The Impact of Four- Hour Rule/NEAT Policy on ED Hospital Performance in Australia: A Mixed Methods Study

Never Stand Still

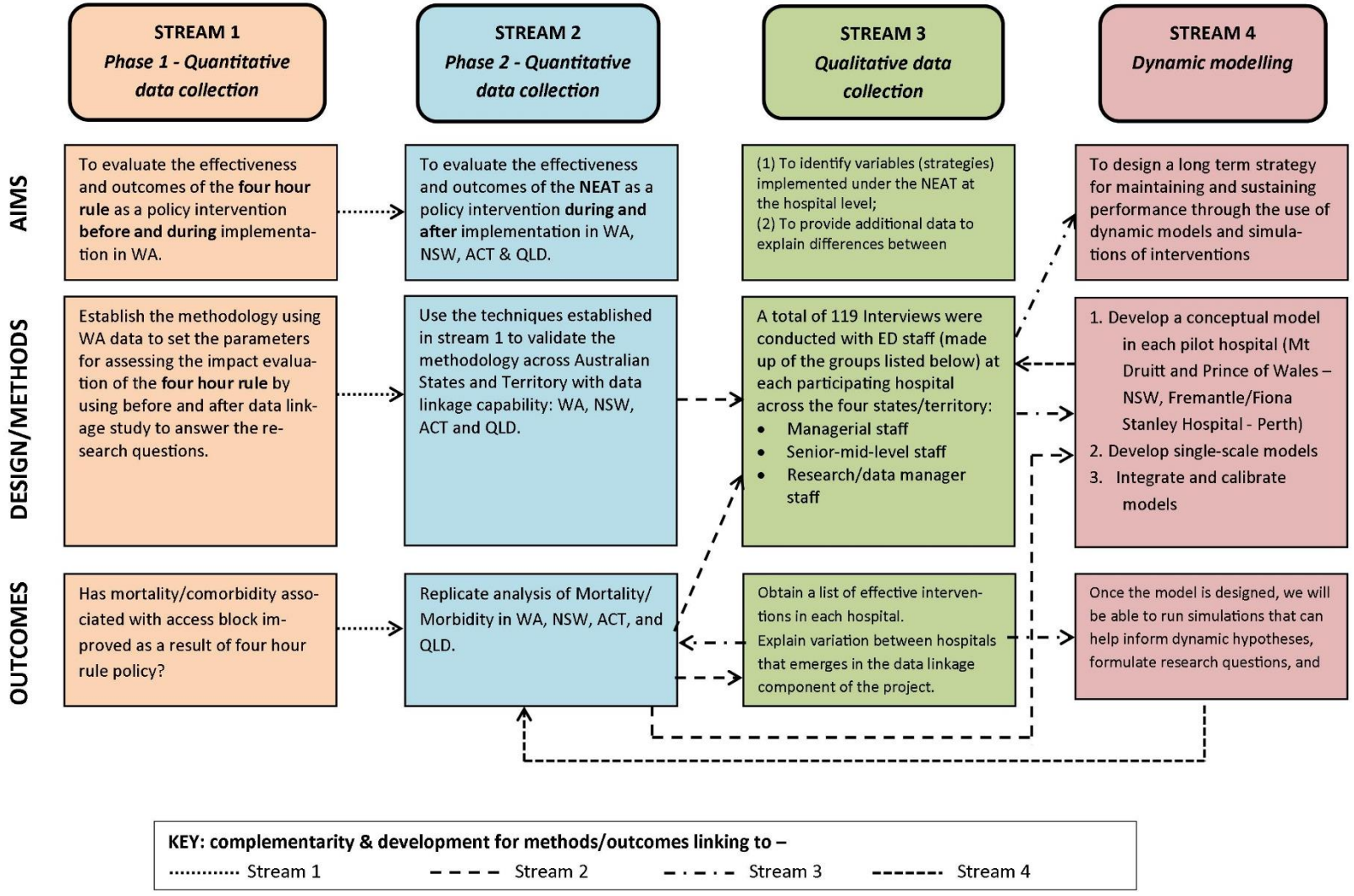
Roberto Forero, Nicola Man, Shizar Nahidi, Gerry Fitzgerald, Daniel Fatovich, Mohammed Mohsin, Hanh Ngo, Sam Toloo, Nick Gibson, Sally McCarthy, David Mountain, Ken Hillman

Background

- This project was part of an initiative to assess the impact of the Four-Hour Rule/National Emergency Access Target (NEAT) policy on performance of Australian EDs.
- The Policy, is also known as *The Four-Hour Rule (4HR)* in Western Australia (2008 and 2011); *National Emergency Access Target (NEAT)* and *Emergency Treatment Performance (ETP) in* NSW.
- The Policy requires that most patients (% vary) should be treated in the ED within 4 hours (e.g., discharged, admitted to hospital or transferred to another hospital for treatment).
- We conducted a Mixed-methods study to assess the impact of the Policy across participating Australian Jurisdictions.

Overall Project streams

(Adapted from Jones et al, 2012)



Aims

- To identify characteristics of staff perceptions and ED operations associated with ED performance.
- To add new information from Stream 3 into stream 1 & 2 to assist in the analysis and understanding of linked data (Stream 1, 2) and generate new hypothesis and research questions (Streams 3, 4).
- To explore main drivers of performance associated with qualitative factors that are not discernible by quantitative methods alone (Streams 1-4).

Methods

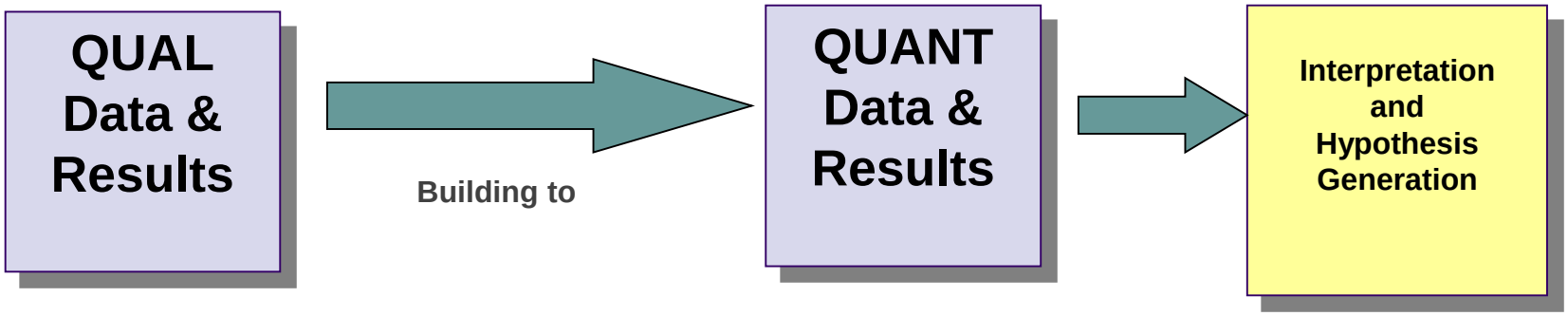
- **Two-phase mixed methods design with qualitative data to explain or build upon initial quantitative results.**
- **Purpose:** to triangulate linked data from 16 participating hospitals with the experiences reported by ED staff during implementation of the Policy.
- **The qualitative component:** involved 119 ED staff interviews from 16 hospitals with four groups of ED staff (directors, physicians, nurses and data/admin staff) across 16 hospitals from NSW, ACT, QLD and WA.
- **Quantitative component:** comprised longitudinal linked data from 16 hospitals in NSW, WA, ACT and QLD
- **Mixed Methods Design:** An explanatory sequential QUAN → QUAL design was used.
- **Ethics:** Approvals obtained from all 16 participating hospitals (6 in NSW, 2 in ACT, 4 in QLD & 4 in WA).

Sequential QUAL ->QUANT Design

Exploratory Design

Design Characteristics:

Exploratory sequential, QUAL first, Equal Priority



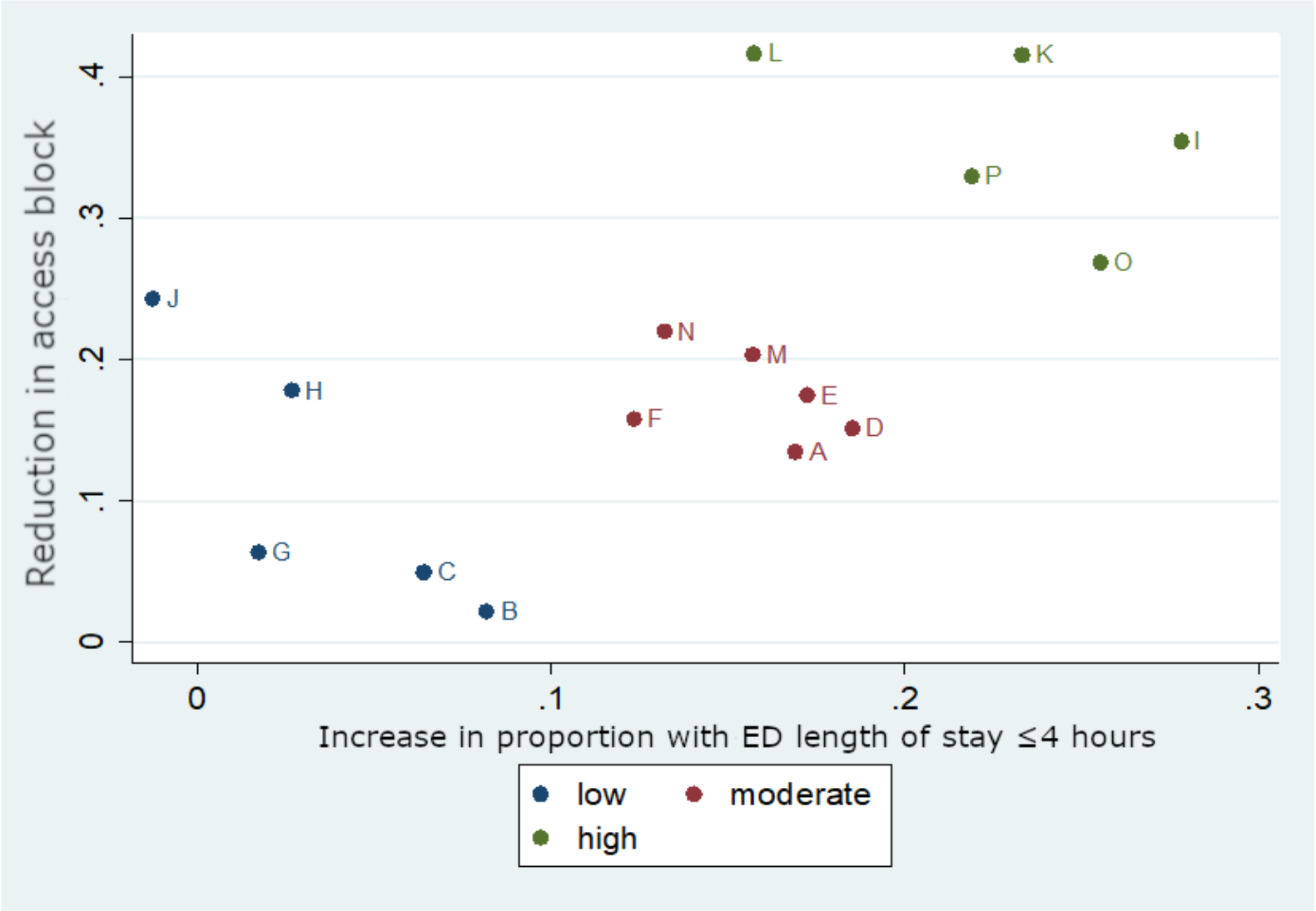
Results- Quantitative data

Number of ED presentations	Baseline year (2011)	End year (2013)
NSW (6 hospitals)	322,409	362,623
ACT (2 hospitals)	114,412	121,797
QLD (4 hospitals)	241,230	270,603
	(2008/9)	**(2013)**
WA (4 Hospitals)	200,841	201,930

Results- Qualitative data

Participants characteristics	Number of participants (n=119)	% of total participants
Gender		
Male	57	48%
Female	62	52%
Role in the ED		
ED Directors (ED Dir., Deputy Dir, Acting Dir)	21	18%
ED Physicians (Staff Spec, Registrars)	43	36%
ED Nurses (NUMs, CNCs, Nurse Coordinator)	44	37%
Data or Administrator (Data manager, Admin)	11	9%
State/territory of service:		
NSW/ACT	52	44%
QLD	37	31%
WA	30	25%

Rate difference from baseline to end of study



Quantitative measures of ED performance

Performance groups		High (Hospitals I, O, K, P, L)	Moderate (Hospitals M, N, D, F, E, A)	Low (Hospitals J, H, C, B, G)	P-value [a]
Measure type	**Outcome measure**	**Mean quantitative measures of performance**			
Rate difference from baseline to end of study	Access block	-0.357	-0.173	-0.111	<0.001
.	EDLOS ≤4 hours	0.229	0.157	0.035	<0.001
Log of odds from baseline to end of study	Access block	-1.794	-0.880	-0.464	<0.001
	EDLOS ≤4 hours	0.967	0.655	0.143	<0.001
Level in the year 2013 (end of study)	Access block	0.160	0.219	0.367	0.003
	EDLOS ≤4 hours	0.695	0.611	0.564	0.048

[a] ANOVA test of differences between the three performance groups

Quantitative Results

- High performing hospitals reported a reduction in access block between 27% and 42% reduction in and improvement in the proportion of patients being seen within 4-hours between 16% and 28%.
- Moderate performing hospitals reported between 13% and 22% improvement in access block and between 12% and 19% improvement in the proportion of patients been seen within 4-hours.
- Low performing hospitals reported between 0% and 24% improvement in access block but only less than 10% improvement in the proportion of patients being seen within 4-hours.

Table 3 Social Factors Across ED Performance Groups

Performance groups	High (Hospitals I, O, K, P, L)			Moderate (Hospitals M, N, D, F, E, A)			Low (Hospitals J, H, C, B, G)		
Themes and Key concepts	Quotations	Interview	Int. % total (37)	Quotations	Interview	Int. % total (51)	Quotations	Interview	Int. % total (30)
Social factors									
- **NEAT worsened stress and morale**	558	37	100%	418	49	96%	177	24	80%
- **Increased incidents of bullying in ED**	23	6	16%	55	10	20%	6	2	7%
- **NEAT had negative impact on teamwork**	34	14	38%	36	15	29%	12	6	20%
- **NEAT had a negative impact on relationships between ED and rest of hospital**	74	25	68%	48	21	41%	15	9	30%
- **Whole of Hospital (WoH) approach improves NEAT**	114	34	92%	136	33	65%	84	20	67%
- **Hospital did not use WoH approach to achieve NEAT**	51	19	51%	102	24	47%	37	11	37%
- **Hospital went some way towards executive buy-in**	27	16	43%	32	13	25%	15	6	20%
- **Hospital did not have sufficient executive buy-in**	21	11	30%	25	10	20%	18	5	17%
- **NEAT Increased Staff-Patient Communication**	32	10	27%	20	13	25%	4	3	10%
- **NEAT Decreased Staff-Patient Communication**	79	23	62%	50	16	31%	11	4	13%

UNSW SYDNEY

Table 4 Management Changes across ED performance groups

Performance groups	High (Hospitals I, O, K, P, L)			Moderate (Hospitals M, N, D, F, E, A)			Low (Hospitals J, H, C, B, G)		
Themes and Key concepts	Quotations	Interview	Int. % total (37)	Quotations	Interview	Int. % total (51)	Quotations	Interview	Int. % total (30)
ED management changes									
- **NEAT-related to staff shortages**	306	34	92%	228	36	70%	128	23	77%
- **Short Stay Unit / Emergency Medicine Unit**	89	27	73%	94	28	55%	51	15	50%
- **Fast Track Area**	25	16	43%	15	14	27%	22	12	40%
- **One-call admission Policy**	29	20	54%	34	15	29%	17	9	30%
- **Direct Admission Policy (DAP)**	8	7	19%	0	0	0%	0	0	0%
- **IT system changes as a result of NEAT**	65	28	76%	25	16	31%	39	14	47%
- **NEAT led to improve the size & capacity of ED**	35	23	62%	17	14	27%	24	11	37%

Table 5 ED Outcomes /NEAT compliance across ED performance groups

Performance groups	High (Hospitals I, O, K, P, L)			Moderate (Hospitals M, N, D, F, E, A)			Low (Hospitals J, H, C, B, G)		
Themes and Key concepts	Quotations	Interview	Int. % total (37)	Quotations	Interview	Int. % total (51)	Quotations	Interview	Int. % total (30)
ED Outcomes									
- NEAT had positive effects on EDs	240	32	86%	289	43	84%	181	24	80%
- NEAT had negative effects on EDs	172	27	73%	145	30	59%	72	19	63%
- NEAT did not impact ED care and practice	42	14	38%	66	26	51%	55	13	43%
- Consequences of access block	73	27	73%	41	21	41%	31	9	30%
- Access block has been an issue before during and after NEAT	42	18	49%	33	21	41%	23	11	37%
- Access block got worse with NEAT	9	7	19%	4	4	8%	2	2	7%
- Access block got worse regardless of NEAT	2	2	5%	2	2	4%	1	1	3%
- Access block got better with NEAT	65	21	57%	47	23	45%	34	18	60%
- NEAT positively impacted medical education & training	18	7	19%	16	5	10%	2	1	3%
- NEAT negatively impacted medical education & training	53	15	41%	27	10	20%	3	2	7%
NEAT Compliance									
- Unsatisfactory NEAT performance	16	8	22%	23	9	18%	23	10	33%
- Satisfactory NEAT performance	21	10	27%	18	12	24%	2	1	3%
- NEAT performance improved but plateaued or failed	36	12	32%	31	12	24%	11	5	17%
- NEAT performance improved but the target is not met	24	11	30%	31	15	29%	23	12	40%

Qualitative Results

- Bullying was reported by 20% moderate, 16% of high and 7% of low performing hospitals.
- Negative impact on team work was reported by 68% high; 41% moderate and 30% of low performing hospitals.
- Decreased staff-patient communication was reported by 62% high, 31% moderate and 16% of low performing hospitals.
- Staff roles and staff shortages were reported by 92% high, 70% moderate and 77% low performing hospitals.
- Whole of Hospital approach improved for 92% high, 65% moderate and 67% low performing hospitals.
- Access block improved with NEAT on 57% high, 45% moderate and 60% low performing hospitals.

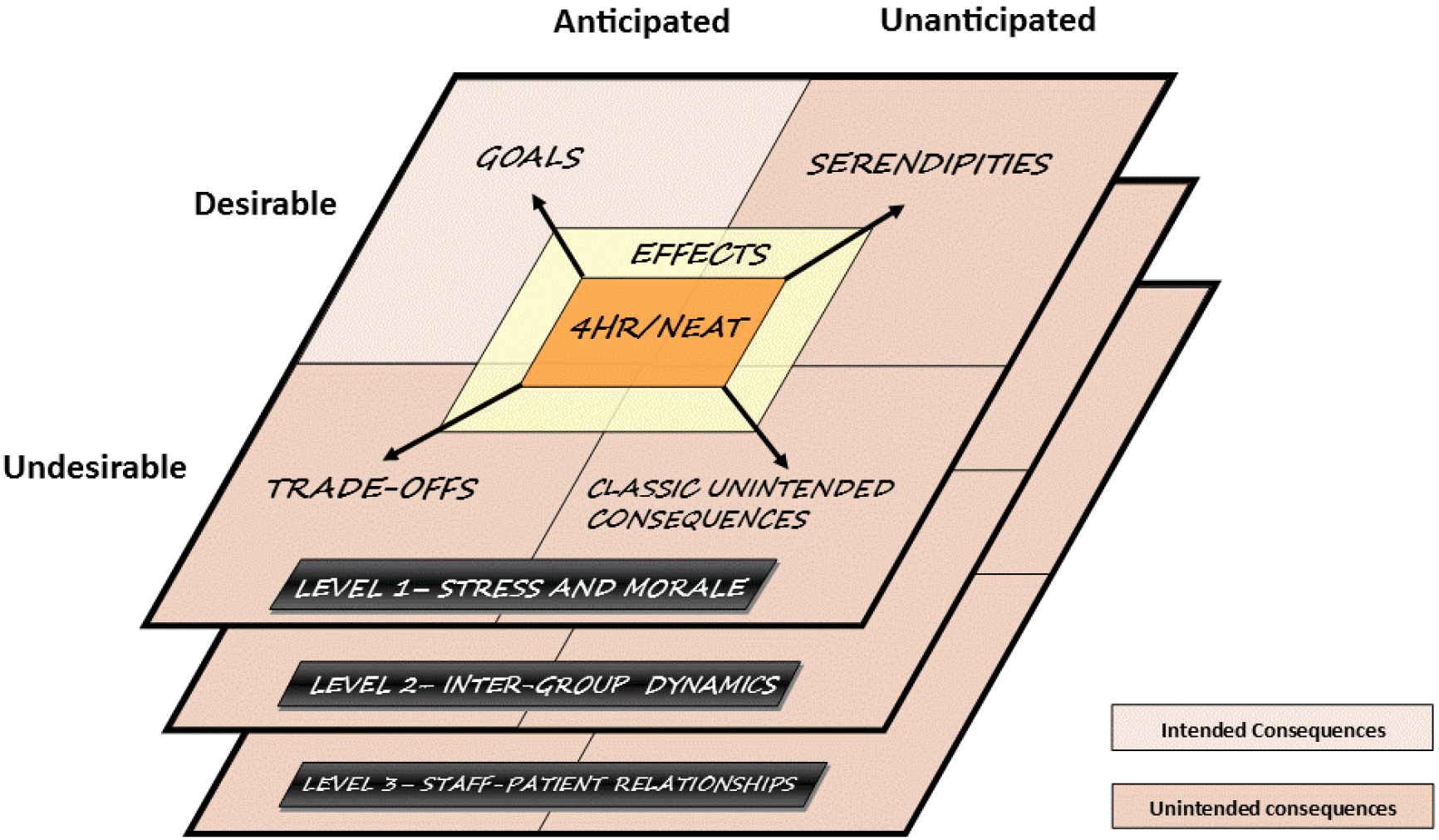
Quotes From Participants per Performance Level

Performance groups	High Performing Hospitals	Moderate Performing Hospitals	Low Performing Hospitals
- NEAT worsened stress and morale	"…much more stressful, much more aggravation. It's a different stress to before". (ED Physician QLD)	"There are stresses … because when you send patients up to the ward and you know the ward is not adequately staffed," (ED Director, NSW/ACT)	"Without a doubt, morale has gone down and stress has gone up"
- NEAT had a negative impact on relationships between ED and rest of hospital	"We had to harass the wards staff which had a negative throwback towards us, and we were harassed by executives, nursing and others, who would come down on a regular basis to explain and justify why patients had not left the emergency department." (ED Nurse, WA)	"I think ED staff find it stressful when the rest of the hospital blame ED for "Oh, you're only bringing this patient up so you can reach the four hour target." Because that's often the response that people get. Or "You're pushing us to accept these people, so that they..." Which is just rubbish." (ED Nurse, NSW/ACT)	"[NEAT] creates a bit of bad blood between the inpatient teams and us, because we're pushing for an admission…" (ED Director, NSW/ACT)
- Whole of Hospital (WoH) approach improves NEAT	"By making it a whole of hospital approach, it made NEAT everyone's responsibility, not just the ED." (ED Nurse, WA)	"Transformational approach from the whole of hospital – it was amazing. It was almost a clinical orgasm! " (ED Nurse, NSW/ACT)	"…it's actually a whole of hospital target, so I think the culture change has been significant in that whole aligning of services and helping out." (Data/Admin, NSW/ACT)
- NEAT Decreased Staff-Patient Communication.	"Because they're gone before you sort of build-up that rapport…. That's a big complaint. (ED Nurse, QLD)	"Before NEAT … it gave you time to…like, look, I don't have time now to be with the patient and chat with them and their family. There's no time for that." (ED Physician, NSW/ACT)	"I think the relationships with patients is zero. .." (ED Physician, NSW /ACT)
- Increase Incidents of Bullying	"…junior staff found it very stressful…and you know, some of them felt a bit bullied by various people because of the pressure of meeting the target." (ED Physician, WA)	"There's quite a lot of threat and bullying that goes on around compliance, particularly towards nursing staff." (ED Physician, NSW/ACT).	"That sort of unrealistic numbering thing is actually not helpful because, really, all you're saying to the staff is, "You're not good enough. You don't work hard enough. You can't do your job fast enough." (ED Director, NSW/ACT)

UNSW SYDNEY

Performance groups	High Performing Hospitals	Moderate Performing Hospitals	Low Performing Hospitals
- NEAT-related staff roles	"So we've created lots of new roles, and it's just a constantly evolving thing. " (ED Nurse, WA)	"Well, for us, we did get funding, and that was a separate project for the changing models of care, but with NEAT, there's been project officers, whole of hospital project officers." (ED Director, NSW/ACT)	"I feel that there were big changes to staffing roles….. Certain positions were trained up to empower the rest of the team, and that role was placed on staffing roles that were already overwhelmed." (ED Nurse, NSW/ACT)
- Staff shortages and supply	"… it's due to all the funding cuts and the staffing pressures, so the fact that we've not been able to increase our staffing, so we're short-staffed." (ED Physician, WA)	"I think one of our ongoing issues is staff shortages, and particularly the hospital has a real RMO shortage, ….. I think our ability to do it really relies on us having good staffing" (ED Physician, QLD)	"I think historically we've always had staffing issues. The demand curve's about 3 to 4% per annum; ours, at times we were admitting 12 to 15% annum. …we are understaffed and remain so." (ED Physician, WA)
- Short Stay Unit / Emergency Medicine Unit	"I'm sure the short stay units changed as well. It became a clinical decisions unit,…" (ED Nurse, WA)	"So, there were a few things that we've done in terms of trying to improve flow. Probably one of the earlier ones was more effective: the use of the short stay unit...." (ED Physician, NSW/ACT)	"I think there is a lot of implementation for things like short stay units, so that people introduced a whole pile of medical short stay, surgical short stay, So in our institution that didn't work, either" (ED Director, NSW/ACT)
- Fast Track Area	"Fast Track's changed quite a lot. ." (ED Physician, QLD)	"We've had a fast track which has been sort of variably effective, so within that discharge stream, to try and pluck out particular subgroups of patients who you know are pretty quick fixes, to get them in and out." (Ed Physician, NSW/ACT)	"When the NEAT came in, we also brought in Fast Track," (ED Nurse, NSW/ACT)

Adapted Diffusion of Innovation (DOI) Model



Findings

Themes	Categories of Policy Consequences			
	GOALS (Anticipated & desirable)	**SERENDIPITIES (Unanticipated & desirable)**	**TRADE-OFF (Anticipated & Undesirable)**	**UNINTENDED CONSEQUENCES (Unanticipated & Undesirable)**
Personal experiences of stress and morale	➢ Policy improved the clinical role performance (8; 11)	➢ Policy improved morale in ED staff (18; 52) ➢ Policy decreased stress (4; 4)	➢ **Policy increased workload (81; 419)**	➢ **Policy increased stress and decreased morale (109; 1147)**
Intergroup dynamics	➢ Policy improved relationships with rest of the hospital (33; 40) ➢ Policy signified the importance of hospital's executive buy-in (21; 59) ➢ **Policy necessitated the Whole of Hospital Approach (WoHA) (87; 334)**	➢ Policy improved communications within ED staff (29; 50) ➢ Policy improved ED teams and teamwork (25; 39) ➢ Policy increased autonomy of ED staff (16; 25)		➢ Policy undermined ED teams and teamwork (35; 82) ➢ Policy worsened communication within ED staff (26; 43) ➢ Policy shifted the flow of power from ED to hospital executives(6;7) ➢ **Policy impaired relationships with rest of the hospital (77; 257)** ➢ **Hospital failed to employ the WoHA (54; 190)** ➢ **Suboptimal leadership and insufficient buy-in at hospital executive confounded Policy-related changes (47; 128)**
Interaction with patients	➢ Policy improved staff-patient communication (26; 56)	-	➢ Policy had no change on staff-patient relationships (17; 20)	➢ **Policy decreased staff-patient communication (43; 140)** ➢ Non-Policy factors influencing staff-patient communication (6; 6)

Comparison of the emergent key concepts and number of quotations across different jurisdictions

	KEY CONCEPTS	Number of quotations (mean per respondent)			
Theme	Unintended Consequences	All	NSW/ACT	WA	QLD
		No. (mean)	No. (mean)	No. (mean)	No. (mean)
Personal experiences of stress and morale	Policy increased stress and decreased morale	**1146 (10.5)**	323 (7.3)	**512 (17.1)**	311 (8.9)
	Policy increased workload	**419 (5.2)**	135 (4.8)	**132 (6.0)**	152 (4.9)
	Policy improved morale in ED staff	52 (2.9)	13 (1.9)	32 (4.6)	7 (1.8)
Intergroup dynamics	Policy necessitated the Whole of Hospital Approach (WoHA)	**334 (3.8)**	120 (3.9)	**124 (4.4)**	90 (3.2)
	Hospital failed to employ the WoHA	190 (3.5)	113 (4.3)	13 (1.4)	64 (3.4)
	Suboptimal leadership and insufficient buy-in at hospital executive confounded Policy-related changes	128 (2.7)	59 (2.8)	18 (2.0)	51 (3.0)
	Policy improved ED teams and teamwork	39 (1.6)	9 (1.8)	17 (1.4)	13 (1.6)
Interaction with patients	Policy decreased staff-patient communication	140 (3.3)	36 (3.0)	46 (3.3)	58 (3.4)
	Policy improved staff-patient communication	**56 (2.2)**	15 1.7)	**23 (3.8)**	18 (1.6)

Comparison of the emergent key concepts and number of quotations across different ED staff roles

Theme	Key concepts	Number and % of respondent (95%CI) for each concept by ED staff roles												
		All (n=119)	Physician (n=43)			Admin (n=11)			Nursing (n=44)			Director (n=21)		
		No	No	%	95% CI	No	%	95% CI	No	%	95% CI	No	%	95% CI
Personal experiences of stress and morale	Policy increased stress and decreased morale	109	39	91%	82-99	10	91%	74-100	42	95%	89-100	18	86%	71-100
	Policy increased workload	81	32	**74%**	61-88	6	**55%**	25-84	31	**70%**	57-84	12	**57%**	36-78
	Policy improved morale in ED staff	18	10	23%	11-36	0	0%		3	7%		5	24%	6-42
	Policy impaired relationships with rest of the hospital	77	30	**70%**	56-84	4	**36%**		27	**61%**	47-76	16	**76%**	58-94
	Hospital failed to employ the WoHA	54	19	44%	29-59	4	36%		17	39%	24-53	14	67%	47-87
	Leadership issues confounded Policy-related changes	47	17	**40%**	25-54	1	**9%**		20	**45%**	31-60	9	**43%**	22-64

Strength and Limitations

- Strengths:
  - This is a robust mixed methods study comparable across jurisdictions.
  - Sampling provided a stratified number of participants. All interviews were consistent and comparable across states.
  - Saturation achieved for all hospitals and consistent across states and roles.
- Limitations:
  - Study provided information from 16 hospitals only, i.e. small sample.
  - Long-term impact not assessed.
  - Interviews conducted after the implementation of the policy
  - Key participants such as patients and people working outside ED not included.

Conclusions

- The 4HR/NEAT produced intended and unintended consequences.
- Unintended consequences included negative effects on stress and morale, inter-group dynamics, and staff interaction with patients.
- Improvements in efficiency are a necessary component of future health system resilience.
- A more balanced approach to performance measurement is required to identify the less visible (from performance data alone) unintended adverse consequences.
- More research is required to understand the hidden impact of unintended consequences on organisational resilience and long-term sustainability and clinical outcomes.

Acknowledgments

- **Project Management Committee:**
  Roberto Forero, Ken Hillman, Daniel Fatovich, Sally McCarthy, David Mountain, Peter Sprivulis, Antonio Celenza, Paul Tridgell, Mohammed Mohsin, Frank Daly, Elizabeth Rohwedder, Sarah Marmara, Gerard Fitzgerald, John Burke, Paul Middleton, Drew Richardson and Patrick Aboagye-Sarfo.

- **Associate Investigators:**
  Nick Gibson, Jeffrey Braithwaite and Peter Nugus.

- **Staff:**
  Shizar Nahidi, Hanh Ngo, Wing (Nicola) Man, Sam Toloo, Josephine De Costa, Fenglian Xu and Brydan Lenne

- **Consultant:**
  Dr Jenine Beekhuyzen, CEO Adroit Research.

Funding Organizations

Partnership Project APP1029492

- National Health and Medical Research Council
- Australasian College for Emergency Medicine
- NSW Ministry of Health
- NSW Agency of clinical Innovation
- Department of Health of Western Australia
- Queensland Emergency Medicine Foundation