



# Research in OHCA – Past Developments & Current Research in Australia

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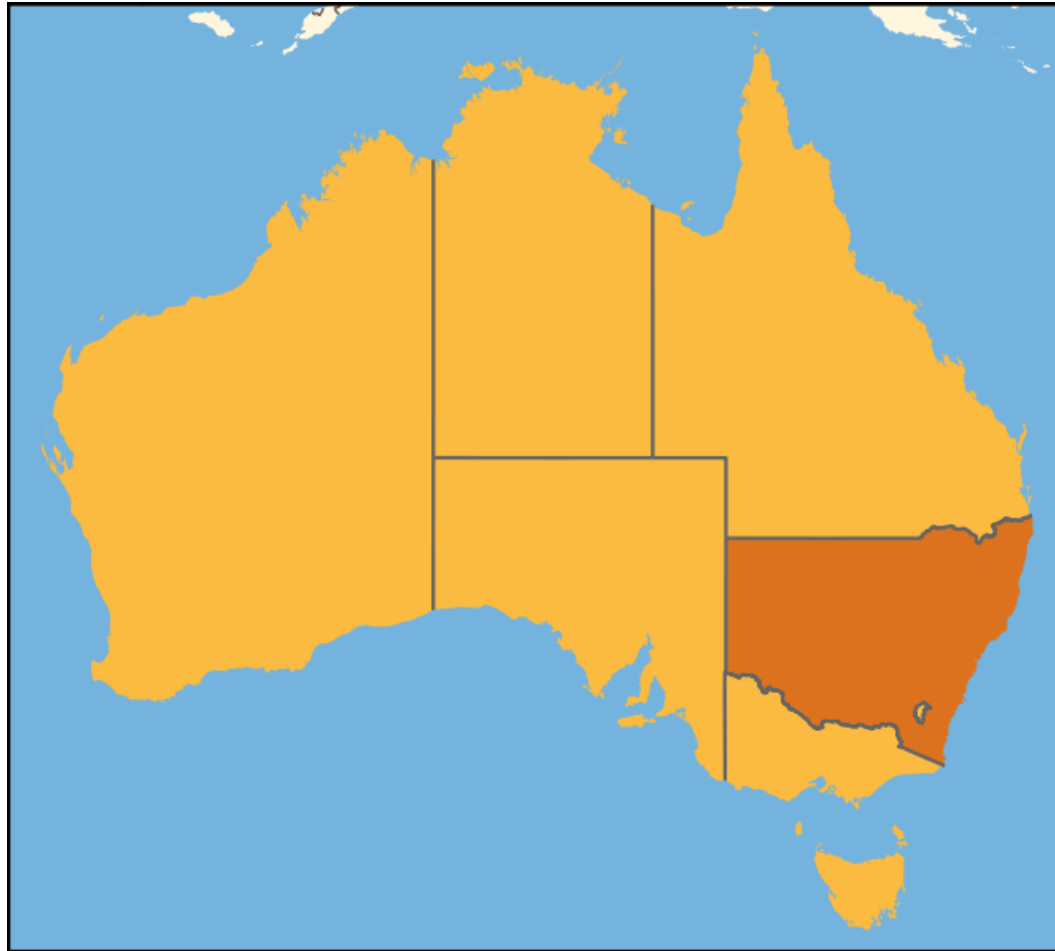
# OHCA Research

## Australia



# OHCA Research

Australia



# OHCA Research

New South Wales



- iGel vs Soft Seal LMA trial
- Cardiac arrest registry
- GIS mapping
- OHCA survival pre and post-2005 ILCOR guideline changes
- Boussignac insufflation ± Autopulse

# OHCA Research

iGel vs Soft Seal



# OHCA Research

## iGel vs Soft Seal

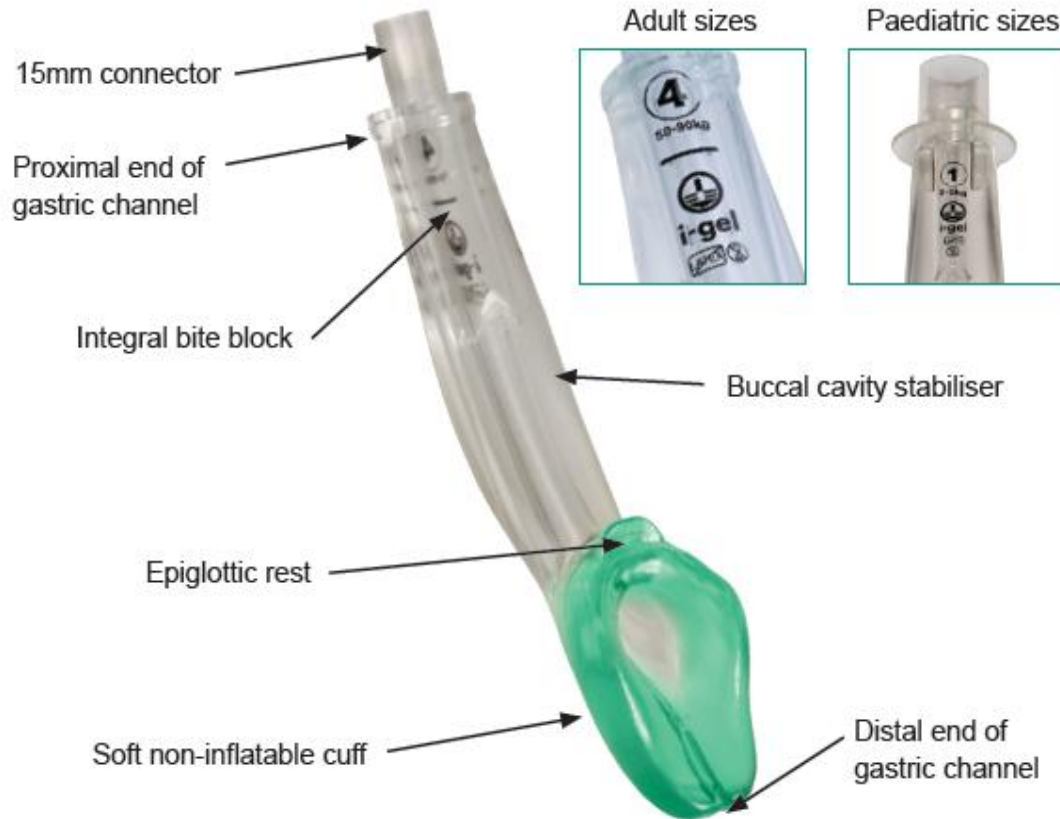


Figure 2: Key components of the i-gel

# OHCA Research

iGel vs Soft Seal



# OHCA Research

## iGel vs Soft Seal

- ▶ Randomised controlled trial
- ▶ 50 OHCA patients in each arm
- ▶ Endpoint of successful insertion





# OHCA Research

Cardiac Arrest Registry



# OHCA Research

## Cardiac Arrest Registry



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Welcome To:

## Cardiac Arrest Registry to Enhance Survival (CARES)

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**EMORY**  
UNIVERSITY  
SCHOOL OF  
MEDICINE

American Heart Association  
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CARES Introduction

More information on Cares

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**CARES**

The Cardiac Arrest Registry to Enhance Survival (CARES) was initiated in October 2004 as a cooperative agreement between the Center for Disease Control and Prevention (CDC) and the Department of Emergency Medicine at Emory University School of

# OHCA Research

Cardiac Arrest Registry



## PAROS Data Collection & Taxonomy

**A/Prof Marcus Ong Eng Hock**  
**Consultant, Director of Research and Senior Medical Scientist**  
**Dept of Emergency Medicine, Singapore General Hospital**  
**Assoc Professor, Office of Clinical Sciences**  
**Duke-NUS Graduate Medical School, Singapore**  
**Consultant, Ministry of Health, Hospital Services Division**



# OHCA Research

## Cardiac Arrest Registry



- ▶ Agreement for secure hosting and website maintenance – Base**location**
- ▶ Registry nurse interview in one week
- ▶ Recruitment of in-hospital collaborators commenced
- ▶ Mapping of PAROS / CARES dataset to Electronic Medical Record completed

# OHCA Research

Geographical Information System mapping



# OHCA Research

## Geographical Information System mapping



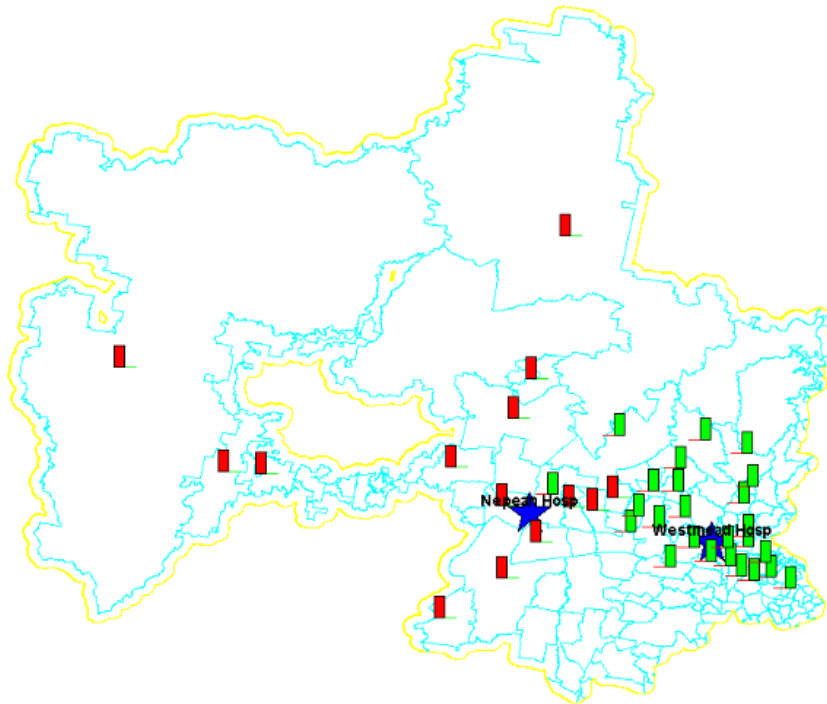
- ▶ Initial GIS mapping techniques undertaken by biostatistician
- ▶ Mapping of trauma, stroke, trauma response times

# OHCA Research

## Geographical Information System mapping

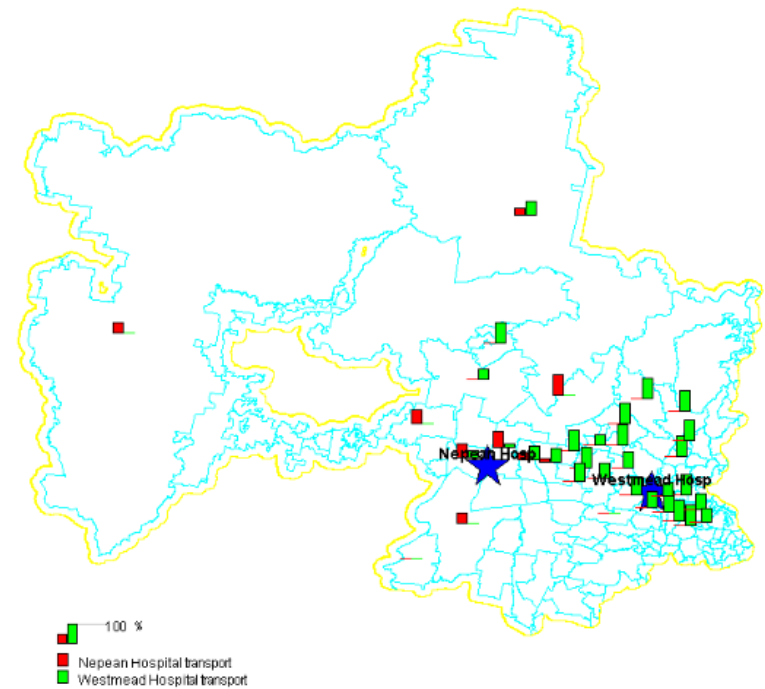


T1 Cases Nepean Westmead Catchment 2009



NORTH

T1 Cases Nepean Westmead Catchment 2010



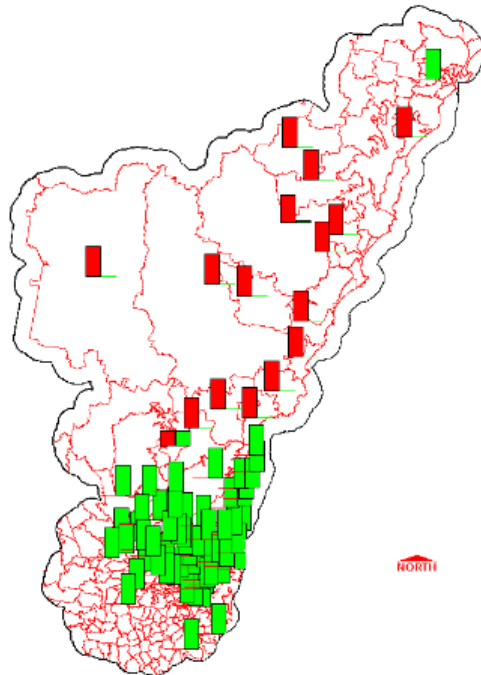
100 %  
Nepean Hospital transport  
Westmead Hospital transport

# OHCA Research

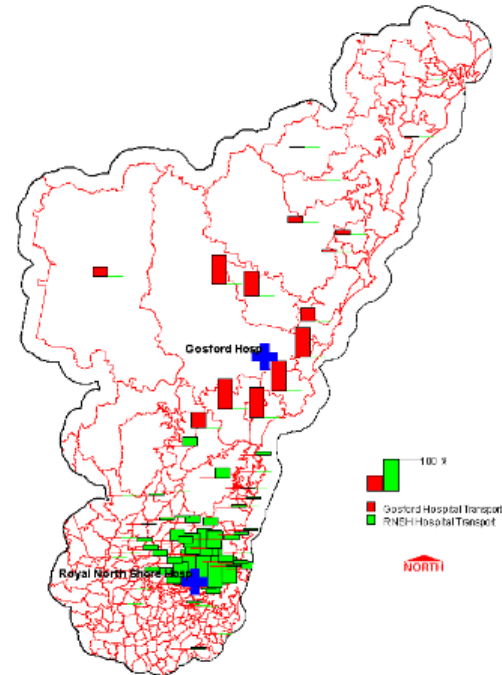
## Geographical Information System mapping



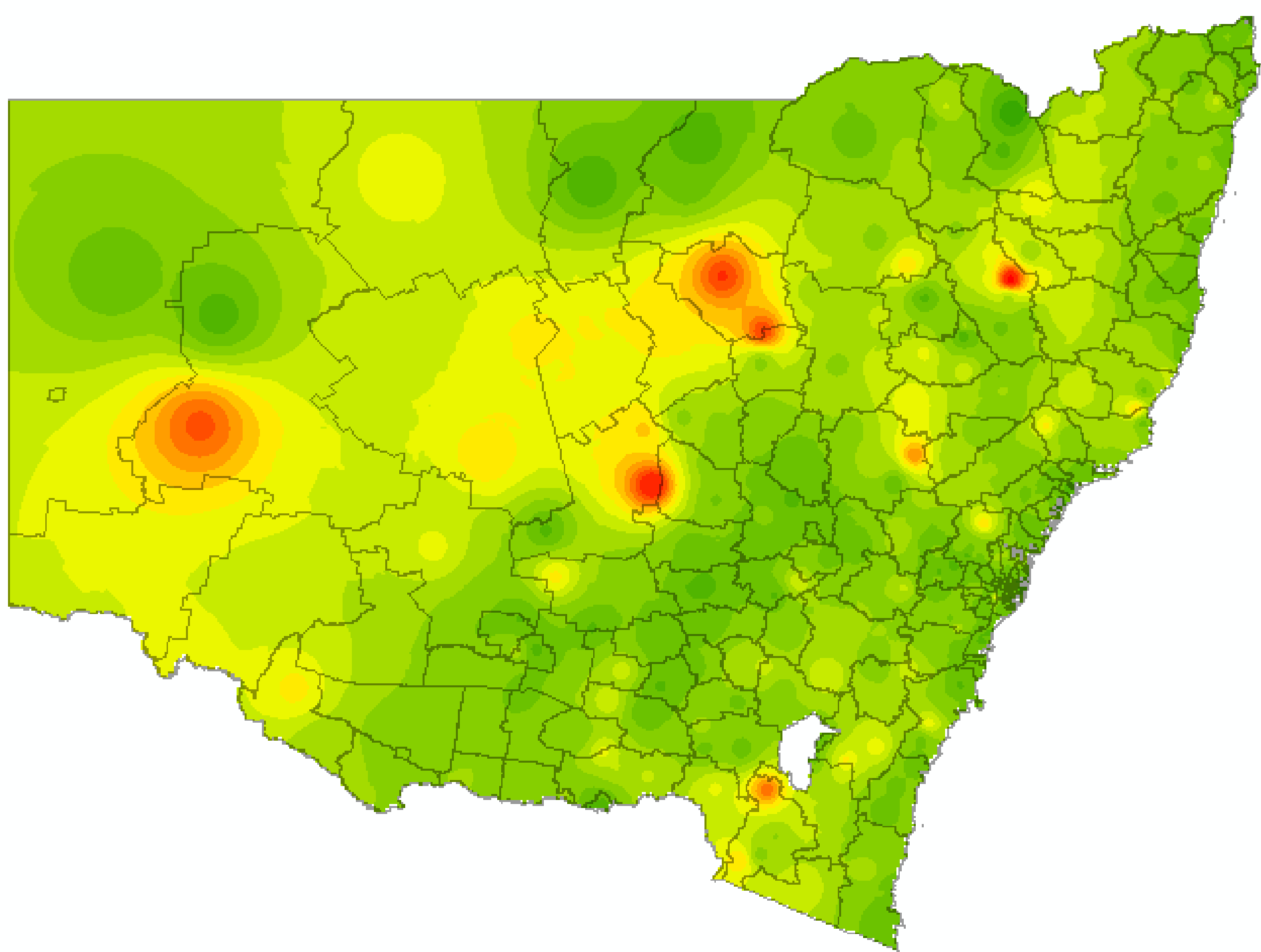
Trauma Cases(NonT1) 2009 RNSH Gosford Catchment



Trauma Cases(NonT1) 2010 RNSH Gosford Catchment







# OHCA Research

## Geographical Information System mapping



- ▶ Initial GIS mapping techniques undertaken by biostatistician
- ▶ Mapping of trauma, stroke, trauma response times
- ▶ Recruitment of biostatistician with GIS mapping speciality in progress
- ▶ January 2011 – retrospective GIS mapping of 2006–2009 linked cardiac arrest data
- ▶ Prospective mapping of all cardiac arrests and spatial statistical analyses

# OHCA Research

Retrospective epidemiological analysis post 2005



# OHCA Research

## Retrospective epidemiological analysis post 2005



### ORIGINAL ARTICLES

## Survival after out-of-hospital cardiac arrest in Sydney, Australia

Winston Cheung, Michael Flynn, Govindasamy Thanakrishnan,  
David M Millis and Elizabeth Fugaccia

Out-of-hospital cardiac arrest (OHCA) is a significant cause of death, but in Australia there is little recent published local information on outcomes. Internationally, the incidence of cardiac arrest is thought to be 0.5 per 1000 person-years (50 per 100 000 person-years) based on activation of emergency medical services, with survival generally estimated to be between 5% and 10%.<sup>1</sup>

In Australia, the regional and national incidence of OHCA appears to be underestimated. The Australian Institute of Health and Welfare listed 1915 separations coded as cardiac arrest from public hospitals in Australia over a 12-month reporting period in 2003–2004,<sup>2</sup> an incidence of 9.5 events per 100 000 person-years. The New South Wales Health Department recorded 900 separations from emergency departments in 2004 with diagnoses of cardiac arrest, an incidence of 13 events per 100 000 person-years, with a mortality rate of 67% (E S Choi, A/Manager, Performance Analysis and Reporting Branch, NSW Health, personal communication). In contrast, a study in Perth, Western Australia, recorded 3730 cardiorespiratory arrests from 1996 to 1999, in a population of 1.385 million people,<sup>3</sup> a crude incidence of 89.1 per 100 000 person-years. A Melbourne study recorded 451 patients having an OHCA in the western half of metropolitan Melbourne over 6 months in 1995, of whom only 3% survived to hospital discharge.<sup>4</sup>

Problems with incidence reporting are compounded by the many patients who suffer cardiac arrest but do not survive to hospital admission and are thus not recorded in hospital or emergency department databases. The lack of accurate information on cardiac arrest for Sydney, NSW, led us to undertake a study to determine the current incidence and survival from OHCA.

### ABSTRACT

**Background:** Out-of-hospital cardiac arrest (OHCA) is a significant cause of death, but there is little published information on its incidence and outcomes in Australia.

**Aim:** This study was undertaken to determine the incidence and survival from OHCA in Sydney, New South Wales.

**Methods:** Patients listed on the Ambulance Service of NSW database as having an OHCA during the 12-month period 1 June 2004 to 31 May 2005 were matched with the NSW Registry of Births, Deaths and Marriages to determine if they had died, and how long they survived. Survival was also determined for patients aged 80 years or older, and for the presenting electrocardiograph (ECG) rhythm.

**Results:** OHCA were recorded for 2011 people in a population of 3.993 million. The age-standardised incidence was 52.6 events per 100 000 person-years (95% CI, 51.6–53.6). Incidence was significantly higher in older age groups. Only 24% of patients survived past the day of the OHCA. Survival for 28 days, 90 days and 1 year was 12.6%, 12.2%, and 11.5%, respectively. Survival was highest when the presentation ECG was ventricular fibrillation. Patients aged 80 years or older had lower survival rates.

**Conclusion:** Survival from OHCA in Sydney is low, and lower in patients aged 80 years or older. The incidence of OHCA in Sydney is similar to that in the rest of the world. Mortality occurs early after OHCA. Hence, for interventions to be effective in improving survival, they need to be targeted at the early stages of OHCA.

# OHCA Research

Retrospective epidemiological analysis post 2005



- ▶ Previous OHCA study in NSW using pre-2005 data
- ▶ Comparative study using 2005-2010 data
- ▶ Ethical permission granted
- ▶ Analysis complete by December 2010

# OHCA Research

Boussignac insufflation

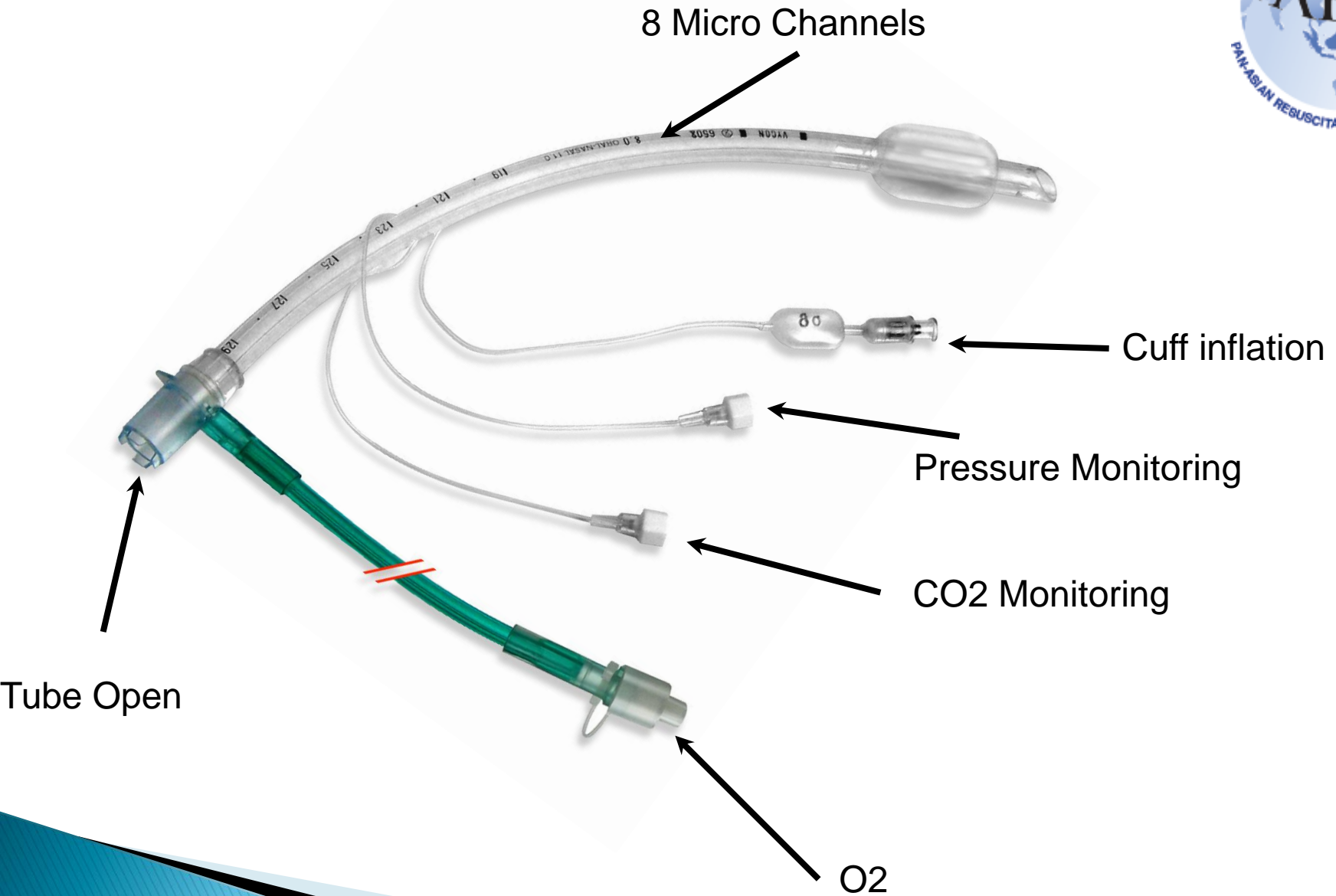


# OHCA Research

## Boussignac insufflation



- ▶ Hyperventilation during cardiac arrest is common amongst all rescuers (J O'Neill & C Deakin, Resuscitation 2007)
- ▶ Excessive ventilation result in significantly increased intrathoracic pressure and markedly decreased coronary perfusion pressure (Aufderheide et al, Circulation 2004)
- ▶ Any incidence of hyperventilation is likely to have detrimental hemodynamic and survival consequences during low flow states such as CPR. (Aufderheide et al)





# OHCA Research

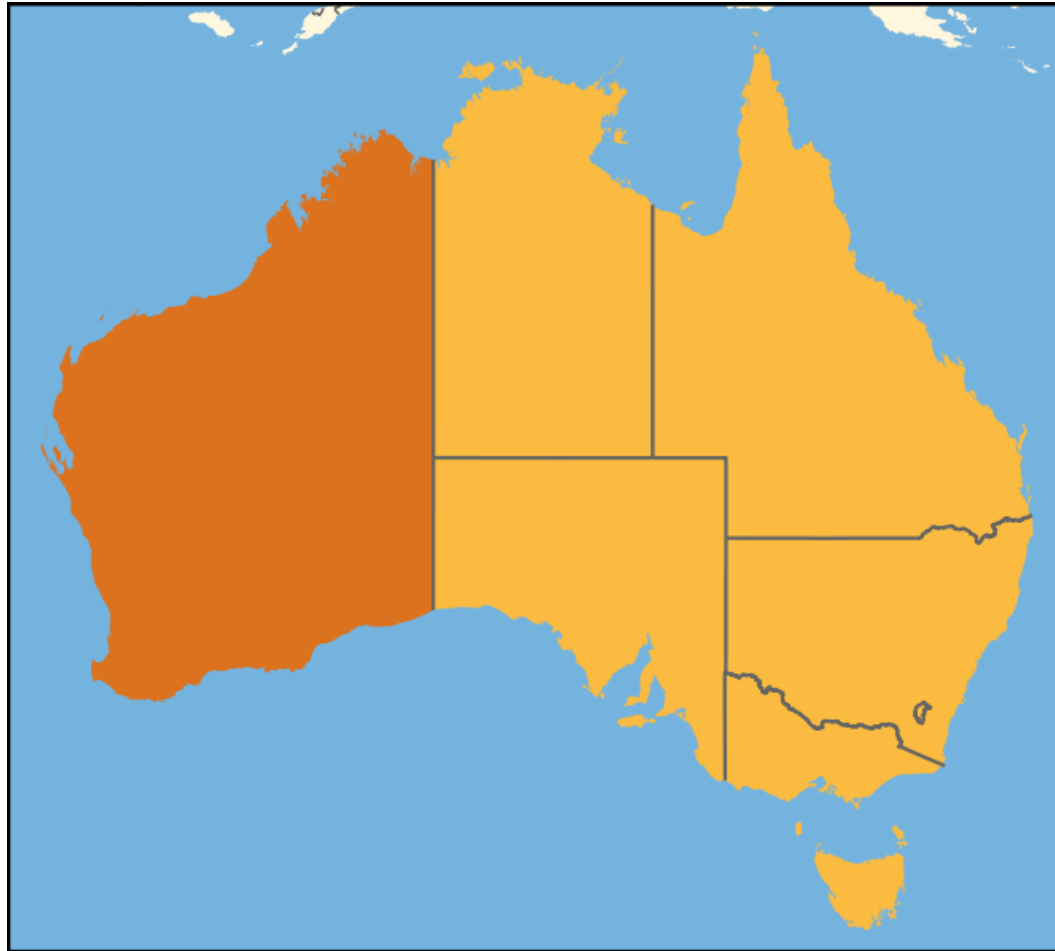
## Boussignac insufflation



- ▶ Randomised controlled trial planned for 2011
- ▶ Power calculation suggests 1000 patients in each arm
- ▶ Ethical permission granted
- ▶ Considering factorial design using Autopulse for CPR standardisation

# OHCA Research

## West Australia



# OHCA Research

West Australia



- RINSE (Rapid Infusion of Cold Normal Saline) trial (with Victoria and South Australia)
- Cardiac arrest registry
- PACA trial results to be presented at Resuscitation Science Symposium, Chicago

# OHCA Research

Australia



- Thank you for your hospitality