

**Submission  
No 23**

**INQUIRY INTO IMPACT OF AMBULANCE RAMPING AND  
ACCESS BLOCK ON THE OPERATION OF HOSPITAL  
EMERGENCY DEPARTMENTS IN NEW SOUTH WALES**

**Organisation:** Taylor Fry Pty Ltd  
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Portfolio Committee No 2 – Health  
NSW Legislative Council  
NSW Parliament House  
6 Macquarie Street  
Sydney NSW 2000

Dear Committee Members

## [Inquiry into the impact of ambulance ramping and access block on the operation of hospital EDs in NSW](#)

Thank you for the invitation to make a submission to this inquiry. Access block, Emergency Department (ED) performance and ambulance ramping are interrelated issues. Access block is the primary cause of ED delays and overcrowding, which in turn causes ambulance ramping. These issues are not new, and the fact that sustainable solutions have not been found highlights the complexity of the situation.

There is no single solution that will address access block, improve ED performance and reduce ambulance ramping, but a range of initiatives that address the multiple underlying causes. Solutions implemented unilaterally by NSW Health will be only partially successful; tackling access block, ED performance and ambulance ramping requires a whole-of-system approach involving health, aged care and disability, and collaboration between NSW Health, the Australian Government, and other agencies.

In general, solutions that simply expand capacity - in ambulance, ED, inpatient or residential care – are likely to provide short term relief but be consumed by rising demand from ageing and chronically ill patients in the longer term. Strategies that improve patient flow and involve models of care are also necessary.

The Committee's terms of reference consider the impact of ambulance ramping on ED performance. However, the impact of ambulance ramping on ambulance service performance is more significant, as it prevents paramedics responding to out-of-hospital emergencies, wasting scarce and expensive ambulance resources, and depriving the community of an essential health service.

The complex interrelationships between different parts of the system make it important to identify priorities and develop initiatives that will have the largest impact. In this respect, there is an opportunity to make greater use of linked healthcare and other data to develop and model evidence-based solutions.

With continual demands on government expenditure, value for money needs to be a factor when investing in additional health services, and costs considered from a whole-of-system perspective, not from that of an individual provider.

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## 1 About Taylor Fry

Taylor Fry is a medium-sized consultancy that provides actuarial and analytics advice to government and industry. Founded in Sydney in 1999 with a focus on the general insurance industry, we have expanded into analytics and modelling in general insurance, injury schemes, health, disability, aged care, education and social welfare. Taylor Fry employs over 100 professional staff in Sydney, Melbourne and Wellington.

Our health practice assists government agencies and other organisations measure performance, understand health service needs and make sound funding choices. Our health offering includes: activity-based funding analysis and forecasting; analysis of linked health data; health service performance, safety and quality analysis; forecasting of future service needs and costs; evaluation and policy impact.

## 2 Addressing the inquiry's terms of reference

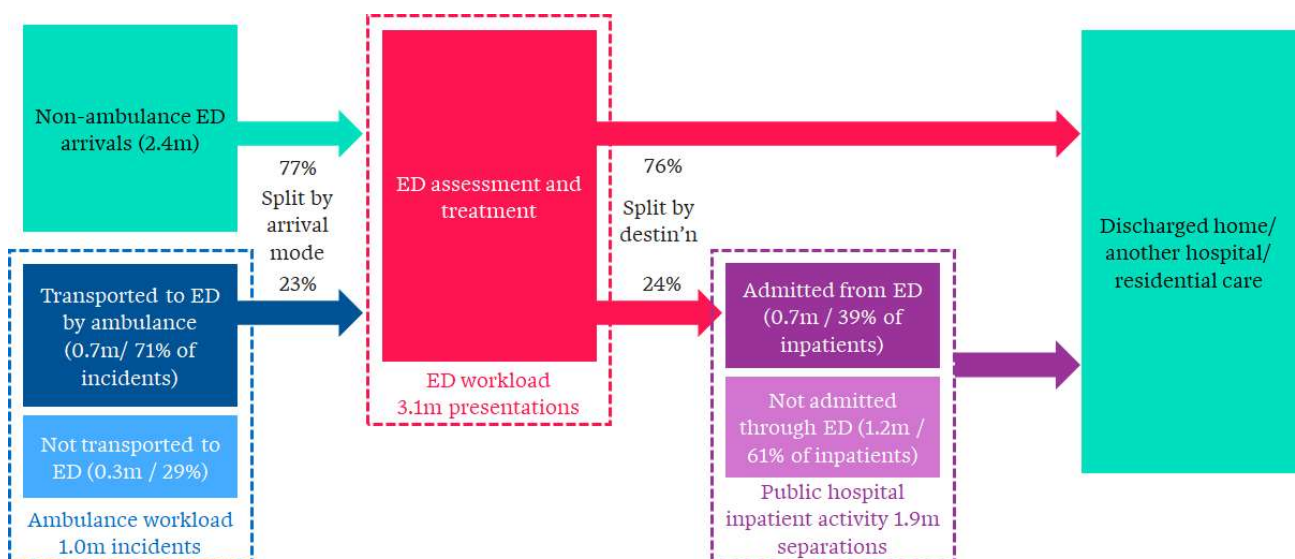
Comments have been included under each of the terms of reference, as indicated below. The Australasian College of Emergency Medicine (ACEM) has written extensively on the topic of access block and ED performance[1-3]. Taylor Fry's submission recognises that the ED perspective is already well-covered and focuses on the areas of actuarial and paramedic professional experience of the authors: health service performance, data, funding and the impact of access block and ED overcrowding on ambulance operational performance.

### Context

Access block refers to the inability to move patients requiring a hospital admission out of the ED and into a hospital bed within a reasonable timeframe (8 hours under ACEM's definition) because of a lack of inpatient bed capacity[4]. Ambulance 'ramping' (extended transfer of care time/ delayed off-stretcher time) refers to delays in the transfer of patients from paramedics to ED care i.e., clinical handover and offloading of the patient into an ED bed. In NSW, the target is 90% of patients transferred to ED care within 30 minutes.

The following diagram summarises ambulance, ED and public inpatient workload in NSW in 2020-21 and illustrates the flow of patients between each setting.

Figure 1 - Patient flow NSW, 2020-21



Source: BHI [5] AIHW [6, 7]

Key points are:

- Patients are transported to hospital in 71% of NSW Ambulance incidents (0.7m out of 1m). 29% of incidents do not result in the patient being transported to hospital[5]. This indicates that most ambulance patients are transported to ED and therefore have the potential to be affected by ramping (transfer of care delays). Additionally, there is a sizeable proportion of low acuity patients who may not need an ambulance at all.
- 23% of ED arrivals in NSW are by ambulance. More than three-quarters of patients (2.4m out of 3.1m presentations or 77%) make their own way to hospital[6]. It is a common misconception that patients arriving by ambulance makes up a larger share of ED patients.
- 24% of ED presentations are admitted to (the same) hospital, with the majority (2.3m out of 3.1m presentations or 74%) discharged home, to another hospital or usual place of residence[6]. The ‘admitted’ group is the cohort affected directly by access block.
- Admissions from ED make up 39% of public hospital inpatients, with most admissions planned (1.2m out of 1.9m separation or 61%. [7]. ‘Planned’ or non-emergency admissions includes those initiated by an ED visit, but not admitted directly from ED. A reduction in planned admissions would increase inpatient capacity for emergency admissions and ease access block, however, this is a description of how the two streams of patients interact, not a suggested solution. Patients are in hospital because they require treatment and there are consequences of delaying elective admissions[8] and indeed there may be opportunities to reduce the need for emergency admissions through the right preventative, planned admissions.

Although only 23% of ED arrivals are by ambulance, these tend to be patients in the higher acuity triage categories, the majority requiring stretcher transport. Unsurprisingly, admissions from ED to hospital also tend to be concentrated in the higher acuity triage categories. Table 1 shows the number and proportion of patients in each category, by mode of arrival to ED and discharge from ED.

Table 1 – Arrivals by ambulance to ED and admissions to hospital from ED, NSW 2020-21 (rounded)

Triage category	Total ED presentations	Arrivals by ambulance	Admitted to hospital	% arrived by ambulance to ED	% admitted to hospital from ED
Resuscitation	22,000	18,000	15,000	84%	69%
Emergency	407,000	175,000	196,000	43%	48%
Urgent	1,049,000	336,000	357,000	32%	34%
Semi-urgent	1,174,000	157,000	153,000	13%	13%
Non-urgent	414,000	10,000	12,000	2%	3%
<b>Total</b>	<b>3,066,000</b>	<b>696,000</b>	<b>732,000</b>	<b>23%</b>	<b>24%</b>

Source: BHI [5] AIHW [6, 7]

### TOR (a): the causes of ambulance ramping, access block and emergency department delays

Access block occurs when there are insufficient inpatient beds available to allow patients to be transferred from the ED to a hospital bed in a timely manner. Access block prevents patients moving out of ED and causes ED overcrowding and delays. There are other factors that contribute to ED delays, for example ED staffing level and staffing mix, but access block is the main cause [1].

The inability to move patients out of ED beds prevents other patients going into them. This has a disproportionate effect on patients brought in by ambulance because of the higher acuity nature of the patients. Access block is therefore a primary cause of ambulance ramping as well as ED delays, i.e.,



Causes of access block can be categorised into demand-related, supply-related and patient flow causes, with a high-level overview in Table 2. Some factors have an effect at multiple points, for example, insufficient / inadequate residential or community care causes patient deterioration, resulting in ED presentation and hospital admission, while at the same time the lack of available residential or community care support prevents existing inpatients from being discharged and delays patients moving through the system.

Table 2 - Causes of access block[4, 9]

Demand	Supply	Patient flow
<p>Admissions from ED exceed capacity of hospital to accommodate them:</p> <ul style="list-style-type: none"> <li>▪ Pandemic/ seasonal illness</li> <li>▪ Other natural events (floods, bushfires, heatwaves)</li> <li>▪ Patient deterioration due to insufficiency of community/ primary/ residential care services</li> <li>▪ Time of day factors</li> </ul>	<p>Direct supply issues – insufficient inpatient beds/ hospitals at full capacity and/or insufficient staffing to allow beds to be used</p> <p>Relative numbers of emergency/ non-emergency admissions, driven in part by elective surgery waiting lists</p>	<p>Delays in discharging patients:</p> <ul style="list-style-type: none"> <li>▪ Discharge processes - waiting for medical or allied health review, pharmacy, transport</li> <li>▪ Indirect supply issues - insufficient ultimate care to allow patients to be discharged safely</li> </ul>

By definition, the direct cause of access block is lack of inpatient bed capacity compared with demand, but opinions vary as to whether this is a fundamental issue with the number of beds (and/or staffing to operate them)[4] or flow of patients through these beds[9]. Whole-of-system simulation and scenario modelling can help to understand the opportunities for both to contribute to improvements.

### TOR (b) the effects that ambulance ramping and access block has on the ability and capacity of emergency departments to perform their function

24% of NSW ED presentations require a hospital admission. Access block keeps these patients in ED longer than necessary, preventing additional patients from being treated by ED staff, reducing ED efficiency, with potentially serious restrictions on EDs’ ability to perform their function. In 2021, ACEM quantified the annual financial impact of this to be \$522m to the Australian health system[2].

Ambulance ramping has a limited impact on the ability of EDs to perform their function. Queuing stretchers and paramedics waiting to offload patients take up physical space, and the situation puts administrative pressure on ED staff to find beds for patients brought in by ambulance. However, paramedics continue to provide patient care while waiting to offload, relieving EDs of this responsibility.

Given the chain of causation (access block → ED overcrowding → ambulance ramping), the impact of ambulance ramping on ambulance performance is far more significant than the impact on ED performance. Delays in ambulance transfer of care at hospital seriously compromise the ability of ambulance services to perform their primary function of responding to life-threatening emergencies in the community, with flow on effects for paramedics and patients. This is discussed under TOR (e).

## TOR (c) the impact that access to GPs and primary health care services has on emergency department presentations and delays

According to the Australian Institute of Health and Welfare (AIHW), 38% of ED presentations in NSW in 2018-19 were for lower-urgency care[10]. This does not translate directly to patients that could have seen their GP, because there are other factors that influence the choice of treatment location, but it is indicative. Separate research undertaken in Western Australia indicates that between 20% and 40% of ED presentations are primary-care type presentations[11].

The number of visits to ED for lower urgency care is small compared with GP visits – 1 million lower urgency ED presentations in NSW in 2018-19 vs 52 million GP attendances in the same year[12]. There are various reasons that patients present to ED rather than their GP for low acuity care. Lack of access to primary care is one cause[13]. However, the Royal Australian College of General Practitioners' (RACGP's) 2022 Health of the Nation report indicates 87% of GPs set aside same-day appointments for urgent care[14]. Other reasons include patient-perceived urgency and complexity, socioeconomic factors, patient choice, GP advice to visit an ED, convenience (access to radiology and imaging at no cost, in one location) and financial cost to the patient[13, 15].

The important question is what impact low acuity patients have on ED presentations and delays. GP-type patients increase the number of presentations to ED and EDs need to be staffed to deal with them. The ACEM view is that they do not increase ED delays for other patients[2]. GP-type patients may wait longer to be seen than higher acuity patients, but they do not cause overcrowding in the ED treatment area because they can safely remain in the waiting room until ready to be treated. By their nature, GP-type patients do not require a hospital admission, so they are unaffected by access block.

Regardless of the impact of increased low acuity presentations on ED performance, the question is whether the ED is the appropriate location for these patients to be treated. This is addressed in TOR (g).

From an ambulance perspective, GP-type patients arguably have a greater impact on ambulance workload. There are community expectations of ambulance responsiveness, even if the issue is minor, and in many cases the required response to a low acuity patient (usually a double-crewed ambulance) is similar to a high acuity response. Given the mobile nature of ambulance service provision and lack of access of NSW paramedics to patient health information, response times, clinical assessment and documentation take up a certain length of time regardless of patient acuity.

## TOR (d) the impact that availability and access to aged care and disability services has on emergency department presentations and delays

There are two aspects to consider:

- The aged-care and disability service-related factors that cause ED presentations
- The lack of access to aged care and disability services that may delay a patient's discharge from hospital and contribute to access block.

The impact on NSW Ambulance should also be considered, as many of these patients require ambulance transport to ED, with associated costs and impact on ambulance workload.

The Australian Medical Association (AMA) has estimated that in the year to June 2021:

- There were 28,000 potentially-avoidable admissions from nursing homes to public and private hospitals, costing \$312 million Australia-wide. In addition, there were an estimated 49,300 presentations to EDs from nursing homes for patients not subsequently admitted to hospital (cost \$112m - ambulance transport plus ED treatment).
- 1.9 million inpatient bed days could have been avoided in the over 65 age group with improved community aged care (\$3.7 billion cost) and
- 232,000 excess bed days (7.2 out of every 1,000) arose from patients unable to be discharged because they were waiting for a place in a nursing home (cost \$197 million)[16].

The impact of the quality and availability of aged care on ambulance workload, ED presentations and hospital activity has been covered by the Royal Commission[17] and is not repeated here. In respect of patients with a disability and complex needs, the situation is similar, with the discharge delays arising from lack of access to suitable interim or long-term housing[18].

Initiatives that allow for more medical care to be provided in residential care settings rather than in hospital would reduce the number of ED presentations and hospital admissions. Greater supply of community services and residential care would address the patient flow and delay factors that contribute to access block.

The federal Labor government has flagged continued reform to the funding and requirements for residential aged care, including 24/7 access to a registered nurse in every residential aged care facility[19]. These changes have the potential to reduce demand for ambulance and ED services, with more care provided in situ. Simulation and scenario modelling of patient flow would provide invaluable information to assist NSW Health to plan service needs around these changes.

### TOR (e) how ambulance ramping and access block impacts on patients, paramedics, emergency department and other hospital staff

There is extensive international literature on the consequences of access block, ED overcrowding and delays for ED patients and staff. The effects include: delays in commencing appropriate treatment resulting in poorer patient outcomes (morbidity and mortality), longer inpatient length of stay after hospital admission, patient and staff dissatisfaction, increased violence towards staff, and higher costs to the health system[1, 20].

This submission focuses on the ambulance perspective. As indicated in Table 1, most patients brought in by ambulance fall into the ‘emergency’/ ‘urgent’ and ‘semi-urgent’ categories. Of these patients, those who require a stretcher and/ or ongoing monitoring by their attendant paramedic crew are affected by delays in transfer of care. Ambulance ‘resuscitation’ patients usually go straight into a resuscitation bed. At the other end of the scale, ambulant low acuity patients can be offloaded to the ED waiting room after triage.

The potential impacts of ambulance ramping are direct (on patients and paramedics subject to ramping) and indirect (decreased capacity to respond to new incidents because paramedics are unable to offload existing patients):

- **Direct impacts** - There is far less research on the direct impact of ambulance ramping on paramedics and their patients than on the ED impacts[21]. The direct effects on patients include: a longer wait to definitive care, a longer ED length of stay, slightly higher subsequent ED representations (for chest pain patients), but inconclusive evidence on the impact on mortality[22, 23]. For paramedics, the impacts include missed meal breaks and additional stress, leading to sick leave and staff attrition[21].
- **Indirect impacts** - Ambulance ramping has a significant knock-on effect on ambulance service operational performance. In an ED, access block prevents patients moving from ED beds to wards, but ED staff can still be productive treating lower-acuity patients that do not require an ED bed. By contrast, paramedics waiting to offload a patient cannot respond at all. In life-threatening situations, there is no substitute for an emergency ambulance response. Ambulance ramping nullifies a scarce and expensive resource and prevents a vital health service from being delivered to the community. Deterioration in response performance can result in adverse outcomes for Triple Zero callers. There are media reports that highlight individual cases, but little high-quality research to investigate the scale of the problem.



TOR (f) the effectiveness of current measures being undertaken by NSW Health to address ambulance ramping, access block and emergency department delays / TOR (g) drawing on other Australian and overseas jurisdictions, possible strategies, initiatives and actions that NSW Health should consider to address the impact of ambulance ramping, access block and emergency department delays

A range of actions have been, and are being, taken in NSW, other Australian jurisdictions, and overseas to address the impact of ambulance ramping, access block and emergency department delays. The potential range of solutions can be grouped according to the underlying cause of access block and ED overcrowding, as summarised in Table 3.

Table 3 – Initiatives to address access block and ED overcrowding

Demand	Supply	Patient flow
Measures to reduce patients brought in by ambulance (alternative care pathways identified during the Triple Zero call, or on scene by paramedics)	Additional inpatient beds	ED time-based treatment targets and escalation processes for ambulance ramping
Diversion of low-acuity patients from ED (e.g., Urgent Care Centres)	Changes to in-hospital treatment approaches to reduce average LOS (effectively creating capacity)[24)	Senior doctor triage in ED[25)
Better community / residential care management of chronic to prevent patient deterioration		Changes to hospital patient flow and discharge processes
More treatment in situ (community/ residential care)		Additional supply of community services/ residential care

The multi-factorial causes of access block, ED overcrowding and ambulance ramping highlighted under TOR (a), and the wide range of initiatives highlighted in Table 3, means that solutions implemented by NSW Health in isolation will be only partially successful. Furthermore, strategies implemented elsewhere may not translate to Australia or NSW because of the complex nature of health system funding and service provision.

Tackling access block, ED performance and ambulance ramping requires a whole-of-system approach involving health, aged care and disability, and collaboration between NSW Health, the Australian Government and other agencies. In this respect, the recent announcements that NSW and Victoria will be seeking to work more closely with the Australian Government on healthcare reform are welcome.

This submission does not cover ED and hospital-based strategies beyond the summary in Table 3. Commentary on initiatives, strategies and actions below relates to the actuarial and paramedic professional experience of the authors: health service performance, data, funding and strategies that affect ambulance services.

Access block causes ED overcrowding causes ambulance ramping (transfer of care delays). The immediate consequence of transfer of care delays at ED is that ambulances are prevented from responding to emergencies in the community, wasting a scarce and expensive resource and denying an essential health service to the community. Possible ambulance service responses to this are:

- **More paramedics:** increase ambulance service response capacity
- **Identify appropriate alternate care pathways at point of triage:** reduce workload by reducing the number of patients that receive an ambulance response



- **On-scene treatment and referral:** Increase availability by transporting fewer patients to ED (and reducing the risk of getting stuck there).

#### Additional ambulance service capacity

In the view of the authors, recruiting additional paramedics is not a good solution to ambulance ramping. In this situation, additional response capacity is likely to be quickly consumed by ambulance ramping, and ‘more paramedics’ becomes ‘more paramedics waiting to offload patients at ED’.

Ambulance services are expensive to provide. In Australia in 2019-20 it cost \$3.9bn to respond to 3.9m incidents (\$1,050 per incident) for treatment and transport to definitive care[26]. By contrast, \$6.1bn was spent on EDs to treat 8.2m presentations (\$750 per presentation)[27].

There is little research to quantify the operational impact of ambulance ramping and the cost of the hours of paramedic time wasted, but ambulance ramping presents an obvious inefficiency in the provision of an expensive health service.

#### Identify appropriate alternate care pathways at point of triage (reduce ambulance responses)

Paramedics are the appropriate (and only) health service to respond to life-threatening emergencies in the out of hospital environment. However, NSW Ambulance responded to one million Triple Zero incidents in 2020-21, of which 52% did not require an emergency (lights and sirens) response[26]. Some of these lower acuity callers may not require an ambulance at all.

Several ambulance services (including NSW) have developed initiatives to address the high cost of dispatching an ambulance to low acuity calls while at the same time providing clinically-appropriate care. These initiatives involve passing lower acuity callers onto virtual care programs that provide telephone advice and referrals to a range of health providers[28, 29] at the point of the initial Triple Zero call.

Research indicates that of the calls referred to secondary triage (less than half of Triple Zero calls), a maximum of 31% could be diverted to self/ home care[30]. This means between 10 and 15% of Triple Zero calls could be appropriate for referral at the point of triage. This would have a significant impact on ambulance workload and free up valuable response capacity.

If the secondary triage process saves an ambulance being dispatched, at the estimated cost to state government at the upper end (e.g., with ultimate referral to a private virtual ED medical provider) is under \$400. This is less than half the cost of sending an ambulance, and an efficient initiative from the state government perspective in the context of the existing Triple Zero workload.

Looking through a whole-of-government lens, a more cost-effective solution may be to divert these patients to treatment through the Medicare-funded primary care system. A typical Medicare-funded GP consultation costs \$40 for a Level B consultation, ranging up to \$77 for a Level C consultation[31]. GP telehealth options are available (currently only for pre-existing patients). Both these options are significantly cheaper than the average \$1,050 cost of sending an ambulance, and potentially less than the cost of virtual care provision via Triple Zero.

Earlier in this paper we noted the clear barriers that patients face in accessing services out of hospital – including out-of-pocket costs, limited after-hours options and the convenience of accessing a mixture of services in the hospital setting. Given the substantial cost differential between primary care and ambulance, we encourage governments to work together to explore ways to address these barriers.

There is a lack of research in this area. Linked data analysis would be useful to understand the volume of calls that could be handled by secondary triage and referral services, the referral pathways available, the success of these referrals (in terms of avoiding re-presentations), patient safety, cost, and the interaction with alternative primary care or telehealth services.

#### On-scene treatment and referral

In 2020-21, 29% of NSW Ambulance patients were able to be treated and left at home, referred to their GP or another healthcare provider[26]. For patients who do not require an ambulance transport, there is a

potential time saving compared with transporting a patient to ED, which then creates capacity to respond to the next Triple Zero incident. However, the ambulance time saving is not significant if the patient could have been transported and offloaded to the ED waiting room. Non-transport incidents still involve response time, information-gathering, clinical assessment, identification of referral pathways and detailed documentation. The time savings are potentially more valuable against a backdrop of ambulance ramping, and the additional benefit is an ED presentation avoided.

The success of treat-and-refer options delivered by non-specialist paramedics depends on there being referral pathways available; there is currently a limited range of options in NSW. Anecdotally, paramedics who have worked in UK ambulance services report there being a wider range of referral options open to them, and of it being common to contact the patient's GP to discuss treatment.

The potential for paramedics to treat patients in situ has led to expanded roles for specialist paramedics in out-of-hospital care. NSW Ambulance has Extended Care Paramedics (ECP), who respond to low acuity high complexity incidents to provide urgent, unscheduled care. For specific interventions, they are highly effective. The cost of an ECP for an unscheduled catheter change or resolution of a feeding tube issue is significantly less than the cost of 'double-crewed ambulance plus ED presentation'. As with secondary triage/ virtual care, this initiative is effective in the context of the existing ambulance workload. Anecdotally, some residential care facilities are calling ECPs for routine catheter changes, which turns ECPs into 'cost-effective alternative to double-crewed ambulance' into 'expensive alternative to community nursing'.

### Use of linked data

Practical and political factors need to be bolstered by evidence-based solution design. The complex interrelationships between different parts of the system means it is important to identify priorities and develop initiatives that will have the largest impact in terms of reach and benefit versus cost.

This is where the use of linked health data and data from other sources can be utilised to greater effect. Through this paper we have noted areas where linked data could inform simulation modelling or scenarios testing in order to make informed decisions. Australia's siloed health datasets have been identified as a higher barrier to using data to support evidence-based change[32]. If these barriers can be overcome, modelling using linked data sets can be undertaken to understand questions such as:

- What happens to ambulance patients not transported to hospital, and what are their subsequent interactions with the health system?
- What might be the impact on patients, ambulances and EDs of sectoral investments like those proposed for residential aged care and being considered through the Disability Royal Commission?
- What is the difference in patient mix accessing low acuity services through ambulance, ED or primary care and how is this influenced by relative availability of different types of services?
- What might be the impact on patients, ambulance and ED services, and what might be the potential savings from investments in primary care that address current patient barriers?

Taylor Fry is currently working with NSW Health on several projects that use linked health system data to better understand patient pathways, outcomes and costs. For example:

- Using linked health system data, we recently commenced evaluation of the NSW Government's End of Life and Palliative Care Strategy 2019-2024. This project is using linked data encompassing hospital admissions, ED presentations, ambulance services, non-admitted patient services and cause of death data, to understand what health services patients needing palliative care services typically use in the six months prior to death. Initial analysis will seek to understand the variability in access to palliative care services across different types of patients and different LHDs, the variability in service mix across different patients and regions, and how investments in out-of-hospital care influence patient outcomes and NSW Health's costs.
- We are using similar linked health system data to investigate the effectiveness of investments in suicide prevention as part of the Towards Zero Suicides initiative. This analysis encompasses similar

linked data to the palliative care project, and in addition links a much broader range of data on out-of-hospital mental health services and will soon encompass Medicare data. This research will involve a deeper dive into patient pathways, understanding how patients access services pre and post a suicide attempt and what lessons that might mean for future service delivery.

We encourage government to harness existing linked data assets to explore the impact of different options on access block, ambulance ramping and ED performance. The LUMOS data set in particular links de-identified data from general practices with other health service data to provide a more comprehensive view of patient pathways. It can be used to better understand variations in service need (for example, the different types of services used by patients with different demographic characteristics, geographic locations or health conditions), and better understand patient pathways (for example, how differential use of GP services by different patient groups affects the use of ambulance and ED services). Linked data can also inform projection, scenario and simulation models that can estimate the potential impact of different changes on patient pathways and hence service need.

### TOR (h) any other related matters

No additional comments have been made under this term of reference.

We make this submission with optimism and in the belief that with intergovernmental collaboration and cross-system support, there is the potential to find sustainable solutions to access block, ED overcrowding and ambulance ramping. We would be available to participate in Committee hearings if requested.

Yours faithfully

**Sophie Dyson**  
Director

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Principal

### Submission authors

The authors of this submission are Sophie Dyson and Kirsten Armstrong, both Fellows of the Institute of Actuaries of Australia. Sophie Dyson is also an AHPRA-registered paramedic who works as a casual paramedic for NSW Ambulance. Additional research was undertaken by Taylor Fry consultants Alex Zhu and David Wassef.

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