Final Report on Systems Factors related to SAAS Safety Incidents in 2018

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Glossary

AO	Ambulance Officer
AMA	Against Medical Advice
CPG	Clinical Practice Guideline
ECP	Extended Care Practitioner
ESS	Emergency Support Service
ICP	Intensive Care Practitioner
KPI	Key Performance Indicator
NSQHS	National Safety and Quality Healthcare Standard
PCR	Patient Care Record
PTS	Patient Transport Service
RDR	Rapid Detection and Response
SAAS	South Australian Ambulance Service
SDM	State Duty Manager
SLS	Safety Learning System
TNT	Treat Not Transport
TL	Team Leader

1. Executive Summary

The South Australian Ambulance Service (SAAS) invited me to review a series of 17 patient safety incidents that occurred between August and December 2018. The purpose of this report is to determine the common systems factors that may have contributed to this small number of incidents. The report uses three data sources to inform its findings:

- Incident reports and other associated data such as transcripts or notes of interviews with staff members, SAAS Patient Clinical Records, and Event Chronologies;
- A random audit of 33 care records of patients managed by SAAS in December where abnormal clinical observations (such as heart rate or respiratory rate) were recorded;
- Findings and notes from 13 staff focus groups conducted by the SAAS Chief Executive Officer in response to the incidents in December 2018 and January 2019.

This report does not outline details, circumstances or outcomes of individual incidents as these are out of scope, instead it focusses on the common systems factors that may have contributed to them.

1.1. Summary of findings from the three data sources

There were 14 incidents in the 17 that were reviewed, where preventable patient harm may have occurred. An overall theme was that there was an under-appreciation of clinical risk posed to patients involved in these incidents. The most significant finding across the incidents was a lack of response to abnormal observations and to clinical and historical risks. These included incidents where observations were in the highest risk clinical category (purple) in the Patient Care Record (PCR) Rapid Detection and Response (RDR) charts. This lack of response manifested most frequently in not seeking clinical support from more senior colleagues. This may be due to lack of recognition of the significance of the clinical observations or unwillingness to contact senior colleagues, which needs to be explored further. Additionally, basic clinical observations were not completely documented in the PCR RDR charts in approximately half of the incidents. These observations are key to making clinical decisions and in determining whether escalation of care is necessary. There were also inappropriate and clinically risky activities being undertaken such as walking patients whose clinical observations suggested that this was not safe.

In terms of managing the incidents, some were not reported as incidents into the Safety Learning System (SLS). The reasons for this under-reporting of incidents with serious outcomes is not clear and needs to be further explored.

The audit of 33 care records found that only 30% of patients who had observations in the abnormal range were escalated. Whilst escalation is not mandatory, of those cases that were not escalated, 80% had either an observation in the highest risk (purple) RDR category or two observations in the "red" category.

In the 13 focus groups conducted by the SAAS Chief Executive Officer the main systems themes that emerged were the impact of ramping, organisational focus on activity targets and staff issues.

Ramping is a leading source of clinical staff frustration as it can led to an ambulance being unavailable for a period of hours. Over a number of years, the SAAS organisational focus has been mainly on achieving non-clinical targets or KPIs such as activity, response times, and throughput. The setting, focus and achieving of these targets has *"taken the focus away from the patient"* as clinical staff are aware of the need to achieve the KPIs. Both ramping and the organisational message to

reduce pressure on hospitals may have resulted in clinical staff being more reluctant to transport a patient to hospital and a change in their appreciation of clinical risk posed to the patient.

Staff issues were also prominent. Morale, complacency, and fatigue were mentioned in a number of the focus groups. Ramping and the increase in workload and patient acuity contribute to these issues. Two staff groups in particular were mentioned, Emergency Support Services (ESSs) and Team Leaders. ESSs were seeing patients that were too sick for their level of expertise and were not provided with the level of supervision that they required. Due to organisational pressures, Team Leaders are less able to provide adequate levels of supervision and advice to clinical staff, or to conduct reflective clinical review and feedback of incidents. This lack of management and supervisory capacity of TLs may have contributed to clinical staff changing their appreciation of clinical risks.

1.2. Recommendations

I note the pro-active efforts in the latter part of 2018 and early 2019 by the Patient Safety and Quality Team and SAAS Executive Management in recognising that incidents were occurring and taking action in response including undertaking numerous consultations and focus groups with staff, implementing more RDR resources and education, changing policies, communicating with staff, and commissioning this review. It is important to commend SAAS's previous and ongoing patient safety work in implementing the RDR chart, being successfully assessed against the Australian Commission on Safety and Quality in Healthcare National Safety and Quality Health Service (NSQHS) Standards, and facilitating a good incident reporting culture and providing extensive analysis and feedback in relation to SLS incidents.

In response to the findings, the recommendations that follow relate to executive systems, the rapid detection and response chart, data strategy and analysis, and incident reporting and analysis. The systems factors outlined in this report such as the impact of increased ramping, the decade-long organisational focus on ambulance activity, and organisational pressures on team leaders may have led to a change in the perception of what is an at-risk patient and who is need of transport. In response, a broader definition of a high quality service is necessary; one that is not just solely focussed on being a timely service but one that encompasses a strategy to measure, discuss, communicate, and improve on all domains of patient care, including safety, patient experience, and the delivery of contemporary best practice. Such a strategy involves enhancing the further implementation of clinical tools such as the RDR charts as well as investment in electronic patient care records and systems to efficiently capture and analyse data. Such a strategy must be driven internally by the executive and be core to SAAS's business strategy and organisational purpose.

Recommendation 1: SAAS develop a cohesive and organisation-wide strategy for delivering high quality and safe care across all six domains of healthcare quality.

Recommendation 2: The strategy includes a framework that outlines its high level goals and tactics for achieving those goals. One set of goals and tactics should be focussed on the central issue of this report, namely unsafe care associated with under-appreciation of clinical risk posed to patients.

Recommendation 3: The strategy should include sets of measures, applicable to SAAS and aligned to the framework in Recommendation 2 and the six domains of quality. The strategy must be embraced and role modelled by all levels of organisational leadership. It must be genuinely integrated into SAAS's strategic planning, operations, and organisational performance management.

Recommendation 4: The strategy should review and be explicit about the expectations and accountability across all levels and roles in the organisation in relation to quality and safety.

Recommendation 5: This strategy should carefully consider the capacity (in light of current structure and workload) for roles, particularly Team Leaders, to adequately undertake their quality and safety functions.

Recommendation 6: The strategy should review and consider the formation of an executive sub-committee that includes external representation, including from patients. See Box 4 as an example. This committee will monitor the implementation of the strategy and provide ongoing advice to executive.

Recommendation 7: The SAAS Executive strongly support the Patient Safety and Quality team's efforts to continue to embed the RDR charts. It is likely that the organisation-wide strategy for delivering high quality and safe care across all six domains of healthcare quality as outlined in Recommendations 1-6 will include improved adoption of the RDR charts as a key tactic.

Recommendation 8: The process for structured random auditing be reviewed in line with the goals and measures of the quality and safety strategy in Recommendations 1-6.

Recommendation 9: In line with the review of the process for structured random auditing, the feasibility of electronic patient care records being recorded should be investigated.

Recommendation 10: There should be clarity on the terminology to clearly distinguish between the activities of (for example):

- "Audit" – a selection of sets of PCRs to determine compliance with policy, best practice or standards; and
- "Guided reflective case review" – a review of one or a small number of cases by teams for the purpose of learning what worked and what could be improved in the management of patients.

Recommendation 11: In line with the quality and safety strategy outlined in Recommendations 1-6, SAAS continue to emphasise the benefits of incident reporting. More investigation on the barriers to incident reporting should be also undertaken.

Recommendation 12: Further procedure and training should be provided to Team Leaders on how to undertake best practice reflective case reviews. Furthermore, an assessment of Team Leader's workload capacity to adequately undertake reflective case reviews and other safety and quality activities should be undertaken, given the increase in their reported operational workload in the past decade.

Recommendation 13: Where it is considered that they may have valuable information, patient or family interviews should be included in investigations of serious incidents. Legal advice may need to be sought to clarify the circumstances when these are not appropriate from a legal risk perspective.

Recommendation 14: Within SAAS's data strategy, consideration should be given to the use of other patient safety tools such as the global trigger tool. The purpose of the tool is two-fold – to detect previously unknown adverse events and to catalyse discussions on patient safety and quality.

2. Introduction

The South Australian Ambulance Service (SAAS) invited me to review a series of patient safety incidents that occurred between August and December 2018 where SAAS had causes for concern with the clinical management of patients. Based on this I reviewed 17 incidents which included incident reports, transcripts or notes of interviews with staff members, SAAS Patient Clinical Records, and Event Chronologies (see Section 3.1). The purpose is to review the common systems factors that may have contributed to the small number of incidents that occurred.

It should be noted that the details, circumstances and outcomes of individual incidents are out of scope for this report. It should also be noted that at the time that the incident reviews were conducted for this report in December 2018, not all SAAS investigations into the incidents were complete.

The report has also been informed by a random audit of 33 care records patients managed by SAAS in December where abnormal clinical observations (such as heart rate or respiratory rate) were recorded (Section 3.2). The purpose of the audit was to further inform the current "normal" practices of SAAS clinical staff without the "outcomes bias" that may be associated with analysing incidents where patients may have been harmed.

The reviews of the incidents and care record random audit are supplemented and informed by findings and notes from 13 staff focus groups conducted by the SAAS Chief Executive Officer in December 2018 and January 2019. The purpose of the focus groups was to explore the reasons for the current set of incidents (Section 3.3).

Based on these analyses, this report has made 14 recommendations which are outlined in Section 4 and grouped according to executive systems, the rapid detection and response chart, data strategy and analysis, and incident reporting and analysis.

3. High level findings

3.1. Information Source 1: Incident reviews

In 14 of the 17 incidents reviewed preventable patient harm may have occurred. Based on the information within these incidents, the common systems themes are outlined below. Theme numbers 1, 2, 4, 5, and 6 were collectively related to an overall theme of an under-appreciation of clinical risk posed to patients.

1. Basic clinical observations and related tests were not completely documented in the Patient Care Record (PCR) Rapid Detection and Response (RDR) charts in about half of the incidents. These included, as examples:
    a. second sets of observations not done for Treat-No-Transport (TNT) cases; and electrocardiographs (ECGs) where relevant.
    b. discrepancies in two cases between the electronic (via the HeartStart MRx Monitor) and the PCR observations recorded;
    c. a patient not objectively assessed by an ECP in a residential aged care facility (RACF) despite RACF staff taking observations that were equivalent to the most "out-of-range" RDR category (purple), and verbally passing this information onto an Extended Care Practitioner (ECP).

2. The most significant finding across the incidents was a lack of response to abnormal observations and to clinical and historical risks. These included incidents where observations and clinical and historical risks were in the high risk (purple) category in the RDR chart[1]. This lack of response manifested most frequently in not seeking clinical support from more senior colleagues. This may be due to lack of recognition of the significance of the observations or unwillingness to contact senior colleagues, which needs to be explored further. Note that for patients assessed as "potentially critically unwell – high risk", the SAAS guidance document states that clinical support should be "considered", that is, it is not mandatory. Although, we cannot be certain, "confirmation" bias is likely to play a part in the development of an incorrect diagnosis that in four incidents seems to have preceded the patient harm. Given the combination of diagnostic problems and patient harm, it is likely that the management of these patients would have benefited from a clinical review from a senior colleague with a "fresh set of eyes" who may challenge the thinking of the clinical staff. It should be noted that for TNT and Refusal of Service cases, SAAS changed its policy in December 2018 in response to these incidents in late 2018, such that a clinical review *must* be sought prior to a refusal of service or engagement in any non-transport referrals by Ambulance Officers and Paramedic staff. The change in policy means that a clinical review is a requirement for any non-transport referrals where RED or PURPLE Rapid Detection & Response (RDR) Chart triggers or Clinical/Historical Risk Factors are identified.
3. Inappropriate response from senior colleagues: this finding was not as strong as lack of the observations and lack of response to abnormal observations and clinical and historical risks. In one incident, it was noted that the ECP support via the telephone did not include probing or challenging questions, was accompanied by incomplete notes, and was likely to be affected by fatigue of the ECP.
4. Inappropriate and clinically risky activities undertaken such as walking patients whose observations suggested that this was not safe. At least four patients were walked, or allowed to walk, in what appears to be inappropriate circumstances.
5. As discussed in the second theme confirmation bias and an associated incorrect diagnosis may have been a characteristic in at least four examples in this set of incidents. These include pulmonary embolism for cardiac arrest; anxiety for cardiac arrest; mental health for cardiac arrest; and frailty/falls for atrial fibrillation. These circumstances may be related to the lack of clinical review and support sought from more senior colleagues despite indications in observations and clinical and historical risks that clinical review should be considered.
6. In a number of incidents where the outcome was TNT or Against Medical Advice (AMA), further clarity and review is needed about the strength of clinical staff's recommendations to patients, in relation to the perceived clinical need to be transported to hospital for medical review.
7. Some incidents were not reported as incidents into the Safety Learning System (SLS). The reasons for this under-reporting of incidents with serious outcomes is not clear and needs to be further explored.
8. In the investigations that followed the incidents, there was little evidence of interviews with patient's families who were present when critical events took place. These interviews may provide clarity on the types of conversations that occurred between the ambulance staff and

patients and families. There may be valid reasons for interviews not being conducted, such as SAAS not being immediately aware of the incidents. Although interviews need to be approached in the correct manner, both from a medico-legal perspective and as they involve emotionally traumatised families, they may be important in capturing other perspectives about what happened. Natural justice for the ambulance staff involved in incidents with serious outcomes dictates that all reasonable information sources should be collected.

9. In most of the incident reports, there were no recommendations as many were still under investigation.

3.2. Information Source 2: Case Audit

Due to the increased number of adverse events experienced in late 2018, a random case audit was conducted where clear clinical triggers were identified on the Patient Clinical Records (PCR) RDR chart or as Clinical and Historical Risks for deterioration. The case audit was conducted by Damien Norsworthy, SAAS Intensive Care Paramedic and Clinical Support Officer in Clinical Education at SAAS. The cases represent a small number of cases and further audits may be necessary to ensure it is representative.

A convenience sample of 33 cases from 7 December to 9 December 2018 was identified by randomly selecting cases. The resulting 33 cases were audited in order to determine whether clinical escalation was conducted appropriately.

There were 33 Patient Clinical Records (PCRs) assessed. The clinical staff incorporated in these were: paramedic (22), ambulance officer (4), and 7 intensive care paramedic. Of the 33 cases, two cases involved a TNT: patient suffering a narcotic overdose and a patient who was palliative. Of the 33 PCR's, Table 1 shows the parameters that were completed by percentage.

TABLE 1: % COMPLETED SELECTED PARAMETERS IN AN AUDIT OF 33 PCRS

Parameter	% completed
Age Risk Factors box	88
Gender	99.7
Patient weight	70
Presenting complaint	73

Of the 26 ambulance officer (AO) and paramedic cases, 37% of patients who had multiple yellow, red or purple RDR triggers on their PCR were escalated in some form. Case Priority breakdown for the 26 cases is shown in Table 2.

TABLE 2: PRIORITY IN AN AUDIT OF 33 PCRS

Priority	n
P1	2
P2	17
P3	3
P4	2
P5	1
P6	1

Two included cases related to children, both aged five. If these two cases are excluded, then only 30% of cases were escalated. In the 16 cases that were not escalated, 10 had observations at least in the red zone and six had purple observations. Of the 16 cases:

- seven had more than one parameter (RR, SpO2, BP, PR, Temp, Pain, ECG, GCS) in the red;
- one had a purple and a red parameter; and
- two cases had multiple purple parameters (RR, SpO2, BP, GCS; RR, PR, GCS).

Examples of escalation include:

- three cases requested a higher clinical level (two requests for an Intensive Care Practitioner (ICP) and one request for a Paramedic by an AO crew);
- three cases consulted to the ECP or State Duty Manager (SDM) where ECP was not available (one case) (included one of the five year old cases);
- two were ICP Auto Dispatches for Priority 1 cases; and
- two cases consulted with doctors on scene of transfer or via phone (included one of the five year old cases).

3.3. Information Source 3: Staff and Management Focus Groups

The SAAS Chief Executive Officer conducted 13 focus groups with staff in December 2018 and January 2019 where an overview of each incident was presented and the reasons for the current set of incidents were explored. The groups included Clinical Team Leaders, Operations Managers, Extended Care Paramedics, and the in-service training team. Most SAAS managers have attended one of these sessions. Numerous themes emerged with the most consistent outlined below. The themes were developed from the notes taken at these sessions.

The impact of ramping

The increased incidence of ramping in the past 12 months, and the associated publicity, may have had an impact on the attitudes or decision-making of clinical staff and their use of AMAs and TNTs. Ramping is a leading source of clinical staff frustration as it can led to an ambulance being unavailable for a period of hours. The impact may be a subtle reluctance of clinical staff to transport patients to hospital and a change in their appreciation of clinical risk posed to the patient: *"People feeling under more pressure to actively keep patients out of hospital or they get ramped."* [all italicised text blocks are quotes from one of the 13 focus groups]. A number of comments in the focus groups mentioned that this attitude needed to be countered with an *"it's OK to take people to hospital message."*

Organisational focus on meeting non-clinical targets

Another dominant theme to emerge during focus group discussions was organisational focus. Over a number of years, the SAAS organisational focus has been mainly on achieving non-clinical targets or KPIs. These KPIs are generally related to patient activity, response times and throughput. The setting, focus and achieving of these targets has *"taken the focus away from the patient"* as clinical staff are aware of the need to achieve the KPIs. The *"push on performance times"* and *"no clinical indicators"* may led to reduced assessment activities and recording as clinical staff are under time pressure: *"Get there fast is more important than what we do when we get there".* This organisational focus also includes reducing pressure on the hospital system which has been a significant driver over the last decade: *"pressure to get crews to clear hospitals – performance criteria"*, *"culture and*

corporate message ex NHS re non-transport" and *"people feeling under more pressure to actively keep people out of hospital"*. This latter driver may subtly increase clinical staff's tendency to TNT a patient.

The AMA / TNT system

The decision-making process of clinical staff leading to AMAs and TNTs may have been influenced by ramping and by the organisational message as the clinical staff have felt the need to reduce pressure on hospitals (see previous theme). This may have resulted in clinical staff being more reluctant to transport a patient to hospital. The focus groups raised the possibility of some uncertainty regarding the language and interpretation of AMAs and TNTs (the recent policy update and release[2] may counter this). One focus group member felt that some Emergency Support Service personal (ESSs) may be reluctant to speak to ECPs re TNTs so they "opt" for an AMA. Some clinical staff feel under time pressure from the Emergency Operations Centre (EOC) when they have notified the patient as a TNT (this may have been addressed via education work done internally within the EOC in late 2018). There is also a lack of organisational learning on AMAs and TNTs, including feedback and education on their appropriateness.

Clinical assessment and recognition of potentially deteriorating patients

Problems with the process of clinical assessment and recognition of deteriorating patients was multifactorial. RDR design was mentioned, however, the more recent changes in clinical consult pad construction are likely to improve this. A lack of understanding of the RDR, being too familiar with the RDR, and a checkbox mentality all were mentioned (and are mildly contradictory to each other). *"Some observation recording has become tick/flick."* There may be a lack of understanding about why the RDR has been introduced, (i.e., that it is a valuable tool to assist in clinical reasoning and to flag patients who may be of at higher clinical risk). Rather, it may be seen as a compliance tool for management to ensure that clinical staff are undertaking observations. There were also a number of comments related to the focus of education and skill sets, with most of the emphasis on management of high acuity medicine, however the subtle clinical signs and presentations are given less time: *"good with big sick – difficulty with little/subtle sick"*.

Clinical Practice Guidelines (CPGs)

Problems with clinical practice guidelines (CPGs) are a recognised problem, i.e., they were recognised prior to late 2018, however they may have still contributed to clinical staff decision-making in relation to the incidents reviewed in this report. It is acknowledged that CPGs are highly useful and a necessary support for clinical staff. However, it is difficult for clinical staff to keep up with changes to CPGs and if a patient does not "fit" a CPG profile, then clinical staff may be more likely to consider the patients as not-urgent.

Team leader roles

One of the strongest themes to emerge was the Team Leaders (TLs) role. This theme focussed both on the on-the-job supervision provided by TLs and the capacity to routinely and systematically review and discuss cases for learning. Over a number of years, there has been a significant increase in the ratio of clinical staff to TLs with an associated increase in TL administrative workload. This has led to reduced contact formally and informally between TLs and clinical staff. The feedback in the focus groups was strong and consistent that the TLs are unable to provide the same level of supervision and advice to clinical staff as had previously occurred. This has also lead to junior staff being less willing to seek clinical input due to their lack of access to TLs. TLs, due to time constraints,

are also less able to provide clinical review of incidents or cases and to audit cases under their supervision in a routine and systematic manner. This lack of management and supervisory capacity of TLs may have contributed to clinical staff changing their appreciation of clinical risks.

Emergency Support Service (ESS) roles

Some focus groups felt that ESSs were operating like paramedics and seeing patients that were too sick for their level of expertise, ESSs were not provided with the level of supervision that they required, and nor did ESSs feel comfortable seeking help from ECPs. One individual stated that the ESSs were the subject of *"years of organisational abuse"* gradually drifting towards managing more sick patients, and they had poor morale as a result.

SAAS morale, complacency, and fatigue

Morale, complacency, and fatigue were mentioned in a number of the focus groups, as specific to ESSs or more generally. Ramping, the increase in workload and patient acuity, and the lack of TL supervision all contribute to poor morale.

The system for responding to and communicating incidents and errors

The system for responding to and communicating incidents and errors was mentioned more in relation to the clinical staff and TL roles rather than SAAS Executive or the Patient Safety and Quality Team. As stated above, in the section on TLs, there is little time for TLs to discuss with clinical staff in a routine and systematic manner, the types of the incidents and errors that are occurring, to collectively undertake reflective case reviews, and to use these reviews as rich learning opportunities. There is also a lack of organisational drive and focus to undertake the reviews.

A couple of individuals stated that there was no real system for finding the serious incidents and that SAAS may be missing other serious incidents. A system of feedback from or more communication with the hospitals about their patients was thought to have value. There were also comments that a compliance culture existed, rather than a learning culture, which may impact on how audits are managed. There was a need to embed the audit process more systematically, to provide more guidance, and to potentially do periodic thematic audits, for example, GTN administration.

4. Discussion and Recommendations

I note the pro-active efforts by the Patient Safety and Quality Team and SAAS Executive Management team in recognising this problem and already putting in place actions to:

- further understand the problem, via the focus groups and numerous discussions with staff and incident reviews;
- tackle the problem, such as implementing more RDR resources, and changing policies. I note that the policy has been changed such that all Ambulance Officers (including extended scope of practice, remote AO, ESS AO, PTS AO and regional volunteer AO), Ambulance Responders and Ambulance Assist are required to seek clinical authorisation for any patient who is not requiring or consenting to be transported to an Emergency Department;
- communicate with staff, such as the Clinical Communication on Adverse Events (CLC-18-035) issued on the 19 December 2018.

I also acknowledge and commend SAAS's commitment to implement the Rapid Detection and Response (RDR) Observation Chart. This is a critical clinical tool that can standardise assessment, assist clinical staff to screen patients who may be at risk of clinical deterioration and in need of escalation of care, and may assist SAAS in its performance monitoring as it provides a more robust and structured method of auditing care.

The following recommendations are for consideration by the SAAS Executive Leadership Team. A note on "Technical recommendations": these relate to changes in policy, further education of SAAS clinical staff, and providing more information to clinical staff. These are important and necessary to reduce similar incidents where a patient's clinical risk may be under-appreciated. However, these will be of little benefit, unless an extensive safety cultural strategic, diagnostic and implementation exercise is undertaken with SAAS led by the executive (see Section 4.1: Recommendations 1 – 6 below).

4.1. Executive system and commitment to quality

Healthcare quality is generally considered to have six domains – patient safety, efficiency, effectiveness/appropriateness, patient-centredness (or experience), access and timeliness[3] (see Box 1). These domains can be applied via strategies and measures to different types of healthcare organisations including hospitals, primary care, and ambulance. They clearly overlap and it is common for healthcare organisations to be measured and concentrate on some domains more than others.

Box 1: The six domains of healthcare summarised

The right patient has access to, and is offered the right care at the right time, safely, and in accordance with their personal beliefs, at the lowest possible cost.

For SAAS, it is likely that its strategy and the measures that are most important relate to the domains of access, timeliness and efficiency. These are embodied by parameters such as call handling, triaging times and emergency responses times by priority category. It is right and proper for SAAS to be measured against these parameters, as they are core to its business.

However, a high quality service will plan for, measure, discuss, communicate, and try to improve all domains. Boxes 2 and 3 show some safety and quality measures used in Ambulance Victoria and internationally as examples. Whilst the first two and the last two indicators in Box 2 are used by SAAS, they are not used as part of a planned data strategy to monitor and improve care (see Recommendation 8 in Section 4.3). It should be noted that a significant number of examples of indicators in Box 3 relate to recording of clinical signs such as patients with trauma (e.g., Glasgow Coma Score, blood pressure, respiratory rate, SpO2, pupil reaction and for patients with stroke/TIA (e.g., blood sugar and blood pressure). The importance of undertaking and recording clinical signs such as these is a key theme of this report to SAAS. Importantly, this report is not advocating SAAS use these particular indicators, but provides them as examples of quality indicators that are not just related to access, timeliness and efficiency.

Box 2 Examples of safety and quality measures in Ambulance Victoria [4]
Percentage of emergency patients satisfied or very satisfied with the quality of care provided by paramedics
Percentage of patients experiencing severe cardiac or traumatic pain whose level of pain is reduced significantly
Percentage of adult stroke patients transported to definitive care within 60 minutes
Percentage of major trauma patients that meet destination compliance
Percentage of adult cardiac arrest patients surviving to hospital
Percentage of adult cardiac arrest patients surviving to hospital discharge

Box 3 Emergency Services Quality Indicators[5]

A paper reviewing Emergency Medical Services (i.e., a wider scope than ambulance) quality indicators outlined examples of patient clinical assessment and management that can be tracked and measured[5]. It included those for STEMI, stroke/TIA, asthma, hypoglycaemia, trauma, and cardiac arrest.

STEMI
Aspirin
Nitroglycerin
Recording pain score (before and after treatment)
Pain medication
Transfer targets for thrombolysis/PCI

Stroke/TIA
Recording of Face Arm Speech Test (FAST)
Recording of blood sugar
Recording of blood pressure

Asthma
Recording of respiratory rate
Recording of Peak Expiratory Flow Rate (PEFR)
Recording of SpO2
β2 agonist
Oxygen

Hypoglycaemia
Recording of blood glucose before treatment
Recording of blood glucose after treatment
Recording treatment
Direct referral to appropriate health professional

Severe trauma
Glasgow Coma Score, GCS < 8)
Recording of blood pressure
Recording of respiratory rate
Recording of SpO2
Recording of pupil reaction

Cardiac arrest
Return of Spontaneous circulation (ROSC) on arrival to hospital
Presence of defibrillator on scene
ALS provider in attendance
Call to scene response ≤4min

The SAAS Annual Report (2016/17) only reports patient level metrics related to the domains of access, timeliness or efficiency. It also reports aggregated incident analysis and themes which relates to the domain of patient safety. Other domains are not reported.

A peer-reviewed paper published in 2006 in the United Kingdom by Price, using interviews with experienced ambulance officers, outlined how only using metrics such as response time targets is inadequate as a set of performance indicator[6]. These metrics tend to dominate ambulance service culture and practice at the expense of other quality indicators. Strategies introduced to meet targets against these metrics can be detrimental to patient care and also have adverse effects on the health, safety, wellbeing, and morale of paramedics. The authors concluded that there is a need for quality indicators that include more than timeliness – these should recognise that there are many stages and tasks between a patient's call for help and safe arrival in hospital.

The incidents that led to this report in South Australia relate to the domains of care of patient safety as well as effectiveness/appropriateness, or in more understandable terms, care (assessment and management) that is evidence-based. Clinical guidelines, policies, and education are the mechanisms by which the delivery of evidence-based care is promoted within SAAS. They are critical and must be continued and refined as necessary. However, a deliberate strategy, accompanied by a set of measures, reporting structures, and accountabilities, to facilitate this delivery of evidence-based care is not readily apparent.

Of note, and to be commended, is SAAS's commitment and successful assessment against the Australian Commission on Safety and Quality in Healthcare National Safety and Quality Health Service (NSQHS) Standards. These standards are not compulsory for ambulance services, so being assessed against them is a discretionary activity. This is an important and necessary building block to becoming a high quality healthcare organisation.

However high quality is more than compliance with external standards (note the finding in the focus groups of the problems arising within SAAS of solely achieving non-clinical targets or KPIs - see Section 3.3: Information Source 3). High quality organisations have a relentless focus on the needs of the patients framed by the six domains, and understanding if and how they can meet those needs.

This focus on patients' needs must be internally driven by executive and be core to organisational business strategy and purpose. More importantly, executive and staff "own" the results - the drive to improve is not externally driven by compliance, but by internal organisational motivation.

Two strong findings in the SAAS Staff and Management focus groups (see Section 3.3) was the impact of increased ramping and a decade-long organisational focus on reducing hospital demand. The increased incidence of ramping in the past 12 months and the associated publicity may have had an impact on the attitudes and clinical decision-making of clinical staff in terms of blunting or bias in interpretation of clinical presentations and possibly led to a change in the perception of what is a sick or an at-risk patient and who is need of transport. Having a quality and safety strategy in place can help an organisation frame and respond to external influences that are inevitability going to arise.

Recommendation 1: SAAS develop a cohesive and organisation-wide strategy for delivering high quality and safe care across all the six domains of healthcare quality.

Recommendation 2: The strategy includes a framework that outlines its high level goals and tactics for achieving those goals. One set of goals and tactics should be focussed on the central issue of this report, namely unsafe care associated with under-appreciation of clinical risk posed to patients.

Recommendation 3: The strategy should include sets of measures, applicable to SAAS and aligned to the framework in Recommendation 2 and the six domains of quality. The strategy must be embraced and role modelled by all levels of organisational leadership. It must be genuinely integrated into SAAS's strategic planning, operations, and organisational performance management.

Recommendation 4: The strategy should review and be explicit about the expectations and accountability across all levels and roles in the organisation in relation to quality and safety.

Recommendation 5: This strategy should carefully consider the capacity (in light of current structure and workload) for roles, particularly Team Leaders, to adequately undertake their quality and safety functions.

Recommendation 6: The strategy should review and consider the formation of an executive sub-committee that includes external representation, including from patients. See Box 4 as an example. This committee will monitor the implementation of the strategy and provide ongoing advice to executive.

Box 4: Safety and Quality Governance Example[4]

Ambulance Victoria has a committee which actively monitors the performance of quality care and service provision against the five domains of the Safer Care Victoria Clinical Governance Framework and Ambulance Victoria's own Best Care Framework. Membership includes board directors (each with extensive health service Board and governance experience), paramedic observers and Community Advisory Committee members.

4.2. Rapid Detection and Response Chart

As noted previously, SAAS has implemented the Rapid Detection and Response (RDR) Observation Chart. However, there is evidence that the RDR is not fully embedded and accepted by all teams and clinical staff such that it is not consistently completed in the PCR and nor are clinical actions

appropriate in the light of abnormal observations. This evidence is found in all three data sources reviewed – the incident reviews, care record audits, and focus groups.

Recommendation 7: The SAAS Executive strongly support the Patient Safety and Quality team's efforts to continue to embed the RDR charts. Potential measures to monitor their adoption are discussed in the next section. It is likely that the organisation-wide strategy for delivering high quality and safe care across all the six domains of healthcare quality as outlined in Recommendations 1-6 will include improved adoption of the RDR charts as a key tactic.

4.3. Data strategy and analysis to inform quality

SAAS currently undertakes structured random audits of completeness of clinical observations and other parameters. These audits are undertaken for the purposes of accreditation and also quality improvement activities. They have been published in various SAAS staff forums and are supplemented by strong messages and education from the SAAS Patient Safety and Quality Team. However, their impact, for example in changing SAAS clinical staff behaviour to increase the reliability of observations being documented, has potential to improve.

Publication of the results of their audits internally is often accompanied by de-identified incident reports. This is best practice and to be commended (i.e., to present the quantitative information together with "stories" that illustrate the impact that may occur when observations and other processes are not reliably followed and recorded). The recent report in the December 2018 Safety and Quality Matters Newsletter by Dr Cathrin Parsch, SAAS Chief Medical Officer, followed by a summary of incident reports, is an excellent example of highly useful information provided to clinical staff using such a format.

In terms of audits[1], there are a couple of options that can be considered to add to the good work by the SAAS Patient Safety and Quality Team which are discussed below. However, all options should be considered in light of the strategy that is developed as part of the Recommendations 1-6 above.

- One option to be considered is to present audits by **teams** in a comparative manner e.g., using funnel plots that illustrate which teams are performing "out of the ordinary"; and statistical process control (SPC) charts, which track progress over time. Appropriate use of funnel plots and SPC charts are considered best practice in organisations delivering high quality healthcare (see Appendix A). Making comparative performance explicit at team level provides the SAAS with more granular performance information and it can incentivise clinical staff within teams to change their behaviours. The disadvantage is that more data needs to be manually analysed as electronic statistical and patient care related information is not readily available at a local level.
- Another option is for a system of audits that are undertaken at the level of teams be promoted and supported. Currently teams do "audits" but these are individual reflective case reviews for learning. They do not undertake structured random audits of RDR clinical observation completeness and other parameters. The advantage of team based audits is that they tend to be "owned" by the teams and their results are more likely to be actioned. For such audits, provision of support from the Patient Safety and Quality Team in terms of training, guidance (how many, how often, sampling), and templates (for collection, presentation, discussion) is

[1] Note the term "audit" in SAAS has a number of meanings and Recommendation 9 of this report seeks to clarify this.

critical. TLs need to be provided with the time and capacity to undertake these (see Recommendation 5 and 12).

Recommendation 8: The process for structured random auditing be reviewed in line with the goals and measures of the quality and safety strategy in Recommendations 1-6.

One of the major barriers to efficient structured random auditing is the reliance to record clinical data on paper. Data captured and stored using paper requires staff to manually review each record to sample and to assess the parameters in question. It is a very time-consuming, expensive, and potentially error-prone. In contrast, electronic systems that capture clinical information may allow more automated and efficient audits to be undertaken to enable care to be monitored over time. Electronic systems also allow the embedding of clinical decision-making tools at the point of care which may increase the reliability of the delivery of appropriate care including recording of, and actions in response to, observations.

Recommendation 9: In line with the review of the process for structured random auditing, the feasibility of electronic patient care records being recorded should be investigated.

Recommendation 10: There should be clarity on the terminology to clearly distinguish between the activities of (for example):

- "Audit" – a selection of sets of PCRs to determine compliance with policy, best practice or standards; and
- "Guided reflective case review" – a review of one or a small number of cases by teams for the purpose of learning what worked and what could be improved in the management of patients.

4.4. Incident reporting and analysis

An organisation with a comprehensive quality and safety strategy should have multiple sources of data to inform and measure their strategy and performance. This includes incident reporting, which is currently the most important source of safety information in SAAS. The culture in SAAS of reporting incidents is reasonably good with 120 incidents per month, on average, reported into the SA Health statewide incident management system, the Safety Learning System (SLS). If more incidents are an indication of a better safety culture, this number compares favourably with various NHS Ambulance Services (Table 3), which are much larger and service greater populations than SAAS. For example, London services a population of more than eight million people. This good safety culture within SAAS is likely to be driven by the extensive analysis and feedback provided back to the teams by the Patient Safety and Quality Team. Feedback in relation to incidents has been shown to be one of the most important factors for engagement with incident management systems[7, 8]. However, despite the culture of reporting, a number of the incidents that led to this review were not reported in the SLS despite clearly meeting the criteria.

TABLE 3: NHS AMBULANCE SERVICE AVERAGE MONTHLY INCIDENT REPORTS[9]

NHS AMBULANCE SERVICE	N
LONDON	139
NORTH (CUMBRIA AND NORTH EAST)	198
NORTH (LANCASHIRE AND GREATER MANCHESTER)	53
NORTH (YORKSHIRE AND HUMBER)	137
MIDLANDS AND EAST (NORTH MIDLANDS)	126
MIDLANDS AND EAST (WEST MIDLANDS)	39
MIDLANDS AND EAST (EAST)	579
SOUTH (SOUTH EAST)	127
SOUTH (SOUTH CENTRAL)	10

There has been one study on barriers to incident reporting in the ambulance sector (in the Republic of Ireland). This study confirms the broader international healthcare literature on barriers including lack of feedback, fear of consequences, procedural ambiguity and a perceived lack of confidentiality[7].

Of further consideration by SAAS is the nature of feedback provided. Feedback provided is often a "passive" process — a process of information transfer rather than a participative exchange. An incident report potentially represents someone speaking up, stating that an issue concerns them and that they have an interest in its improvement. Rather than simply collecting and feeding back information, incident reporting systems should provide spaces that encourage open conversation, participative investigation and collective improvement of safety[8]. The implication is that the extensive feedback provided back to the SAAS teams by the Patient Safety and Quality Team may need to be enhanced by strategies to encourage more active discussion at team level of incidents that have occurred.

Recommendation 11: In line with the quality and safety strategy outlined in Recommendations 1-6, SAAS continue to emphasise the benefits of incident reporting. More investigation on the barriers to incident reporting should be also undertaken.

Recommendation 12: Further procedure and training should be provided to Team Leaders on how to undertake best practice reflective case reviews. Furthermore, an assessment of Team Leader's workload capacity to adequately undertake reflective case reviews and other safety and quality activities should be undertaken, given the increase in their reported operational workload in the past decade.

One of the findings of the incident reviews in this report (Section 3.1) was that there was little evidence of interviews with patient's families who were present when critical events took place. These interviews may provide clarity on the types of conversations that occurred between the ambulance staff and patients and families. There may be valid reasons for interviews not being conducted for some of these incidents as SAAS were not immediately aware of the incidents.

Recommendation 13: Where it is considered that they may have valuable information, patient or family interviews should be included in investigations of serious incidents. Legal advice may need to be sought to clarify the circumstances when these are not appropriate from a legal risk perspective.

Finally, within the domain of patient safety, incident reports are not the only method of collecting information. Another method includes the "Global Trigger Tool" (GTT) which is a method for detecting incidents by reviewing patient medical records[10]. The GTT was initially developed by the Institute of Healthcare Improvement (IHI) in 2003 for use in hospitals, and has been modified for primary care[11]. GTTs use a series of triggers to screen the medical record for a potential adverse event. The presence of a trigger then leads to a more in-depth review of the record. Adverse events are then coded according to their type and an incident rate is calculated. The original IHI version of the GTT has been shown to have high specificity, moderate sensitivity and favourable inter-rater and intra-rater reliability using hospital-based records[12].

There is only one published study using a GTT in an ambulance environment, which was in Qatar[13]. Triggers specific to ambulance were developed and then records were manually reviewed. The study found a low level of adverse events of 2.48 AEs per 10,000 patient encounters. The other finding was that three triggers accounted for 93% (n = 180) of the triggers found throughout the analysis:

- Change in Systolic Blood Pressure Greater Than 20%;
- Temp > 38°C without subsequent reduction; and
- SpO2 < 94% without supplemental Oxygen or SpO2 < 85% without assisted ventilation.

These triggers have the potential to supplement the SLS to capture adverse events. My previous work with the GTT has concluded that it can be a useful supplement patient safety source; however given that it can be time-consuming, it should be used in a limited manner[10, 11].

The GTT, like other medical record review techniques, can have a further purpose which relates to interactive incident feedback discussed above – that the act of reviewing records by clinicians can lead to highly useful discussions on patient safety and the quality of care.

Recommendation 14: Within SAAS's data strategy, consideration should be given to the use of other patient safety tools such as the global trigger tool. The purpose of the tool is two-fold – to detect previously unknown adverse events and to catalyse discussions on patient safety and quality.

5. References

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Appendix A: Quality improvement data methods examples

Below are two methods used to display data that encourage improvement. Appropriate use of these methods is a common feature of high performing healthcare organisations. A succinct guide on these techniques is the NSW Clinical Excellence Commission "Measurement for Quality Improvement for Board Members and Executives", found here: http://www.cec.health.nsw.gov.au/knowledge-and-resources/publications-library/reports/quality-improvement

Statistical Process Control (SPC) Chart example[13]

This figure shows the rate of adverse events over time in an ambulance service. The UCL and LCL represent the upper and lower control limits – these are generated from the data and are 3 standard deviations from the mean. SPC charts have rules relating to points of data outside these control limits or trends in the data whereby further investigation is warranted.

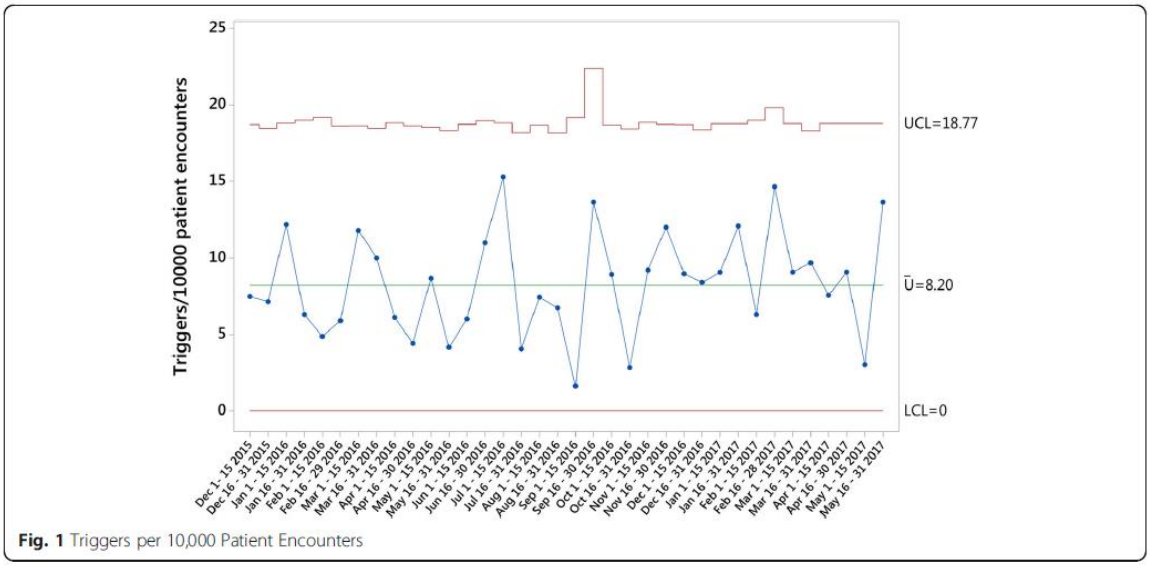


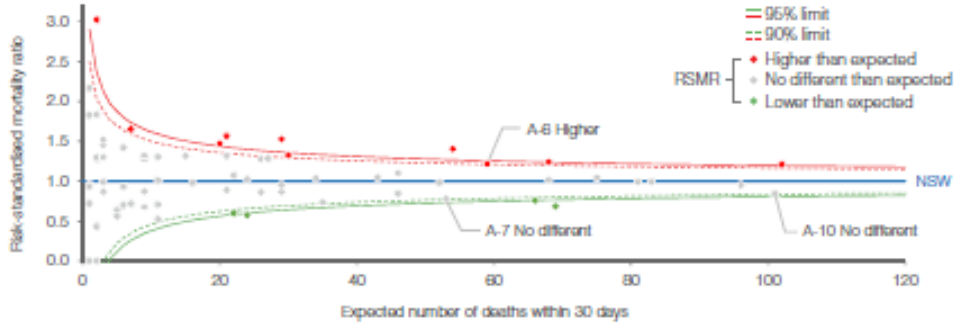
Fig. 1 Triggers per 10,000 Patient Encounters

Funnel Plot Example [14]

The figures below show the rate of the ischaemic stroke mortality in NSW hospitals. Each represents a hospital and the hospitals in red have rates greater than 2 standard deviations above the mean.

Figure 7 Ischaemic stroke 30-day risk-standardised mortality ratio, NSW public hospitals, July 2009 – June 2012

Including private hospital patients



Excluding private hospital patients