Recent research addressing health inequalities among Australia’s Aboriginal and Torres Strait Islander peoples

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IEA World Congress of Epidemiology, Plenary session on Health disparities, ethics of human rights, and social justice – Anchorage August 2014
Presentation

• Brief overview of Australian indigenous population and headline health indicators

• Summary of three recent research projects addressing disparities in Aboriginal and Torres Strait Islander health

• Under the right conditions, epidemiology is a tool for advocacy - there are no disparities where they are not defined, measured and tracked over time
Presentation

• ‘Epidemiology is necessary to guide health policy and service delivery and a tool for advocacy but is not alone sufficient to eliminate health inequalities experienced by Aboriginal and Torres Strait Islander people’

• Current debate in Australia focuses on efforts to achieve constitutional recognition of Aboriginal and Torres Strait Islander people and a treaty in the longer term

• Parallel policy initiatives focus on addressing the disparities experienced by Aboriginal and Torres Strait Islander people
The heterogeneity of Aboriginal Australia
Impact of white colonisation on Aboriginal health today

Cultural genocide
Stolen children

Marginalisation from white society, poor communication and discrimination
Unemployment, Poverty, Poor education
Tobacco, Alcohol and Substance abuse
Domestic violence, Accidents, deaths in custody

COLONISATION
Loss of hunter-gatherer Lifestyle, loss of culture

Poor nutrition
Low birth weight, Diabetes mellitus, Hypertension, Cardiovasc. disease

Fixed settlements
Fringe camps
Urban ghettos

Poor housing, Poor hygiene, Overcrowding and Infectious disease
Respiratory disease, Ear disease, Rheumatic heart dis. Renal disease

Source: Matthews (1997)
Australia: growing old and growing young

Recent improvements

- Smoking declined from 51% in 2001 to 41% in 2012-13

- Coronary heart disease mortality decreased 36% from 2001 to 2011
Two different populations in one country

<table>
<thead>
<tr>
<th>Population (fertility rate)</th>
<th>Non-Aboriginal population</th>
<th>Aboriginal population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22,323,933 (1.97)</td>
<td>574,874 (2.52)</td>
</tr>
<tr>
<td>Median age</td>
<td>37.0 years</td>
<td>21.0 years</td>
</tr>
<tr>
<td>Adult to child ratio(^1)</td>
<td>3.0</td>
<td>1.3</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>79 years males&lt;br&gt;83 years females</td>
<td>67 years males&lt;br&gt;73 years females</td>
</tr>
<tr>
<td>Percent of population age 0-14</td>
<td>4.3 million (19%)</td>
<td>200,245 (35%)</td>
</tr>
</tbody>
</table>

\(^1\)Persons aged 18+ for every 0-17 year old
### Two different populations in one country

<table>
<thead>
<tr>
<th></th>
<th>Non-Aboriginal population</th>
<th>Aboriginal population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infant mortality</strong></td>
<td>4.2 per 1000</td>
<td>10.3 per 1000</td>
</tr>
<tr>
<td><strong>Child mortality</strong></td>
<td>12 per 100 000</td>
<td>25 per 100 000</td>
</tr>
<tr>
<td><strong>Teeth decay by age 6</strong></td>
<td>46%</td>
<td>79%</td>
</tr>
<tr>
<td><strong>In child protection system 0 to 14 years (out of home care)</strong></td>
<td>5 per 1000</td>
<td>55 per 1000</td>
</tr>
<tr>
<td><strong>Juvenile justice supervision</strong></td>
<td>42 per 100 000</td>
<td>996 per 100 000</td>
</tr>
</tbody>
</table>
## Two different populations in one country

<table>
<thead>
<tr>
<th></th>
<th>Non-Aboriginal population</th>
<th>Aboriginal population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental vulnerability at school entry</td>
<td>22%</td>
<td>48%</td>
</tr>
<tr>
<td>Year 5 literacy (attained minimum)</td>
<td>93%</td>
<td>66%</td>
</tr>
<tr>
<td>Year 5 numeracy (attained minimum)</td>
<td>96%</td>
<td>75%</td>
</tr>
<tr>
<td>Completed Year 12 School</td>
<td>76%</td>
<td>31%</td>
</tr>
</tbody>
</table>
Suicide,
Age-standardised death rates by Indigenous status, 2001-2010

Rate per 100,000 population

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Indig
Non-Indig
Suicide, Age specific death rates by Indigenous status for males 2001-2010

Rates per 100,000 population
Improved access to acute interventions for Aboriginal people with myocardial infarction
Background

• Coronary revascularisation may be underused for Aboriginal Australians
  ▪ Coory and Walsh (2005) found lower adjusted rates of revascularisation in Queensland for Aboriginal AMI patients but Bradshaw et al. (2010) found no difference in an urban setting in Perth

• Questions:
  – Is there a disparity in NSW?
  – What could be the drivers of this disparity?
## Description of AMI events

<table>
<thead>
<tr>
<th></th>
<th>Aboriginal n=1165</th>
<th>Non-Aboriginal n=58 117</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-54</td>
<td>49%</td>
<td>17%</td>
</tr>
<tr>
<td>55-84</td>
<td>51%</td>
<td>83%</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62%</td>
<td>66%</td>
</tr>
<tr>
<td>Female</td>
<td>38%</td>
<td>34%</td>
</tr>
<tr>
<td><strong>Living in:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city</td>
<td>24%</td>
<td>54%</td>
</tr>
<tr>
<td>Remote / very remote</td>
<td>13%</td>
<td>1%</td>
</tr>
<tr>
<td>Most disadvantaged areas</td>
<td>47%</td>
<td>23%</td>
</tr>
</tbody>
</table>
## Disparity in AMI events

<table>
<thead>
<tr>
<th>Adjusted for:</th>
<th>Aboriginal to non-Aboriginal RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Age, sex, year</td>
<td>2.30 (2.17-2.44)</td>
</tr>
</tbody>
</table>

An Aboriginal person has 2.30 times the risk of an AMI as a non-Aboriginal person of the same age, sex and year.
Study participants and levels


Hospitals
- n=174 public hospitals in NSW with admission for AMI during study period

Patients:
- diagnosis of acute myocardial infarction Jul 2001 to Oct 2008
  - aged 25-84 yrs, acute admission, NSW residents
  - n=58117 non-Aboriginal and n=1165 Aboriginal
Methods

Single and multilevel cox regression to estimate rates of revascularisation within 30 days

Few studies had used modelling techniques to adjust for hospital level effects or for clustering of patients within hospitals
Is there a disparity? Randall et al Circulation 2012

Yes, an Aboriginal person in NSW has a 37% lower hazard of revascularisation within 30 days of AMI than a non-Aboriginal person of the same age, sex, year of admission and AMI type.
What is driving this gap?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Hazard Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, sex, year, MI type</td>
<td>0.63</td>
<td>(0.57, 0.70)</td>
</tr>
<tr>
<td>+ Hospital of admission (random effect)</td>
<td>0.82</td>
<td>(0.74, 0.91)</td>
</tr>
<tr>
<td>+ Selected comorbidities</td>
<td>0.90</td>
<td>(0.81, 1.00)</td>
</tr>
<tr>
<td>+ Substance use (including smoking)</td>
<td>0.92</td>
<td>(0.83, 1.02)</td>
</tr>
<tr>
<td>+ Private health insurance</td>
<td>0.96</td>
<td>(0.87, 1.07)</td>
</tr>
</tbody>
</table>

After adjusting for substance use and private health insurance, there is no longer a significant difference.
Better cardiac care for Aboriginal and Torre Strait Islander people forum

- Held in Sydney March 2014
- Attended by health professionals and representatives from all Australian governments
- Initiated by the Australian Health Ministers Advisory Council
- Investigated why cardiac care outcomes differed for Indigenous people by focusing on primary care, acute care services, post event care and coordination of care
Psychological distress in older Aboriginal people
Background

• Disproportionate burden of mental health problems among Aboriginal Australians

• Psychological distress as a measure of community need

• Mental and physical health- complex interrelationships
Aims

1. To examine the association between current psychological distress and 1) socio-demographic factors, 2) health factors (including disability), 3) medical conditions, and 4) social support amongst older Aboriginal people from NSW.

2. To identify potential key contributors to differences in distress prevalence in older Aboriginal Australians compared to older non-Aboriginal Australians.
The 45 and Up Study

- Longitudinal population-based cohort
- NSW residents aged 45 years and over. (10% of NSW population)
- Cross-sectional baseline postal questionnaire data
- Psychological distress: Kessler-10 scale, score 22 or greater indicated ‘high distress’ (ABS, AIHW).
- Distress data available for 1631 (84%) Aboriginal participants and 231,774 (89%) non-Aboriginal participants
RESULTS: Prevalence of high psychological distress

- Aboriginal: 21% High psychological distress; 79%
- Non-Aboriginal: 8% High psychological distress; 92%

Age- and Sex-adjusted PR 2.5 (95%CI 2.2-2.8)
Socio-demographic factors and distress

Sex
- Male: Total no. 693, % PD 18.5, Adjusted PR 1
- Female: Total no. 938, % PD 22.7, Adjusted PR 1.2 (1.0, 1.4)

Age in years
- 45-49: Total no. 348, % PD 26.4, Adjusted PR 1
- 50-59: Total no. 758, % PD 22.3, Adjusted PR 1.5 (1.1, 1.9)
- 60-69: Total no. 373, % PD 18.2, Adjusted PR 1.2 (0.9, 1.6)
- 70-79: Total no. 124, % PD 7.3, Adjusted PR 0.5 (0.3, 0.8)
- 80+: Total no. 28, % PD 10.7, Adjusted PR 0.7 (0.3, 1.7)

Educational qualifications
- None: Total no. 427, % PD 28.1, Adjusted PR 2.5 (1.7, 3.4)
- School/Intermediate/High School certificate: Total no. 467, % PD 18.8, Adjusted PR 1.5 (1.1, 2.2)
- Trade/apprenticeship/ certificate/diploma: Total no. 450, % PD 19.1, Adjusted PR 1.5 (1.0, 2.2)
- University degree or higher: Total no. 248, % PD 12.9, Adjusted PR 1

Annual household income
- <$20,000: Total no. 472, % PD 33.9, Adjusted PR 4.1 (2.8, 6.0)
- $20,000 - $39,999: Total no. 287, % PD 19.8, Adjusted PR 2.2 (1.5, 3.4)
- $40,000 - $69,999: Total no. 254, % PD 12.2, Adjusted PR 1.3 (0.8, 2.1)
- >=$70,000: Total no. 271, % PD 10.0, Adjusted PR 1

Place of residence
- Major city: Total no. 494, % PD 17.4, Adjusted PR 1
- Inner Regional: Total no. 594, % PD 19.7, Adjusted PR 1.1 (0.9, 1.4)
- Outer Regional: Total no. 440, % PD 24.0, Adjusted PR 1.3 (1.0, 1.7)
- Remote/very remote: Total no. 103, % PD 31.1, Adjusted PR 1.7 (1.2, 2.4)

Age- & sex- adjusted Prevalence Ratio (95% CI) on log scale
Physical disability (and caring for disability) is associated with distress

Major disability
- Do not need help with daily activity: 1334, PR 16.9 (95% CI: 3.0, 5.6)
- Need help with daily tasks: 205, PR 46.8 (95% CI: 2.5, 3.6)

Functional physical limitations
- No functional limitation: 410, PR 9.5 (95% CI: 1.2, 1.9)
- Mild functional limitation: 291, PR 10.7 (95% CI: 2.3, 3.1)
- Moderate functional limitation: 360, PR 18.9 (95% CI: 4.3, 7.3)
- Severe functional limitation: 397, PR 43.8 (95% CI: 3.9, 7.3)

Regular care for sick/disabled family member or friend
- No: 1279, PR 19.8 (95% CI: 3.0, 4.6)
- Yes; Part-time: 147, PR 20.4 (95% CI: 4.3, 7.3)
- Yes; Full-time: 129, PR 32.6 (95% CI: 1.2, 2.1)

Age- & sex- adjusted PR (95%CI)
Medical conditions and distress
ever diagnosed by a doctor (self report)

**Medical condition**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Total no.</th>
<th>% PD</th>
<th>Adjusted PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin cancer (not melanoma)</td>
<td>259</td>
<td>20.1</td>
<td>1.1 (0.8, 1.4)</td>
</tr>
<tr>
<td>Melanoma</td>
<td>85</td>
<td>27.1</td>
<td>1.4 (1.0, 2.1)</td>
</tr>
<tr>
<td>Breast cancer (females only)</td>
<td>43</td>
<td>16.3</td>
<td>0.8 (0.4, 1.6)</td>
</tr>
<tr>
<td>Prostate cancer (Males only)</td>
<td>32</td>
<td>9.4</td>
<td>0.6 (0.2, 1.8)</td>
</tr>
<tr>
<td>Other cancer</td>
<td>125</td>
<td>28.0</td>
<td>1.4 (1.1, 1.9)</td>
</tr>
<tr>
<td>Heart disease</td>
<td>197</td>
<td>27.9</td>
<td>1.7 (1.3, 2.2)</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>609</td>
<td>24.1</td>
<td>1.4 (1.2, 1.7)</td>
</tr>
<tr>
<td>Stroke</td>
<td>58</td>
<td>36.2</td>
<td>2.3 (1.6, 3.2)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>274</td>
<td>28.5</td>
<td>1.6 (1.3, 2.0)</td>
</tr>
<tr>
<td>Blood clot (thrombosis)</td>
<td>102</td>
<td>37.3</td>
<td>2.0 (1.5, 2.6)</td>
</tr>
<tr>
<td>Asthma*</td>
<td>264</td>
<td>35.2</td>
<td>1.9 (1.6, 2.4)</td>
</tr>
<tr>
<td>Hayfever*</td>
<td>247</td>
<td>25.9</td>
<td>1.3 (1.0, 1.6)</td>
</tr>
<tr>
<td>Depression*</td>
<td>398</td>
<td>50.0</td>
<td>5.1 (4.1, 6.3)</td>
</tr>
<tr>
<td>Anxiety*</td>
<td>246</td>
<td>52.9</td>
<td>3.6 (3.0, 4.4)</td>
</tr>
<tr>
<td>Parkinson disease</td>
<td>8</td>
<td>37.5</td>
<td>2.2 (0.9, 5.0)</td>
</tr>
<tr>
<td>None of these conditions</td>
<td>270</td>
<td>7.0</td>
<td>0.3 (0.2, 0.4)</td>
</tr>
</tbody>
</table>

**Morbidity**

<table>
<thead>
<tr>
<th>Health conditions</th>
<th>Total no.</th>
<th>% PD</th>
<th>Adjusted PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>No health conditions</td>
<td>414</td>
<td>8.5</td>
<td>1.0</td>
</tr>
<tr>
<td>1-2 health conditions</td>
<td>809</td>
<td>16.9</td>
<td>2.2 (1.6, 3.1)</td>
</tr>
<tr>
<td>3-4 health conditions</td>
<td>301</td>
<td>40.2</td>
<td>5.7 (4.0, 8.0)</td>
</tr>
<tr>
<td>5-6 health conditions</td>
<td>78</td>
<td>43.6</td>
<td>6.6 (4.4, 9.8)</td>
</tr>
<tr>
<td>7 or more health conditions</td>
<td>29</td>
<td>48.3</td>
<td>8.1 (5.0, 13.1)</td>
</tr>
</tbody>
</table>

*Reference category is without specific condition*
Lower social support is associated with high distress

**Marital status**
- Married/De facto/Living with partner: 1005, 14.8, 1
- Single: 209, 32.1, 2.0 (1.6, 2.6)
- Widowed: 97, 17.5, 1.4 (0.9, 2.2)
- Divorced/Separated: 304, 33.2, 2.2 (1.8, 2.7)

**Close contacts (live outside the home & can depend upon)**
- None: 169, 45.0, 3.1 (2.3, 4.1)
- 1-3 people: 519, 25.4, 1.7 (1.3, 2.3)
- 4-6 people: 403, 14.4
- 7-10 people: 253, 14.2, 1.0 (0.7, 1.5)
- 11 or more: 232, 10.8, 0.8 (0.5, 1.2)
AIM 2

To identify potential key contributors to differences in distress prevalence in older Aboriginal Australians compared to older non-Aboriginal Australians.
Contributors to higher distress of Aboriginal Australians?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Prevalence Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, Sex</td>
<td>2.45</td>
</tr>
<tr>
<td>+ Education</td>
<td>2.07</td>
</tr>
<tr>
<td>+ morbidity/functional limit./disability</td>
<td>1.27</td>
</tr>
<tr>
<td>+ marital/close contacts</td>
<td>1.13</td>
</tr>
</tbody>
</table>
Study strengths and limitations

- Population-based
- Diverse Aboriginal communities
- Baseline description to build on
- K-10 valid tool among older Aboriginal population

(McNamara, Eades et al. ANZJPH 2014, in press)

- Response rate/data collection method
- Healthy cohort effect (less distress, less disabled)
- Self-report
Conclusions/Implications

• High psychological distress is very common in those with physical health problems, especially with physical functional impairment.

• Clinical services, especially those serving older Aboriginal people, should prioritise screening and management plans for mental health problems in individuals with multiple conditions and in those with physical disability.

• Interventions to reduce social and economic inequalities experienced by Aboriginal people
Acknowledgements

Aboriginal Health and Medical Research Council (AH&MRC) of New South Wales - Ethics Committee

Aboriginal and non-Aboriginal participants of the 45 and Up Study

Preventative Health colleagues (Baker IDI Heart and Diabetes Institute)

The 45 and Up Study is managed by the Sax Institute, in collaboration with major partner Cancer Council New South Wales; and partners the National Heart Foundation of Australia (New South Wales Division); New South Wales Department of Health; Beyondblue: the National Depression Initiative; Ageing, Disability and Home Care, Department of Human Services New South Wales; Red Cross Blood Service; and Uniting Care Ageing

Collaborating researchers
Diabetes in pregnancy: a growing challenge for our future
Why is GDM important for Indigenous peoples?


Recent guidelines have particular implications

<table>
<thead>
<tr>
<th>Factor</th>
<th>ADIPS (2001-2013)</th>
<th>ADIPS (2013+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early screening for all mod-high risk women</td>
<td>Not specified</td>
<td><strong>High risk:</strong> 2hOGTT &gt;=8.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Mod risk:</strong> (ethnicity, BMI 25-35): FPG &gt;7.0 mmol/L (126 mg/dL) then 2hOGTT</td>
</tr>
<tr>
<td>Overt diabetes</td>
<td>Not specified</td>
<td>Overt diabetes pp diagnosis only</td>
</tr>
<tr>
<td>Diagnostic criteria</td>
<td></td>
<td>75g OGTT:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FPG &gt;= 5.1 mmol/L (92 mg/dL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 hr &gt;= 10.0 mmol/L (180 mg/dL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2 hr &gt;= 8.5 mmol/L (153 mg/dL)</td>
</tr>
<tr>
<td>Treatment targets</td>
<td>Diet and insulin (FPG &lt;5.5 mmol/L, 1h &lt;8.0 mmol/L, 2h &lt;7.0 mmol/L)</td>
<td>Clinician discretion</td>
</tr>
<tr>
<td>Postpartum care</td>
<td></td>
<td>6-12 weeks 75g OGTT</td>
</tr>
<tr>
<td></td>
<td>• 6-8 weeks 75g OGTT</td>
<td>then annual OGTT if contemplating another pregnancy.</td>
</tr>
<tr>
<td></td>
<td>• 1-2 yearly OGTT, or 3 yearly if pregnancy not possible</td>
<td>• ?HbA1C when medicare funded.</td>
</tr>
</tbody>
</table>

75g OGTT:
- FPG >= 5.1 mmol/L (92 mg/dL)
- 1 hr >= 10.0 mmol/L (180 mg/dL)
- 2 hr >= 8.5 mmol/L (153 mg/dL)
GDM Prevalence: age groups by decade

Figure 3: Crude prevalence of GDM in Indigenous and non-Indigenous women by age: 1990-99 and 2000-09


GDM Prevalence Review – lots of variability

Systematic Review Methods
• Comprehensive search (565 abstracts)
• 25 published papers
• 2 people independently extracted data and assessed quality

Time to first postpartum diabetes screen in FNQ

Oral Glucose Tolerance Test (OGTT)

HR 0.61 95% CI 0.48-0.79; p<0.0001

‘Any’ laboratory-based glucose test (OGTT, HbA1C, FPG, RPG)

HR 0.81, 95% CI 0.67-0.98%, p=0.03

Summary

- Gestational diabetes is a major public health issue, particularly for Indigenous peoples
- Recent guideline changes

Major challenges:

- Insufficient evidence on acceptability and effectiveness of prevention, treatment or postpartum care
- Utilising the ‘window of opportunity’ for prevention during pregnancy
- Improving postpartum care
Importance of postpartum care after GDM

- Essential screening criteria
- Women with GDM have 8-fold risk of T2DM compared to women without GDM
- Indigenous women have even higher risk at a younger age

Kim C et al. Dia Care 2002;25:1862-1868
Which women were more likely to have diabetes screening?

Rates have increased significantly over time (p<0.0001) but remain low, particularly among indigenous women (10% vs 27% in 2010 by 6/12pp).

Longer times to first postpartum OGTT in:
- Indigenous women in urban Cairns compared to Indigenous women in remote areas (HR 0.58, 0.38-0.71, p=0.01).
- Non-Indigenous women who:
  - were born in Aust (HR 0.76, 0.59-1.00, 0.05)
  - aged <25 yrs (HR 0.45, 0.23-0.89, p=0.02)
  - parity>5 (HR 0.33, 0.12-0.90, p=0.03)
  - Smoked (HR 0.48, 0.31-0.76, p=0.001)
  - did not breastfeed (HR 0.09, 0.01-0.64, |