



**Institute for  
Musculoskeletal  
Health**

*A research partnership between Sydney Local Health District and The University of Sydney in musculoskeletal health and physical activity*

## **SHaPED trial**

Sydney Health Partners Emergency Department trial

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NHMRC Early Career Fellow



**Health**  
Sydney  
Local Health District



THE UNIVERSITY OF  
**SYDNEY**

**Table 4.7: The 20 most common principal diagnoses<sup>(a)</sup> (3-character level) for emergency department presentations<sup>(b)</sup>, states and territories, 2016–17**

| Principal diagnosis |  | NSW              | Vic              | Qld              | WA             | SA             | Tas            | ACT            | NT             | Total            |
|---------------------|--|------------------|------------------|------------------|----------------|----------------|----------------|----------------|----------------|------------------|
| R10                 | Abdominal and pelvic pain  | 124,834          | 79,783           | 61,522           | 29,711         | 20,028         | 6,251          | 8,021          | 4,609          | 334,759          |
| R07                 | Pain in throat and chest   | 109,954          | 73,691           | 29,117           | 26,715         | 21,711         | 6,170          | 6,661          | 5,321          | 279,340          |
| B34                 | Viral infection of unspecified site  | 35,686           | 34,046           | 29,307           | 20,221         | 5,339          | 2,285          | 3,938          | 2,231          | 133,053          |
| L03                 | Cellulitis   | 49,185           | 22,600           | 23,721           | 14,144         | 5,724          | 2,341          | 2,128          | 5,276          | 125,119          |
| M54                 | Dorsalgia  | 50,787           | 30,232           | 9,091            | 8,933          | 6,646          | 3,117          | 1,928          | 2,516          | 113,250          |
| S01                 | Open wound of head   | 34,976           | 24,922           | 22,195           | 14,712         | 7,521          | 2,371          | 2,359          | 2,372          | 111,428          |
| T14                 | Injury of unspecified body region  | 82,580           | 7,865            | 8,979            | 3,749          | 5,844          | 38             | 237            | 674            | 109,966          |
| A09                 | Other gastroenteritis and colitis of infectious and unspecified origin         | 47,387           | 25,521           | 16,164           | 6,067          | 5,538          | 1,992          | 2,638          | 1,285          | 106,592          |
| Z53                 | Persons encountering health services for specific procedures, not carried out  | 54,910           | 2,036            | 13,789           | 11,010         | 11,013         | 3,795          | 4,676          | 0              | 101,229          |
| J06                 | Acute upper respiratory infections of multiple and unspecified sites           | 45,326           | 14,861           | 18,385           | 9,942          | 6,010          | 1,835          | 1,296          | 3,171          | 100,826          |
| S61                 | Open wound of wrist and hand   | 35,528           | 23,771           | 17,347           | 10,524         | 6,290          | 2,417          | 1,953          | 1,476          | 99,306           |
| N39                 | Other disorders of urinary system  | 35,317           | 19,582           | 19,836           | 9,639          | 5,937          | 1,563          | 1,845          | 1,712          | 95,431           |
| S93                 | Dislocation, sprain and strain of joints and ligaments at ankle and foot level | 25,735           | 20,980           | 25,128           | 11,207         | 4,627          | 2,754          | 2,310          | 1,398          | 94,139           |
| S62                 | Fracture at wrist and hand level   | 27,034           | 25,660           | 17,773           | 12,092         | 4,320          | 1,942          | 1,740          | 1,336          | 91,897           |
| R11                 | Nausea and vomiting  | 37,061           | 16,513           | 14,608           | 7,088          | 4,898          | 1,206          | 1,698          | 1,017          | 84,089           |
| R55                 | Syncope and collapse   | 26,070           | 20,094           | 18,500           | 7,447          | 7,893          | 1,792          | 1,395          | 852            | 84,043           |
| S52                 | Fracture of forearm  | 30,320           | 12,042           | 19,069           | 8,495          | 5,717          | 1,883          | 1,801          | 1,549          | 80,876           |
| M79                 | Other soft tissue disorders, not elsewhere classified                          | 39,843           | 25,104           | 4,569            | 3,836          | 3,739          | 1,148          | 1,017          | 545            | 79,801           |
| J18                 | Pneumonia, organism unspecified  | 24,383           | 14,304           | 18,216           | 9,992          | 4,236          | 1,640          | 2,105          | 410            | 75,286           |
| J45                 | Asthma   | 28,682           | 22,970           | 11,330           | 1,499          | 5,754          | 1,451          | 1,108          | 1,240          | 74,034           |
| S09                 | Other and unspecified injuries of head   | 43,358           | 10,757           | 3,031            | 6,026          | 5,904          | 493            | 1,157          | 1,695          | 72,421           |
| <b>Total</b>        |  | <b>2,784,545</b> | <b>1,731,040</b> | <b>1,457,083</b> | <b>835,551</b> | <b>493,268</b> | <b>156,323</b> | <b>143,860</b> | <b>153,936</b> | <b>7,755,606</b> |



## Person with low back pain

with or without leg pain

Red flags

~15%

Radicular LBP

~10%

Non-specific LBP

~75%

Serious LBP

~5%

# Why do patients with simple mechanical back pain seek emergency care?

## **Box 5a: Quotations from Theme 5**

*“I just wanted to know what was wrong with me” (Participant 3)*

*“Just reassurance that it was okay, it was something that I’d just pulled and not in the process of dying” (Participant 5)*

## **Box 5b: Quotation from Theme 5**

*“I thought oh my God, what is happening to me, am I ever going to walk again?” (Participant 10)*

# What type of care do these patients receive in the emergency department?

**Table 3** Number (%) of patients receiving lumbar spine imaging

|                              | Non-specific LBP<br>(n=5461) | Radicular LBP<br>(n=642) | Serious spinal pathology<br>(n=290) | Total<br>(n=6393) |
|------------------------------|------------------------------|--------------------------|-------------------------------------|-------------------|
| Simple radiograph            | 1069 (19.6)                  | 77 (12%)                 | 77 (26.5)                           | 1223 (19.1)       |
| Advanced imaging (MRI or CT) | 302 (5.5)                    | 41 (6.4)                 | 65 (22.4)                           | 408 (6.4)         |
| MRI                          | 57 (1.0)                     | 12 (1.8)                 | 17 (5.8)                            | 86 (1.3)          |
| CT                           | 253 (4.6)                    | 31 (4.8)                 | 54 (18.6)                           | 338 (5.3)         |
| Any lumbar spine imaging     | 1284 (23.5)                  | 108 (16.8)               | 116 (40.0)                          | 1508 (23.6)       |

LBP, low back pain.

# What type of care do these patients receive in the emergency department?

**Table 2** Number (%) of different types of pain medication used in the ED (n=2539)

|  | Non-specific LBP<br>(n=2104) | Radicular LBP<br>(n=311) | Serious spinal pathology<br>(n=124) | Total<br>(n=2539) |
|--|------------------------------|--------------------------|-------------------------------------|-------------------|
| Analgesics, n (%)  | 1184 (56.2)                  | 164 (52.7)               | 73 (58.8)                           | 1421 (55.9)       |
| NSAIDs, n (%)  | 806 (38.3)                   | 125 (40.2)               | 25 (20.1)                           | 956 (37.6)        |
| Opioids (any), n (%)                                     | 1454 (69.1)                  | 233 (74.9)               | 80 (64.5)                           | 1767 (69.6)       |
| Opioid anaesthetics, n (%)                               | 39 (1.9)                     | 5 (1.6)                  | 2 (1.6)                             | 46 (1.8)          |
| Opioids, n (%)   | 1272 (60.5)                  | 213 (68.5)               | 74 (59.7)                           | 1559 (61.4)       |
| Opioids in combination with non-opioid analgesics, n (%) | 366 (17.4)                   | 56 (18.1)                | 12 (6.7)                            | 434 (17.1)        |
| Muscle relaxants, n (%)                                  | 3 (0.1)                      | 2 (0.6)                  | 0 (0.0)                             | 5 (0.2)           |
| Benzodiazepines, n (%)                                   | 201 (9.5)                    | 27 (8.68)                | 9 (7.26)                            | 237 (9.3)         |
| Antiepileptics, n (%)                                    | 171 (8.1)                    | 64 (20.5)                | 7 (5.65)                            | 242 (9.5)         |
| Antidepressants, n (%)                                   | 89 (4.2)                     | 22 (7.1)                 | 5 (4.0)                             | 116 (4.5)         |
| Oral corticosteroids, n (%)                              | 53 (2.5)                     | 13 (4.1)                 | 6 (4.8)                             | 72 (2.8)          |
| Antipsychotics, n (%)                                    | 27 (1.2)                     | 1 (0.3)                  | 2 (1.6)                             | 30 (1.2)          |

ED, emergency department; LBP, low back pain; NSAID, non-steroidal anti-inflammatory drug.

# What type of care do these patients receive in the emergency department?

**Table 1** Demographic and ED presentation characteristics

|  | Non-specific LBP<br>(n=5461) | Radicular LBP<br>(n=642) | Serious spinal<br>pathology<br>(n=290) | Total<br>(n=6393) |
|--|------------------------------|--------------------------|--|-------------------|
| Gender, female, n (%)                        | 2738 (50.1)                  | 346 (53.9)               | 116 (40)                               | 3200 (50.1)       |
| Age (years), mean (SD)                       | 51.8 (20.4)                  | 56.7 (18.3)              | 55.6 (20.3)                            | 52.4 (20.2)       |
| Adults, n (%)                                | 3838 (70.3)                  | 397 (61.8)               | 186 (64.1)                             | 4421 (69.1)       |
| Older adults (≥65 years), n (%)              | 1623 (29.7)                  | 245 (38.2)               | 104 (35.9)                             | 1972 (30.9)       |
| Mode of arrival, n (%)                       |                              |                          |  |                   |
| Ambulance                                    | 1769 (32.4)                  | 146 (22.7)               | 96 (33.1)                              | 2011 (31.4)       |
| Public transport                             | 134 (2.4)                    | 10 (1.5)                 | 10 (3.4)                               | 154 (2.4)         |
| Internal bed/wheelchair                      | 3 (0.01)                     | 0 (0.0)                  | 0 (0.0)                                | 3 (0.01)          |
| Walked in                                    | 587 (10.7)                   | 49 (7.6)                 | 31 (10.6)                              | 667 (10.4)        |
| Private car                                  | 2959 (54.2)                  | 436 (67.9)               | 153 (52.7)                             | 3548 (55.5)       |
| Other  | 8 (0.1)                      | 1 (0.1)                  | 0 (0.0)                                | 9 (0.1)           |
| Admitted to hospital, n (%)                  | 898 (16.4)                   | 106 (16.5)               | 125 (43.1)                             | 1129 (17.6)       |
| Hospital length of stay (days), median (IQR) | 6 (3–12)                     | 4 (3–9)                  | 5 (2–9)                                | 6 (3–12)          |

\*Australasian Triage Scale (ATS)

ED, emergency department; LBP, low back pain.



MODEL OF CARE

# Management of people with acute low back pain

Musculoskeletal Network



Collaboration. Innovation. Better Healthcare.





### Principle 5: Begin with simple analgesic medicines

Where pain medicines are required it is best to begin with simple analgesics using time-contingent dosing. Non-steroidal anti-inflammatory medications can be used for short time-frames after consideration of possible adverse reactions. Opiates should be avoided.



### Principle 6: Judicious use of complex medicines

In the presence of persisting severe leg pain, some complex medication regimens may support pain control. These include tricyclic anti-depressants, anticonvulsant agents and serotonin noradrenaline reuptake inhibitors. However, caution is required considering the impact of potential mood changes and somnolence. Opiates are less effective in this patient group, and corticosteroid spinal injections offer only short-term pain relief and should not be initiated in the primary care setting.



### Principle 8: Only image those with suspected serious pathology

Imaging is only indicated when a thorough patient history and physical examination indicates that there may be a medically serious cause for the lower back pain.



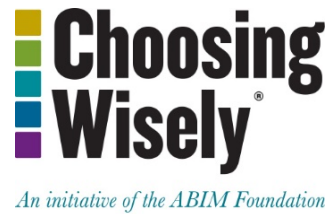
### Principle 9: Pre-determined times for review

Review each individual's progress at two, six and twelve weeks. If there has been insufficient progress then change the treatment plan as outlined in the MoC.



### Principle 10: Timely referral and access to specialist services

If the patient has not recovered by twelve weeks arrange for review by a musculoskeletal specialist as outlined in the MoC.



# What were our research questions?

- Can implementation of a new model of care using a multi-faceted intervention improve care for low back pain in emergency departments by:
  - reducing the % of patients receiving lumbar imaging (primary)?
  - reducing the % of patients receiving opioid medicines?
  - reducing the % of patients admitted to hospital?
- Secondary aims:
  - Patient outcomes: pain, function, QoL and satisfaction
  - Economic evaluation
  - Process evaluation



Dubbo

CRGH



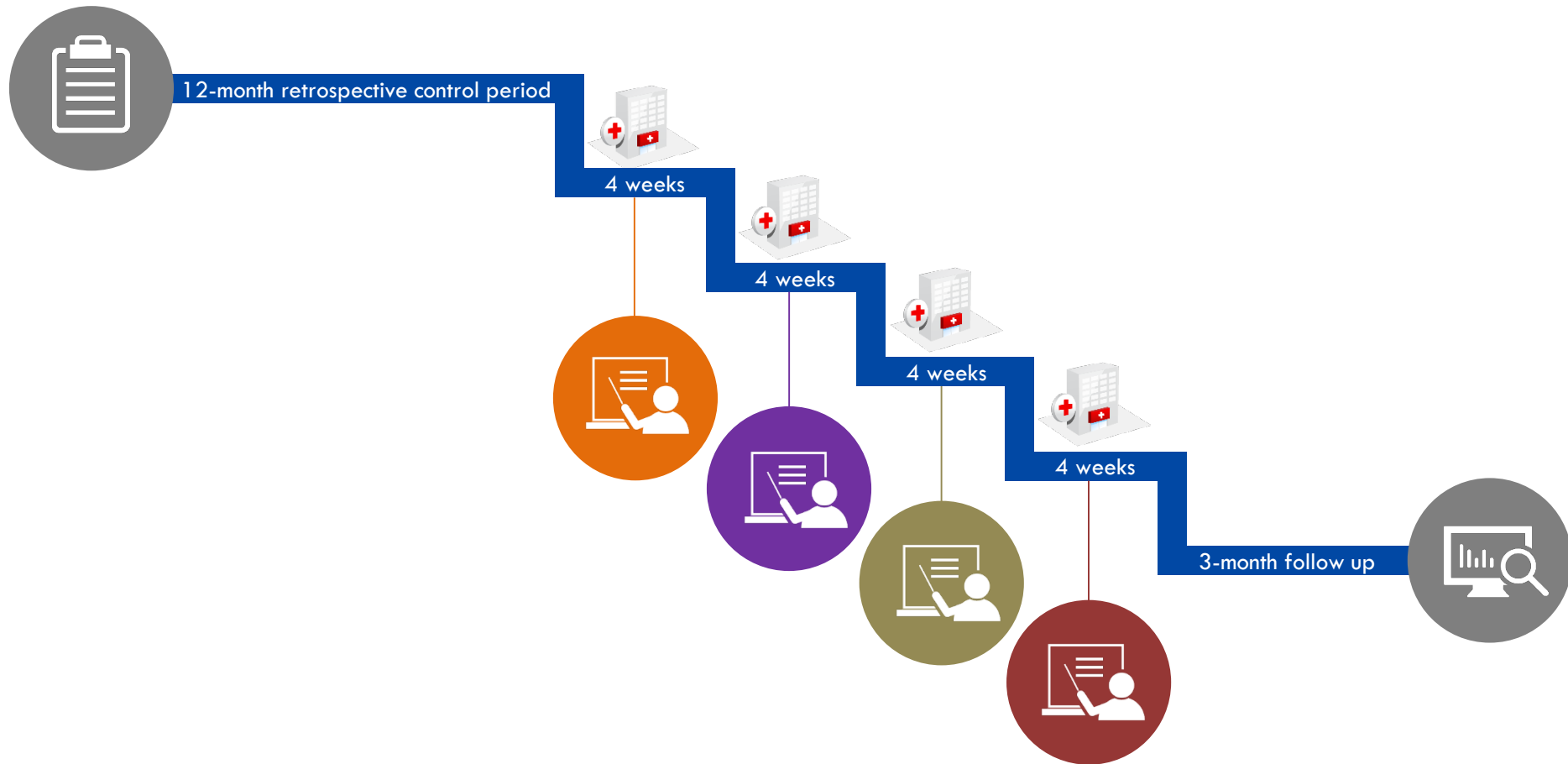
TCH



RPAH



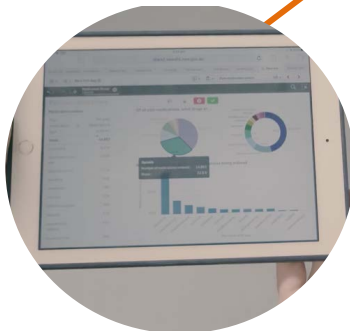
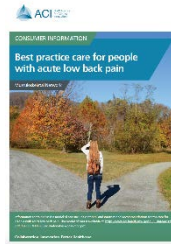
# Stepped wedge cluster randomised controlled trial



# Our participants

- Emergency department clinicians:
  - Doctors
  - Nurses
  - Physiotherapists
- Patients with low back pain:
  - Non-specific LBP
  - Radicular LBP
  - Identified using discharge SNOMED codes

# Multifaceted implementation strategy



**DR TERESA AI**  
Chief Executive, Sydney Local Health District

Thank you for participating in the SKoRED trial. As we recognise that research and innovation is vital to the best care for our patients. We know back pain pressures are common and increasing so it is timely to think about this condition.

The SKoRED trial has been designed to implement a low back pain into our emergency departments. The partnership with clinicians, researchers and patients. With your support we expect the SKoRED trial to improve the outcomes of our patients and improve the quality of care. Read and use the valuable resources at the end of the trial.



## Our outcomes: health service

- % patients receiving lumbar imaging
- % patients given opioid medicines
- % patient admitted to hospital



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Sense<sup>TM</sup>

iPad

2:32 PM

37%



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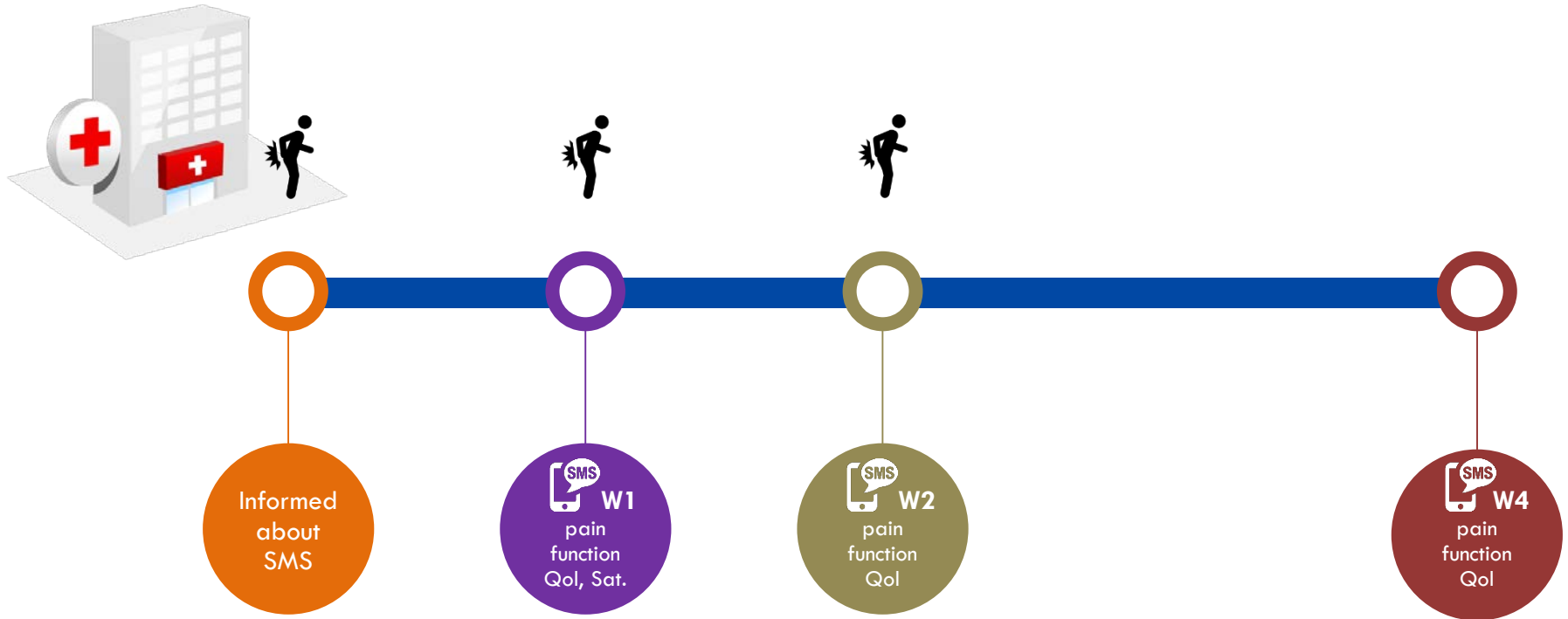
Apple



Favorites



# Our outcomes: patient reported



## Where are we up to?

- **Completed** on 28 February 2019
- Recruited and educated **269** ED clinicians
- Extracted data for **4,864** eligible low back pain presentations from eMR
- Invited 807 and **416** patients completed PROMs using RECap and Twilio
- Completed **23** telephone interviews with clinicians for process evaluation
- Full data being analysed



# Challenges and lessons learned

- **Time** for the education sessions
- Engagement of **site champions**
- Use of **heat wraps**
- Lack of electronic **medication charts** in some hospitals
- Data analytic system such as **STARS Back Pain App**
- **PROMs** using REDCap and Twilio



# Acknowledgements

- Dr Gustavo Machado
- Prof Chris Maher
- Dr Bethan Richards
- Prof Rachelle Buchbinder
- Prof Ian Harris
- Dr Chris Needs
- Ms Danielle Coombs
- Dr James Edwards
- Dr Rochelle Facer
- Dr Eileen Rogan, for *SHaPED trial Investigators*





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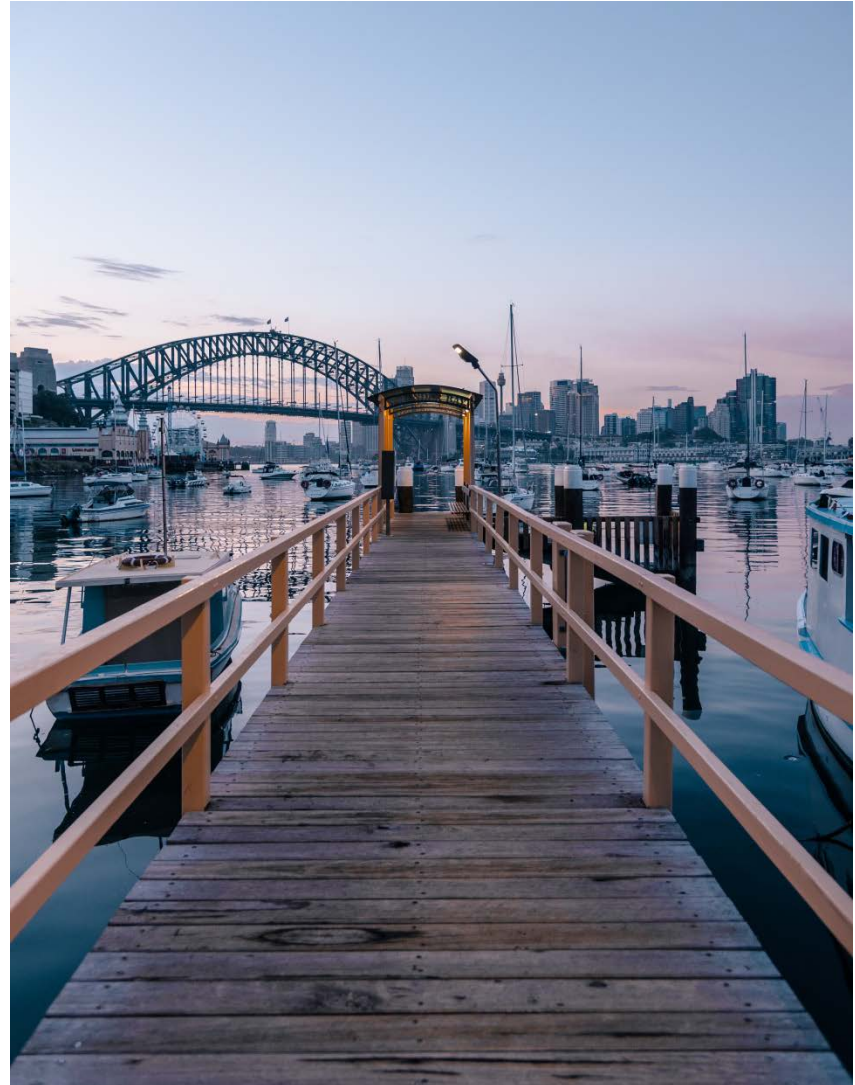
**Thank you**

For any further questions, contact:

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