Using cohort studies to investigate rural mental health

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Overview

• Background & aims
• Themes in mental health research
• Current large-scale population mental health research studies
• Opportunities & challenges of longitudinal research in rural mental health
• Links with existing data sets & research collaborations
## Mental Health in Australia

<table>
<thead>
<tr>
<th></th>
<th>Lifetime</th>
<th>12 month</th>
<th>30 day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EPC (‘000)</td>
<td>% (95%CI)</td>
<td>EPC (‘000)</td>
</tr>
<tr>
<td>Any affective disorder</td>
<td>2405.3</td>
<td>15.0 (14.1–16.0)</td>
<td>995.9</td>
</tr>
<tr>
<td>Any anxiety disorder</td>
<td>4205.0</td>
<td>26.3 (24.9–27.6)</td>
<td>2303.0</td>
</tr>
<tr>
<td>Any substance use disorder</td>
<td>3960.3</td>
<td>24.7 (23.5–26.0)</td>
<td>819.8</td>
</tr>
<tr>
<td>Any mental disorder</td>
<td>7286.6</td>
<td>45.5 (44.1–46.9)</td>
<td>3,197.8</td>
</tr>
</tbody>
</table>

CI, confidence interval; EPC, estimated population count. EPCs are rounded to the nearest 100.

Original Research

A European Approach to Rural–Urban Differences in Mental Health: The ESEMeD 2000 Comparative Study

Viviane Kovess-Masféty, MD, PhD, Jordi Alonso, MD, MPH, PhD, Ron de Graaf, PhD, Koen Demyttenaere, MD, PhD, on behalf of the ESEMeD 2000 Investigators

Objective: The study aimed to answer the following questions: Are there any rural–urban differences in mental health, once sociodemographic variables are controlled for, and are any of these differences observed in EU countries? Did the individuals suffering from mental health disorders have the same characteristics in rural and urban areas, particularly concerning self-reported impairment?

Method: The European Study of the Epidemiology of Mental Disorders (ESEMeD 2000 study) is a cross-sectional, in-person, household interview survey based on probability samples representative of the adult population of 6 European countries: Belgium, France, Germany, Italy, the Netherlands, and Spain. The rural population is defined as those living in towns with fewer than 10,000 inhabitants, and the urban population is defined as those living in towns or cities with 10,000 or more inhabitants. A stratified, multistage, random sample without replacement was drawn in each country. The overall response rate of the study was about 61.2% (weighted response rate).

Results: The study results confirmed previous findings on the variation in mood disorders between rural and urban areas. Overall, urbanicity seemed to be linked to a higher risk of mental health disorders, particularly depressive disorders, whereas the link to anxiety disorders was only moderate and there was no link at all to alcohol disorders. Country differences concerned male respondents and not female respondents, with the exception of Belgium, where the differences concerned women only (and showed fewer disorders in rural areas).

Conclusions: This study will, hopefully, stimulate further intra-European studies using comparable methods and instruments to look at the experience across the European continent and introduce steps to harmonize rural–urban population limits across diverse countries.


Information on funding and support and author affiliations appears at the end of the article.
Mental Health in six European countries
Comparing rural and urban settings

Table 6 Psychological distress: SF12 mental health score deviations. Statistically significant differences between rural and urban samples divided into 3 classes

<table>
<thead>
<tr>
<th>Country</th>
<th>Men Rural</th>
<th>SE</th>
<th>Medium-size</th>
<th>SE</th>
<th>Metropolis</th>
<th>SE</th>
<th>Women Rural</th>
<th>SE</th>
<th>Medium-size</th>
<th>SE</th>
<th>Metropolis</th>
<th>SE</th>
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</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>4.73</td>
<td>0.64</td>
<td>5.54</td>
<td>0.27</td>
<td>4.16</td>
<td>0.71</td>
<td>2.06</td>
<td>0.80</td>
<td>4.19</td>
<td>0.33</td>
<td>2.69</td>
<td>0.96</td>
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<tr>
<td>France</td>
<td>4.34</td>
<td>0.36</td>
<td>2.89</td>
<td>0.53</td>
<td>3.44</td>
<td>0.67</td>
<td>1.98</td>
<td>0.41</td>
<td>1.37</td>
<td>0.49</td>
<td>1.07</td>
<td>0.59</td>
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<tr>
<td>Germany</td>
<td>4.97</td>
<td>0.31</td>
<td>4.98</td>
<td>0.31</td>
<td>5.39</td>
<td>0.31</td>
<td>3.89</td>
<td>0.36</td>
<td>3.86</td>
<td>0.35</td>
<td>3.80</td>
<td>0.36</td>
</tr>
<tr>
<td>Italy</td>
<td>4.81</td>
<td>0.25</td>
<td>4.44</td>
<td>0.23</td>
<td>3.98</td>
<td>0.33</td>
<td>2.76</td>
<td>0.30</td>
<td>1.67</td>
<td>0.31</td>
<td>1.33</td>
<td>0.38</td>
</tr>
<tr>
<td>Netherlands</td>
<td>6.18</td>
<td>0.69</td>
<td>5.64</td>
<td>0.29</td>
<td>4.48</td>
<td>0.48</td>
<td>6.52</td>
<td>0.99</td>
<td>4.11</td>
<td>0.34</td>
<td>3.10</td>
<td>0.54</td>
</tr>
<tr>
<td>Spain</td>
<td>4.65</td>
<td>0.37</td>
<td>4.74</td>
<td>0.30</td>
<td>5.11</td>
<td>0.29</td>
<td>2.65</td>
<td>0.38</td>
<td>2.39</td>
<td>0.32</td>
<td>2.71</td>
<td>0.30</td>
</tr>
</tbody>
</table>

*P < 0.05
Review

The current status of urban-rural differences in psychiatric disorders

Peen J, Schoevers RA, Beekman AT, Dekker J. The current status of urban–rural differences in psychiatric disorders.

Objective: Reviews of urban–rural differences in psychiatric disorders conclude that urban rates may be marginally higher and, specifically, somewhat higher for depression. However, pooled results are not available.

Method: A meta-analysis of urban–rural differences in prevalence was conducted on data taken from 20 population survey studies published since 1985. Pooled urban–rural odds ratios (OR) were calculated for the total prevalence of psychiatric disorders, and specifically for mood, anxiety and substance use disorders.

Results: Significant pooled urban–rural OR were found for the total prevalence of psychiatric disorders, and for mood disorders and anxiety disorders. No significant association with urbanization was found for substance use disorders. Adjustment for various confounders had a limited impact on the urban–rural OR.

Conclusion: Urbanization may be taken into account in the allocation of mental health services.

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Key words: meta-analysis; mental illness; prevalence; rural health; urban health

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Rural Mental Health Service Delivery

• Lower rates of presentation to health professionals
• Lower rates of detection of mental disorder
• Lower rates of accessing effective interventions across full spectrum of early intervention, acute care, ongoing care.
• Lower retention in treatment

Rost, 2002
Richards et al, 2004
Harrison et al, 2004
Caldwell et al, 2004
AIHW, 2005
Wang et al, 2003
Suicide

Higher risk groups across rural Australia
– Males > females across all age groups
– Urban rates: 20/100,000 (m), 6/100,000 (f)
– Rural rates:
  • Males (rural centres) 24-25/100,000
  • Males (remote) up to 52/100,000 (20-29yrs)
  • Aboriginal youth – up to 76/100,000 (15-24yrs)
  • Men in farming - 24-51/100,000

(Caldwell et al, 2004; AIHW, 2005; Page & Fragar, 2002)
Limitations of Current Research

• Inconsistent findings across countries
• Interaction effects of age, gender, migration, marital status
• Varying definitions of “rural” and thresholds for rurality affect findings (e.g., European Survey)
• Inattention to breadth/diversity of rural context
• Varying indigenous population base
• Culture/language and measurement of mental disorder
Place and Mental Health

- **Contextual Factors**
  - Where are people living?

- **Compositional Factors**
  - What are the characteristics of those living there?

- **Collective Factors**
  - What are the shared values/culture?
Themes in rural mental health
(Rost, 2005, Smith et al., 2008, Wainer et al.)

• a sense of connection with community and physical environment (Wainer et al. 2000)
• socio-economic disadvantage
• high-risk occupations
• low service access
• disproportionate Aboriginal representation
• exposure to adverse environmental events
• greater vulnerability to adverse social impact when those events occur
• New threat: climate change

# Future climate scenarios based on 3 different projections of emissions growth:

**A2** relatively high emissions

**A1B** mid

**B1** low

Satellite-based measures of average global temperature (near-surface lower atmosphere), by year (Sept-Feb period), 1979-2010

Long-term uptrend continues

Reference temperature, (1979-1998 average)

10 years of alleged ‘cooling’ since 1998
Seasonal rainfall zones: future shift?

Major seasonal rainfall zones of Australia

- **Crucial for wheat-belt**

- **Summer dominant**
  - Marked wet summer and dry winter

- **Summer**
  - Wet summer and low winter rainfall

- **Uniform**
  - Uniform rainfall

- **Winter dominant**
  - Wet winter and low summer rainfall

- **Arid**
  - Marked wet winter and dry summer
  - Low rainfall
CC & MH: Complex causal pathways

**Climate change**
- Drought amplification
- Regional drying, warming
- More extreme weather events

**Mediators of health risks**
- Reduced farm yields (food; + fibre, forests)
- Lower family incomes
- Community structure, assets, function

**Health Impacts**
- Impaired food and nutrition security
- Mental health problems
- Bereavement; Post-traumatic Stress Disorder
- Physical health problems (resp/CVD)

- Reduced food availability, quality
- Coping capacity -- social capital

**Coping capacity -- social capital**
- Injury, death

**Extreme bushfires ... and heat extremes**
- Property damage
- Smoke exposure ... and heat

**Impaired food and nutrition security**
- Child (nutritional) health/development
- Adult health
CC & MH: Complex causal pathways

Integrating phys, psych space; Amenable to research
Amenable to intervention

Mediators of health risks

Health Impacts

Climate change

Drought amplification
Regional drying, warming
More extreme weather events

Reduced farm yields (food; + fibre, forests)

Reduced food availability, quality
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Community structure, assets, function

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Mental health problems

Impaired food and nutrition security

Child (nutritional) health/development
Adult health

Injury, death
Bereavement; Post-traumatic Stress Disorder
Physical health problems (resp/CVD)

Extreme bushfires ...
and heat extremes

Property damage
Smoke exposure ...
and heat
Social Capital: a way to understand community functioning and underlying processes

What is it?
How does it work?

Strong (Australian) evidence base for SC & MH
Intuitive, well-accepted

Social Capital

Community Participation → Social Cohesion → Health

Baum et al., 2000
Berry & Welsh, 2010
Berry & Shipley, 2009
Impacts of CC on MH: Quantitative empirical testing using HILDA

• The Household, Income & Labour Dynamics Survey Australia (FaHCSIA, MISER)
  http://www.melbourneinstitute.com/hilda/

• Annual data collection, W1 N≈19,000

• Socioec, demog, pyschosoc, health & WB

• H/hold is PSU; 4 ?aires all adults 15+, incl SRQ:
  – Social capital measures W6
  – Weather-related trauma exposure W10
    (items also in other studies discussed next)
Weather-related disasters & MH

Two current HILDA studies (results next year!):

1. Drought and mental health: could community connectedness ease the pain? (FaHCSIA)
2. CC, bushfires, food supply & MH (NHMRC)
   - Data linking: BoM rainfall data lagged deviation precipitation index 100+ years; bushfire events from emergency management d/base
     - Linked by CCD to unconfidentialised files
   - Soc cap as mediator CC/weather disast & MH
Weather-related trauma exposure screening *

HILDA, ARMHS, Hunter CS, xTEND

- Were you affected by a weather disaster (e.g., flood, bushfire, storm, cyclone) in the past 12 months?

IF YES

- Did any of the following happen as a result of this weather disaster?
  - Your home was damaged or destroyed
  - You thought you might die
  - You personally knew people who were killed or badly injured
  - You felt terrified, helpless or hopeless
  - You are still currently distressed about it

* Berry, McDermott, Kelly, Raphael, 2009
Investigators

Dr Helen Stain, Prof Brian Kelly (NSW Centre for Rural & Remote Mental Health, Orange, University of Newcastle)

Prof Brian Kelly, Mr Terry Lewin, Dr Kerry Inder (HNE Health & Centre for Brain & Mental Health Research, University of Newcastle)

A/Prof Jeffrey Fuller (UDRH, University of Sydney, Lismore)

A/Prof David Perkins, Prof David Lyle (UDRH, Centre for Remote Health Research, University of Sydney, Broken Hill)

A/Prof Lyn Fragar (Australian Centre for Agricultural Health & Safety, Uni. Sydney, Moree)

Prof Vaughan Carr (School of Psychiatry and Schizophrenia Research Institute, University of NSW)

Prof John Beard (Disability and Ageing, WHO, Geneva)

Associate Investigators

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Richard Buss (Northern Coast Area Health Service NSW)

Dr Dinesh Arya (Hunter New England Area Health Service NSW)

Dr Clare Coleman (CRRMH)

Dr Helen Berry, (ANU NCEPH)

Tom Brideson (NSW Health, Aboriginal Mental Health)

Prof John Attia (Centre for Epidemiology and Population Health, University of Newcastle)
• Funded by NHMRC for 1yr, 3yr & 5yr follow-up
• >2000 participants throughout NSW
• To investigate
  – determinants & outcomes of mental disorders in rural & remote communities
  – patterns & determinants of service use
  – factors contributing to geographic variability in mental health
• Provide new knowledge to meet current & changing service needs
Mental health & wellbeing
Physical health
Social Networks and social support
Life events
Health care
Views about mental health
Perceptions of the community

Family relationships
Family health
Health & wellbeing of the children
Family/household events

Remoteness
Socio-economic factors
Population changes
Environment (e.g., drought severity)
Services (social, health, community)
The Composite International Diagnostic Interview (CIDI) is a structured interview based on internationally recognised diagnostic criteria. It is the main instrument of the World Mental Health Survey (28 countries, over 140,000 participants). Its variation for the NSMHWB Survey is used in the ARMHS. It focuses on common disorders:

- Affective Disorders (Chiefly Depressive syndromes)
- Anxiety Disorders
- Substance Use Disorders

It also includes a Brief Psychosis Screener and a Suicidality Module.
• Provides
  – Lifetime and current prevalence
  – Age of onset, course, correlates and treatment
  – Severity and disability
  – Service use
  – Comparability with National and International data sets
Hunter Community Study – HCS
CI: Professor John Attia

• Aims to develop an information resource for researchers to answer questions about ageing & chronic disease
  – public health, genetics, medical, health services, social, economic and environmental factors
• Population based cohort study of 3253 community dwelling men & women, aged 55-85 years residing in Newcastle
• Randomly selected from NSW state electoral roll
• Contacted between Dec 04 & Dec 07
Baseline HCS data

• Cardiovascular measures - heart rate, blood pressure, BMI
• Respiratory - spirometry
• Neurological – balance, sensation, vision, hearing, smell & cognition
• Mental health - depressive symptoms, alcohol use, general distress & functioning
• Physical activity, smoking, alcohol, nutrition
• Medications & medical history
• Demographics - education, housing, income, carer, spirituality
• Consent to link Medicare, PBS & local health databases
• 2010 follow-up will focus on mental health
  • McEvoy et al, IJE, 2010
Extending Treatments Education and Networks in Depression – xTEND
B Kelly, J Attia, A Baker, F Kay-Lambkin, T Lewin, T Hazel, K Inder

• Aims to examine the association between social factors and relationship breakdown with depression & suicidal ideation in rural communities, and
• To investigate the role of family & social relationships in depression among people in rural areas
• 3 yr program funded by Hunter Medical Research Institute with support from beyond blue & Xstrata Coal Post Doctoral Fellowship
• Collaboration of researchers from Centre for Brain & Mental Health, Centre for Clinical Epid. & Biostatistics & Hunter Institute of Mental Health
3 Phases of xTEND

• Analysis of cross-sectional data sets from ARMHS, HCS & 2007 ANSMHWB
• Longitudinal follow-up of HCS & ARMHS in the Hunter regions
• Evaluate effectiveness of evidenced based interventions to reduce depression & suicide risk in rural populations
Translation from population based studies to interventions (1)

- SHADE – Self Help for Alcohol/other drug use and Depression
  - Innovative computer delivered treatment program
  - Equivalent to clinician delivered treatment
  - Addresses both depression & alcohol-related problems
  - Easier access to evidenced-based treatment
  - Aids early intervention

KayLambkin et al, Addiction, 2010
Translation from population based studies to interventions (2)

• Partners in Depression study
  – Developed in response to gap in resources for carers, family & friends of people with depression
  – Hunter Institute of Mental Health & beyondblue
  – 6-session group-based information & support
  – Improved levels of depression, anxiety & stress
  – Improved relationships at completion
  – National dissemination underway

Daviess et al 2008
Longitudinal research in rural mental health

• Few longitudinal studies have examined
  – New onset of psychiatric disorders in rural communities
  – Impact of community characteristics on mental health
  – Links between social capital and mental health
  – Household as a critical context
  – Circumstances of individuals within households within communities
Longitudinal research – opportunities

• Allows impact of location & rural characteristics on mental health outcomes to be examined
• Fosters capacity building - Research training
• Links mental health with population health
• Provides a framework for nested studies - including qualitative research to explore observations
• Identification of common trends & principles by linking with national & international research programs
Longitudinal research – challenges

• Maintaining a cohort
  – Engaging people in longer term research goals
  – Interest & commitment to participate
  – Widespread problem of declining epidemiologic research participation rates

• Maintaining currency of research
  – Adapting to new and emerging needs while retaining consistency in methods over time

• Attrition over time
  – Consideration for power & sample size calculations

• Bridging mental health and population health
Figure. “Blue Highways” on the NIH Roadmap

**Bench**
- Basic Science Research
  - Preclinical Studies
  - Animal Research

**T1**
- Case Series
- Phase 1 and 2 Clinical Trials
- Translational to Humans

**Bedside**
- Human Clinical Research
  - Controlled Observational Studies
  - Phase 3 Clinical Trials

**T2**
- Practice-Based Research
  - Phase 3 and 4 Clinical Trials
  - Observational Studies
  - Survey Research
  - Translational to Patients

**Practice**
- Clinical Practice
  - Delivery of Recommended Care to the Right Patient at the Right Time
  - Identification of New Clinical Questions and Gaps in Care

**T3**
- Dissemination Research
- Implementation Research
- Translational to Practice
Conclusion

• Longitudinal research in mental health across rural and remote communities can assist with addressing rural-urban differences in
  – Health and well-being
  – Access to health services
  – Mortality rates

• Research collaboration and data linkage opportunities maximise gains