I would like to acknowledge the Wadjuk Noongar people - the Traditional Custodians of the land where we are meeting.
Opportunities to improve Aboriginal heart health in Western Australia: a journey in progress

Assoc Prof Judith Katzenellenbogen
BAHHWA is a WA-wide research project addressing disparities in CV health and medical care in Aboriginal people.

Series of detailed studies to add to what is known in Aboriginal CVD.
The relative risk of disease burden in Indigenous Australians compared to the total Australian population: 2003

Source: Burden of disease in Indigenous Australians (Vos et al 2008)
Evolution of the project

- 2007: Team around WA Health grant evaluating AHW role in a cardiac ward
- 2008-2011: NHMRC grant Disparities in management of Ischaemic Heart Disease in Aboriginal Western Australians
- 2012: New NHMRC grant Continue and extend work - include Heart Failure and Dysrhythmias
Focus of BAHHWA

RESEARCH

1. Epidemiology and clinical manifestations of heart disease and major co-morbid conditions
2. Access of Aboriginal people to acute and continuing medical care for heart diseases
3. Describe health care service utilisation and direct costs

RESEARCH TRANSLATION

4. To disseminate findings, encourage action in the sector and study system barriers to change
Mixed Methods

Data collection

WA Data linkage system

Routine hospital data

Death records

Review of ACS hospital records (WA-wide)

Qualitative Methods

Clinical data (2002-04)
- Investigations
- Biochemistry
- Medications
- Revascularisation

Evaluation of translation
- Interviews, focus groups
- Participants: providers, policy-makers, planners, community
- Outputs and data provision
THE CARDIOVASCULAR DISEASE JOURNEY

Micro/macro Environment → Lifestyle → Biological Risk factors → Cardiac Events → Services/Treatments → Outcomes

Information to support change

Today: Describe study results to give a broad idea of the body of work
Various heart conditions: Multiple research question

<table>
<thead>
<tr>
<th>Diag</th>
<th>Time period</th>
<th>Age range</th>
<th>People or events</th>
<th>Look-back</th>
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</tr>
</thead>
<tbody>
<tr>
<td>IHD</td>
<td>2000-08</td>
<td>25-79</td>
<td>people</td>
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<td>ACS</td>
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**Note:**
- **Diag** indicates the diagnosis.
- **Time period** specifies the duration of the study.
- **Age range** indicates the age group studied.
- **People or events** refers to the type of data collected (people, events).
- **Look-back** is the time period for outcome analysis.
- **Outcome** details the results observed.
## Various heart conditions: Multiple research question

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THE CARDIOVASCULAR DISEASE JOURNEY

Micro/macro Environment → Lifestyle → Biological Risk factors → Cardiac Events → Services/Treatments → Outcomes

Source: Linked hospital & death data

Incident MI  Incident Heart Failure  Stroke Prevalence  Incident Atrial Fib
Age patterns: Incident Myocardial Infarction

WA 2000-2004

NON-ABORIGINAL

MALES
n=6933

FEMALES
n=2367
Age patterns: Myocardial infarction cases

WA 2000-2004

ABORIGINAL

MALES
n=461

FEMALES
n=279
INCIDENCE OF MYOCARDIAL INFARCTION: AGE SPECIFIC RATES, BY SEX AND ABORIGINALITY: WA 2000-04

Incidence of 1\textsuperscript{st} hospitalization for Atrial fibrillation (WA, 2000-09)

<table>
<thead>
<tr>
<th>Age-specific rate ratios</th>
<th>3.0</th>
<th>3.6</th>
<th>2.1</th>
<th>1.2</th>
<th>0.78</th>
<th>6.0</th>
<th>6.1</th>
<th>4.2</th>
<th>1.6</th>
<th>1.02</th>
</tr>
</thead>
</table>

![Graph showing incidence of atrial fibrillation by age and gender]

Katzenellenbogen JM, et al. World Congress of Cardiology (poster) 2014
Incidence of 1st hospitalization for HF in men (WA, 2000-09)

Incidence rate/100,000 population in Indigenous vs non-Indigenous men: 516.1 vs 158.3 (3.3 times higher)
Incidence of 1st hospitalization for HF in men (WA, 2000-09)

Age-specific incidence rate ratios

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Indigenous</th>
<th>Non-Indigenous</th>
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</thead>
<tbody>
<tr>
<td>20-29</td>
<td>11.3</td>
<td>1.1</td>
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<td>30-39</td>
<td>11.5</td>
<td>1.9</td>
</tr>
<tr>
<td>40-49</td>
<td>10.1</td>
<td>4.5</td>
</tr>
<tr>
<td>50-59</td>
<td>7.7</td>
<td>1.1</td>
</tr>
<tr>
<td>60-69</td>
<td>4.5</td>
<td>1.1</td>
</tr>
<tr>
<td>70-79</td>
<td>1.9</td>
<td>1.1</td>
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<tr>
<td>≥ 80</td>
<td>1.1</td>
<td>1.1</td>
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</table>

THE CARDIOVASCULAR DISEASE JOURNEY

Micro/macro Environment → Lifestyle → Biological Risk factors → Cardiac Events → Services → Outcomes

- Health economics: Resource use
- Sources: Clinical data base
  Linked hospital data

- ACS Hospital audit
- Time to presentation
- Evid-based drugs for ACS
- DAMA After Inc IHD
- Transfer to metro/Angio
- Barriers to using services
Time to presentation for Acute Coronary Syndromes (ACS)

BAHHWA database from clinical records
State-wide ACS admissions: 2002-04

(Sanfilippo F et al Oral presentation, HF conference 2012)
Median delay time (hours): ACS + angina episodes of care by demographic variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Aboriginal (n=319)</th>
<th>Non-Aboriginal (n=874)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delay time</td>
<td>p value</td>
</tr>
<tr>
<td>Total</td>
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Unknown delay time: 8% metro and 26% non-metro for Aboriginal episodes; 2% metro and 18% non-metro for non-Aboriginal episodes.
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<td>2.6</td>
</tr>
<tr>
<td>Sex</td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>3.5</td>
<td>0.51</td>
</tr>
<tr>
<td>Female</td>
<td>3.4</td>
<td>0.51</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-54</td>
<td>3.1</td>
<td>0.58</td>
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<tr>
<td>55-79</td>
<td>3.8</td>
<td>0.58</td>
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<tr>
<td>Residence</td>
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<td></td>
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<tr>
<td>Metro</td>
<td>3.2</td>
<td>0.73</td>
</tr>
<tr>
<td>Non-Metro</td>
<td>4.5</td>
<td>0.73</td>
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Unknown delay time: 8% metro and 26% non-metro for Aboriginal episodes; 2% metro and 18% non-metro for non-Aboriginal episodes.

p value = 2-sided Kruskal-Wallis test
Understanding delays for Aboriginal patients experiencing ACS in northern WA

Qualitative interviews with heart disease patients and health service providers

(Kate Taylor et al –draft for submission)
DELAYS IN ACCESSING ACUTE CARE – KIMBERLEYS & PILARA

PATIENT factors

• Poor symptom recognition
• Normalisation of poor health

Fear of implications → avoidance

Depression linked with fatalism

Stoicism: ongoing hardship → health low priority

Gender roles: Females take care of family
Males = be strong/proud

Prioritisation of cultural responsibilities & lore time

Limited access to telephones & cars

SERVICE factors

Multiple Co-morbidities

Clinical complexity
Difficulty in diagnosing

Cultural misunderstanding and miscommunication

Limited cultural training for clinicians

Limited or inappropriate treatment protocols

Unreliable access to urban cardiologists for advice/consultation

Problematic flow of patient information

Limited ambulance service
PTS access and rules limiting

Geographic isolation

Taylor KP, et al
Receipt of Evidence-based drugs: Acute Coronary Syndromes (ACS)

BAHHWA database from clinical records:
State-wide ACS admissions: 2002-04

(Gausia K et al Internal Medicine Journal, 2014)
Prescription of secondary preventive drugs for ACS in WA hospitals, 2002-04

* Significantly a lower proportion of Aboriginal patients had Beta blockers
Influence of Socio-demographic and health centres type on EB drugs

Male: AOR = 1.63
Female: AOR = 0.94

Remote: AOR = 0.64
Regional: AOR = 0.55
Metro: AOR = 0.51
Influence of Socio-demographic and health centres type on EB drugs

- Male: AOR = 1.63
- Female
- Remote: AOR = 0.64
- Regional: AOR = 0.55
- Metro: AOR = 0.58
- Private: AOR = 0.51
- District: AOR = 0.51
- Aboriginal: AOR = 0.94
- Non-Aboriginal
- Metro non-teaching
- Tertiary
Transfers to metropolitan hospitals and coronary angiography: Rural emergency IHD patients

Linked hospital and mortality data WA-wide: 2005-09

(Lopez D et al. BMC Health Services 2014)
Flow diagram of IHD and MI events in rural WA, by Aboriginal status: 2005-2009

Factors associated with transfer to metro hospital: Rural MI patients

Aboriginal  
No private insurance **OR=0.85***  
Age: 65-74  **OR=0.87***  
75-84  **OR=0.59***  
COPD  **OR=0.85***  
Heart Failure  **OR=0.74***

IHD=ischaemic heart disease; MI=myocardial infarction
Discharges Against Medical Advice: Relationship with Rurality in Ischaemic Heart Disease admissions

Analysis of Linked hospital and death data

Katzenellenbogen JM et al BMC Health Services Research, 2013
Rural location as a risk factor for DAMA

Adjusted

OR=0.17
OR=0.57
OR=1.51
OR=0.46
OR=1

BASELINE

Private hospital
Rural hospital, metro residence
Rural hospital, rural residence
Metro hospital, rural residence
Metro hospital, metro residence

Unadjusted

OR=0.08*
OR=0.78
OR=2.66 *
OR=0.73

Baseline
Other significant risk factors for DAMA

Aboriginal status: OR=2.3*
Non Aboriginal

Sex: OR=2.1*
Male
Female

IHD type: OR=2.0*
Unstable angina
MI
Other IHD

OR=0.9
Other significant risk factors for DAMA

Admission type

- Booked
- Emerg

OR = 5.9*

History of admission for alcohol and mental health

- Alc + mental health
- Mental health only
- Alc only
- No history

OR = 3.0*
OR = 2.9*
Differentials in resource utilisation for Heart Failure: WA 2000-09

Linked hospital and death records, including DRGs

(Teng et al. Oral Presentation, World Cardiology Congress 2014)
## Readmissions after first-ever admissions for Heart Failure: impact on costs

<table>
<thead>
<tr>
<th>Measure</th>
<th>Aboriginal</th>
<th>Non-Aboriginal</th>
<th>Adj Ratio</th>
<th>Impact on costs</th>
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<td>Emergency</td>
<td>89%</td>
<td>71%</td>
<td>1.15</td>
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<tr>
<td>Readmissions with HF diag</td>
<td>61%</td>
<td>50%</td>
<td>1.17</td>
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<td>Readmission DRG attrib to HF</td>
<td></td>
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<tr>
<td>Time to readmission</td>
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*Adjusted rate ratio for readmission within 1 yr = Aboriginal vs non-Aboriginal 1.17*
Resource utilisation for Heart Failure: Differential and impact on costs

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<td>52%</td>
<td>46%</td>
<td>1.20*</td>
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<tr>
<td>Time to readmission</td>
<td>All =192 days 20-54yrs=163*</td>
<td>All =207 days 20-54yrs=199</td>
<td>---</td>
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<tr>
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<td>6.6 days *</td>
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Adjusted rate ratio for readmission within 1 yr = Aboriginal vs non-Aboriginal 1.17
THE CARDIOVASCULAR DISEASE JOURNEY

Micro/macro Environment → Lifestyle → Biological Risk factors → Cardiac Events → Services/Treatments → Outcomes

Sources: Clinical database
Linked hospital data

Re-admission
Recurrence
30-day, 1 yr, 2 yr mortality
Comparison of Aboriginal to non-Aboriginal differentials in 2-year MI outcomes by sex:

CVD death or recurrent MI in 28-day survivors

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<td>3.6</td>
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<td>2.3</td>
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<td>Plus revascularisation in 28 days</td>
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Risk-adjusted 1-year mortality after First-ever Heart Failure admission

Under 55 years age-group

1-year mortality in HF patients under 55 years

HR=1.92, 95% CI(1.14-3.23)  p=0.014

55 years and over age-group

1-year mortality in HF patients 55 years and over

p=0.314

Teng et al. Presented at Heart Foundation Conference 2013
THE CARDIOVASCULAR DISEASE JOURNEY

Micro/macro Environment → Lifestyle → Biological Risk factors → Cardiac Events → Services/Treatments → Outcomes

Information to support change

Translation Activities and evaluation

Provide information*, Workshops/Presentation, Stakeholder report, Health Indigenous Infonet, Engage health system

Unpacking research translation process
Summary

• Indigenous cardiovascular health is a complex and challenging space
• Disparities are great, esp younger ages
• Much work to be done at all stages of journey
• Research must support a strengths-based approach and agenda
• The clinical, policy & research communities must accelerate efforts to address disparities
• Multi-sectoral solutions are required, including input from communities
Conclusion

• BAHHWA and associated projects have improved the data on Aboriginal heart health in WA and nationally
• Active heart health network in WA working towards improving services for Aboriginal patients
• Primary prevention remains a key to improving health outcomes
• Secondary prevention – discharge care, cardiac rehab and case management
• Many opportunities for improving Aboriginal heart health: work with partners to trial innovative ways of improving systems for Aboriginal cardiac patients
Acknowledgements:

• WA data linkage branch
• Data custodians
• NHMRC funding
# Acknowledgement of team

<table>
<thead>
<tr>
<th>CUCRH</th>
<th>POPULATION HEALTH UWA</th>
<th>CURTIN</th>
<th>HEART FOUNDATION</th>
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<td>Dawn Bessarab</td>
<td>Lyn Dimer</td>
<td>Peter Thompson (SCGH)</td>
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<td>Michael Hobbs</td>
<td>Angela Durey</td>
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<td>Marianne Wood (RPH and DYHS)</td>
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<td>Andrew Maiorana</td>
<td>Trevor Shilton</td>
<td>Kim Goodman (CV Network)</td>
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<td>Tom Briffa</td>
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<td>Ben Scalley (WA Health)</td>
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<td>Sandy Hamilton</td>
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<td>Suvarna Nadkarni</td>
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Email: Judith.katzenellenbogen@uwa.edu.au