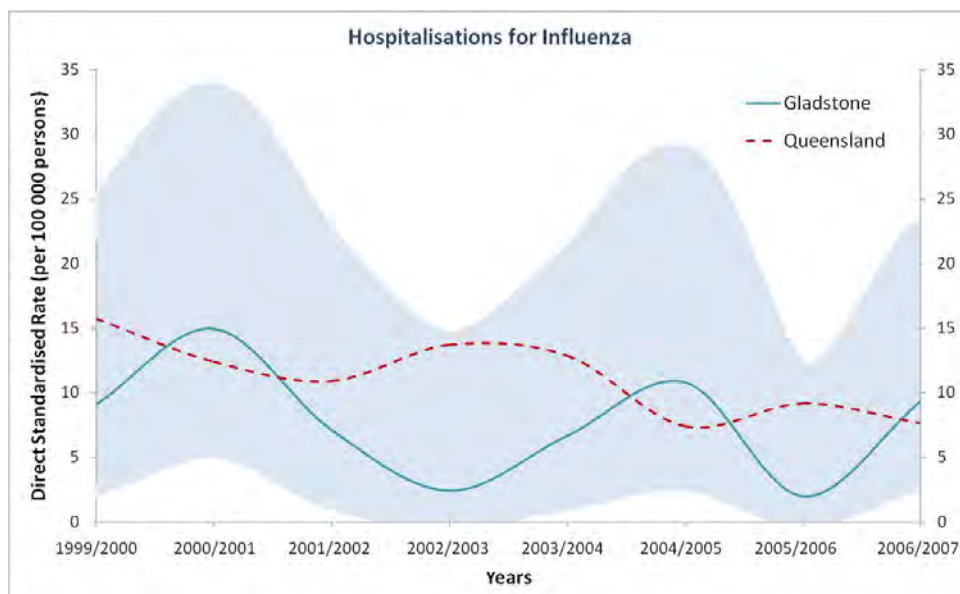


Table 15: Hospitalisations for **influenza** in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	4	9.1	535	15.7	0.7 (0.2-1.8)
2000-2001	6	15.0	435	12.4	1.2 (0.4-2.6)
2001-2002	3	7.1	396	10.9	0.7 (0.1-1.9)
2002-2003	1	2.4	507	13.7	0.2 (0.0-0.9)
2003-2004	3	6.7	486	12.9	0.5 (0.1-1.5)
2004-2005	4	10.8	284	7.4	1.2 (0.3-3.1)
2005-2006	1	2.0	360	9.2	0.2 (0.0-1.3)
2006-2007	5	9.4	311	7.6	1.3 (0.4-3.1)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for influenza

- There are very low numbers of hospitalisations for influenza each year in Gladstone.
- Rates of hospitalisations in Gladstone for influenza were similar to the Queensland rates.
- Influenza occurs with significant year to year variations in the general community.

Graph 16: Hospitalisations for pneumonia in Gladstone and Queensland.

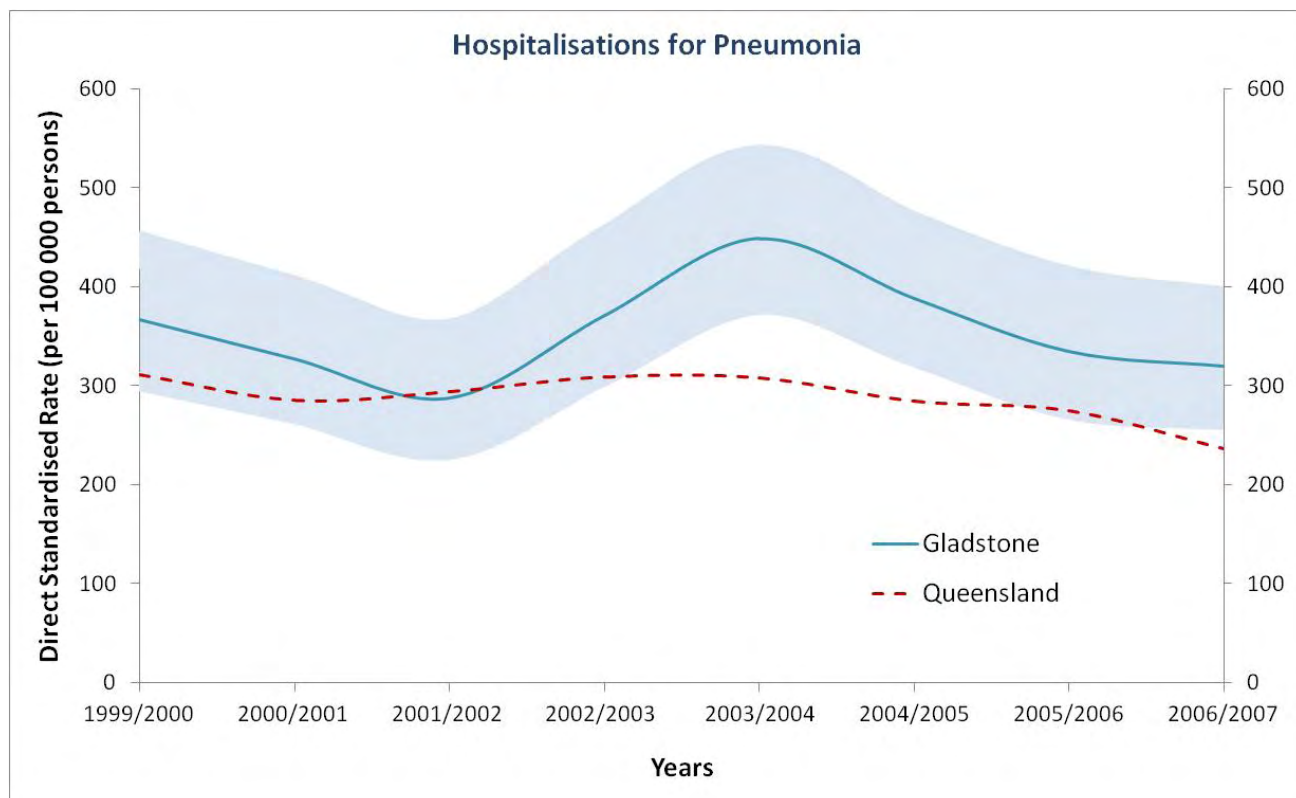


Table 16: Hospitalisations for pneumonia in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	122	366.8	10372	311.9	1.2 (1.0-1.4)
2000-2001	117	327.7	9742	285.4	1.2 (1.0-1.4)
2001-2002	104	288.2	10389	294.0	1.0 (0.8-1.2)
2002-2003	128	371.5	11212	309.6	1.2 (1.0-1.4)
2003-2004	157	449.0	11510	308.8	1.4 (1.2-1.6)
2004-2005	147	388.9	10895	284.7	1.4 (1.2-1.6)
2005-2006	114	334.6	10835	275.4	1.1 (0.9-1.3)
2006-2007	122	319.5	9662	236.9	1.3 (1.1-1.5)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for pneumonia

- In the years 1999/2000 to 2006/2007, there was an average of 126 hospitalisations for pneumonia in Gladstone each year.
- In 2003/2004, 2004/2005 and 2006/2007, the rates of hospitalisations for pneumonia in Gladstone were higher than the Queensland rates.

Graph 17: Hospitalisations for other acute lower respiratory tract infections in Gladstone and Queensland.

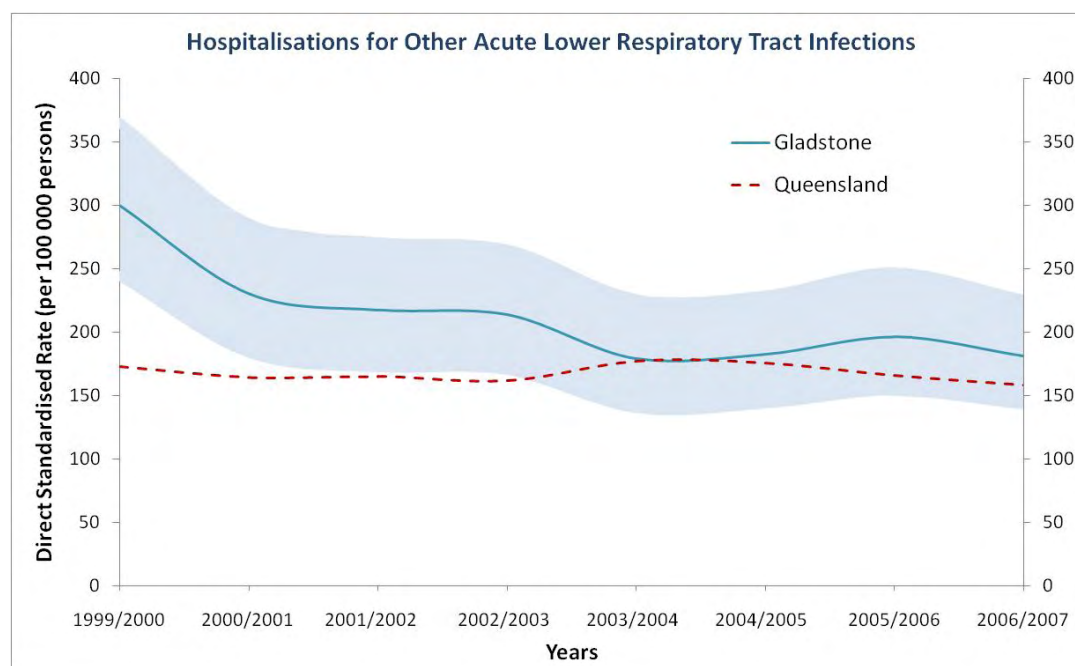


Table 17: Hospitalisations for other acute lower respiratory tract infections in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	100	300.2	5963	172.8	1.5 (1.2-1.8)
2000-2001	83	230.6	5749	164.2	1.2 (1.0-1.5)
2001-2002	79	217.6	5980	165.0	1.2 (0.9-1.5)
2002-2003	82	213.7	5923	161.8	1.3 (1.0-1.6)
2003-2004	71	179.2	6632	177.2	1.0 (0.7-1.2)
2004-2005	74	182.6	6705	175.9	1.0 (0.8-1.2)
2005-2006	72	196.4	6477	166.0	1.0 (0.8-1.3)
2006-2007	78	180.8	6455	158.5	1.1 (0.8-1.3)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for other acute lower respiratory tract infections

- The category “other acute lower respiratory tract infections” does not include pneumonia and influenza.
- In the years 1999/2000 to 2006/2007, there was an average of 80 hospitalisations for acute lower respiratory tract infections in Gladstone each year.
- In 1999/2000, the rate for these infections in Gladstone was higher than the Queensland rate. In other years, rates of these infections in Gladstone were similar to the Queensland rates.

Other Diseases

Graph 18: Hospitalisations for **diabetes** in Gladstone and Queensland.

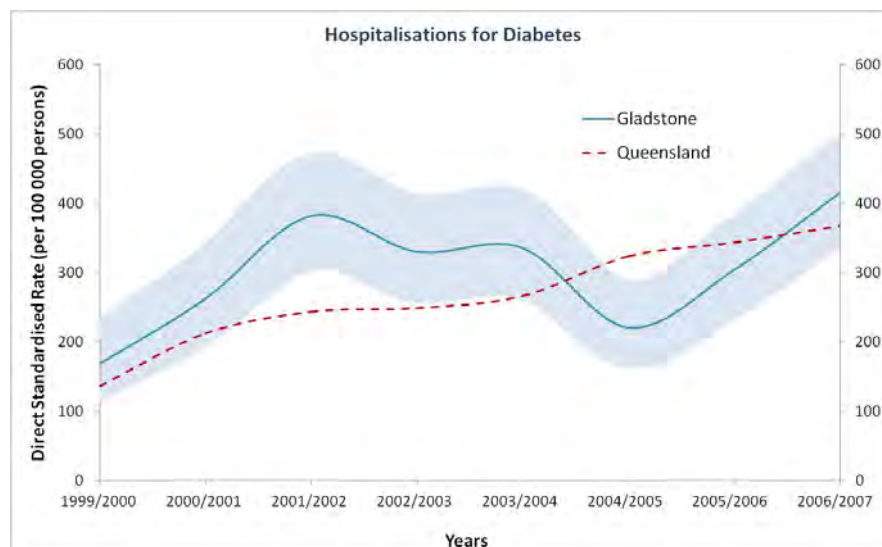


Table 18: Hospitalisations for **diabetes** in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	57	168.3	4586	136.5	1.2 (0.9-1.6)
2000-2001	83	261.9	7190	211.8	1.2 (1.0-1.5)
2001-2002	118	382.3	8554	243.3	1.5 (1.2-1.7)
2002-2003	108	330.3	9028	248.7	1.3 (1.0-1.5)
2003-2004	108	335.7	9953	266.7	1.2 (1.0-1.4)
2004-2005	81	221.0	12415	324.0	0.7 (0.6-0.9)
2005-2006	106	303.6	13557	343.6	0.9 (0.7-1.0)
2006-2007	161	415.1	14966	367.8	1.1 (1.0-1.3)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Hospitalisations for diabetes

- In the years 1999/2000 to 2006/2007, there was an average of 103 hospitalisations for diabetes in Gladstone each year.
- Rates of hospitalisations for diabetes in Gladstone have fluctuated over time and in some years exceeded the Queensland rates.

Deaths due to diabetes (no graph)

- During the eight years of the study, there was an average of four deaths per year directly attributed to diabetes. Rates for Gladstone were similar to the Queensland rates.

Graph 19: Hospitalisations for **dermatitis and eczema** in Gladstone and Queensland.

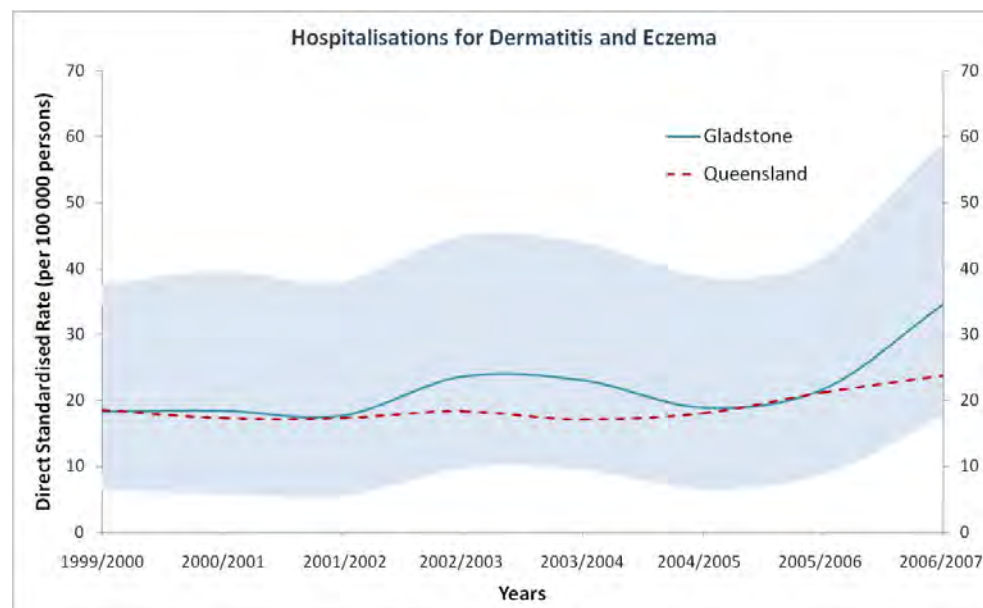


Table 19: Hospitalisations for **dermatitis and eczema** in Gladstone and Queensland

Year	Gladstone area		Queensland		IRR (95%CI)†
	number	rate*	number	rate*	
1999-2000	8	18.3	635	18.6	1.2 (0.5-2.3)
2000-2001	7	18.4	600	17.4	1.1 (0.4-2.3)
2001-2002	7	17.7	619	17.4	1.1 (0.4-2.2)
2002-2003	10	23.6	673	18.4	1.4 (0.7-2.6)
2003-2004	10	23.1	646	17.2	1.5 (0.7-2.7)
2004-2005	8	18.9	695	18.1	1.1 (0.5-2.2)
2005-2006	10	21.8	836	21.3	1.1 (0.5-2.0)
2006-2007	15	34.7	968	23.8	1.4 (0.8-2.3)

Data extracted from the Queensland hospital admitted patient data collection by the Health Statistics Centre.

* Direct age standardised rate per 100,000 persons, using the 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference.

Commentary: Dermatitis and Eczema

- Hospitalisations for dermatitis and eczema in Gladstone are rare (about 10 per year) and occur at rates similar to the Queensland rates.

Cancers

Graph 20: Rates for **cancer of the lung and major airways** in Gladstone, Queensland and Australia.

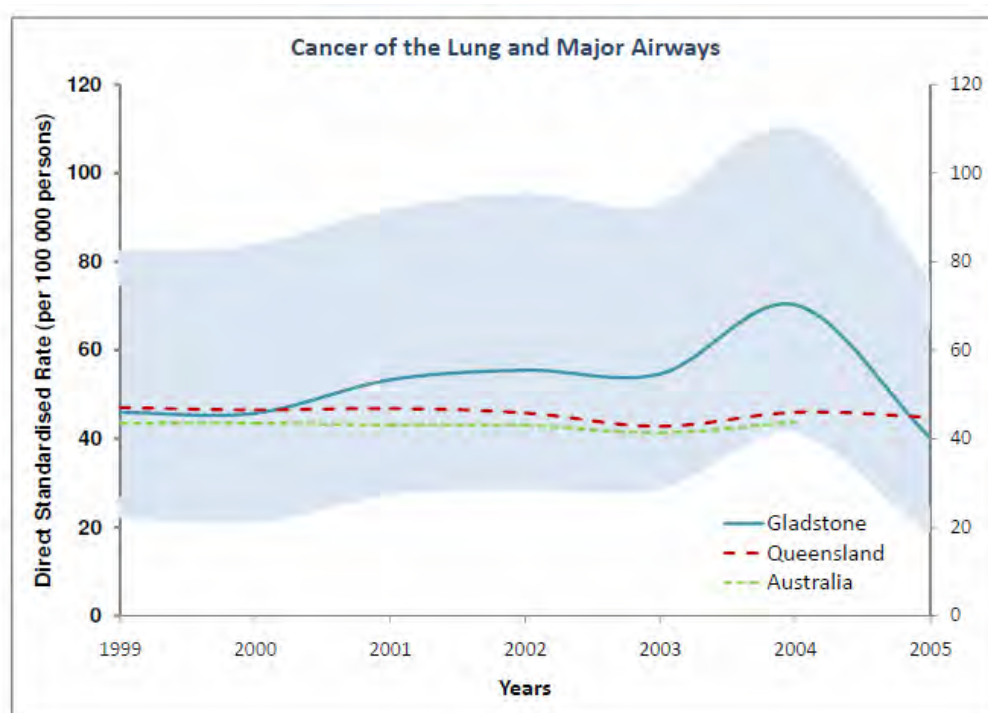


Table 20: Cancer of the lung and major airways in Gladstone, Queensland and Australia

Year	Gladstone area		Queensland		Australia		IRR (95%CI)†
	number	rate*	number	rate*	number	rate*	
1999	13	45.9	1513	47.0	8031	43.5	1 (0.6 - 1.8)
2000	12	45.8	1536	46.5	8223	43.5	1 (0.5 - 1.7)
2001	15	53.3	1617	46.8	8371	43.1	1.1 (0.6 - 1.8)
2002	15	55.5	1639	45.8	8549	43.0	1.1 (0.6 - 1.8)
2003	16	54.6	1583	42.8	8403	41.3	1.2 (0.7 - 1.9)
2004	22	70.2	1767	46.0	9096	43.8	1.5 (0.9 - 2.2)
2005	13	40.2	1779	44.9			0.9 (0.5 - 1.5)

Data for the Gladstone area and Queensland extracted from Queensland cancer registry 2006, by Health Statistics Centre.

Australian data extracted from the Australian Institute of Health and Welfare (AIHW) age standardised data cube.

* Direct age standardised rate per 100,000 persons, using 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference
Australian incidence data not available for 2005

Commentary: Cancer of the lung and major airways

- Over the 7 year period, there was an average of 15 new diagnoses of cancer of the lung, trachea and bronchus (the major airways) per year.
- Rates in Gladstone were similar to the rates in Queensland.

Graph 21: Rates for prostate cancer in Gladstone, Queensland and Australia.

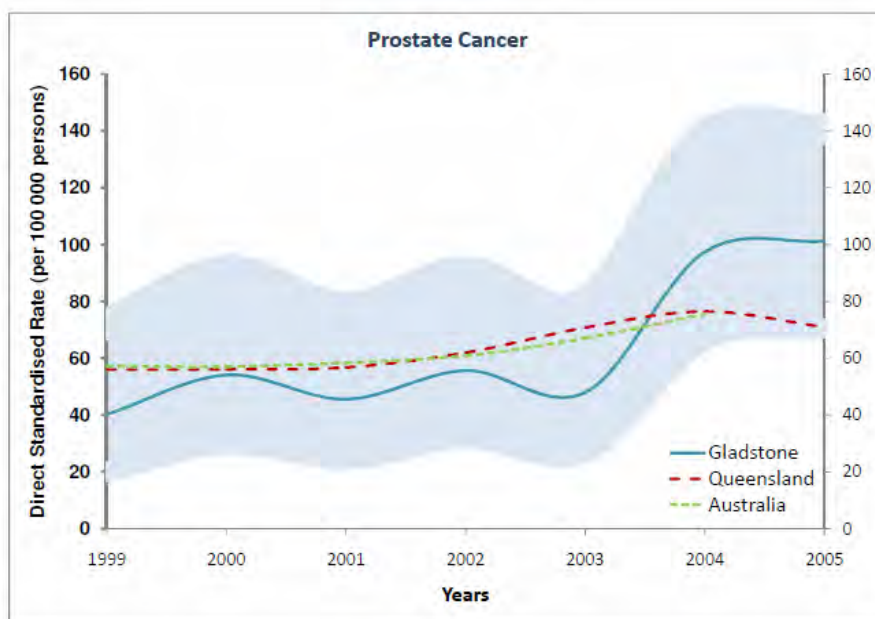


Table 21: Prostate cancer in Gladstone, Queensland and Australia

Year	Gladstone area		Queensland		Australia		IRR (95%CI)†
	number	rate*	number	rate*	number	rate*	
1999	11	40.2	1784	56.0	10546	57.2	0.8 (0.4 - 1.4)
2000	14	54.1	1842	56.1	10778	57.1	1 (0.5 - 1.6)
2001	13	45.6	1951	56.8	11334	58.4	0.8 (0.4 - 1.4)
2002	16	55.7	2217	62.0	12113	60.9	0.9 (0.5 - 1.4)
2003	15	48.0	2635	70.8	13671	67.1	0.7 (0.4 - 1.1)
2004	31	97.4	2959	76.5	15759	75.5	1.2 (0.8 - 1.7)
2005	35	101.3	2846	70.9			1.4 (1 - 2)

Data for the Gladstone area and Queensland extracted from Queensland cancer registry 2006, by Health Statistics Centre.

Australian data extracted from the Australian Institute of Health and Welfare (AIHW) age standardised data cube.

* Direct age standardised rate per 100,000 persons, using 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference

Australian incidence data not available for 2005

Commentary: Prostate Cancer

- Diagnoses of prostate cancer increased from an average of 14 per year between 1999 and 2003 to 33 per year in 2004 and 2005. The rate each year, however, was similar to the rate in Queensland.
- The increase in diagnosed cases is likely to reflect increases in prostate cancer screening, particularly availability of blood testing for prostate specific antigen (PSA).

Graph 22: Rates for all leukaemias in Gladstone, Queensland and Australia.

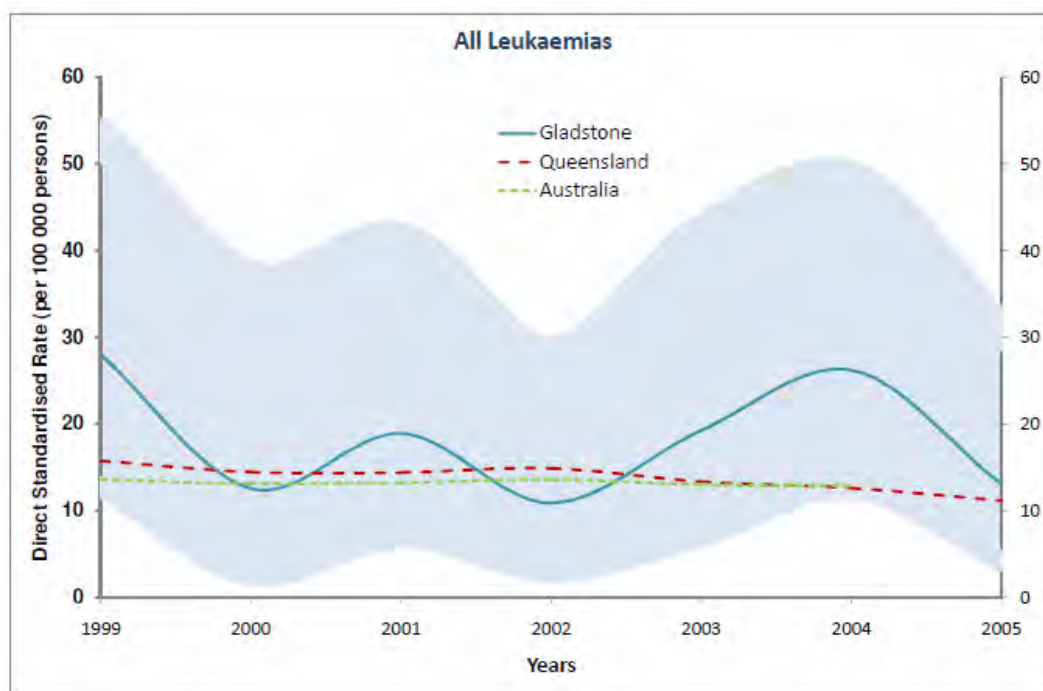


Table 22: All leukaemias in Gladstone, Queensland and Australia

Year	Gladstone area		Queensland		Australia		IRR (95%CI)†
	number	rate*	number	rate*	number	rate*	
1999	9	28.0	515	15.8	2504	13.6	1.9 (0.9 - 3.7)
2000	3	12.6	487	14.5	2471	13.1	0.7 (0.1 - 2)
2001	6	18.9	504	14.4	2561	13.2	1.3 (0.5 - 2.8)
2002	4	10.9	536	14.9	2694	13.6	0.8 (0.2 - 2.1)
2003	6	19.3	501	13.3	2623	13.0	1.3 (0.5 - 2.8)
2004	10	26.2	485	12.6	2665	12.9	2.2 (1.1 - 4.1)
2005	5	13.1	443	11.1			1.2 (0.4 - 2.8)

Data for the Gladstone area and Queensland extracted from Queensland cancer registry 2006, by Health Statistics Centre.

Australian data extracted from the Australian Institute of Health and Welfare (AIHW) age standardised data cube.

* Direct age standardised rate per 100,000 persons, using 2001 Australian estimated resident population.

† Indirect Rate Ratio (IRR) with 95% Confidence Intervals (CI), using Queensland as the reference

Australian incidence data not available for 2005

Commentary: All leukaemias

- Diagnoses of all leukaemias show a peak year in 2004, with 10 cases diagnosed that year. Of note, there was a subsequent decrease in 2005. An increase in chronic lymphocytic leukaemia (CLL) has been investigated. The report is available at:
http://www.health.qld.gov.au/ph/documents/caphs/cil_summary_report.pdf
 CLL is a cancer for which there is no known environmental cause, despite studies involving hundred of cases.

Acute myeloid leukaemia (no graph)

- Acute myeloid leukaemia (AML) is rare, with 9 cases diagnosed over the 7 year period studied; it occurred in Gladstone at rates that were similar to the Queensland rates.

Other cancers (no graph)

- Less common cancers including liver cancer (7 cases over the 7 year period); stomach cancer (15 cases over the 7 year period) and ovarian cancer (7 cases over the 7 year period) all occurred at rates in Gladstone that were similar to the Queensland rates.

Birth outcomes (no graph)

- Deaths due to congenital malformations, deformations and chromosomal abnormalities were rare in Gladstone, with 9 deaths in the period 1999 to 2006. The rates were similar to the Queensland rates.
- There were 39 fetal deaths (stillbirths) in the period 1999 to 2006. The rates for Gladstone were similar to the Queensland rates.

How does the health assessment link in with the air monitoring program?

Pollutants that may cause or aggravate health conditions are being measured in the Environmental Protection Agency's enhanced air monitoring program, which started in November 2008. Queensland Health will compare the measured levels of these pollutants in the air with health-based standards, to determine how each pollutant may contribute to the risk of health impacts. This process, called a "Human Health Risk Assessment" will be completed after 12 months of air monitoring data become available. An initial review of the air monitoring data will be conducted after six months of air monitoring to identify any significant health risks and help guide any adjustments to the air monitoring program.

The table below shows the identified conditions included in the health assessment and how they are being measured. The table also identifies the various pollutants that could be associated with each of these conditions.

Condition	Measure ^{Source}	Pollutants of particular interest
Chronic Obstructive Pulmonary Disease chronic bronchitis emphysema	Deaths [†] Hospital admissions ⁺	oxides of nitrogen, sulfur dioxide, ozone, particulates, chromium
Asthma	Deaths [†] Hospital admissions ⁺ Prevalence [‡]	oxides of nitrogen, sulfur dioxide, ozone, particulates, chromium
Heart disease	Deaths [†] Hospital admissions ⁺ Prevalence [‡]	oxides of nitrogen, sulfur dioxide, ozone, particulates
Diabetes	Deaths [†] Hospital admissions ⁺ Prevalence [‡]	Particulates
Pneumonia	Hospital admissions ⁺	Ozone
Cancers - lung and respiratory tract cancers - acute myeloid leukaemia - non-Hodgkin's lymphoma - liver cancer - prostate cancer	Incidence [§] Prevalence [‡]	arsenic, beryllium, cadmium, chromium VI, nickel, trichloroethylene, benzo[a]pyrene, benzene, xylene, dioxins
Birth outcomes - stillbirth - birthweight - fetal malformations	Incidence [¶]	Arsenic, lead, benzene, xylene
Irritant/allergenic effects - odour - eye irritation - skin irritation/dermatitis/eczema - respiratory tract irritation	Prevalence [‡] Hospital admissions ⁺	oxides of nitrogen, sulfur dioxide, ozone, particulates, volatile organic compounds (eg benzene), carbonyl compounds (eg acetaldehyde), polycyclic aromatic hydrocarbons, cadmium, manganese, zinc, nickel, ammonia

Sources: **+** Hospitalisation data **†** Death Registry
 ‡ Community telephone survey

§ Cancer Registry
¶ Perinatal data.

What about the community telephone survey?

A community telephone survey, completed in October 2008, obtained further health information on 2183 adults and 822 children in the Gladstone area. Of the adults who took part in the survey, half of them had lived in Gladstone for more than 17 years.

The project team is currently analysing the data from this survey. It will provide very useful information regarding:

- asthma, heart disease, cancer and diabetes
 - irritant effects such as itchy eyes, odour and impact of air pollution on lifestyle
 - smoking history and occupation
- and for children, information regarding:
- wheeze, irritant effects on the nose, eyes and skin
 - cancer and diabetes

The results of the community telephone survey will be reported back to the community in the final health assessment report, which is expected to be completed in early February 2009.

Conclusion

Overall, the health of the population of the Gladstone area as measured by the selected health outcomes and presented in this preliminary report, does not show consistent variation from Queensland as a whole. Deaths and cancers occurred at rates similar to the Queensland rates. There were year to year fluctuations for most conditions in Gladstone, which is not unusual when health outcomes are measured in a community the size of Gladstone. For some conditions in some years, rates for hospitalisations were higher than the Queensland rates; however, this does not necessarily indicate higher rates of disease.

The final health assessment report will include additional information from existing health datasets and include the analysis of the community survey. This is due for completion in February 2009. Public information sessions, scheduled to be held in Gladstone on Thursday 5 February, will be advertised prior to the event.

The health assessment, by itself, cannot draw any conclusions about the contribution of air pollution to each condition; those questions will be considered once the data from the Environmental Protection Agency's program of enhanced air monitoring are available. Queensland Health will compare the measured levels of these pollutants in the air with health-based standards, to determine how each pollutant may contribute to the risk of health impacts. This process, called a "Human Health Risk Assessment" will be completed after 12 months of air monitoring data become available. An initial review of the air monitoring data will be conducted after 6 months of air monitoring to identify any significant health risks and help guide any adjustments to the air monitoring program.

Further information

Further information about the Clean and Healthy Air for Gladstone Project, including the discussion paper mentioned in this report, is available at www.epa.qld.gov.au/gladstone

Print copies are also held in libraries, council offices and the offices of local politicians in the Gladstone area.