

# The Impact of Four-Hour Rule/NEAT policy and outcomes for patients with mental health problems presenting to the Emergency Department.



**Roberto Forero, Nicola Man, Daniel Fatovich, David Mountain, Hanh Ngo, Gerard FitzGerald, Sally McCarthy, Drew Richardson & Members of the Project Management Committee**



# Background

- Overall improvements in EDLOS and Access Block (AB) associated with the implementation of NEAT.
- Significant impact of the policy on ED staff across hospitals and jurisdictions.

## Objectives:

- To evaluate the impact of the Policy on ED patients with and without mental health problems.
- To re-assess the impact of the four-hour rule policy for patients with mental health issues in relation to:
  - ED length of Stay within 4 hours,
  - Access Block,
  - 7-day ED reattendances and
  - short stay admissions < 24 hours.

# Methods: Data source, Outcomes, and Analysis

- A longitudinal cohort of de-identified patients from participating EDs across WA, QLD, NSW and ACT
- Psychiatric diagnoses based on ICD-9-CM, ICD-10-AM, AR-DRG and/or SNOMED were used to identify Psychiatric patients and psychoactive substance users.
- Quarterly data was aggregated by jurisdiction for Interrupted Time Series analysis.
- Analysis was carried for each jurisdiction using Stata 14.2.
- All statistical significance tests set at  $\alpha = 0.05$

## Results: Sample characteristics of ED presentations (%)

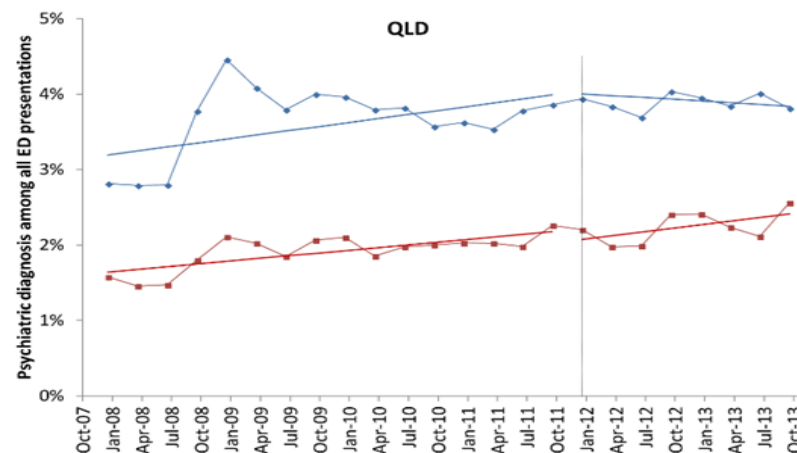
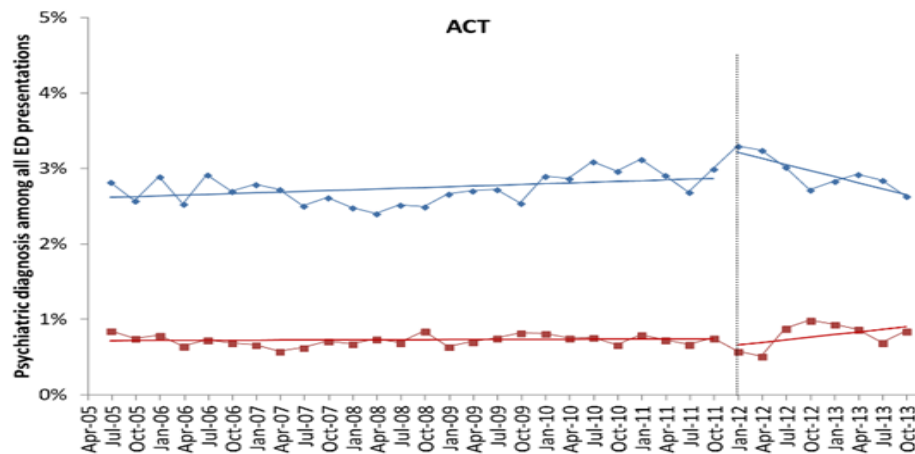
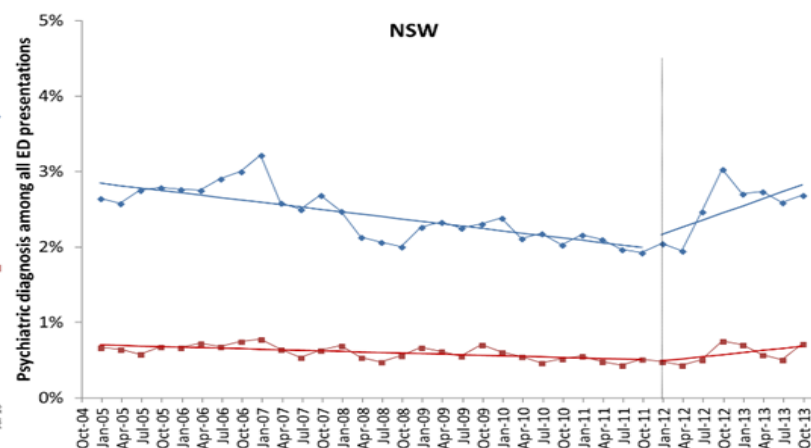
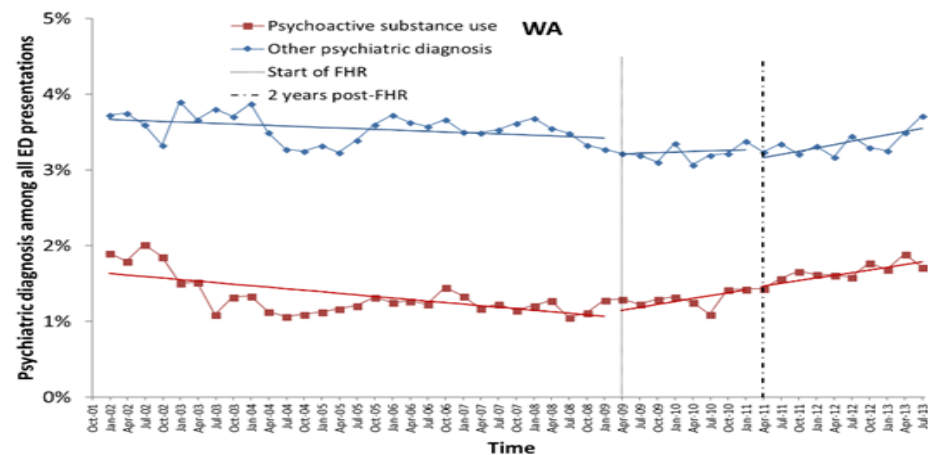
	WA (2002-13)	QLD (2008-13)	NSW (2005-13)	ACT (2005-13)
<b><i>Psychoactive substance use</i></b>				
<b>Age (&lt;30 years)</b>	37.3	37.4	38.9	49.4
<b>Gender (Male)</b>	64.1	62.5	61.5	56.7
<b>Arrival by ambulance</b>	54.9	47.2	68.9	53.2
<b>Admission rate</b>	48.4	35.6	37.6	25.2
<b>Reattendance within 7 days</b>	20.4	14.8	14.7	16.1
<b><i>Other psychiatric diagnosis</i></b>				
<b>Age (&lt;30 years)</b>	32.1	32.9	31.3	36.4
<b>Gender (Male)</b>	47.8	49.9	48.2	46.2
<b>Arrival by ambulance</b>	31.1	40.6	41.8	17.6
<b>Admission rate</b>	52.5	32.1	49.3	34.2
<b>Reattendance within 7 days</b>	12.5	15.3	13.6	17.0
<b><i>Non-psychiatric diagnosis</i></b>				
<b>Age (&lt;30 years)</b>	27.6	29.8	25.8	31.1
<b>Gender (Male)</b>	52.7	49.5	50.0	48.8
<b>Arrival by ambulance</b>	31.6	37.1	34.1	21.8
<b>Admission rate</b>	41.7	35.7	41.2	29.2
<b>Reattendance within 7 days</b>	7.3	9.2	8.9	11.4

# Results: ED Psychiatric diagnoses

		WA	QLD	NSW	ACT
	Psychoactive substance use (F10-F19)	31,358 (28.9%)	25,196 (35.2%)	13,715 (19.7%)	5,311 (21.0%)
Other psychiatric diagnosis	Schizophrenia and schizotypal and delusional disorders (F20-F29)	10,808 (10.0%)	6,621 (9.3%)	7,648 (11.0%)	5,252 (21.0%)
	Mood affective disorders (F30-F39)	15,782 (14.6%)	7,142 (10.0%)	*	5,877 (23.2%)
	Neurotic, stress-related and somatoform disorders (F40-48)	33,883 (31.3%)	12,791 (17.9%)	*	6,016 (23.8%)
	All other psychiatric diagnoses (other Fxx)	16,551 (15.3%)	19,825 (27.7%)	48,276 (69.3%)	2,830 (11.2%)
	Total	108,382 (100%)	71,575 (100%)	69,639 (100%)	25,286 (100%)

\* Corresponding diagnosis groups could not be mapped from ICD 9-CM to ICD-10-AM.

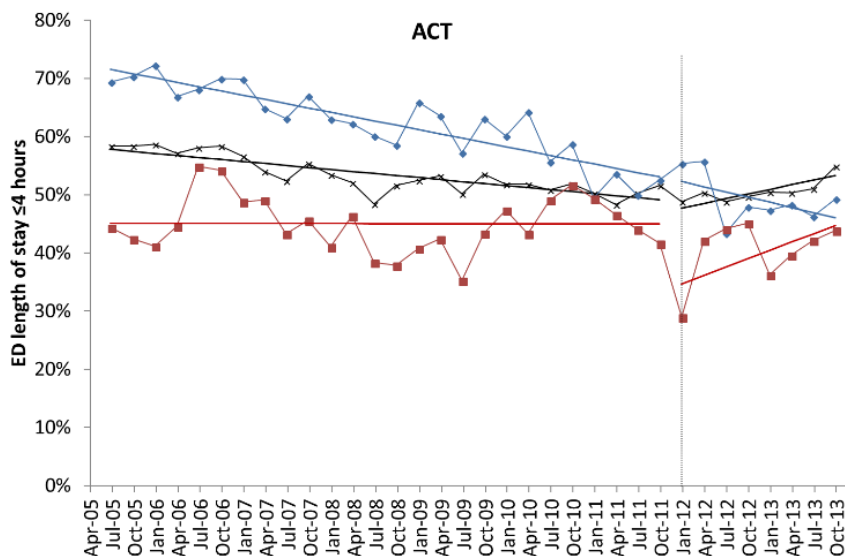
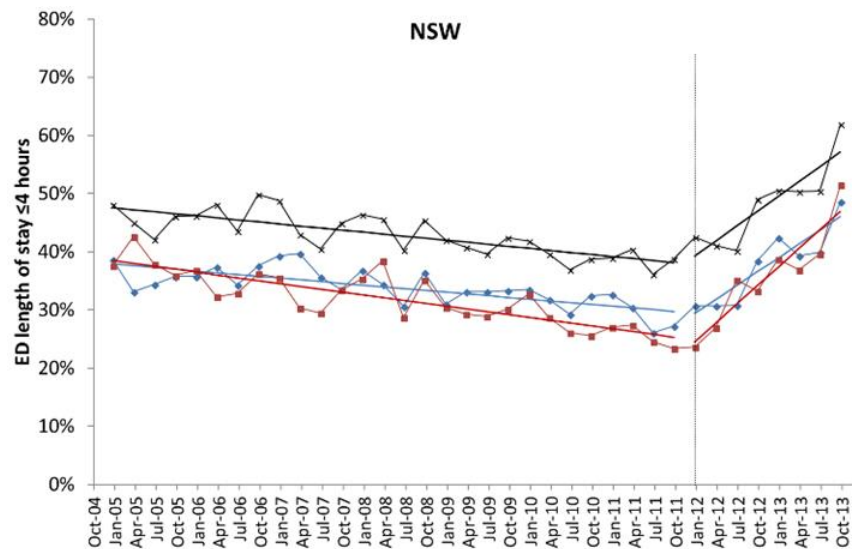
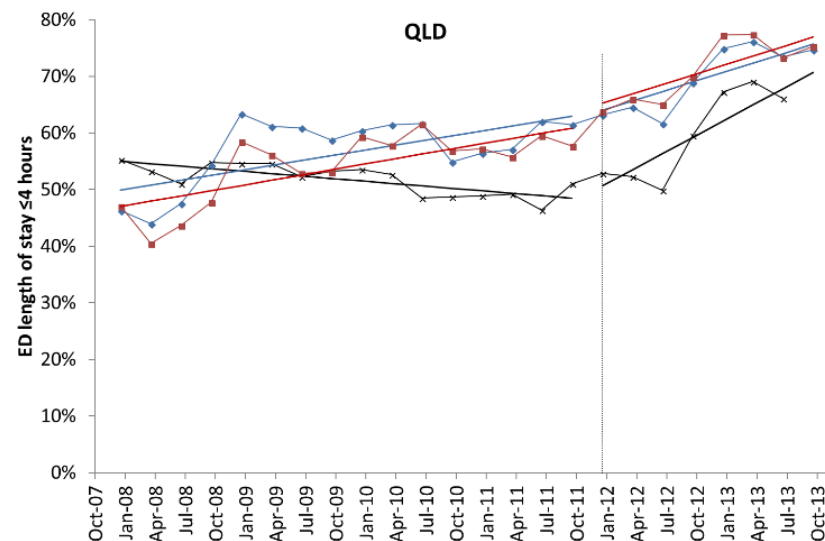
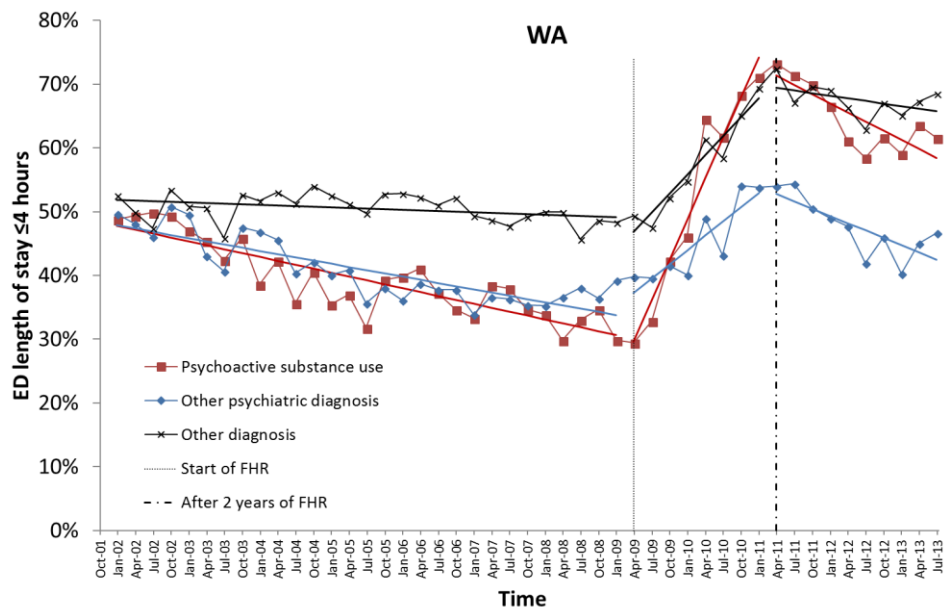
## Trend in percentage of presentations by psychoactive substance use and other psychiatric diagnosis for each jurisdiction



# Results

- Psychoactive substance use and other psychiatric patients more likely to be younger.
- Psychoactive substance use patients more likely to be male and likely to arrive by ambulance compared with other psychiatric diagnosis and non-psychiatric diagnosis.
- Other psychiatric diagnosis in QLD and NSW more likely to arrive by ambulance than WA and ACT when compared with non-psychiatric diagnosis.
- Admission rates in WA for psychoactive substance use and other psychiatric diagnosis were higher than those with non-psychiatric diagnosis.

# Percentage of presentation with EDLOS ≤4 hours





# ED reattendance within 7 days

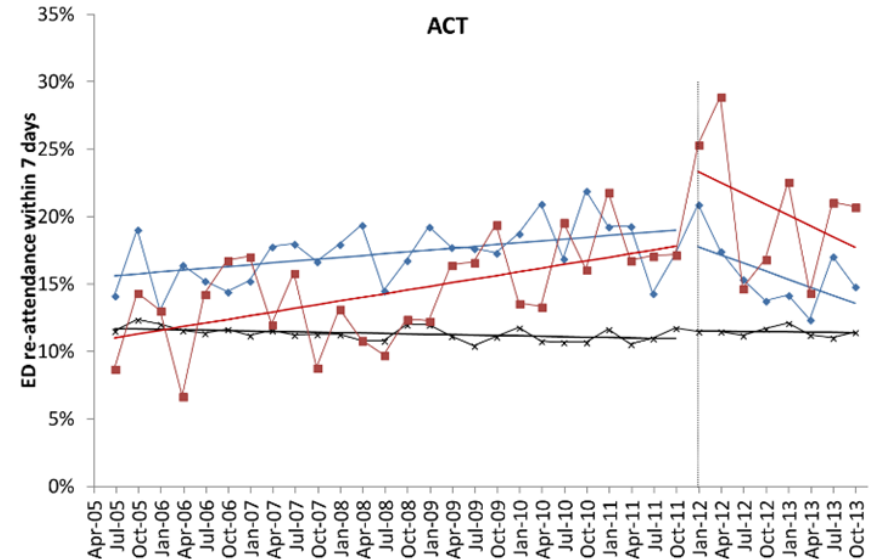
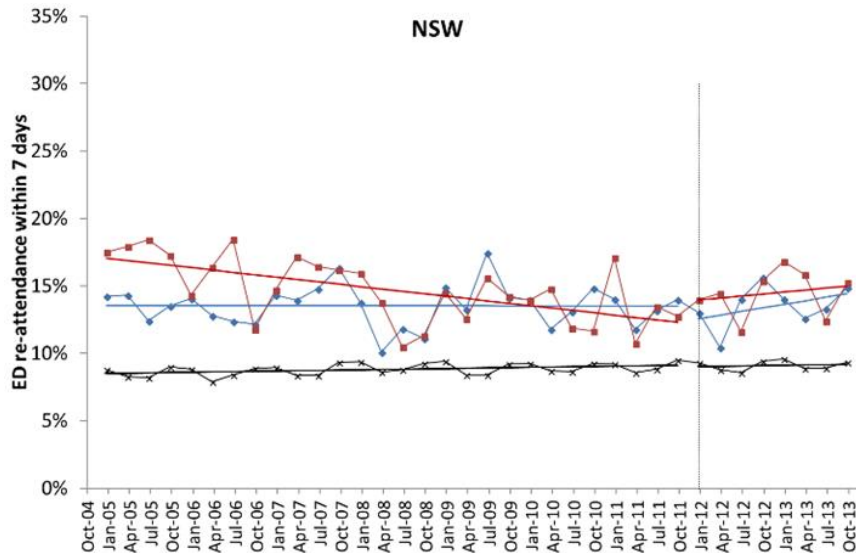
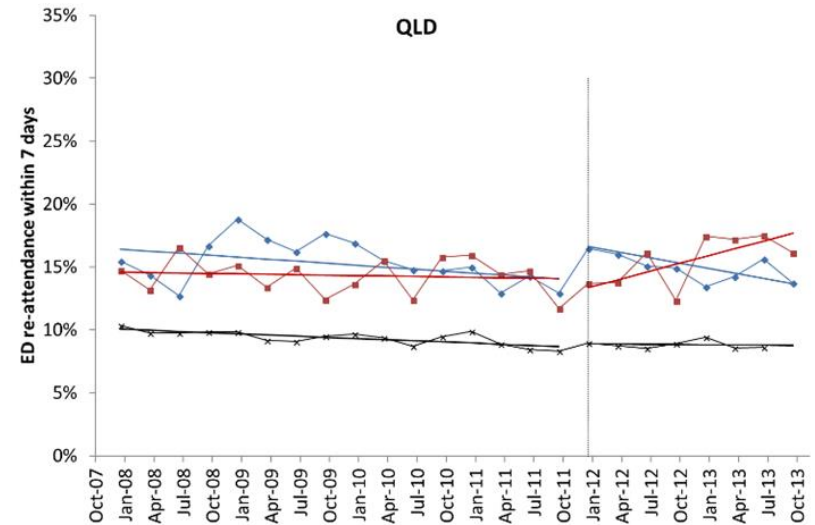
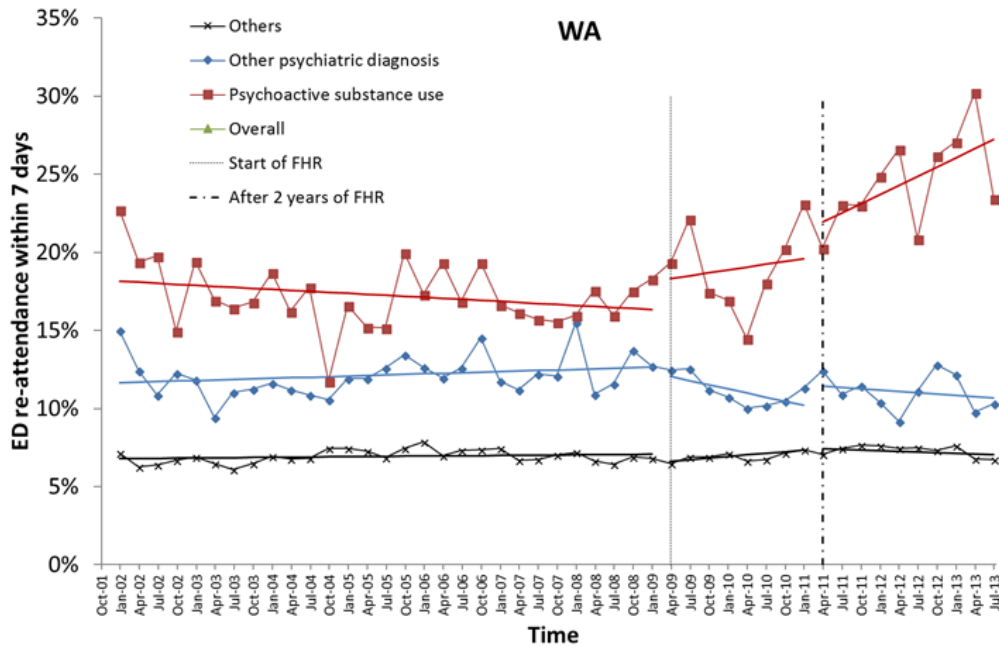
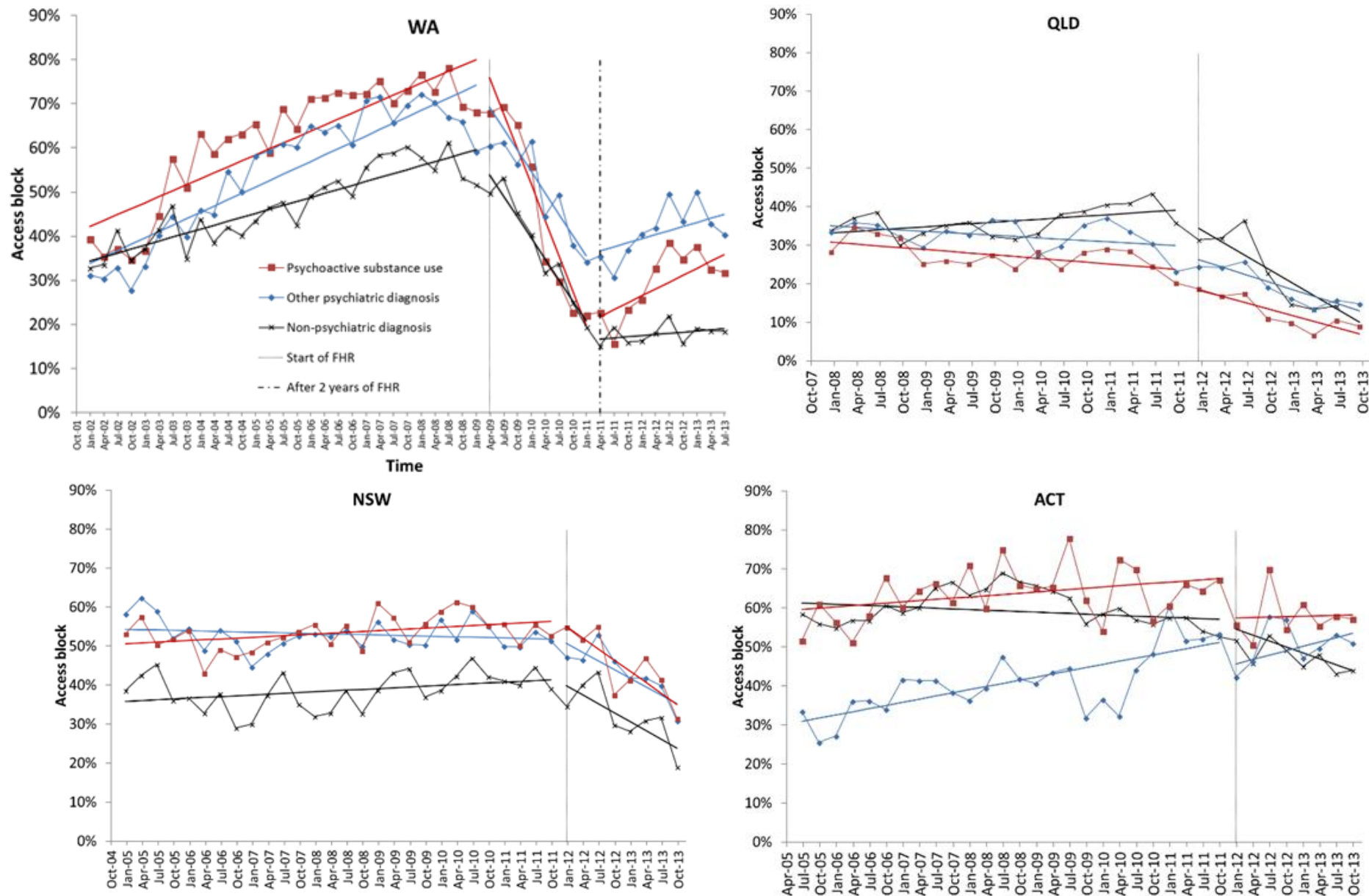
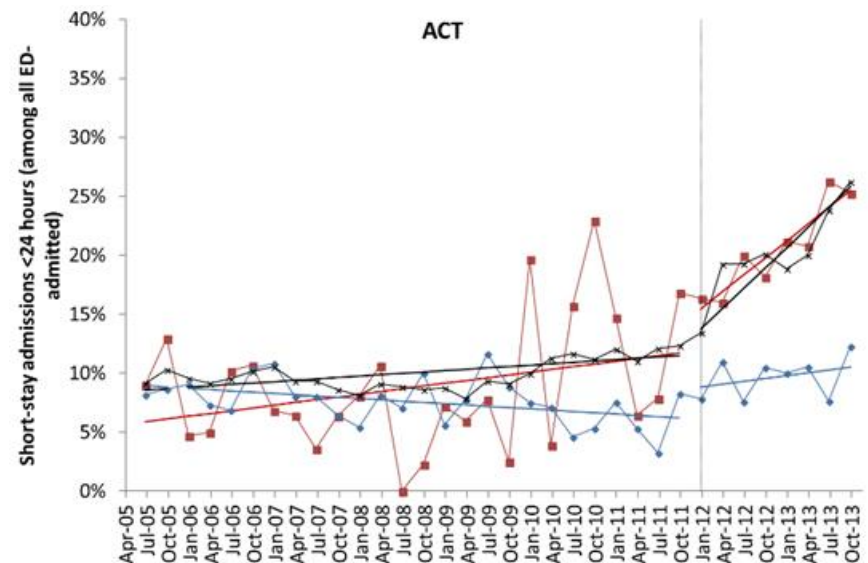
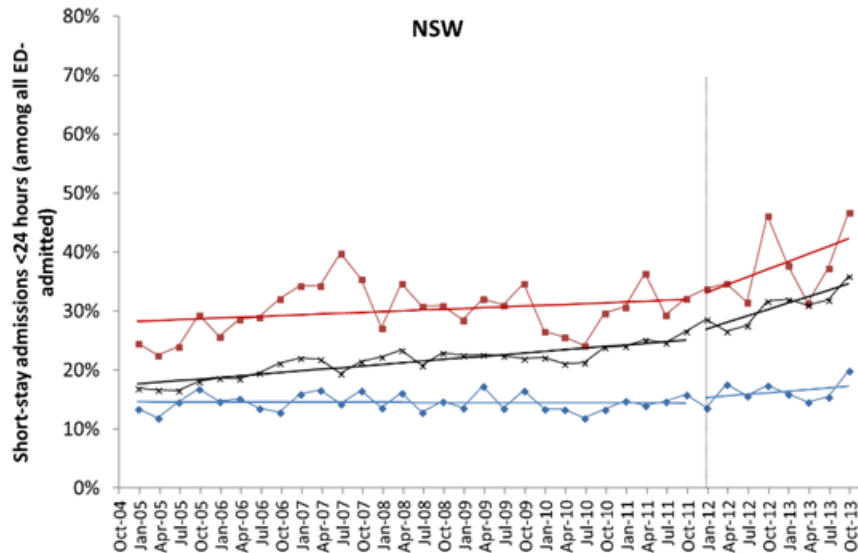
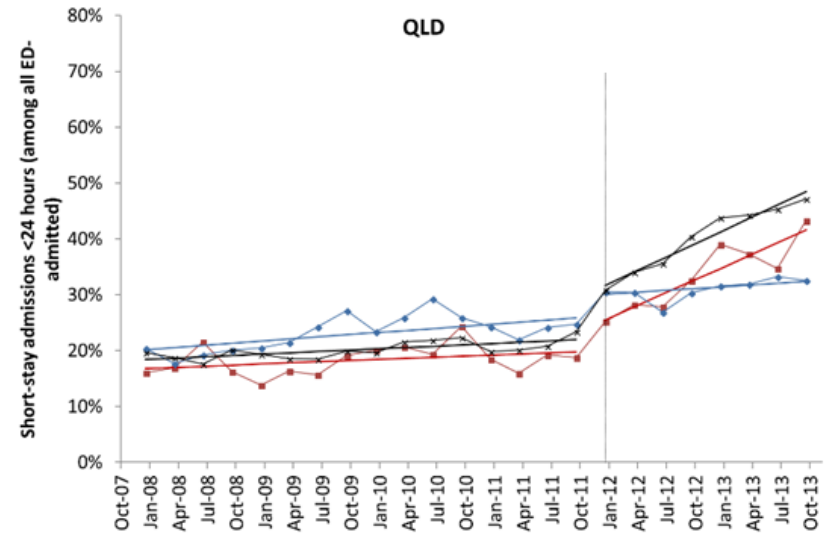
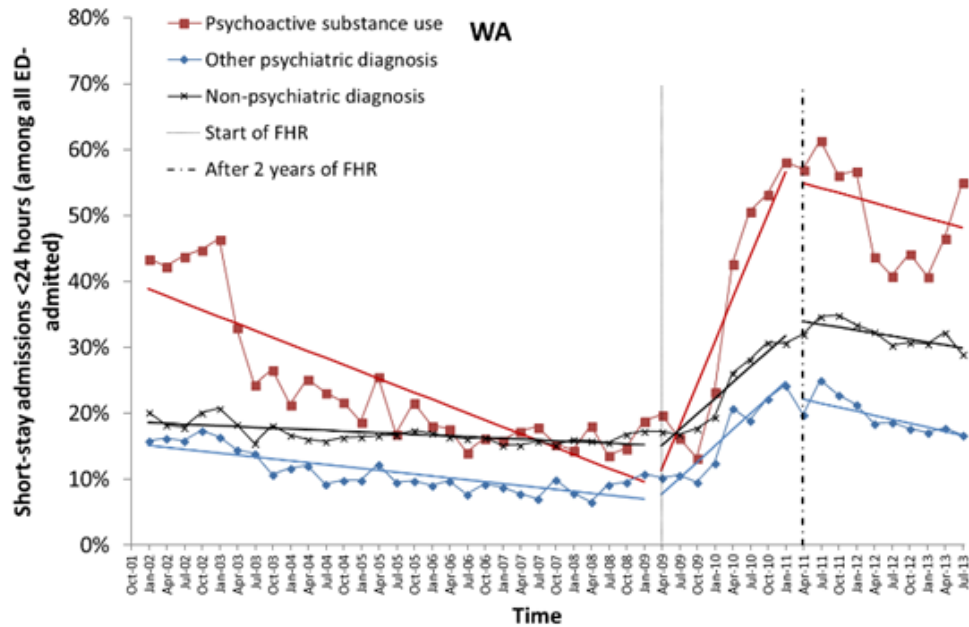


Figure 4. Access Block by diagnostic groups for each jurisdiction (among ED admissions)



# Short-stay admission <24 hours among ED admitted



Short-stay admissions is defined as those with hospital departure time <24 hours after ED departure time.

# Strengths & Limitations

- Strengths
  - Large administrative patient-level linked data from multiple jurisdictions.
  - Trends analysis.
- Limitations
  - 16 hospitals from major cities: not a representative sample of hospitals across Australia.
  - Short time period for analysis particularly for NSW, ACT & QLD.
  - Multiple inconsistencies in linked data availability and definitions across jurisdictions.
  - Cannot infer causality.

# Discussion

For both psychiatric diagnoses groups (compared with non-psychiatric diagnosis group):

- QLD consistently had a higher proportion leaving ED in  $\leq 4$  hours and lower access block even before FHR was implemented
- WA and NSW generally had a lower proportion leaving ED in  $\leq 4$  hours and higher access block
- Rate of unplanned ED reattendance within 7 days is generally higher across jurisdictions and over time

# Conclusions

- The policy had a positive impact on improving psychiatric patient flow through the ED.
- The policy has been effective in spite of increased demand as well as decreased age of people affected by mental health problems.
- There was increase in percentage leaving ED within 4 hours and reduction in access block among patients with psychiatric diagnoses in WA, NSW and QLD with FHR intervention.
- In WA, there was a substantial increase in proportion of short-stay admissions for <24 hours during FHR for psychoactive substance use admissions which explains to some extent the substantial increase in EDLOS  $\leq 4$  hours and decrease in access block during FHR.
- WA trend plateaued after 2 years of FHR intervention due to potential ceiling effect.

# Future Research

- To identify what hospital-level factors play a role in reducing the impact of mental health problems in ED,
- To explore system factors to improve resilience in susceptible populations across jurisdictions such as mental health and frailty in old age.
- To address the effect on ED system resilience deterioration caused by long term increased demand and chronic overcrowding at the hospital, ED staff and Patient level.

# Funding Organizations & Data Custodians

Partnership Project APP1029492

## Funders

- National Health and Medical Research Council
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- NSW Ministry of Health
- NSW Agency of Clinical Innovation
- Department of Health of Western Australia
- Queensland Emergency Medicine Foundation

## Data Custodians

- Emergency Department Data Collections, Hospital Morbidity Data Collections, and Mortality Registers in WA, NSW, ACT, & QLD, respectively



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**Project Management Committee:** Roberto Forero\*<sup>1</sup>, Ken Hillman<sup>1</sup>, Daniel Fatovich<sup>2,3</sup>, Sally McCarthy<sup>3,4</sup>, David Mountain<sup>3,5</sup>, Peter Sprivilis<sup>3,5</sup>, Antonio Celenza<sup>3,5</sup>, Paul Tridgell<sup>6</sup>, Mohammed Mohsin<sup>7,8</sup>, Frank Daly<sup>3,9</sup>, Elizabeth Rohwedder<sup>10</sup>, Patrick Abo<sup>10</sup>, Sarah Marmara<sup>11</sup>, Gerard Fitzgerald<sup>3,12</sup>, John Burke<sup>3,13</sup>, Paul Middleton<sup>3,14</sup>, Drew Richardson<sup>3,15</sup>

**Associate Investigators:** Nick Gibson<sup>16</sup>, Jeffrey Braithwaite<sup>17</sup>, Peter Nugus<sup>18</sup>

**Current and former Staff:** Hanh Ngo<sup>5</sup>, Nicola Man<sup>1</sup>, Shizar Nahidi,<sup>1</sup> Sam Toloo,<sup>12</sup> Josephine De Costa,<sup>1</sup> Fenglian Xu,<sup>1</sup> Brydan Lenne<sup>1</sup>

- <sup>1</sup> *Simpson Centre for Health Services Research, SWS Clinical school UNSW Australia, and Ingham Institute for Applied Research,*
- <sup>2</sup> *Centre for Clinical Research in Emergency Medicine, Department of Emergency Medicine, Royal Perth Hospital and University of Western Australia, Perth, WA*
- <sup>3</sup> *Australasian College for Emergency Medicine, West Melbourne, VIC.*
- <sup>4</sup> *Emergency Care Institute, NSW Agency for Clinical Innovation, Chatswood, Sydney, NSW.*
- <sup>5</sup> *Emergency Medicine, University of Western Australia, Crawley, WA,*
- <sup>6</sup> *Paul Tridgell Consulting, Kenthurst, NSW,*
- <sup>7</sup> *Psychiatry Research and Teaching Unit, SWSLHD, NSW Health , Liverpool, NSW*
- <sup>8</sup> *School of Psychiatry, Faculty of Medicine, UNSW, Randwick, NSW*
- <sup>9</sup> *South Metropolitan Health Service, Department of Health Western Australia, Mount Pleasant, WA,*
- <sup>10</sup> *Health System Improvement Unit, Department of Health Western Australia, East Perth, WA*
- <sup>11</sup> *NSW Ministry of Health, North Sydney, NSW.*
- <sup>12</sup> *School of Public Health and Social Work, Queensland University of Technology, Kelvin Grove, QLD,*
- <sup>13</sup> *Department of Emergency Medicine, Royal Brisbane and Women's Hospital, Herston, QLD,*
- <sup>14</sup> *Australian Resuscitation Council of NSW, NSW*
- <sup>15</sup> *Australian National University Medical School and Canberra Hospital ED, Canberra, ACT*
- <sup>16</sup> *Edith Cowan University, Perth, WA*
- <sup>17</sup> *Macquarie University, Sydney, NSW*
- <sup>18</sup> *McGill University, Montreal, Canada*