

# Using cohort studies to investigate rural mental health

Kerry Inder (1), Brian Kelly (1,2) & Helen Berry (1,3)

(1) Centre for Brain & Mental Health Research, University of Newcastle

(2) Centre for Rural & Remote Health, University of Newcastle

(3) University of Canberra and Australian National University

# 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 3. Lifetime, 12 month and 30 day prevalence of mental disorders*

	Lifetime		12 month		30 day	
	EPC (‘000)	% (95%CI)	EPC (‘000)	% (95%CI)	EPC (‘000)	% (95%CI)
Any affective disorder	2405.3	15.0 (14.1–16.0)	995.9	6.2 (5.5–6.9)	381.6	2.4 (1.9–2.8)
Any anxiety disorder	4205.0	26.3 (24.9–27.6)	2303.0	14.4 (13.4–15.3)	1239.2	7.7 (7.0–8.5)
Any substance use disorder	3960.3	24.7 (23.5–26.0)	819.8	5.1 (4.5–5.8)	285.2	1.8 (1.4–2.1)
Any mental disorder	7286.6	45.5 (44.1–46.9)	3,197.8	20.0 (18.9–21.0)	1608.3	10.0 (9.3–10.8)

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

Slade T et al. 2007 National Survey of Mental Health and Wellbeing: methods and key findings

ANZJPsychiatry. 2009, 43, 584-605.

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

Viviane Kovess-Masféty, MD, PhD<sup>1</sup>, Jordi Alonso, MD, MPH, PhD<sup>2</sup>, Ron de Graaf, PhD<sup>3</sup>, Koen Demyttenaere, MD, PhD<sup>4</sup>, on behalf of the ESEMeD 2000 Investigators<sup>5</sup>

---

**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.

(Can J Psychiatry 2005;50:926–936)

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

	Men						Women					
	Rural	SE	Medium-size	SE	Metropolis	SE	Rural	SE	Medium-size	SE	Metropolis	SE
Belgium	4.73	0.64	5.54	0.27	4.16	0.71	2.06 <sup>a</sup>	0.80	4.19 <sup>a</sup>	0.33	2.69	0.96
France	4.34 <sup>a</sup>	0.36	2.89 <sup>a</sup>	0.53	3.44	0.67	1.98	0.41	1.37	0.49	1.07	0.59
Germany	4.97	0.31	4.98	0.31	5.39	0.31	3.89	0.36	3.86	0.35	3.80	0.36
Italy	4.81 <sup>a</sup>	0.25	4.44	0.23	3.98 <sup>a</sup>	0.33	2.76 <sup>a</sup>	0.30	1.67 <sup>a</sup>	0.31	1.33 <sup>a</sup>	0.38
Netherlands	6.18	0.69	5.64 <sup>a</sup>	0.29	4.48 <sup>a</sup>	0.48	6.52 <sup>a</sup>	0.99	4.11	0.34	3.10 <sup>a</sup>	0.54
Spain	4.65	0.37	4.74	0.30	5.11	0.29	2.65	0.38	2.39	0.32	2.71	0.30
<sup>a</sup> $P < 0.05$												

## 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.

**J. Peen<sup>1,2</sup>, R. A. Schoevers<sup>1</sup>,  
A. T. Beekman<sup>3</sup>, J. Dekker<sup>1,2</sup>**

<sup>1</sup>Research Department, Arkin Mental Health Institute Amsterdam, <sup>2</sup>Department of Clinical Psychology, VU University Amsterdam and <sup>3</sup>Department of Psychiatry, VU University Amsterdam Medical Centre, Amsterdam, the Netherlands

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

J. Peen, Research Department, Arkin Mental Health Institute Amsterdam, PO Box 75848, 1070 AV, Amsterdam, the Netherlands.  
E-mail: jaap.ppeen@arkin.nl

Accepted for publication June 10, 2009

# 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 (eg 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

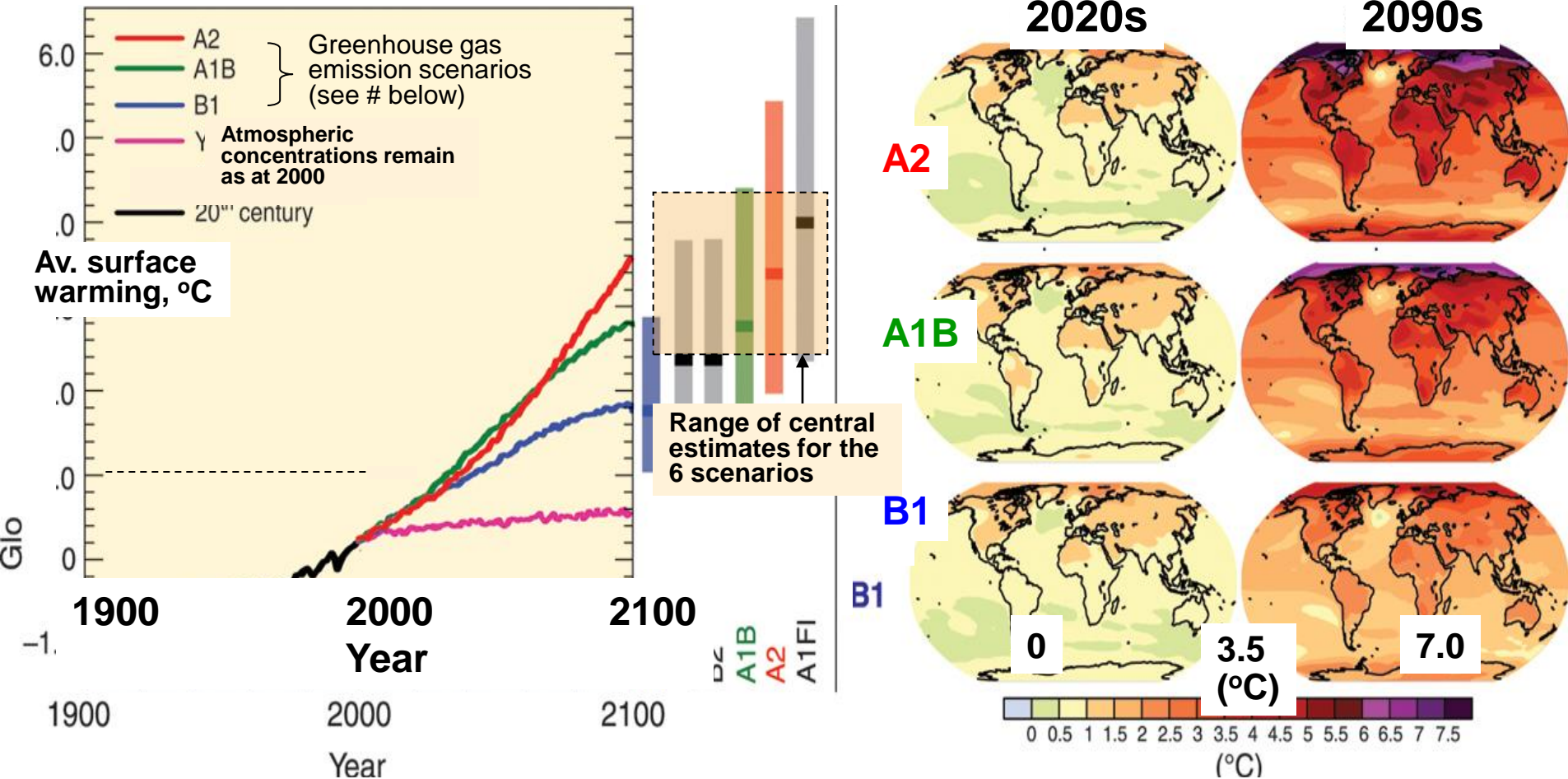
(Rost, 2005, Smith et al., 2008, Wainer et al.)

- 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**





# Projected global surface warming: IPCC\* (2007)

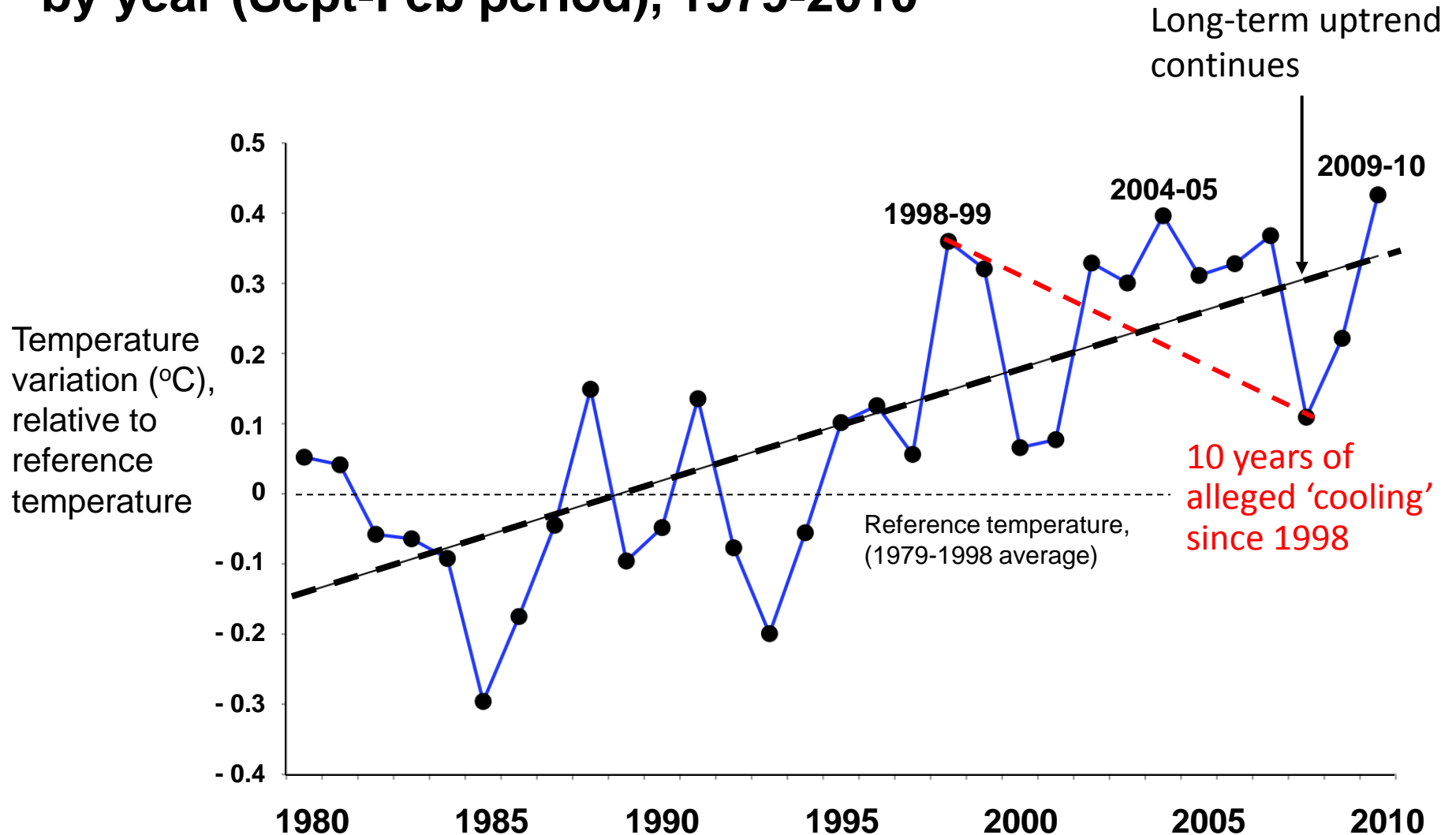


# Future climate scenarios based on 3 different projections of emissions growth:

**A2** relatively high emissions  
**A1B** mid  
**B1** low

\* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 2007: *SYNTHESIS REPORT*. World Meteorological Organization and United Nations Environment Programme, p. 46.

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



# 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



Wet winter and low summer rainfall

### Winter dominant



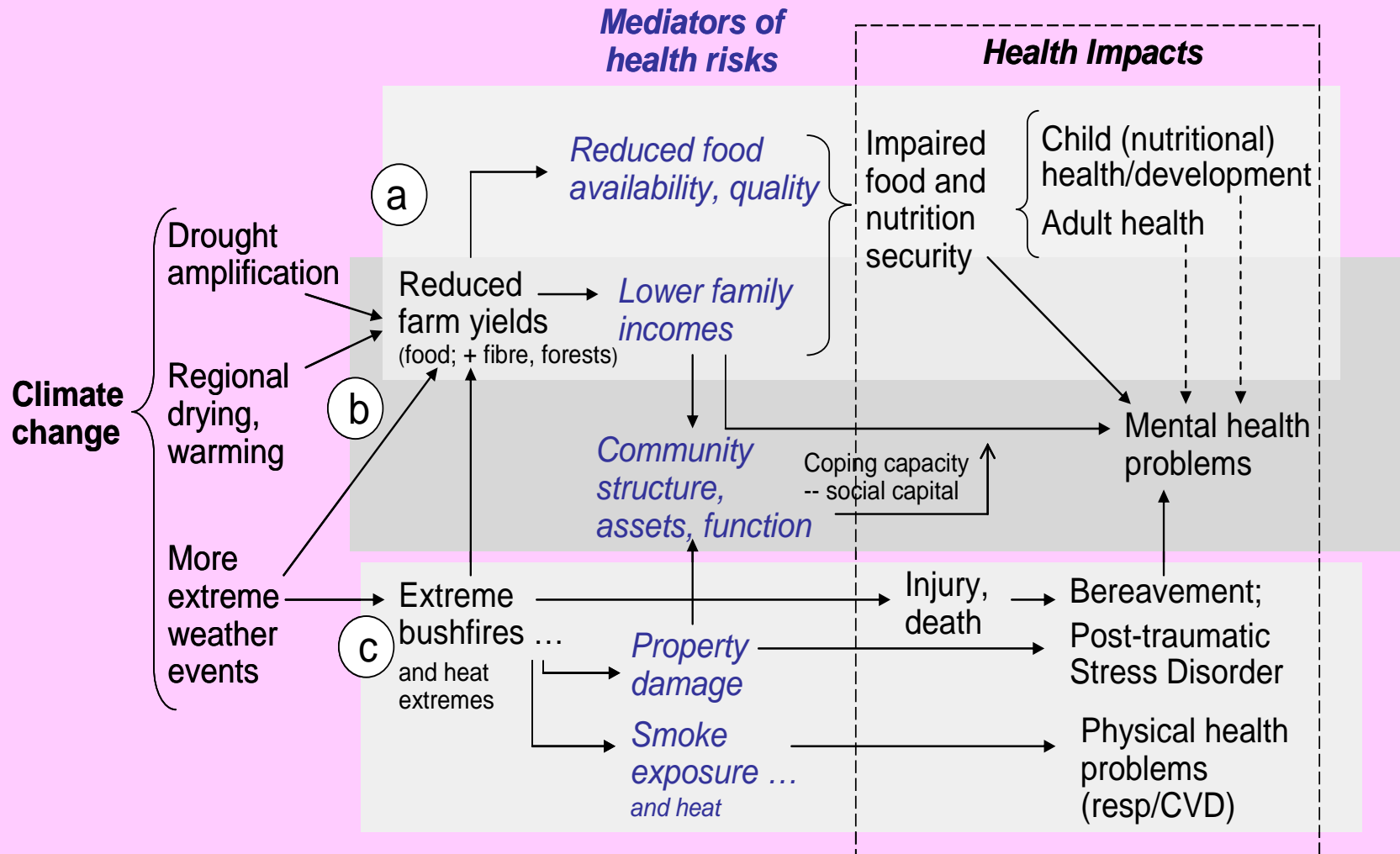
Marked wet winter and dry summer

### Arid



Low rainfall

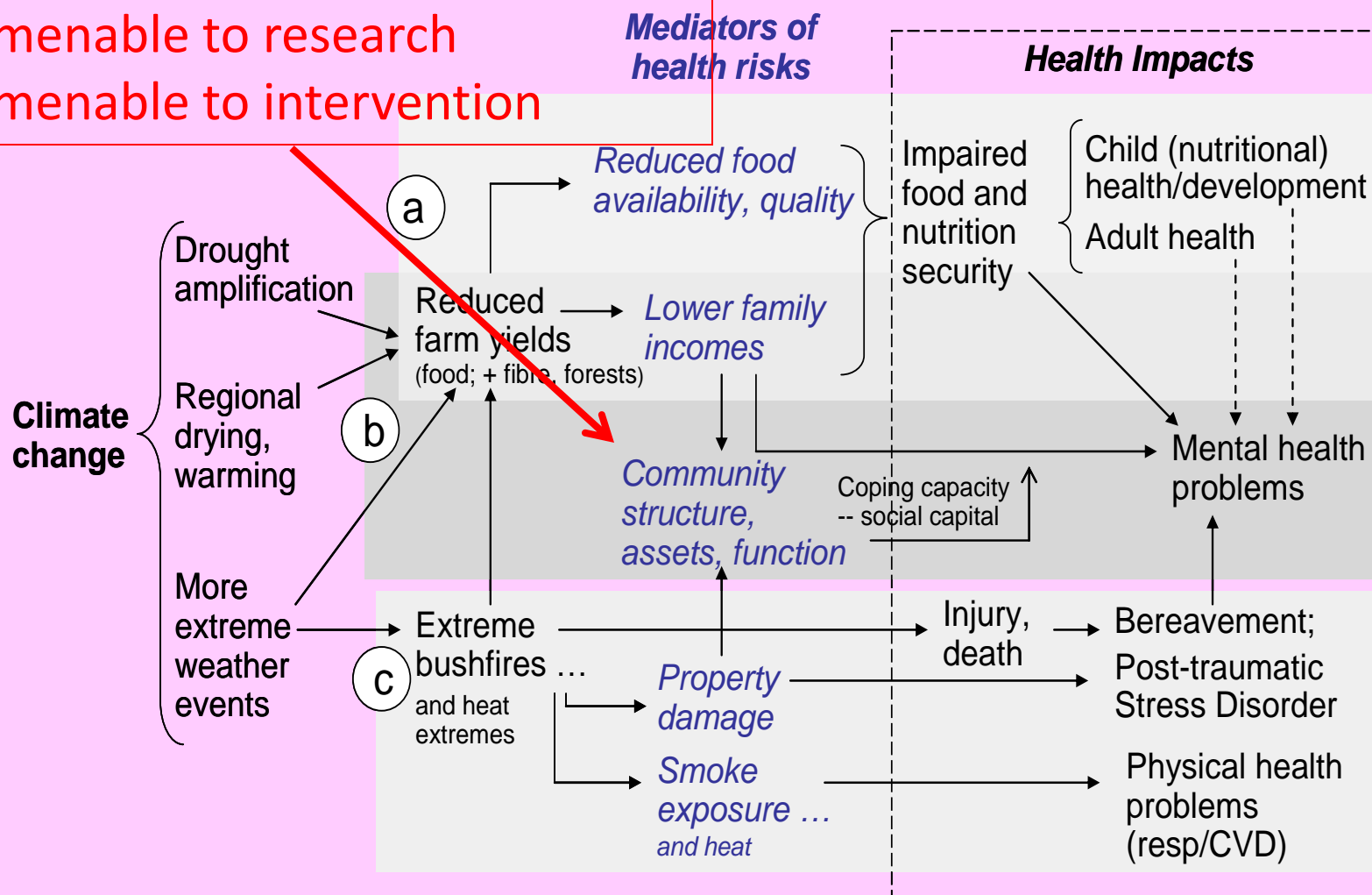
# CC & MH: Complex causal pathways





# CC & MH: Complex causal pathways

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



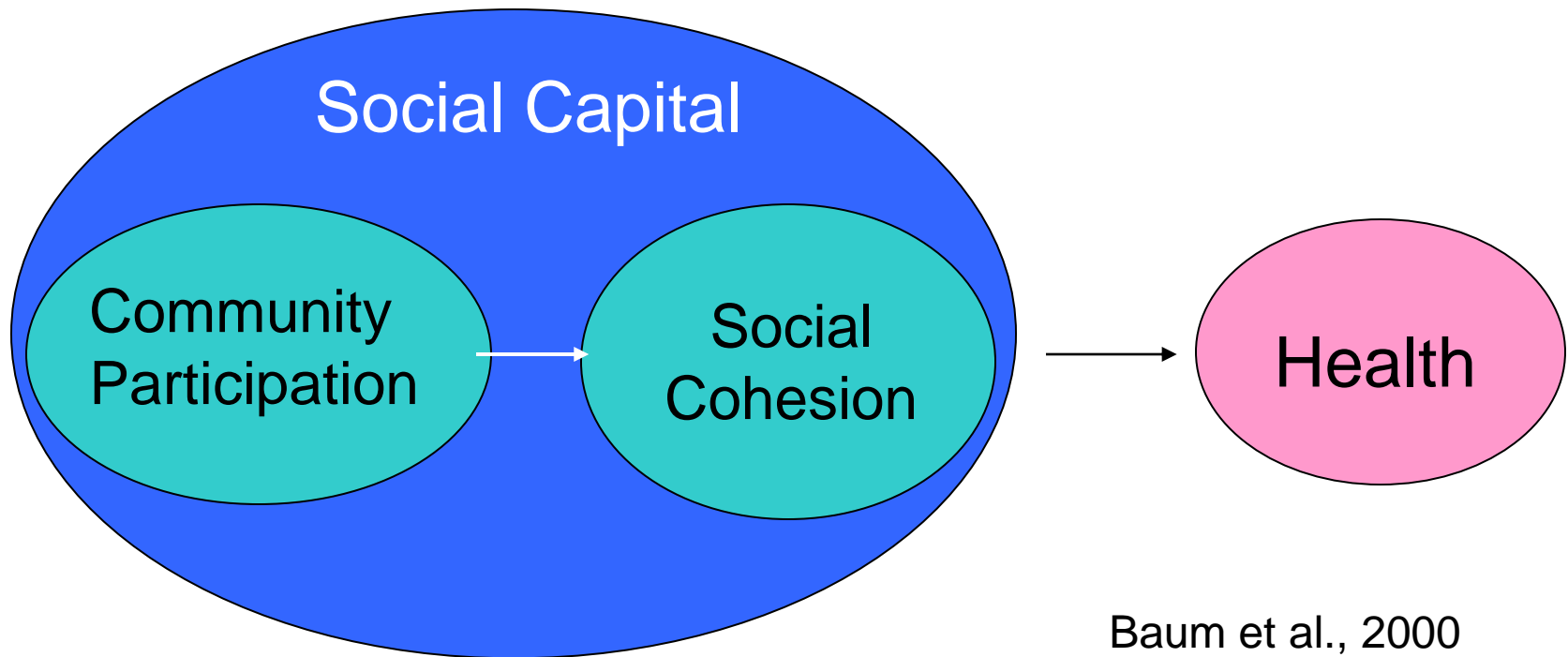
# Social Capital: a way to understand community functioning and underlying processes

Strong (Australian) evidence base for SC & MH

What is it?

How does it work?

Intuitive, well-accepted



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, psychosoc, 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

## Living in a Rural Community: Determinants & Outcomes of Mental Health

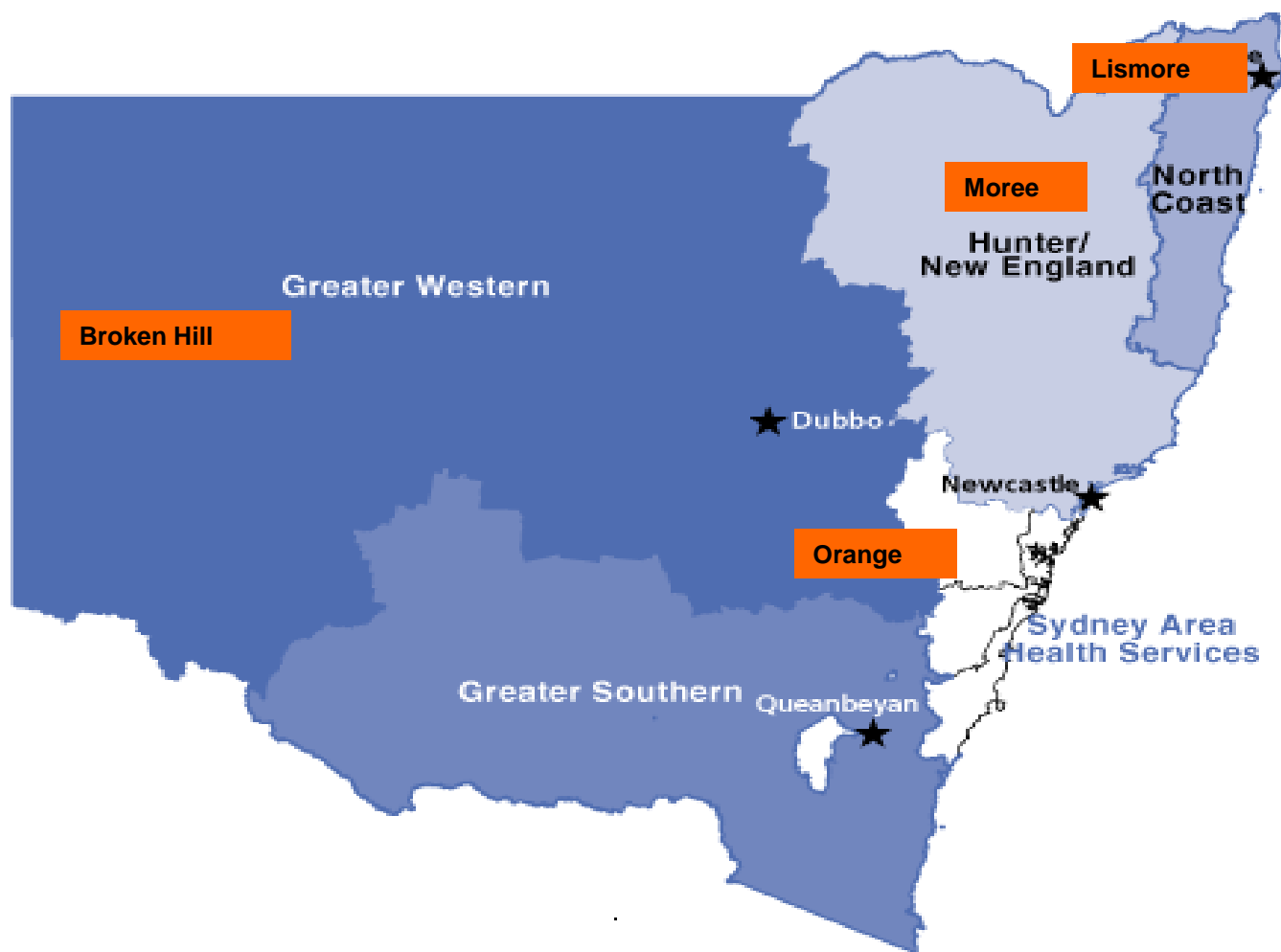
- **Investigators**

- **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**

- Dr Russell Roberts (Greater Western Area Health Service NSW)
- 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 (eg drought severity)**  
**Services (social, health, community)**



- Composite Diagnostic Interview
  - Structured interview based on internationally recognised diagnostic criteria
  - Main instrument of World Mental Health Survey (28 countries, >140,000 participants)
  - Variation for NSMHWB Survey used in ARMHS
  - Focus on common disorders:
    - Affective Disorders (Chiefly Depressive syndromes)
    - Anxiety Disorders
    - Substance Use Disorders
  - Brief Psychosis Screener
  - 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 ANSMHWPB
- 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

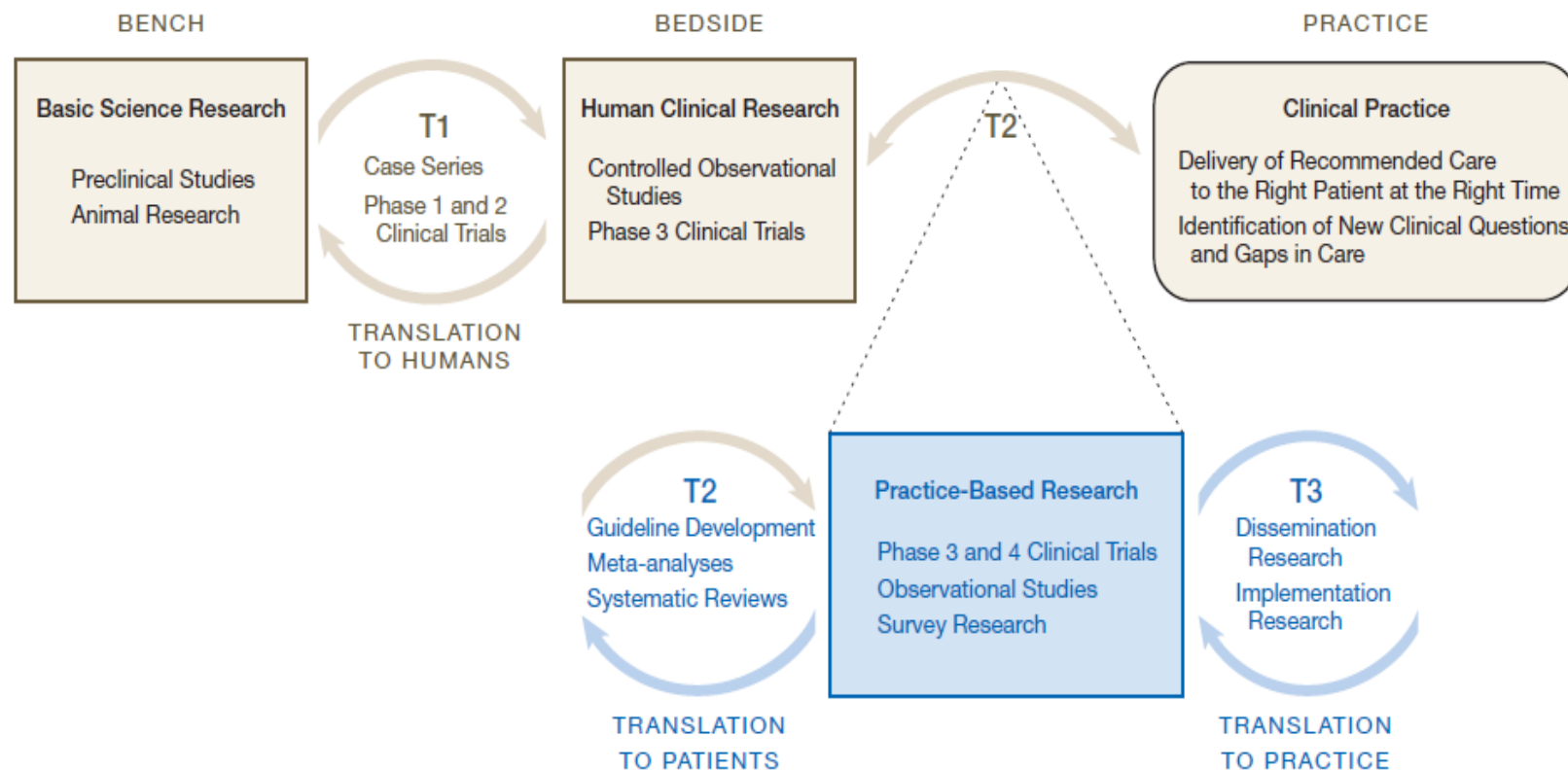
# Longitudinal research – opportunities

- 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



# 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