Title: Using emergency department data to reduce late-night alcohol-related presentations in an Australian Central Business District.

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Abstract

Introduction

The Cardiff Model for Violence Prevention is a data sharing approach aiming to reduce violence-related presentations to Emergency Departments (EDs). This model has not previously been tested with patients attending EDs in a major Australian urban setting, nor has the use of media reporting of results and letters to venues without a local violence prevention board been tested.

Objective

To determine this approach's effect on alcohol-associated presentation rates during high-alcohol hours (HAH) in a major ED servicing the nightlife district in central Melbourne.

Design

Between July 2017 and June 2020, this prospective study asked people aged ≥18 years attending ED about their alcohol consumption and last drink location. From December 2018, quarterly letters were sent to the top five venues identified as the last drink location, and press releases were sent to all media outlets.

Findings

A significant gradual decrease in monthly injury attendance rates during HAH was observed (Coefficient = −0.001, p = 0.017), however no step change was found. Venue-level data highlighted a short-term drop in attributed events.

Discussion

Sharing Last Drinks ED data via stand-alone media reporting and letters to venues was associated with a small, but significant reduction in alcohol-related injury presentation rates. However, impact waned as media stopped reporting findings. This study highlights the importance of including a violence prevention board.

Conclusion

The model continues to have promise for reducing alcohol-related harm, however engagement from government agencies free from alcohol industry funding is important for long-term success.

What is already known on this topic

There is a growing trend in using ED data of alcohol-related assault and injury attendances to inform community safety interventions, frequently referred to as the 'Cardiff Model'. The majority of studies evaluating the effectiveness of interventions based on the Cardiff Model have shown substantial reductions in ED attendances post-intervention.

What this study adds

This study has demonstrated a small, but significant reduction in alcohol-related injury presentation rates to ED following the implementation of the Cardiff Model. The data from

an Australian capital city central business district adds to the existing data from a regional Australian town. Further, this research identifies that a violence prevention board and police intervention are critical components of the Cardiff Model for long-term impact, whereas relying on stand-alone media reporting and letters to venues appears to only have short-term effects.

How this study might affect research, practice, or policy

Sharing establishment data holds venues accountable for alcohol-related injuries, encouraging responsible practices among venue operators and promoting a safer nightlife environment. Collaborative involvement between healthcare institutions, local law enforcement and licensing authorities allow for informed policy actions such as adjusting operating hours and imposing alcohol-related restrictions to proactively mitigate injuries related to alcohol consumption. Further trials could involve media as a community partner as well.

Introduction

Alcohol-related harm represents a substantial burden on Emergency Departments in Australia (1-3) and globally (4, 5). A 2am snapshot of 106 EDs across Australia and New Zealand found that one in seven presentations were alcohol-related, with some EDs seeing alcohol-presentations as high as one in three (6). Alcohol-related ED presentations are most likely to present between midnight and 5am on a Friday, Saturday or Sunday night (7). A 2002 survey of Australian and New Zealand ED clinicians found that over 90 percent of staff had experienced alcohol-related physical aggression from an intoxicated patient, negatively affecting their own wellbeing and their capacity to treat other patients (2). This paper reports on a single site finding which was part of the larger Driving Change study conducted in 11 hospitals across Australia (8).

Nightlife entertainment precincts (NEPs) are geographically dense clusters of on-premises alcohol-serving outlets, that serve as important social and economic hubs in large towns and cities (9, 10). Heavy acute alcohol intoxication is common in these areas (10, 11) and has been associated with increased incidence of violence and injury among nightlife attendees (10, 12, 13). The concentrated level of crime, violence, and injury experienced in these areas puts a substantial burden on frontline workers that are required to respond to these incidents, such as emergency department staff.

Australian governments have introduced many policies measures aimed at reducing violence in NEPs, that consequently reduce the impact burden of alcohol-related violence and injuries on emergency department staff. These restrictions regulate how alcohol outlets operate, such as restricting trading hours, or limiting the type of alcohol that can be consumed in nightlife venues (14). Other methods include funding street service care providers to prevent

individuals with minor problems from presenting to the ED (e.g. minor wounds, intoxication)(15). While both types of intervention seek to reduce the outflow of individuals from NEPs to EDs they fail to exploit that the majority of alcohol-related harm is attributable to a few problematic venues within a NEP (16). An intervention that could easily identify the specific venues contributing the majority of the harm, and hold the specific venues accountable, could potentially reduce alcohol-related harm without needing to change how compliant venues operate, or into funding additional services to act as a safety net against nightlife patrons attending an ED. Using ED data of alcohol-related assault and injury attendances to inform interventions aimed at reducing street level crime is a growing trend, frequently referred to as the 'Cardiff Model'(8). The Cardiff Model is a community-based multi-disciplinary data sharing intervention that includes health, justice, government, and researchers in data collection and analysis, and the development of consensus-based outcomes to improve community safety related to alcohol harm (17). These are often called a Violence Prevention Alliances (VPA) The majority of studies aimed at measuring the effectiveness of interventions based on the Cardiff Model showed substantial reductions in ED attendances post-intervention (1). Sharing ED data to prevent injuries is a public health approach recommended by the World Health Organisation (18, 19). In particular, Warburton and Sheppard (20) reported the use of media in conjunction with the VPA, which we believed warranted further testing. Our paper discussing a regionally-located Cardiff Model intervention determined a small, but significant reduction in injury presentation rate (3). This paper focusses on the implementation of the Cardiff Model in an Australian capital city central business district as part of the larger 5-year National Health and Medical Research Council (NHMRC) *Driving Change* project (8).

Aims and Hypotheses

Aligning with the broader project (8),this study aimed to determine the impact of a Cardiff Model of data-sharing on alcohol-related injuries in central Melbourne, during High Alcohol Hours (HAH): 20:00 hours Friday to 06:00 hours Saturday and 20:00 hours Saturday to 06:00 hours Sunday, recorded at time of triage. Based on the primary outcomes from the study protocol (8), it was hypothesised that:

(i) the proportion of presentations in which the patients report alcohol use in the prior 12 hours during HAH would significantly decrease after each intervention; and

(ii) the proportion of presentations assigned an ICD-10 injury diagnosis (S&T code) occurring during HAH would significantly decrease after each intervention.

Methods

Setting

Melbourne is the capital city of the state of Victoria, in south-eastern Australia. It has an Estimated Residential Population (ERP) of over 5 million people. Eight of the entertainment precincts in central Melbourne are a part of Victoria's 18 Designated Areas: an area experiencing alcohol-related violence within which police have extra powers in an attempt to reduce further violence and anti-social behaviour (https://www.vcglr.vic.gov.au/community-services/government-initiatives/designated-areas).

Unpublished street intercept survey data indicates that only 11% of nightlife patrons in Melbourne reported their postcode of residence as the same one as they were interviewed in (21). Foot-traffic data from these areas also shows that the population in these spaces is transient, and not well represented by ERP. As the interventions targeted nightlife spaces, population data was not deemed a representative denominator for any of the analyses.

Data

Originally a multi-state multi-site study set to end in late 2020, due to different and unique challenges faced by each hospital including prolonged bushfires in Canberra followed by the beginning of the COVID-19 pandemic, the intervention was cut short, and each site was individually examined.

Presentation data

Between January 2015 to June 2020, ICD-10-AM (International Classification of Diseases 10th Revision, Australian Modification) primary diagnosis codes from all presentations of people 18 years and over to the St Vincent's Melbourne ED were obtained. St Vincent's hospital covers the main CBD of Melbourne (https://www.ambulance.vic.gov.au/wp-content/uploads/2021/05/hc_250521.pdf). The time of presentation to triage was also included. Based on previous research, only cases that occurred during high-alcohol hours (HAH, 8pm-6am Friday and Saturday nights; (7)) were extracted. ICD-10-AM injury codes (designated S and T) were used as per the original outcome measure set in the study protocol (8).

As St Vincent's Melbourne ED was shut down during February and March 2018, monthly presentations from January and April were averaged and used to replace data for those time points. Data from March 2020 and beyond were excluded from all analyses due to the unique impact the COVID-19 pandemic had on emergency department presentations.

Last Drinks questions

From July 2017 all people aged 18 years and older presenting to the ED were asked:

1) whether they had consumed alcohol in the past 12 hours,

2) their typical alcohol consumption during a drinking session,

3) the location where most of the alcohol was purchased, and

4) the location of their last alcoholic drink.

Questions were mandatory within the ED electronic medical record systems, with triage staff trained on the reasons behind each question. People aged younger than of 18 years were excluded. Clinicians used their clinical judgement to identify when asking the questions was inappropriate, including patients who were too unwell or non-responsive, or when questions were not asked for ethical reasons, such as a cultural or interpersonal issue (8).

Analysis

As per the previously-published paper (3), Interrupted time series (ITS) analysis (itsa command) in Stata 15 (22, 23) was used to estimate the influence of the intervention on monthly alcohol-related ED presentations. ITS allows simultaneous tests of step (immediate) and slope (gradual) changes in trends (24), this allowed us to evaluate the impact of the initial media release (step), and the gradual impact from the series of media releases (slope). A monthly seasonal variable was included in each model to account for periodic trends. Cross-correlograms were examined to identify the best-fitting transfer function for the intervention variable (specified as lag; (25)).

Intervention

The current study utilised concurrent interventions as per the larger *Driving Change* project (8) based on previously trialled interventions using the Cardiff model (1, 26-28). Each quarter, letters were sent to the top five venues reported within the ED as associated with alcohol-related injuries. These letters outlined the number of attendances and anonymised details of the cases. Letters were sent via the Australasian College for Emergency Medicine (ACEM) to the registered licensees. The de-identified, aggregated data was also shared with licensing authorities, local government, and local police, identifying the top five reported venues and providing a summary of all alcohol-related ED presentations (8). The intervention

commenced with a media release in December 2018. Quarterly letters to venues continued until February 2020 when COVID-19 undermined data collection. Because of a lack of government, police or community buy-in, no VPA was commenced, and the media releases and venue letters were the only active ingredients.

The quarterly media releases summarised reports posted on the website of the Australasian College of Emergency Medicine (see supplementary material) and also linked to the project website. The press releases specifically contained the names of the top three venues associated with ED presentations, along with key data such as the number of presentations by gender and age group.

Patient and Public Involvement Statement

Given the timeframe of the development and nature of the larger *Driving Change* project methodology, there was no patient nor public involvement in the design of this study.

Ethics Approval

Ethics approval was obtained from St Vincent's Hospital Melbourne (HREC-A 170/16) and Deakin University **(**DUHREC 2017-178**)** Human Research Ethics Committees.

Patient and Public Involvement

Patients and the public were not consulted in this study were not consulted on any aspect of the project. The study was designed in 2015 and started in 2016, when patient engagement was not the norm.

Results

Descriptives

Table 1 shows the presentation data for the variable used to test the hypotheses set by the protocol article (8).

Table 1 Cases included in protocol analyses

Variable	Cases during HAH
Total emergency department presentations	23,215 (100%)
Presentations reporting alcohol consumption in the prior 12 hours (% all HAH presentations)	3,075 (13.2%)
Presentations reporting no alcohol consumption in prior 12 hours* (% all HAH presentations)	7,916 (34.1%)
S & T injury ICD-10-AM code presentations (% all HAH presentations)	5,528 (23.8%)

Note. Not all presentations answered the Last Drinks questions*

Time series analysis

Injury-related presentations

ITS models were used to evaluate the impact of the intervention on the number of injury-related (S and T code) presentations during HAH. This was analysed via both the total number of injury-related presentations, and the injury-related presentation rate compared to total ED presentations (Table 2). A significant slope decrease in injury presentation rates was associated with the intervention, however no step change was found. The presentation rate trend can be seen in Figure 1.

Table 2 Injury trends during HAH in response to intervention

Condition		Lag	Coefficient	*p*	CI
Count	Time (slope)	1	0.05	0.564	-0.12, 0.22
	Media release (step)		5.20	0.276	-4.29, 14.68
	Time x Media Release (slope)		-0.61	0.198	-1.55, 0.33
Presentation Rate	**Time (slope)**	**1**	**-0.001**	**0.017**	**-0.001, -0.0001**
	Media release (step)		0.01	0.456	-0.02, 0.03
	Time x Media Release (slope)		**-0.002**	**0.028**	**-0.004, -0.0002**

Figure 1 Injury-related presentation rates during HAH

Last Drinks Question identified attendances

ITS models were used to evaluate the impact of the intervention on the number of people reporting alcohol consumption within the last 12 hours during HAH. This was analysed via both the count of people reporting alcohol consumption, and the proportion of people reporting alcohol consumption compared to those that reported none (Table 3). No significant impact was associated with the intervention in either condition. Due to limitations created by the COVID-19 pandemic in the latter stages of the intervention, less than 50 time points were available, which has potentially resulted in the analyses being under powered. The proportion of people reporting alcohol consumption compared to those that reported none trends can be seen in Figure 2.

Table 3 Last drinks presentation trends in response to intervention

Condition		Lag	Coefficient	*p*	CI
Count	Time (slope)	1	0.46	0.294	-0.44, 1.36
	Media release (step)		-3.07	0.759	-23.90, 17.76
	Time x Media Release (slope)		-1.13	0.402	-3.91, 1.65
Proportion of Yes to No	**Time (slope)**	**1**	**-0.01**	**0.009**	**-0.01, -0.002**
	Media release (step)		0.05	0.318	-0.05, 0.15
	Time x Media Release (slope)		-0.001	0.847	-0.01, 0.02

Figure 2 Proportion of alcohol-related presentations to non-alcohol related presentations

Venue presentations

Figure 3 shows the number of ED attendances over time that reported having consumed their last drink at the five venues identified in the initial 2018 media release by quarter. When examining by venue, no significant trends in ED presentations were observed at any of the five venues following the intervention.

Figure 3. Last Drinks attendances from venues listed in initial media release, by quarter

Discussion

This study examined the introduction an intervention based on the Cardiff Model to address the issue of alcohol-related injuries in the Central Business District of Melbourne, specifically during High Alcohol Hours (HAH). The findings of this study confirmed the effectiveness of this intervention in reducing the alcohol-related presentation rate to the ED

and the proportion of injury-related diagnoses during HAH. The discrepancy between the injury-related presentations and last drinks question presentations may be that the injury protocol had more power to detect small changes. In particular, the number of people reporting recent alcohol consumption during HAHs has been previously shown as a less reliable measure over time (7). The discrepancy between the two results may be that the injury protocol had more power to detect small changes (all presentations had a diagnosis, but only half the people were asked if they had recently consumed alcohol).

The finding that the intervention was associated with a statistically significant decrease in alcohol-related injury presentations is in line with previous research (1). Droste et al (1) found this intervention to be the most effective in terms of Emergency Department based interventions, and this trial provides some support for the previous findings, although the small effect size may be due to the unreliable reporting of trial data in the media (almost no coverage by the third wave of data being released) and poor co-operation of police and the City of Melbourne in the trial. The apparently systemic change in media reporting on alcohol issues since around 2014 has been noted elsewhere (29) and has been attributed to declining independence from the major advertisers: alcohol and gambling. While it is generally recommended that a supporting violence prevention committee be created (17), this was not possible because of a range of self-interest issues. It is likely that the intervention would have had greater impact if there was stronger government agency buy-in as was seen at other sites and internationally.

While the effect sizes found in this trial are comparatively small, the venue specific results reported in Figure 3 also tell an important story in terms of the implementation process and the reality that the initial gains made with media attention were ultimately lost when media outlets stopped reporting results and the venues were no longer being held accountable. Certainly, previous research has shown that existing legislative and other policy responses in

Victoria preside over extremely poor practices of serving patrons while intoxicated; noting that over 80% of people showing 3 or more signs of intoxication were still served alcohol (30-32). In comparison to a regional intervention site within the Last Drinks project (3), this intervention site was solely reliant on media reporting and letter to venues as local police, council and licensing enforcement personal did not engage with the project team in terms of joining a community-based VPA. This is in the context of a state government which has close ties with the local Australian Hotels Association and receives direct political funding from them (33, 34). Future interventions might find better leverage through forming stronger community coalitions which can lobby government as used in other interventions (35).

Limitations

This study has several limitations. The data was collected from a single hospital within the central business district of Melbourne, and although it is the closest to the central city nightlife area where Ambulances are mandated to take patients, it is possible that some alcohol-affected patients would attend other hospitals, especially if injury occurred while travelling home. However, there were no major changes in hospital configurations across Melbourne, nor ambulance protocols during this time, which allows us to assume that any leakage to other hospitals would remain relatively constant over the course of the study. This analysis has focussed on presentations during High Alcohol Hours. HAHs are a proxy for alcohol-related harm, but alcohol-associated injuries can occur at any time. Emergency Departments represent the tip of the iceberg of alcohol-related harm; only the more/most serious cases are taken to hospital. Finally, while patients were asked about the number of drinks consumed in 12h prior to their injury, no objective measure of intoxication was performed, such as breath alcohol concentration (BrAC). Also, in order to lessen the impact

on ED practice, interrater reliability was not assessed for the present study and was not attempted using triage case-notes due to the unreliable reporting of alcohol data in this form. Future research expanding on this work might attempt to incorporate interrater reliability and data quality measures.

Conclusion

Within the limitations described, this data driven intervention appears to have been effective at reducing alcohol-related injuries in this site, and in regional Australia (1). Previous trials across the world have found such data driven interventions effective and efficient with significant implications for public health and safety measures in addressing alcohol-related harm (1, 3, 17, 27, 36). By targeting specific venues and sharing their data, authorities can hold these establishments accountable for the most alcohol-related injuries. This practice encourages responsible practices among venue operators and promoting a safer nightlife environment; a finding which has also been demonstrated when using police-gathered 'last drinks' data (37, 38). Collaborative involvement between healthcare institutions, local law enforcement and licensing authorities allow for informed actions like adjusting operating hours and imposing alcohol-related restrictions and supports World Health Organization's (WHO) recommendations on using ED data to proactively mitigate injuries related to alcohol consumption (14, 15).

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Competing Interests Statement

There are no competing interests for any author

Ethical Approval Statement

Ethics approval was obtained from St Vincent's Hospital Melbourne (HREC-A 170/16) and Deakin University (DUHREC 2017-178) Human Research Ethics Committees.

Funding statement

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Contributorship Statement

PM led the project, obtained funding and wrote most of the paper. NT conducted analysis and contributed to paper writing. DEW was a chief investigator and contributed to paper writing. KK assisted in data collection, conceptualisation and paper writing. JS was a chief investigator and contributed to paper writing. HA was a lead clinical site contributor and contributed to paper writing. PM is the guarantor author.

Patient and Public Involvement

Patients and the public were not consulted in this study were not consulted on any aspect of the project. The study was designed in 2015 and started in 2016, when patient engagement was not the norm.

Figures

Figure 1 Injury-related presentation rates during HAH

Figure 2 Proportion of alcohol-related presentations to non-alcohol related presentations

Figure 3. Last Drinks attendances from venues listed in initial media release, by quarter

Figure 1 Injury presentation trend

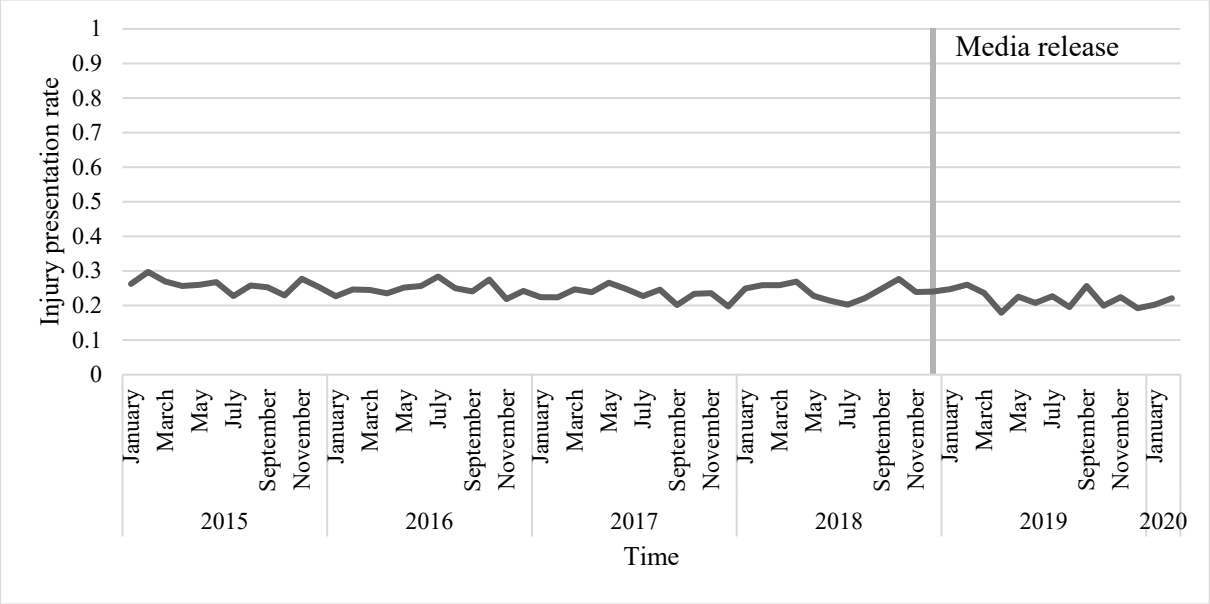


Figure 1 Injury-related presentation rates during HAH

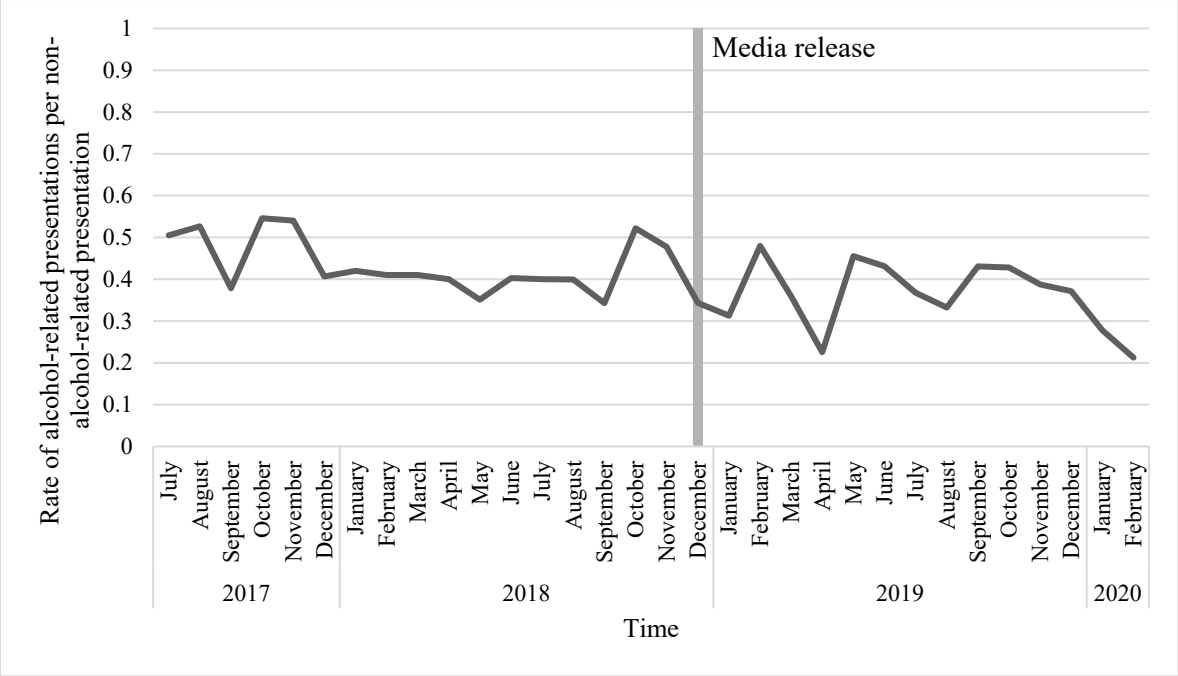


Figure 2 Proportion of alcohol-related presentations to non-alcohol related presentations

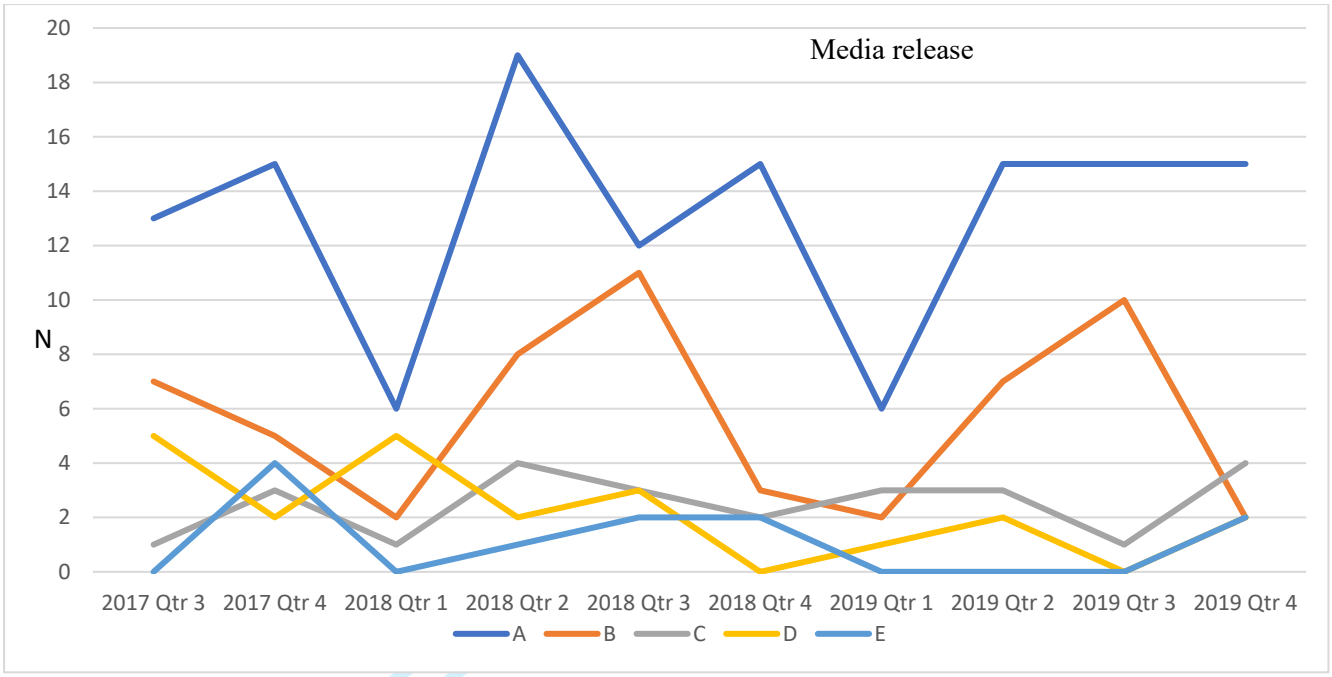


Figure 3. Last Drinks attendances from venues listed in initial media release, by quarter

MEDIA RELEASE

New emergency department data exposes alcohol harm in Melbourne

New emergency department data exposes alcohol harm in Melbourne

New emergency department data exposes the scale of harm from alcohol in Melbourne and the need for the Victorian government to take action, according to the peak body for emergency medicine in Australia.

The Australasian College for Emergency Medicine (ACEM) has released findings from the emergency departments in St Vincent's Hospital and three Monash Health campuses (Clayton, Casey and Dandenong), collected over three months as part of the Driving Change project. Driving Change asks all adults who present to the ED whether they drank alcohol before their attendance, where they bought the alcohol, and the location of the last drink.

The Driving Change data showed that the main reasons for attending the emergency department were for alcohol intoxication, dependence, withdrawal, physical injuries, and suicide ideation. Data shows that dangerous levels of drinking (more than two standard drinks on each occasion) is pervasive across the communities served by the participating hospitals, regardless of age and gender, although men and women aged 45 to 54 were more likely to drink at dangerous levels.

More concerning, almost half of patients (44%) at St Vincent's, and over half (67%) of patients at Monash Health campuses who reported consuming alcohol in the preceding 12 hours had purchased alcohol from packaged liquor outlets such as supermarkets and bottle shops. This is an issue because it enables pre-loading, when drinks can be bought ahead of time while a person is sober, and consumed to excess when no 'safe service' levels apply. This number is also likely to be under-reported because of the number of people who were unable to recall the purchase location, or who were unconscious or refused to respond.

Monash Health

Over a three month period earlier this year at the 3 participating Monash Health campuses, data collected shows that on Friday and Saturday nights, around 1 in 10 patients were there due to alcohol consumption (compared to an average of almost 1 in 20

over the whole week). All told, 7 out of every 10 patients in the ED reported consuming alcohol in the 12 hour period beforehand. These findings continue the trend observed in previous years.

St Vincent's

Over a three month period late last year at St Vincent's ED, data collected shows that on Friday and Saturday nights, over 1 in 4 patients were there due to alcohol consumption (compared to an average of almost 1 in 10 over the whole week). All told, almost half of patients in the ED who reported consuming alcohol in the 12 hour period beforehand had purchased the alcohol from packaged liquor outlets such as supermarkets and bottle shops.
The mostly commonly reported venues from St Vincent's for last drinks before needing to go to an ED were concentrated among major venues in Melbourne:

- Crown Casino
- Flemington Racecourse
- Melbourne Cricket Ground
- The Forum

Spring racing carnival

All reports from Flemington Racecourse date from the period around the Spring Carnival in the first half of November 2018. The findings reveal that contrary to most trends that show males are heavier drinkers, over three quarters of presentations from Flemington Racecourse were female.

Call for action against alcohol harm

ACEM President Dr Simon Judkins said: "Emergency physicians regularly manage the devastating effects of excessive alcohol consumption on individual health, as well as assaults or verbal and physical threats from drunk patients. It is incredibly stressful and confronting to see and have to manage this every weekend. The NT government has demonstrated that alcohol reforms, including setting a minimum floor price, can dramatically reduce ED presentations."

"What is clear is that Australia needs to undertake a cultural shift in its relationship with alcohol. With alcohol being promoted at sporting events, heavy drinking around major events will continue to be a big cause of the problem that contributes to the alcohol harm we see in the ED every day. Regulation is required to tackle the way alcohol is heavily promoted.'
The Driving Change project is led by Professor Peter Miller at Deakin University, with funding from the National Health and Medical Research Council. In addition to the two EDs in Canberra, there are participating hospitals in Melbourne, Geelong, Sydney and Warrnambool. Central Queensland University, the University of New South Wales, Australian National University and Cardiff University (Wales) are also partners in the project.

More details: Last Drinks

DATE RELEASED 16 July 2019

HOSPITAL CATCHMENTS

AV crews will transport their patient to the designated catchment hospital emergency department unless the patient:

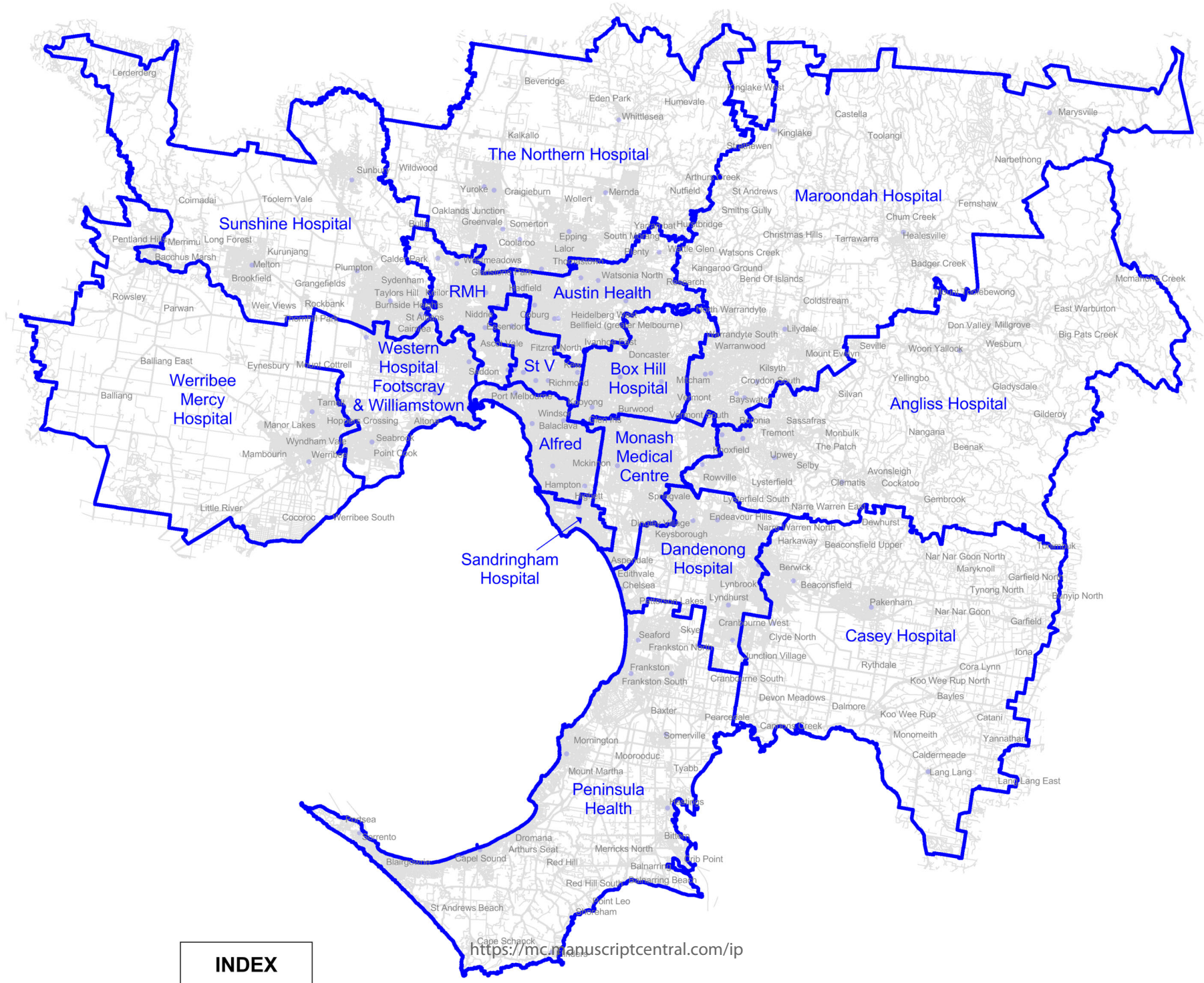
- has a clinical need to attend a different hospital (e.g. major trauma, acute stroke, STEMI where the designated hospital does not have the required services)

- is a child per DHHS criteria (≤15 years old), in which case transport will occur to the closest paediatric-capable ED, except in the case of major trauma

- has relevant history at a different hospital (i.e. investigated/treated for the presenting condition within the last 12 months)

- Is a mental health patient who will need to be transported to the designated Area Mental Health service.

HOSPITAL CATCHMENTS



LOCALITY INDEX

ABBOTSFORD	SVH
ABERFELDIE	RMH
AINTREE	SUN
AIRPORT WEST	RMH
ALBANVALE	SUN
ALBERT PARK	ALF
ALBION	WES
ALPHINGTON	AUS
ALTONA	WES
ALTONA MEADOV	WES
ALTONA NORTH	WES
ARDEER	WES
ARMADALE	ALF
ARTHURS CREEK	NOR
ARTHURS SEAT	PEN
ASCOT VALE	RMH
ASHBURTON	MMC
ASHWOOD	MMC
ASPENDALE	MMC
ASPENDALE GARI	MMC
ATTWOOD	NOR
AVONDALE HEIGH	RMH
AVONSLEIGH	ANG
BACCHUS MARSH	SUN
BADGER CREEK	MAR
BALACLAVA	ALF
BALLIANG	WER
BALLIANG EAST	WER
BALNARRING	PEN
BALNARRING BEA	PEN
BALWYN	BHH
BALWYN NORTH	BHH
BANGHOLME	DAN
BAXTER	PEN
BAYLES	CAS
BAYSWATER	MAR
BAYSWATER NOR	MAR
BEACONSFIELD	CAS
BEACONSFIELD U	CAS
BEAUMARIS	SAN
BENAK	ANG
BELGRAVE	ANG
BELGRAVE HEIGH	ANG
BELGRAVE SOUTH	ANG
BELLFIELD (GREAT	AUS
BEND OF ISLANDS	MAR
BENTLEIGH	ALF
BENTLEIGH EAST	ALF
BERWICK	CAS
BEVERIDGE	NOR
BIG PATS CREEK	ANG
BITTERN	PEN
BLACK ROCK	SAN
BLACKBURN	BHH
BLACKBURN NOR	BHH
BLACKBURN SOU	BHH
BLAIRGOWRIE	PEN
BLIND BIGHT	CAS
BONBEACH	DAN
BONEO	PEN
BONNIE BROOK	SUN
BORONIA	MAR
BOTANIC RIDGE	DAN
BOX HILL	BHH
BOX HILL NORTH	BHH
BOX HILL SOUTH	BHH
BRAESIDE	MMC
BRAYBROOK	WES
BRIAR HILL	AUS
BRIGHTON	ALF
BRIGHTON EAST	ALF
BROADMEADOWS	NOR
BROOKFIELD	SUN
BROOKLYN	WES
BRUNSWICK	SVH
BRUNSWICK EAST	SVH
BRUNSWICK WES	SVH
BULLA	SUN
BULLEEN	AUS
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BURNSIDE	SUN
BURNSIDE HEIGH	SUN
BURWOOD	BHH
BURWOOD EAST	BHH
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CALDER PARK	SUN
CALDERMEADE	CAS
CAMBERWELL	BHH
CAMPBELLFIELD	NOR
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CANTERBURY	BHH
CAPE SCHANCK	PEN
CAPEL SOUND	PEN
CARDINIA	CAS
CARLTON	SVH
CARLTON NORTH	SVH
CARNEGIE	ALF
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CARRUM	DAN
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CATANI	CAS
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CAULFIELD EAST	ALF
CAULFIELD NORTI	ALF
CAULFIELD SOUTH	ALF
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CHELSEA	DAN
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CLAYTON	MMC
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CLIFTON HILL	SVH
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COBBLEBANK	SUN
COBURG	SVH
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COCKATOO	ANG
COCOROC	WER
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COLDSTREAM	MAR
COLLINGWOOD	SVH
COOLAROO	NOR
CORA LYNN	CAS
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CRAIGIEBURN	NOR
CRANBOURNE	DAN
CRANBOURNE EA	CAS
CRANBOURNE NO	DAN
CRANBOURNE SO	PEN
CRANBOURNE WE	DAN
CREMORNE	SVH
CRIB POINT	PEN
CROYDON	MAR
CROYDON HILLS	MAR
CROYDON NORTH	MAR
CROYDON SOUTH	MAR
DALLAS	NOR
DALMORE	CAS
DANDENONG	DAN
DANDENONG NO	DAN
DANDENONG SO	DAN
DARLEY	WER
DEANSIDE	SUN
DEEPDENE	BHH
DEER PARK	WES
DELAHEY	SUN
DERRIMUT	WES
DEVON MEADOW	CAS
DEWHURST	CAS
DIAMOND CREEK	AUS
DIGGERS REST	SUN
DINGLEY VILLAGE	MMC
DIXONS CREEK	MAR
DOCKLANDS	RMH
DON VALLEY	ANG
DONCASTER	BHH
DONCASTER EAST	BHH
DONNYBROOK	NOR
DONVALE	BHH
DOREEN	NOR
DOVETON	DAN
DROMANA	PEN
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EAST WARBURTOI	ANG
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EDITHVALE	DAN
ELSTERNWICK	ALF
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ELTHAM NORTH	AUS
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ESSENDON NORT	RMH
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FERNTREE GULLY	ANG
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FINGAL	PEN
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FRANKSTON NOR	PEN
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GARDENVALE	ALF
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GILDEROY	ANG
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GLADYSDALE	ANG
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MOOROODUC	PEN
MOOROOLBARK	MAR
MORDIALLOC	SAN
MORNINGTON	PEN
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MOUNT COTTREL	WER
MOUNT DANDEN	ANG
MOUNT ELIZA	PEN
MOUNT EVELYN	MAR
MOUNT MARTHA	PEN
MOUNT TOOLEBE	MAR
MOUNT WAVERLI	MMC
MULGRAVE	MMC
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NAR NAR GOON	CAS
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NARRE WARREN I	DAN
NARRE WARREN S	DAN
NEWPORT	WES
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OAKLANDS JUNC	NOR
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OAKLEIGH SOUTH	MMC
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ORMOND	ALF
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RESERVOIR	AUS
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RINGWOOD	MAR
RINGWOOD EAST	MAR
RINGWOOD NOR	MAR
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ROSANNA	AUS
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ROWSLEY	WER
ROWVILLE	ANG
ROXBURGH PARK	NOR
RYE	PEN
RYTHDALE	CAS
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SANDHURST	DAN
SANDRINGHAM	SAN
SASSAFRAS	ANG
SCORESBY	MMC
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SEAFORD	PEN
SEAHOLME	WES
SEDDON	WES
SELBY	ANG
SEVILLE	ANG
SEVILLE EAST	ANG
SHERBROOKE	ANG
SHOREHAM	PEN
SILVAN	ANG
SKYE	PEN
SMITHS GULLY	MAR
SOMERS	PEN
SOMERTON	NOR
SOMERVILLE	PEN
SORRENTO	PEN
SOUTH KINGSVILL	WES
SOUTH MELBOUR	ALF
SOUTH MORANG	NOR
SOUTH WHARF	ALF
SOUTH YARRA	ALF
SOUTHBANK	ALF
SPOTSWOOD	WES
SPRINGVALE	MMC
SPRINGVALE SOU	MMC
ST ALBANS	SUN
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ST KILDA WEST	ALF
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STRATHMORE HEI	RMH
STRATHTULLOH	SUN
SUNBURY	SUN
SUNSHINE	WES
SUNSHINE NORTH	WES
SUNSHINE WEST	WES
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SYDENHAM	SUN
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TAYLORS LAKES	SUN
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TEMPLESTOWE LO	AUS
THE BASIN	ANG
THE PATCH	ANG
THOMASTOWN	NOR
THORNBURY	AUS
THORNHILL PARK	SUN
THREE BRIDGES	ANG
TONIMBUK	CAS
TOOLANGI	MAR
TOOLERN VALE	SUN
TOORADIN	CAS
TOORAK	ALF
TOOTGAROOK	PEN
TOTTENHAM	WES
TRAVANCORE	RMH
TREMONT	ANG
TRUGANINA	WES
TUERONG	PEN
TULLAMARINE	RMH
TYABB	PEN
TYNONG	CAS
TYNONG NORTH	CAS
UPPER FERNTREE	ANG
UPWEY	ANG
VERMONT	BHH
VERMONT SOUTH	BHH
VERVALE	CAS
VIEWBANK	AUS
WANDIN EAST	ANG
WANDIN NORTH	MAR
WANTIRNA	MAR
WANTIRNA SOUT	MMC
WARBURTON	ANG
WARNEET	CAS
WARRANDYTE	BHH
WARRANDYTE SO	BHH
WARRANWOOD	MMC
WATERWAYS	MMC
WATSONIA	AUS
WATSONIA NORT	AUS
WATSONS CREEK	MAR
WATTLE GLEN	AUS
WEIR VIEWS	SUN
WERRIBEE	WER
WERRIBEE SOUTH	WER
WESBURN	ANG
WEST FOOTSCRAY	WES
WEST MELBOURN	RMH
WESTMEADOWS	RMH
WHEELERS HILL	MMC
WHITTLESEA	NOR
WILDWOOD	NOR
WILLIAMS LANDIN	WES
WILLIAMSTOWN	WES
WILLIAMSTOWN I	WES
WINDSOR	ALF
WOLLERT	NOR
WONGA PARK	MAR
WOODSTOCK	NOR
WOORI YALLOCK	ANG
WYNDHAM VALE	WER
YALLAMBIE	AUS
YAN YEAN	NOR
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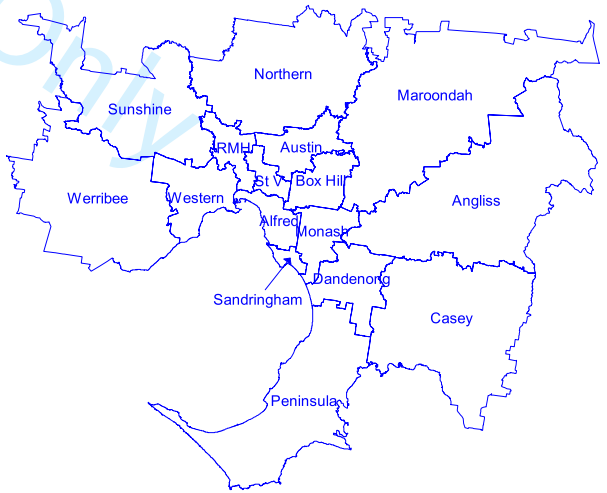
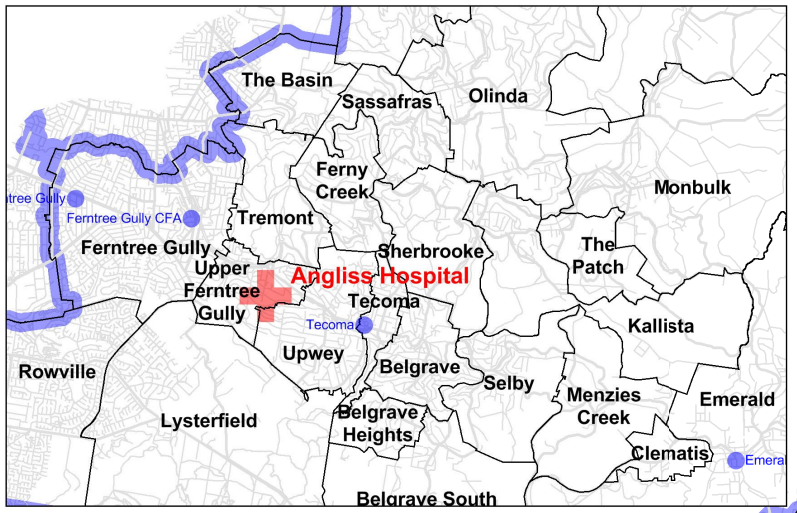
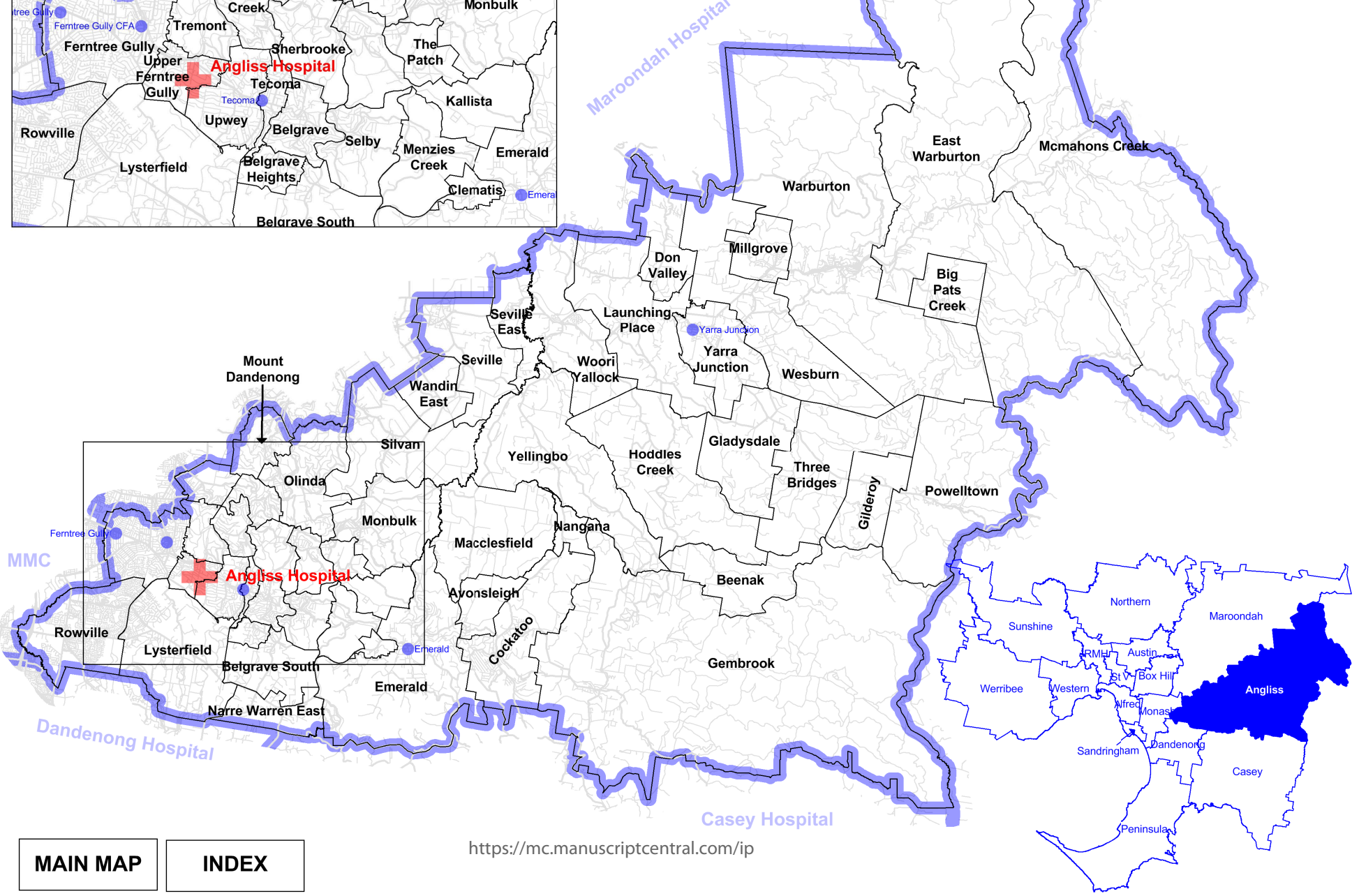


MAIN MAP INDEX

Angliss Hospital Catchment

	LOCALITY_NAME
1	AVONSLEIGH
2	BEENAK
3	BELGRAVE
4	BELGRAVE HEIGHTS
5	BELGRAVE SOUTH
6	BIG PATS CREEK
7	CLEMATIS
8	COCKATOO
9	DON VALLEY
10	EAST WARBURTON
11	EMERALD
12	FERNTREE GULLY
13	FERNY CREEK
14	GEMBROOK
15	GILDEROY
16	GLADYSDALE
17	HODDLES CREEK
18	KALLISTA
19	LAUNCHING PLACE
20	LYSTERFIELD
21	MACCLESFIELD
22	MCMAHONS CREEK
23	MENZIES CREEK
24	MILLGROVE
25	MONBULK
26	MOUNT DANDENONG
27	NANGANA
28	NARRE WARREN EAST
29	OLINDA
30	POWELLTOWN
31	ROWVILLE
32	SASSAFRAS
33	SELBY
34	SEVILLE
35	SEVILLE EAST
36	SHERBROOKE
37	SILVAN
38	TECOMA
39	THE BASIN
40	THE PATCH
41	THREE BRIDGES
42	TREMONT
43	UPPER FERNTREE GULLY
44	UPWEY
45	WANDIN EAST
46	WARBURTON
47	WESBURN
48	WOORI YALLOCK
49	YARRA JUNCTION





MAIN MAP | INDEX

Austin Health The Austin Hospital Catchment

LOCALITY_NAME
ALPHINGTON
BELLFIELD
BRIAR HILL
BULLEEN
BUNDOORA
DIAMOND CREEK
EAGLEMONT
ELTHAM
ELTHAM NORTH
FAWKNER
GREENSBOROUGH
HEIDELBERG
HEIDELBERG HEIGHTS
HEIDELBERG WEST
IVANHOE
IVANHOE EAST
KEW EAST
KINGSBURY
LOWER PLENTY
MACLEOD
MONTMORENCY
NORTH WARRANDYTE
PRESTON
RESEARCH
RESERVOIR
ROSANNA
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VIEWBANK
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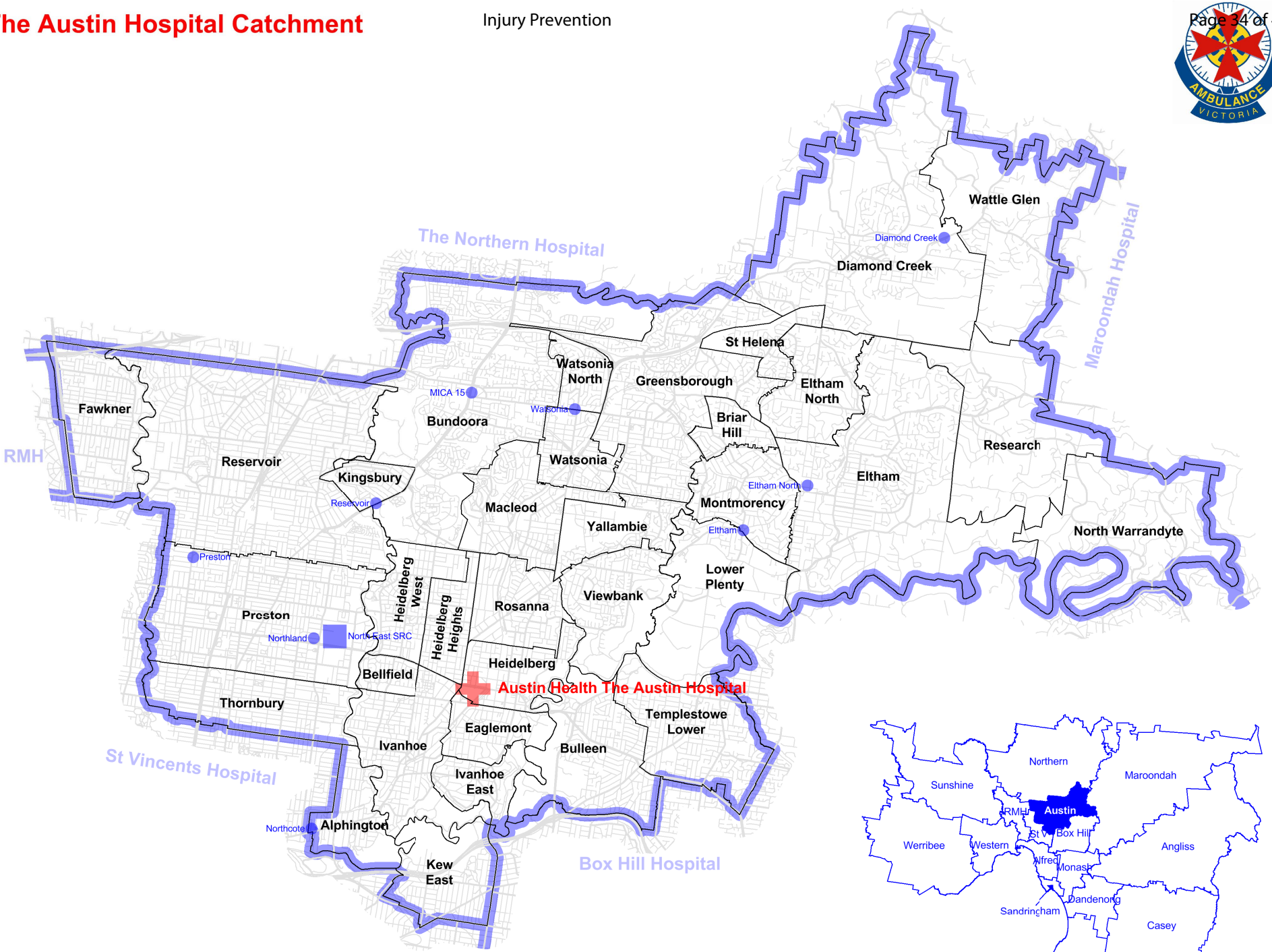
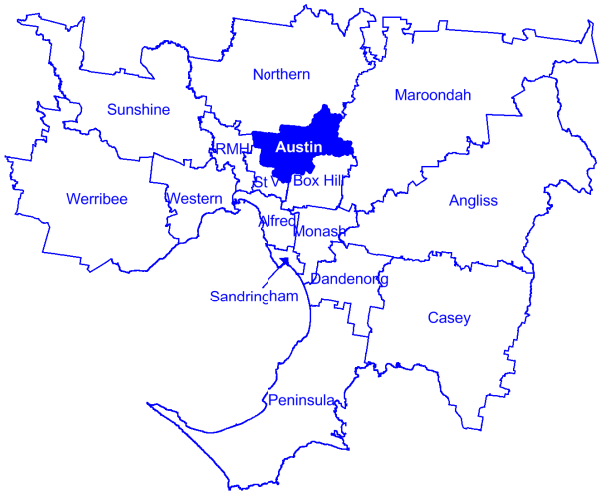
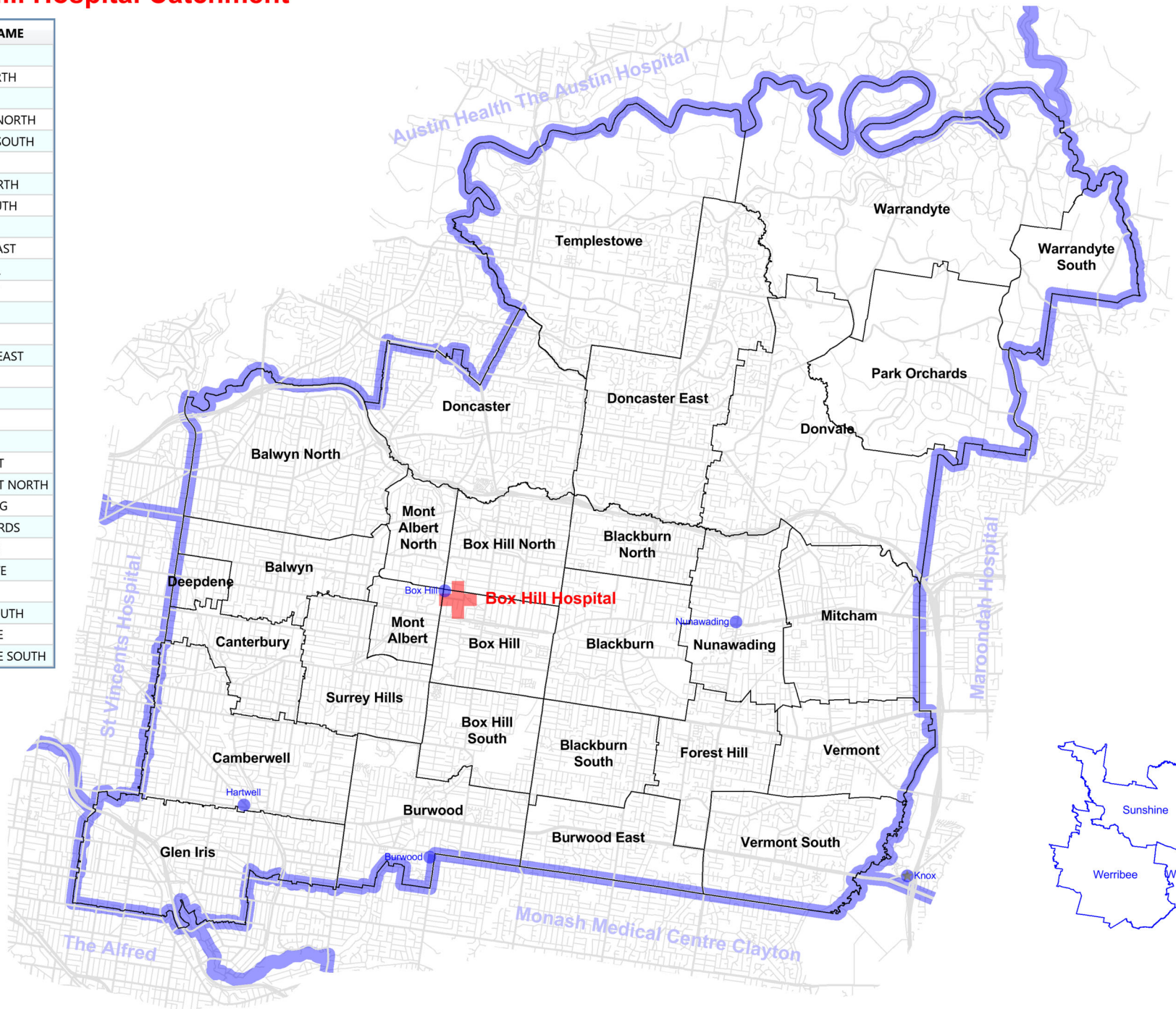




MAIN MAP | INDEX

Box Hill Hospital Catchment

	LOCALITY_NAME
1	BALWYN
2	BALWYN NORTH
3	BLACKBURN
4	BLACKBURN NORTH
5	BLACKBURN SOUTH
6	BOX HILL
7	BOX HILL NORTH
8	BOX HILL SOUTH
9	BURWOOD
10	BURWOOD EAST
11	CAMBERWELL
12	CANTERBURY
13	DEEPDENE
14	DONCASTER
15	DONCASTER EAST
16	DONVALE
17	FOREST HILL
18	GLEN IRIS
19	MITCHAM
20	MONT ALBERT
21	MONT ALBERT NORTH
22	NUNAWADING
23	PARK ORCHARDS
24	SURREY HILLS
25	TEMPLESTOWE
26	VERMONT
27	VERMONT SOUTH
28	WARRANDYTE
29	WARRANDYTE SOUTH



MAIN MAP | INDEX

Casey Hospital Catchment

	LOCALITY_NAME
1	BAYLES
2	BEACONSFIELD
3	BEACONSFIELD UPPER
4	BERWICK
5	BLIND BIGHT
6	BUNYIP
7	BUNYIP NORTH
8	CALDERMEADE
9	CANNONS CREEK
10	CARDINIA
11	CATANI
12	CLYDE
13	CLYDE NORTH
14	CORA LYNN
15	CRANBOURNE EAST
16	DALMORE
17	DEVON MEADOWS
18	DEWHURST
19	GARFIELD
20	GARFIELD NORTH
21	GUYS HILL
22	HARKAWAY
23	IONA
24	KOO WEE RUP
25	KOO WEE RUP NORTH
26	LANG LANG
27	LANG LANG EAST
28	MARYKNOLL
29	MONOMEITH
30	MOUNT BURNETT
31	NAR NAR GOON
32	NAR NAR GOON NORTH
33	OFFICER
34	OFFICER SOUTH
35	PAKENHAM
36	PAKENHAM SOUTH
37	PAKENHAM UPPER
38	RYTHDALE
39	TONIMBUK
40	TOORADIN
41	TYNONG
42	TYNONG NORTH
43	VERVALE
44	WARNEET
45	YANNATHAN
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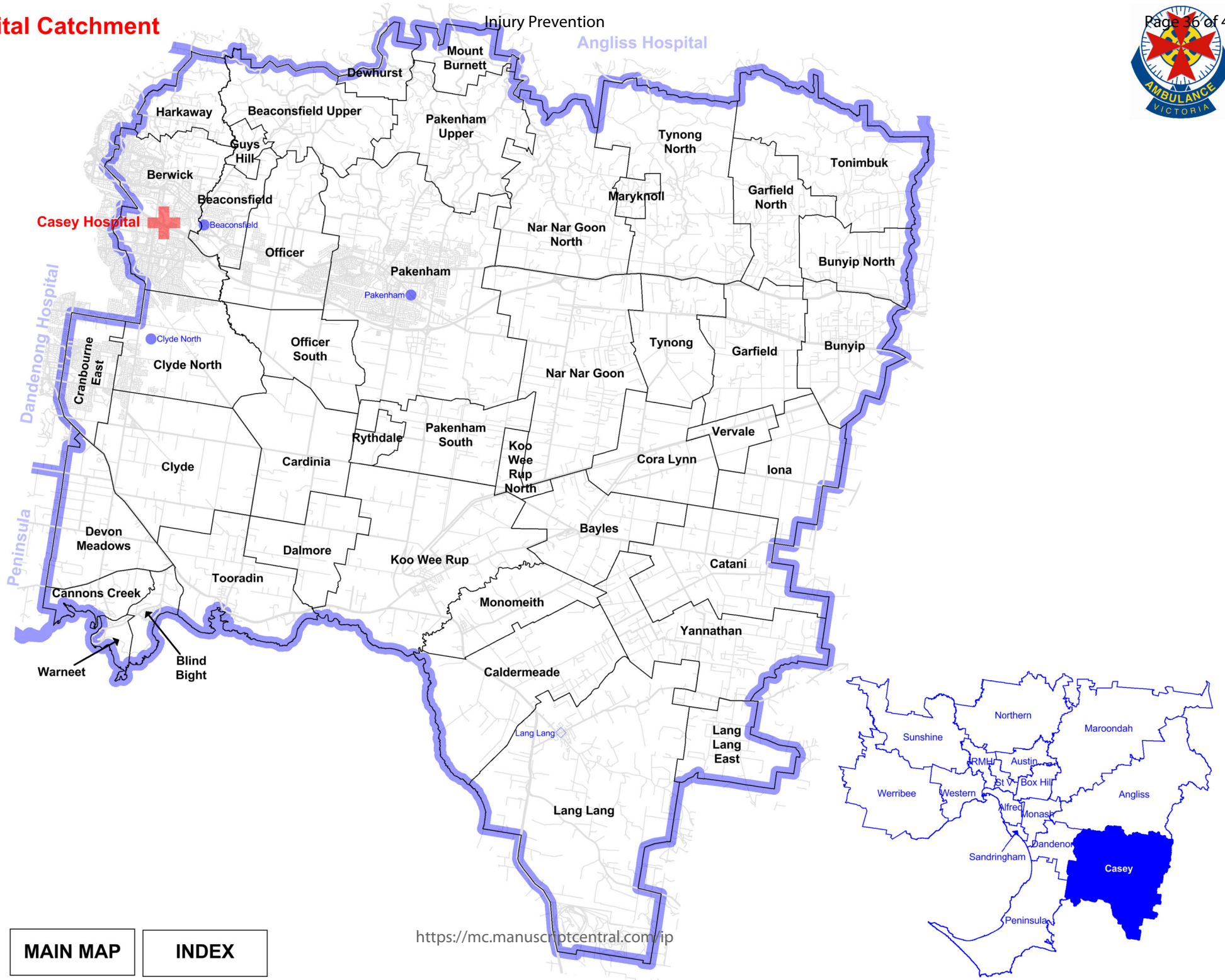
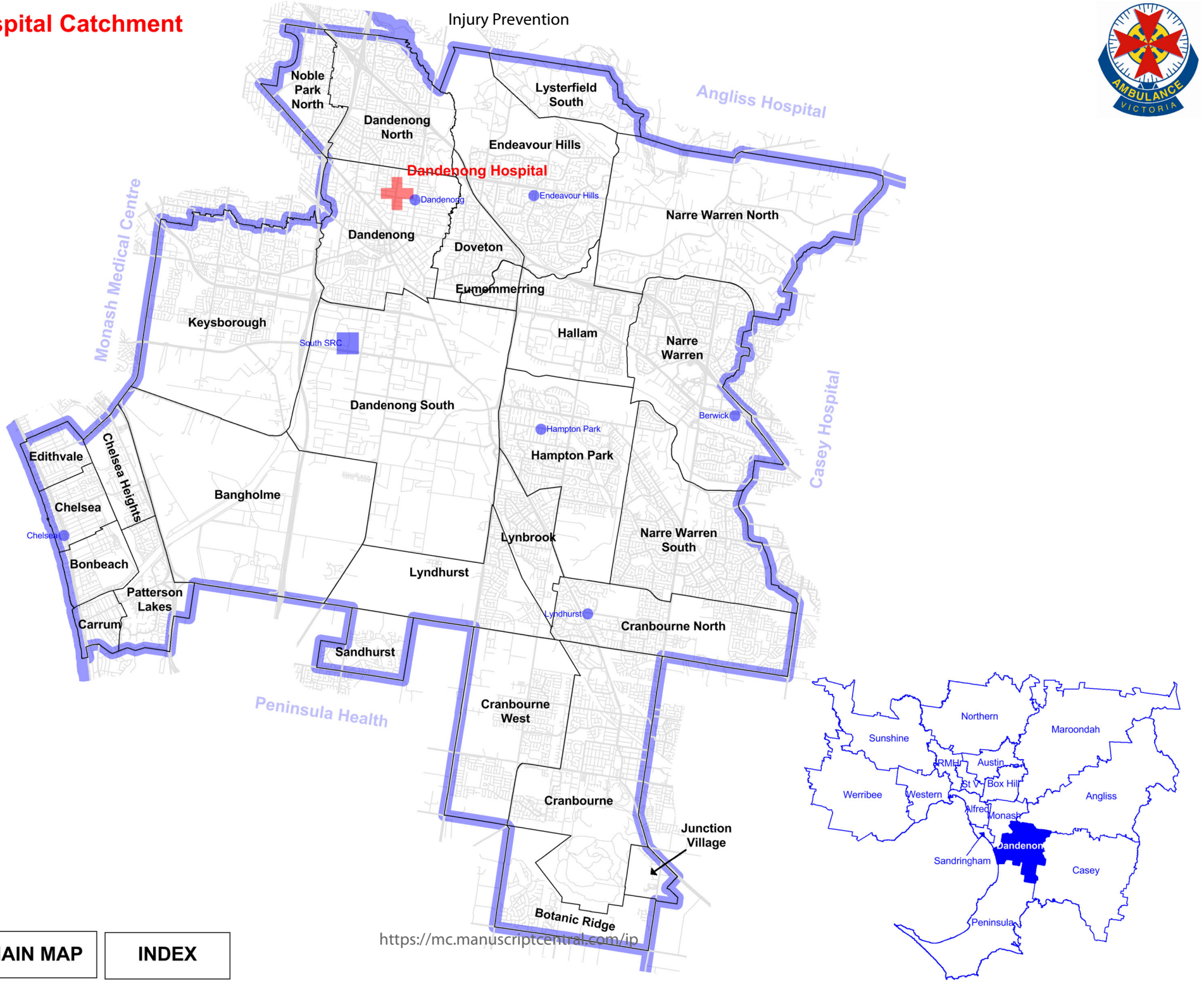


MAIN MAP | INDEX

Dandenong Hospital Catchment

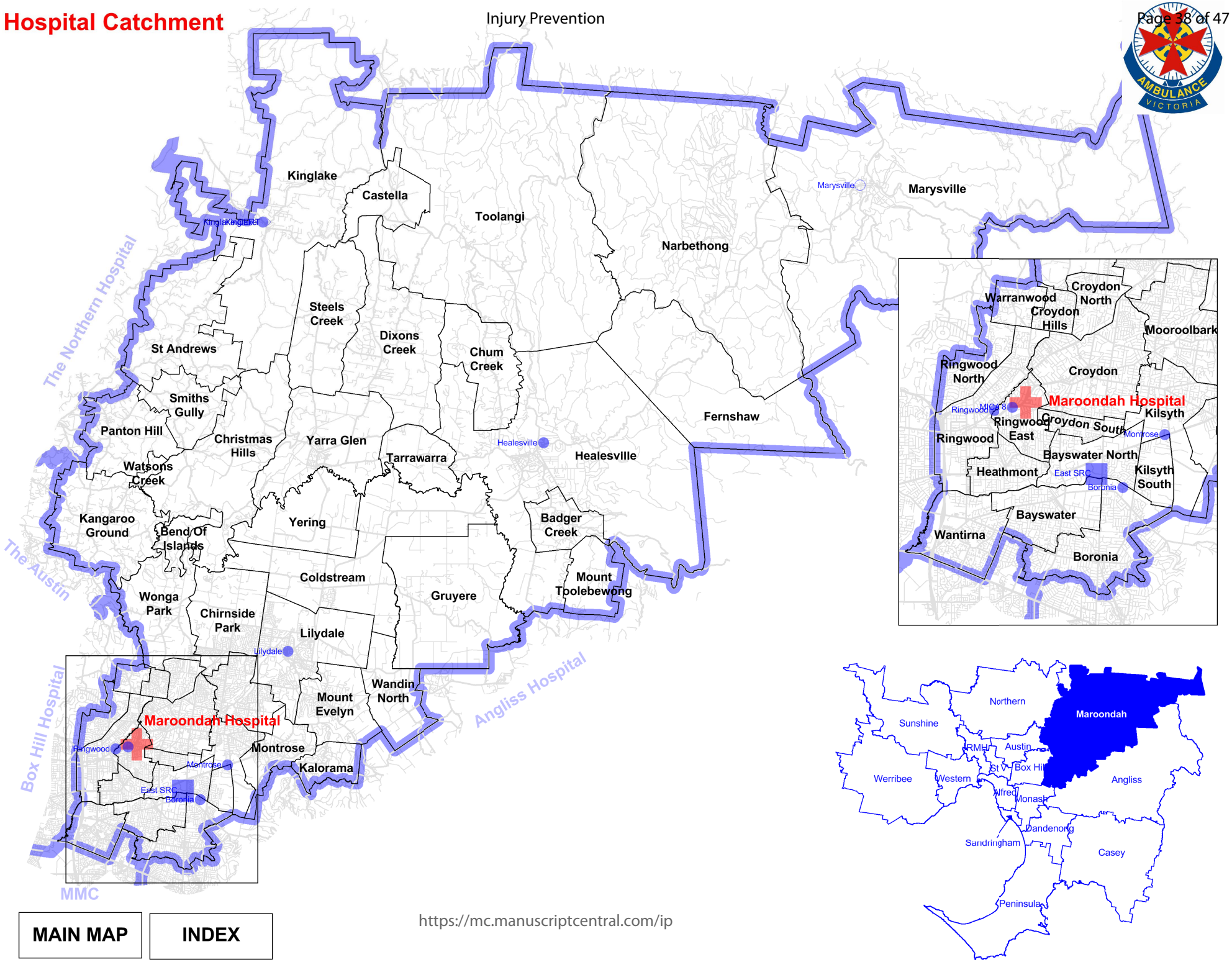
LOCALITY_NAME
BANGHOLME
BONBEACH
BOTANIC RIDGE
CARRUM
CHELSEA
CHELSEA HEIGHTS
CRANBOURNE
CRANBOURNE NORTH
CRANBOURNE WEST
DANDENONG
DANDENONG NORTH
DANDENONG SOUTH
DOVETON
EDITHVALE
ENDEAVOUR HILLS
EUMEMMERRING
HALLAM
HAMPTON PARK
JUNCTION VILLAGE
KEYSBOROUGH
LYNBROOK
LYNDHURST
LYSTERFIELD SOUTH
NARRE WARREN
NARRE WARREN NORTH
NARRE WARREN SOUTH
NOBLE PARK NORTH
PATTERSON LAKES
SANDHURST



MAIN MAP | INDEX

Maroondah Hospital Catchment

	LOCALITY_NAME
1	BADGER CREEK
2	BAYSWATER
3	BAYSWATER NORTH
4	BEND OF ISLANDS
5	BORONIA
6	CASTELLA
7	CHIRNSIDE PARK
8	CHRISTMAS HILLS
9	CHUM CREEK
10	COLDSTREAM
11	CROYDON
12	CROYDON HILLS
13	CROYDON NORTH
14	CROYDON SOUTH
15	DIXONS CREEK
16	FERNSHAW
17	GRUYERE
18	HEALESVILLE
19	HEATHMONT
20	KALORAMA
21	KANGAROO GROUND
22	KILSYTH
23	KILSYTH SOUTH
24	KINGLAKE
25	LILYDALE
26	MARYSVILLE
27	MONTROSE
28	MOOROOLBARK
29	MOUNT EVELYN
30	MOUNT TOOLEBEWONG
31	NARBETHONG
32	PANTON HILL
33	RINGWOOD
34	RINGWOOD EAST
35	RINGWOOD NORTH
36	SMITHS GULLY
37	ST ANDREWS
38	STEELS CREEK
39	TARRAWARRA
40	TOOLANGI
41	WANDIN NORTH
42	WANTIRNA
43	WARRANWOOD
44	WATSONS CREEK
45	WONGA PARK
46	YARRA GLEN
47	YERING



MAIN MAP | INDEX

Monash Medical Centre Clayton Catchment

	LOCALITY_NAME
1	ASHBURTON
2	ASHWOOD
3	ASPENDALE
4	ASPENDALE GARDENS
5	BRAESIDE
6	CHADSTONE
7	CLARINDA
8	CLAYTON
9	CLAYTON SOUTH
10	DINGLEY VILLAGE
11	GLEN WAVERLEY
12	HEATHERTON
13	HUNTINGDALE
14	KNOXFIELD
15	MOORABBIN AIRPORT
16	MOUNT WAVERLEY
17	MULGRAVE
18	NOBLE PARK
19	NOTTING HILL
20	OAKLEIGH
21	OAKLEIGH EAST
22	OAKLEIGH SOUTH
23	SCORESBY
24	SPRINGVALE
25	SPRINGVALE SOUTH
26	WANTIRNA SOUTH
27	WATERWAYS
28	WHEELERS HILL
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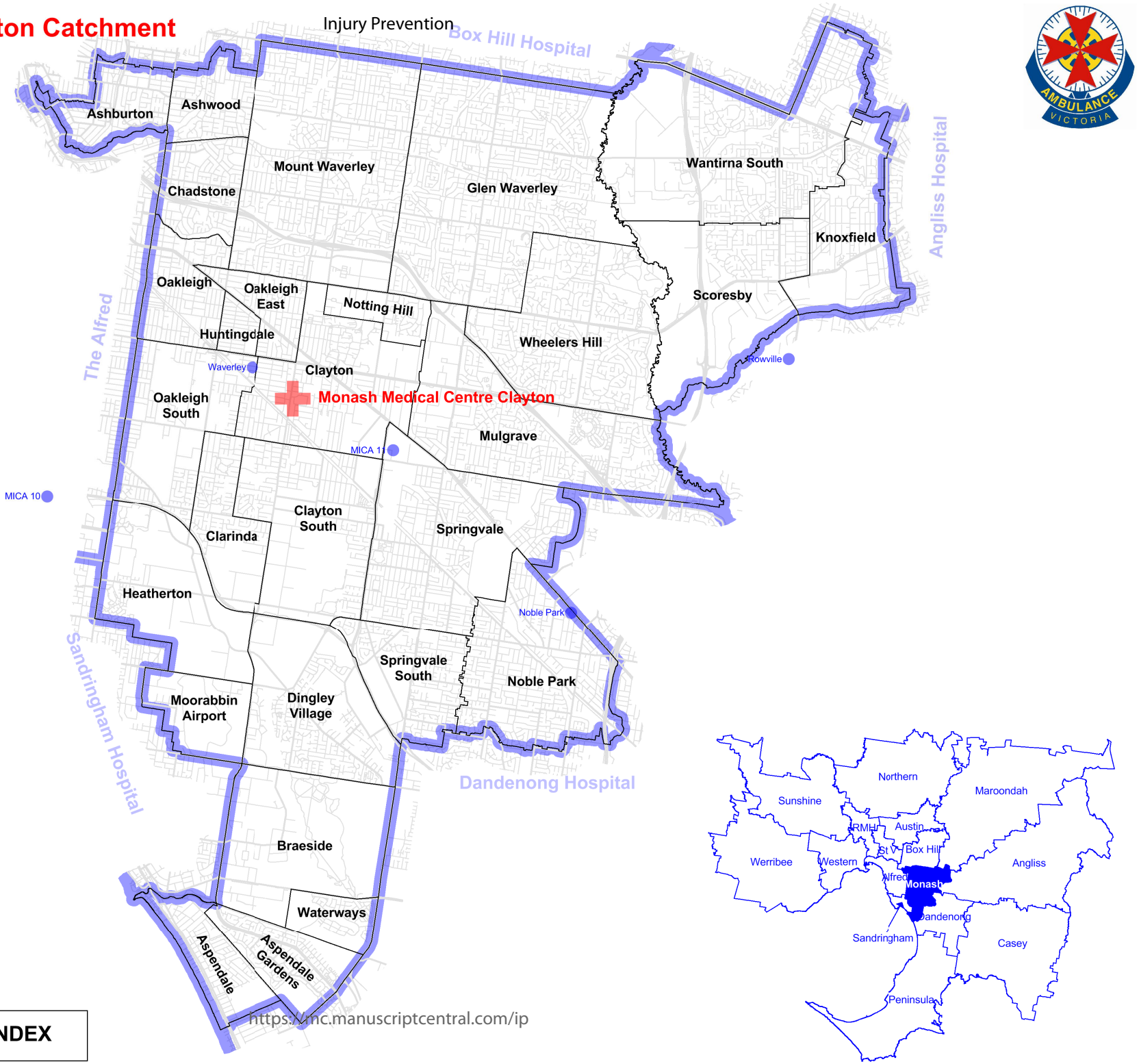

MAIN MAP | INDEX

Peninsula Health Catchment (Rosebud and Franston Hospitals)

	LOCALITY_NAME
1	ARTHURS SEAT
2	BALNARRING
3	BALNARRING BEACH
4	BAXTER
5	BITTERN
6	BLAIRGOWRIE
7	BONEO
8	CAPE SCHANCK
9	CAPEL SOUND
10	CARRUM DOWNS
11	CRANBOURNE SOUTH
12	CRIB POINT
13	DROMANA
14	FINGAL
15	FLINDERS
16	FRANKSTON
17	FRANKSTON NORTH
18	FRANKSTON SOUTH
19	HASTINGS
20	HMAS CERBERUS
21	LANGWARRIN
22	LANGWARRIN SOUTH
23	MAIN RIDGE
24	MCCRAE
25	MERRICKS
26	MERRICKS BEACH
27	MERRICKS NORTH
28	MOOROODUC
29	MORNINGTON
30	MOUNT ELIZA
31	MOUNT MARTHA
32	PEARCEDALE
33	POINT LEO
34	PORTSEA
35	RED HILL
36	RED HILL SOUTH
37	ROSEBUD
38	RYE
39	SAFETY BEACH
40	SEAFORD
41	SHOREHAM
42	SKYE
43	SOMERS
44	SOMERVILLE
45	SORRENTO
46	ST ANDREWS BEACH
47	TOOTGAROOK
48	TUERONG
49	TYABB

MAIN MAP | INDEX

Royal Melbourne Hospital Parkville Catchment

	LOCALITY_NAME
1	ABERFELDIE
2	AIRPORT WEST
3	ASCOT VALE
4	AVONDALE HEIGHTS
5	DOCKLANDS
6	ESSENDON
7	ESSENDON FIELDS
8	ESSENDON NORTH
9	ESSENDON WEST
10	FLEMINGTON
11	GLADSTONE PARK
12	GLENROY
13	GOWANBRAE
14	HADFIELD
15	JACANA
16	KEILOR EAST
17	KEILOR PARK
18	KENSINGTON
19	MELBOURNE AIRPORT
20	MOONEE PONDS
21	NIDDRIE
22	NORTH MELBOURNE
23	OAK PARK
24	PARKVILLE
25	PASCOE VALE
26	STRATHMORE
27	STRATHMORE HEIGHTS
28	TRAVANCORE
29	TULLAMARINE
30	WEST MELBOURNE
31	WESTMEADOWS
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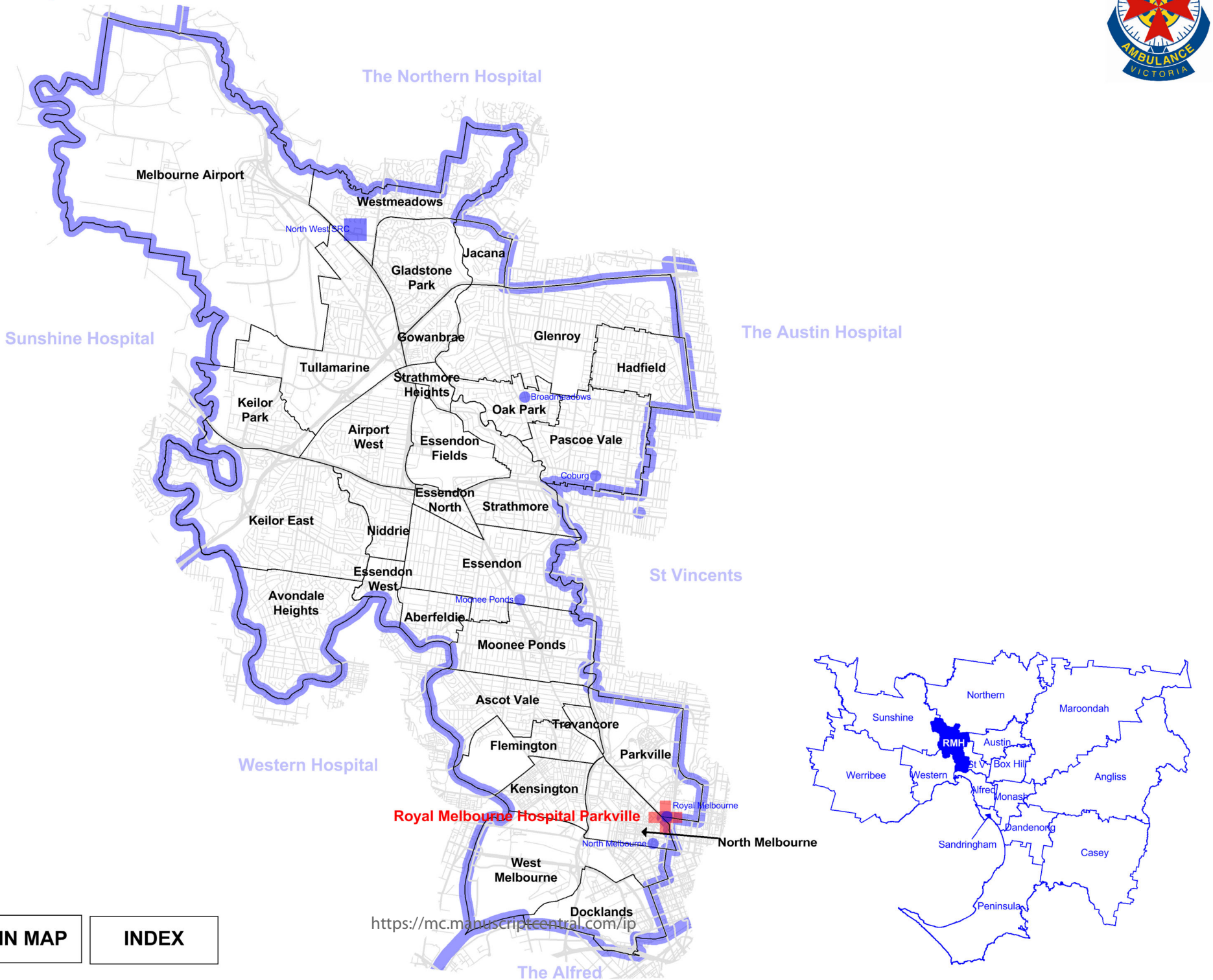
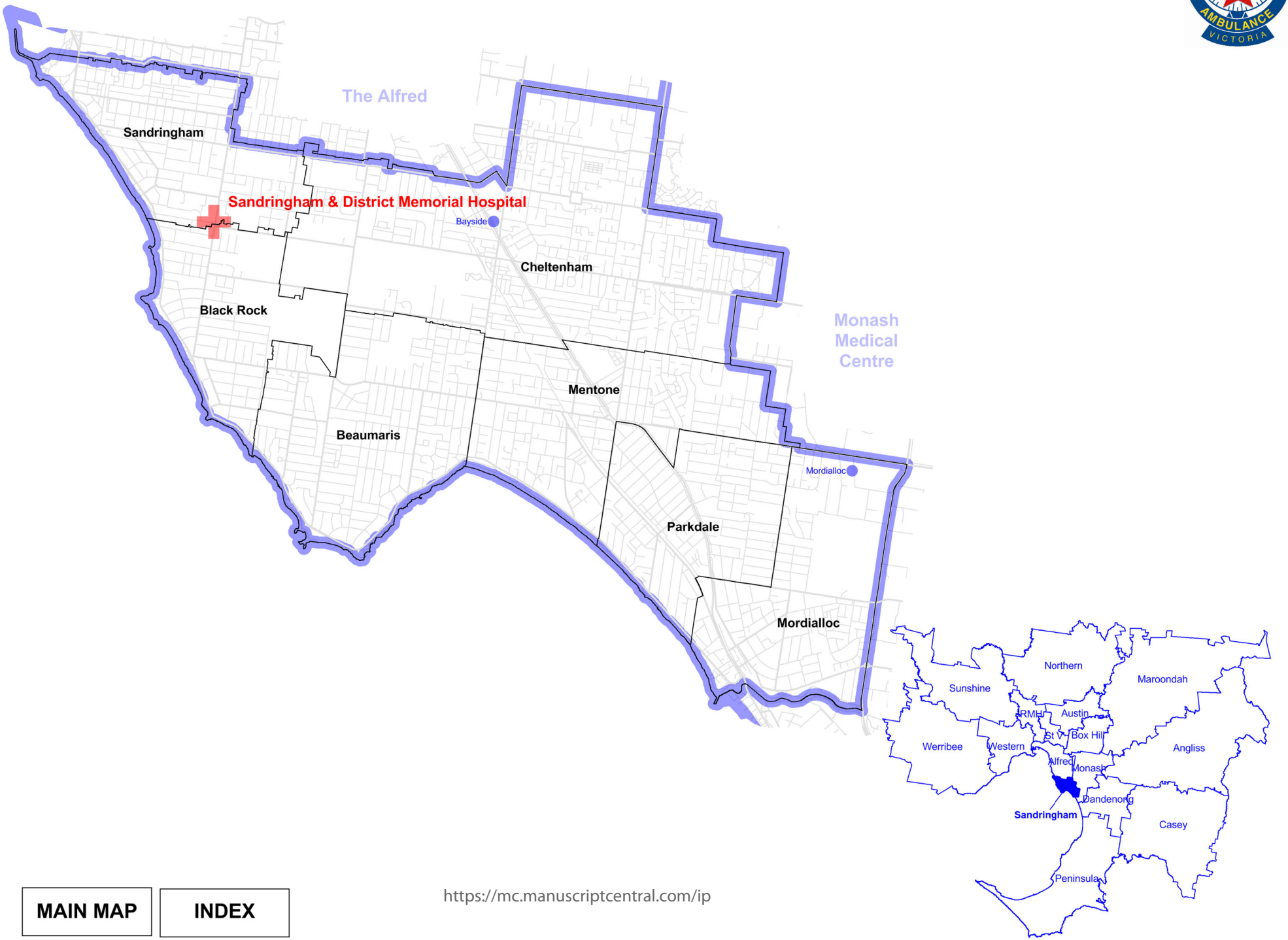


MAIN MAP | INDEX

Sandringham & District Memorial Hospital Catchment

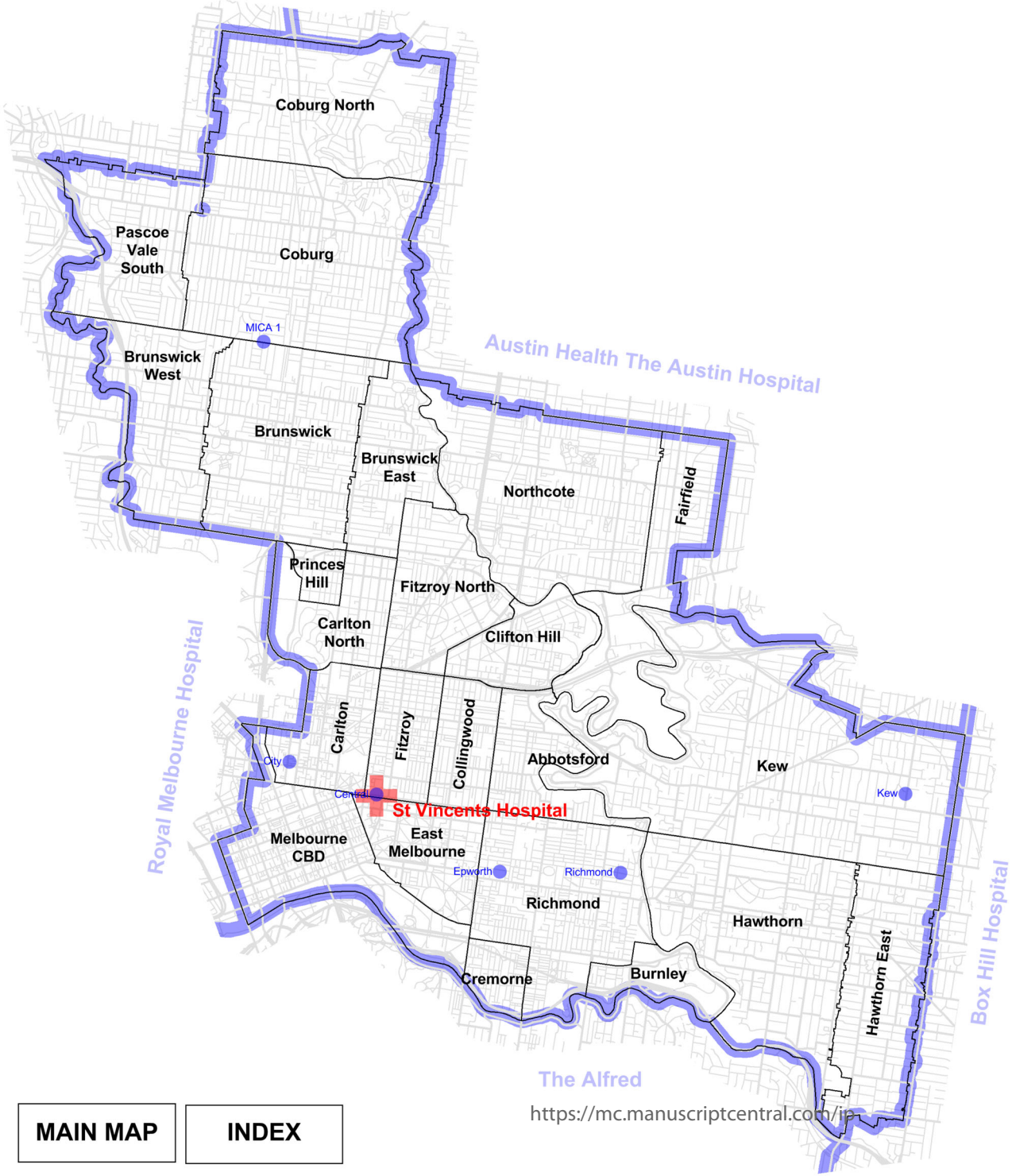
LOCALITY_NAME
BEAUMARIS
BLACK ROCK
CHELTENHAM
MENTONE
MORDIALLOC
PARKDALE
SANDRINGHAM



MAIN MAP
INDEX

St Vincents Hospital Catchment

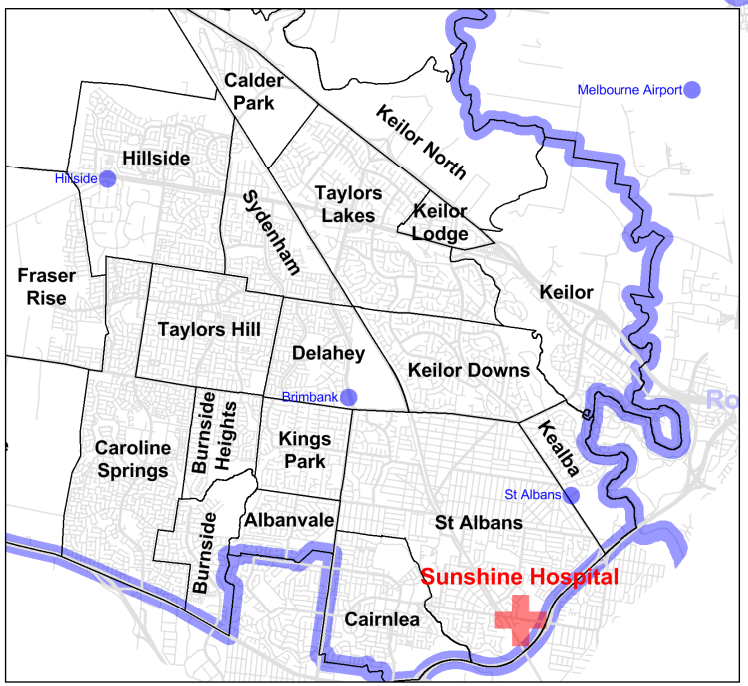
LOCALITY_NAME
ABBOTSFORD
BRUNSWICK
BRUNSWICK EAST
BRUNSWICK WEST
BURNLEY
CARLTON
CARLTON NORTH
CLIFTON HILL
COBURG
COBURG NORTH
COLLINGWOOD
CREMORNE
EAST MELBOURNE
FAIRFIELD
FITZROY
FITZROY NORTH
HAWTHORN
HAWTHORN EAST
KEW
MELBOURNE CBD
NORTHCOTE
PASCOE VALE SOUTH
PRINCES HILL
RICHMOND

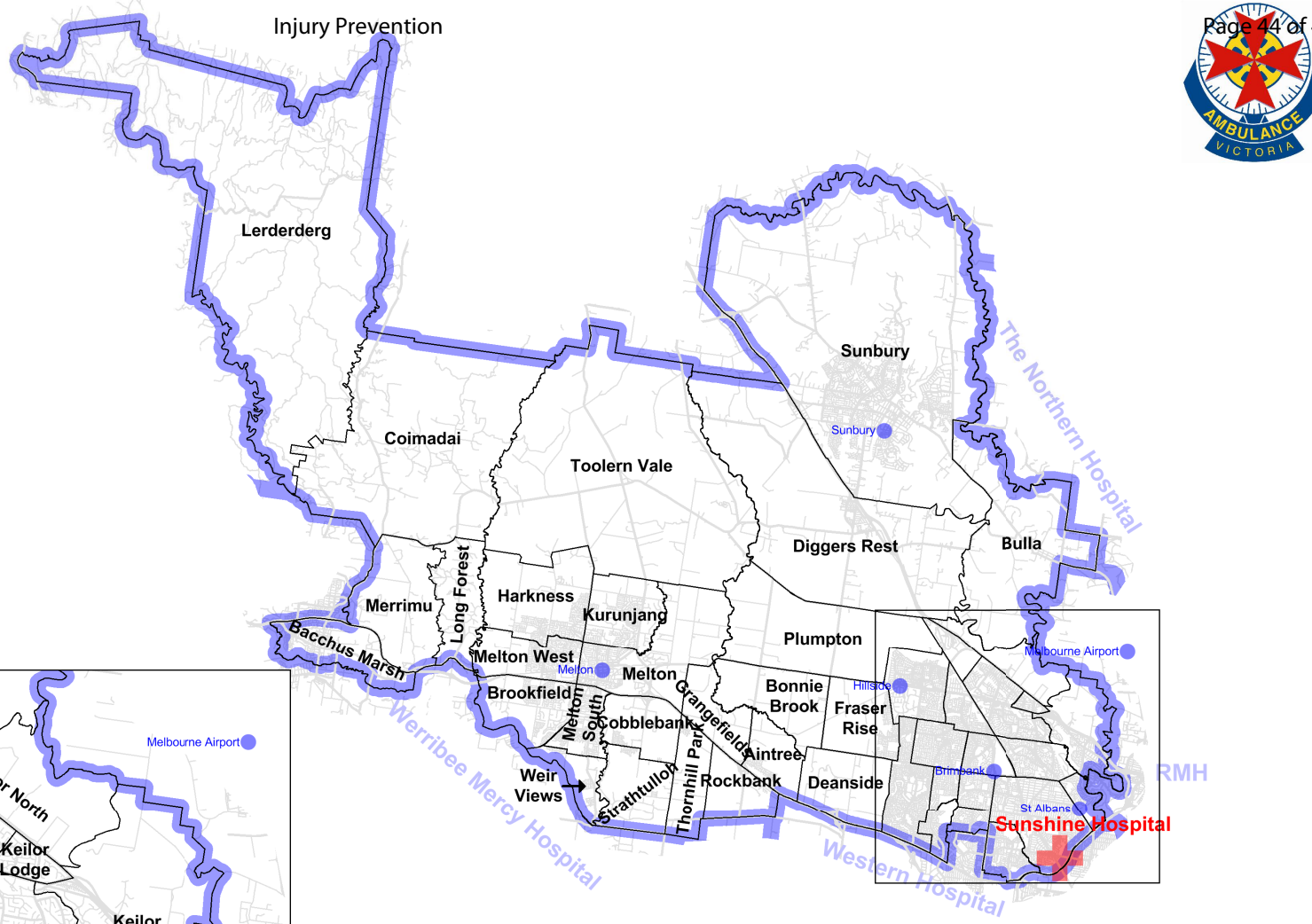


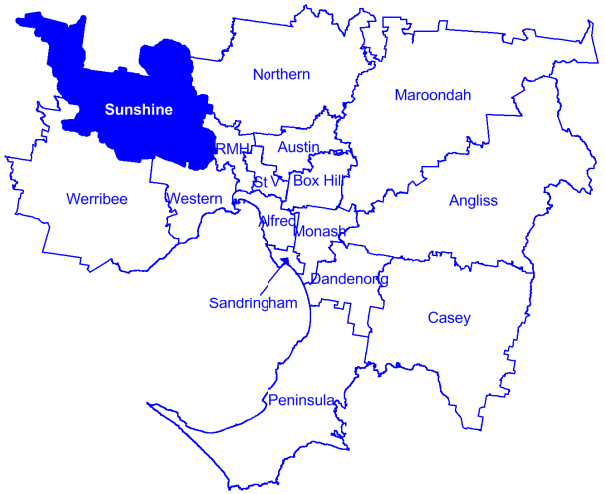
MAIN MAP | INDEX

Sunshine Hospital Catchment

LOCALITY_NAME
AINTREE
ALBANVALE
BACCHUS MARSH
BONNIE BROOK
BROOKFIELD
BULLA
BURNSIDE
BURNSIDE HEIGHTS
CAIRNLEA
CALDER PARK
CAROLINE SPRINGS
COBBLEBANK
COIMADAI
DEANSIDE
DELAHEY
DIGGERS REST
FRASER RISE
GRANGEFIELDS
HARKNESS
HILLSIDE (GREATER MELBOURNE)
KEALBA
KEILOR
KEILOR DOWNS
KEILOR LODGE
KEILOR NORTH
KINGS PARK
KURUNJANG
LERDERDERG
LONG FOREST
MELTON
MELTON SOUTH
MELTON WEST
MERRIMU
PLUMPTON
ROCKBANK
ST ALBANS
STRATHTULLOH
SUNBURY
SYDENHAM
TAYLORS HILL
TAYLORS LAKES
THORNHILL PARK
TOOLERN VALE
WEIR VIEWS



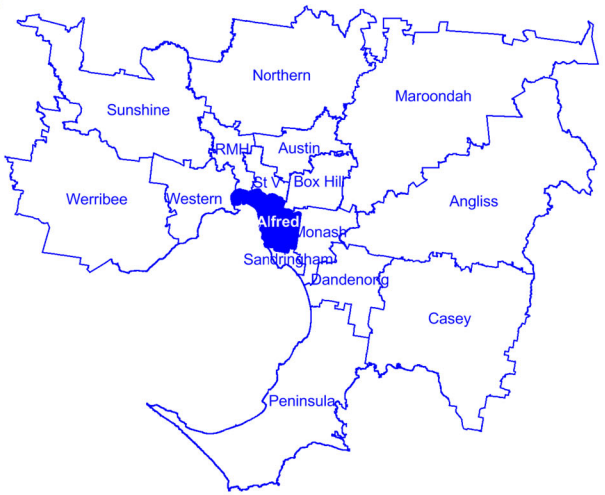




MAIN MAP | INDEX

The Alfred Hospital Catchment

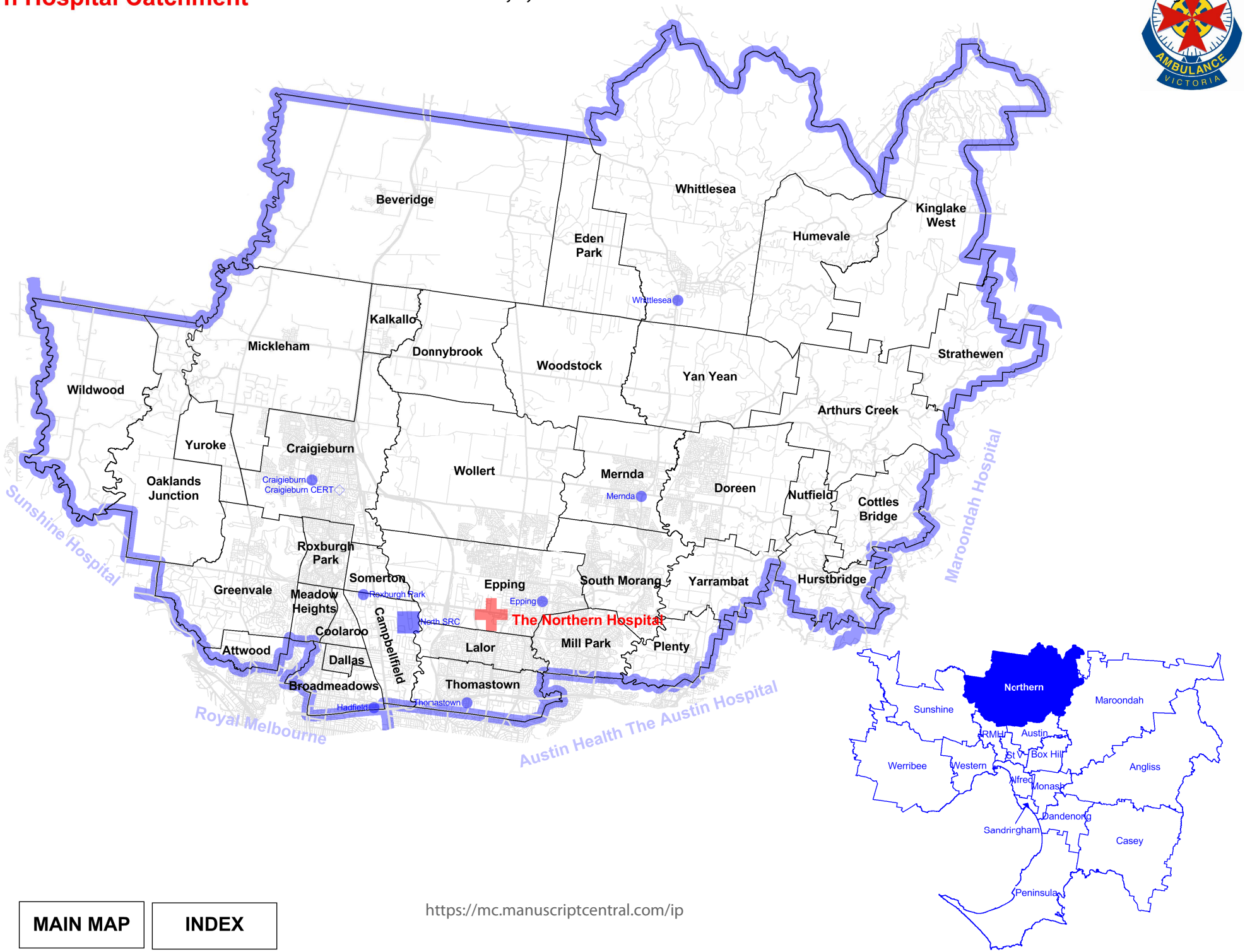
LOCALITY_NAME
ALBERT PARK
ARMADALE
BALACLAVA
BENTLEIGH
BENTLEIGH EAST
BRIGHTON
BRIGHTON EAST
CARNEGIE
CAULFIELD
CAULFIELD EAST
CAULFIELD NORTH
CAULFIELD SOUTH
ELSTERNWICK
ELWOOD
GARDENVALE
GLEN HUNTLY
HAMPTON
HAMPTON EAST
HIGHETT
HUGHESDALE
KOOYONG
MALVERN
MALVERN EAST
MCKINNON
MELBOURNE
MIDDLE PARK
MOORABBIN
MURRUMBEENA
ORMOND
PORT MELBOURNE
PRAHRAN
RIPPONLEA
SOUTH MELBOURNE
SOUTH WHARF
SOUTH YARRA
SOUTHBANK
ST KILDA
ST KILDA EAST
ST KILDA WEST
TOORAK
WINDSOR



MAIN MAP | INDEX

The Northern Hospital Catchment

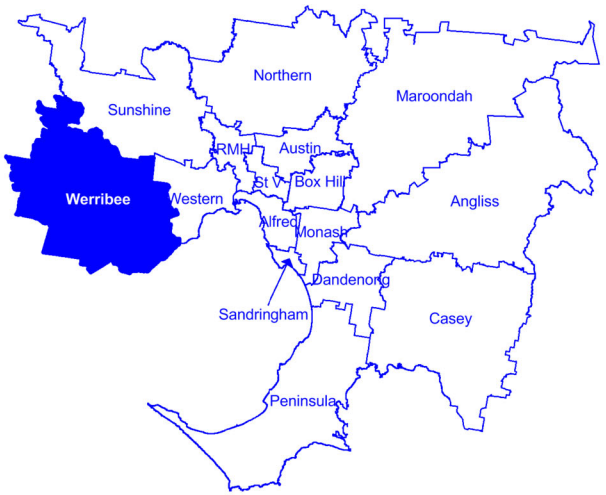
LOCALITY_NAME
ARTHURS CREEK
ATTWOOD
BEVERIDGE
BROADMEADOWS
CAMPBELLFIELD
COOLAROO
COTTLES BRIDGE
CRAIGIEBURN
DALLAS
DONNYBROOK
DOREEN
EDEN PARK
EPPING
GREENVALE
HUMEVALE
HURSTBRIDGE
KALKALLO
KINGLAKE WEST
LALOR
MEADOW HEIGHTS
MERNDA
MICKLEHAM
MILL PARK
NUTFIELD
OAKLANDS JUNCTION
PLENTY
ROXBURGH PARK
SOMERTON
SOUTH MORANG
STRATHEWEN
THOMASTOWN
WHITTLESEA
WILDWOOD
WOLLERT
WOODSTOCK
YAN YEAN
YARRAMBAT
YUROKE



MAIN MAP | INDEX

Werribee Mercy Hospital Catchment

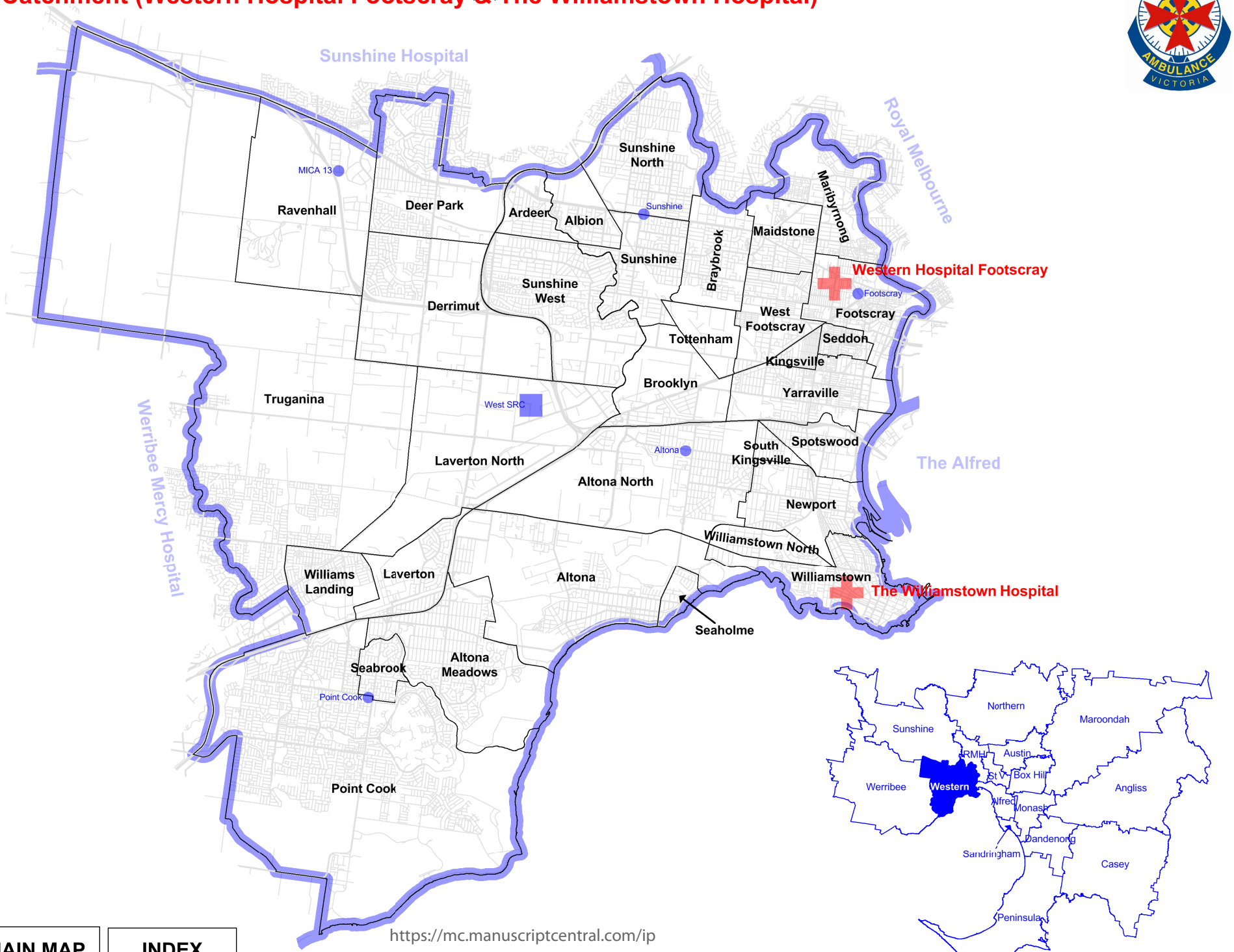
LOCALITY_NAME
BALLIANG
BALLIANG EAST
COCOROC
DARLEY
EXFORD
EYNESBURY
FIELDSTONE
HOPETOUN PARK
HOPPERS CROSSING
LITTLE RIVER
MADDINGLEY
MAMBOURIN
MANOR LAKES
MOUNT COTTRELL
PARWAN
PENTLAND HILLS
QUANDONG
ROWSLEY
TARNEIT
WERRIBEE
WERRIBEE SOUTH
WYNDHAM VALE



MAIN MAP | INDEX

Western Health Catchment (Western Hospital Footscray & The Williamstown Hospital)

LOCALITY_NAME
ALBION
ALTONA
ALTONA MEADOWS
ALTONA NORTH
ARDEER
BRAYBROOK
BROOKLYN
DEER PARK
DERRIMUT
FOOTSCRAY
KINGSVILLE
LAVERTON
LAVERTON NORTH
MAIDSTONE
MARIBYRNONG
NEWPORT
POINT COOK
RAVENHALL
SEABROOK
SEAHOLME
SEDDON
SOUTH KINGSVILLE
SPOTSWOOD
SUNSHINE
SUNSHINE NORTH
SUNSHINE WEST
TOTTENHAM
TRUGANINA
WEST FOOTSCRAY
WILLIAMS LANDING
WILLIAMSTOWN
WILLIAMSTOWN NORTH
YARRAVILLE



MAIN MAP | INDEX