

Clinical Excellence Commission Sepsis Pathways Behavioural Survey





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Acknowledgment

The CEC would like to thank the NSW Health clinicians who have contributed to this survey and provided insightful feedback around the challenges faced in the recognition and management of sepsis.

Understanding clinician perspectives has been invaluable in revising our sepsis pathways and refining the future direction of sepsis care.



Key points

This report details the findings of a comprehensive survey of NSW Health clinicians' perspectives to understand the challenges and barriers to recognising and managing sepsis, including utilisation of a sepsis pathway. The findings identify opportunities for improvement for consideration by Local Health Districts / Specialty Health Networks and by the Clinical Excellence Commission (CEC).

- Over a three-week period, **530** survey responses were received by NSW Health clinicians.
- Sepsis is highly complex and multi-faceted presenting challenges for clinicians.
- The challenges with clinical recognition of sepsis include patient factors, monitoring and surveillance, clinical diagnosis and decision making.
- Clinicians report that education and training, supervision and leadership, communication and documentation, tools, technology, monitoring, and workforce can support clinical recognition.
- Variation in models of Clinical Emergency Response Systems (CERS), response by clinicians, communication and teamwork, senior supervision, and culture were deemed barriers to escalation of care for patients with sepsis.
- One quarter, 25% (n=131) of clinicians reported they always use a sepsis pathway and 28% (n=147) most of the time. In comparison, 28% (n=147) report they never or rarely use a sepsis pathway.
- Reasons for not using a pathway include knowledge, accessibility, pathway design and relevance, culture, professional roles, communication and documentation.
- Clinician skill set, pathology, vascular access, fluid management, antimicrobial therapy, and ongoing monitoring present challenges in the management of sepsis.
- Environmental factors such as workforce, acuity and workload, leadership and supervision, and physical environment implications impact delivery of safe quality care.



Background

The Clinical Excellence Commission (CEC) SEPSIS KILLS program aims to improve recognition and management of sepsis and reduce preventable harm in NSW acute care facilities. The CEC developed four sepsis clinical pathways between 2011 and 2015 in collaboration with multidisciplinary expert clinician groups for use in adult, maternity, paediatric and neonatal population groups in Emergency Departments, inpatient wards / units, and community settings. The pathways support a structured approach to recognition and escalation and guide the time-critical management of sepsis. The pathways were implemented in a phased approach commencing in 2011 and have demonstrated substantial improvements in clinical care and associated patient outcomes, reducing overall sepsis-related morbidity and mortality (Burrell et al 2016).

A national Sepsis Clinical Care Standard was introduced in 2022 with a set of indicators to ensure sepsis is recognised early and patients receive coordinated, best-practice care to reduce the risk of death or ongoing morbidity. Utilisation of a sepsis clinical pathway is a key requirement to guide early recognition and timely management of sepsis. The pathways are currently available as a hard-copy state form. Sepsis pathway use has decreased over time as NSW Health facilities have transitioned to electronic medical records and forms. The CEC acknowledge that a paper sepsis pathway is not well integrated with current clinical workflows and the use of electronic records. The negative impact of decreased or variable pathway use on patient outcomes is unable to be quantified. However, can be perceived or reported as a potential or actual contributory factor in Serious Adverse Event Reviews (SAERs) because of delayed or missed treatment and care for patients with suspected sepsis.

In 2023 an external review of the SEPSIS KILLS program was conducted by Ernst & Young with several recommendations made including revision of the current sepsis pathways. The CEC recognised and received feedback from NSW deteriorating patient leads regarding aspects of the sepsis pathways not aligning with the Sepsis Clinical Care Standard and related international evidence. This was noted to have impacted on clinician use and perceived value of the pathways. These findings have strongly supported the review and redesign the four sepsis pathways and to promote reliable adherence by clinicians to improve clinical outcomes.

The CEC commenced the review of the four sepsis pathways in April 2023, led by the CEC's Patient Safety Improvement Program team members in collaboration with four expert Sepsis Pathway Working Groups and the CEC Sepsis Pathway Expert Advisory Group (Sepsis EAG). An initial statewide survey '*Clinical Excellence Commission: Sepsis Pathway Survey*' was circulated in May 2023 to identify opportunities for improvement as well as perceived gaps or differences to improve alignment with current evidence-based sepsis guidelines. A key area of discussion for the Sepsis EAG was the feedback on pathway use. The Sepsis EAG agreed it would be timely to further explore the barriers and enablers for sepsis recognition and management whilst the pathway





revision process was underway. It was anticipated that the findings could be subsequently applied using a behavioural change lens, to support implementation and promote reliable use of the revised sepsis pathways.

Purpose

The purpose of the survey was to:

Identify the challenges and barriers that hinder recognition and management of sepsis.

- Gather insights from clinicians on the use of the CEC sepsis pathways and other tools in clinical practice to support recognition and management of sepsis.
- Identify areas for improvement that could inform the revision of the CEC sepsis pathways for adult, paediatric, maternal, and neonatal populations.
- Make recommendations to the CEC Chief Executive and Executive Leadership Group on the implementation of the revised sepsis pathways and inform future priorities of the NSW SEPSIS KILLS program.
- Support the statewide implementation of the revised pathways and improve usability of evidence-based guidelines in clinical practice.

Scope

The scope of the survey was to understand the challenges and barriers to recognition and management of sepsis from clinicians working within NSW Health acute care hospital settings. Out of scope was consultation with clinicians in non-acute care settings e.g., Primary Health Networks, General Practice, Private Hospitals, and non-NSW Health entities.

Aim

The aim of the survey was to identify the key challenges and barriers faced by NSW Health clinicians in recognition and management of sepsis, including the use of the NSW CEC Sepsis Pathways in clinical practice.

Methods

Survey design and dissemination

The survey used a nonexperimental cross-sectional design conducted in NSW. A questionnaire was developed by the CEC containing one closed and eight open-ended questions focusing on environmental factors, clinical recognition of sepsis, use of a sepsis pathway and management of sepsis.

The survey was aimed at NSW Health clinicians (nursing, medical, midwifery, and allied health) involved in, and or responsible for the care of patients with suspected or confirmed sepsis. This



included clinicians with organisational patient safety or clinical governance responsibilities and any clinical setting such as Emergency Departments, Intensive Care Units, Infectious Diseases, inpatient wards, or units and Community Health settings. Participation was voluntary and survey responses were anonymous with no identifiable personal information collected. The survey was hosted in Microsoft Forms and the term clinicians will be used throughout this report.

The survey was distributed via correspondence to the Chief Executives and Directors of Clinical Governance of Local Health Districts (LHD) and Specialty Health Networks (SHN) requesting dissemination of the electronic survey link to all relevant clinicians. The survey was also distributed through Paediatric, Maternity and Neonatal Networks and to the CEC Deteriorating Patient Advisory Group. The survey was open for responses for a period of three weeks and closed on 18 August 2023.

Data analysis

The survey responses were exported into an Excel spreadsheet for data analysis. Descriptive statistics were used to analyse the closed questions. An inductive content analysis was used to analyse the open-ended questions. All responses were thoroughly reviewed to get an overall impression of the content. Microsoft Excel was then used to code responses into key themes. Similar responses received the same code, and these codes were further grouped, leading to the categorising of data into meaningful subcategories. Multiple discussions were held with the CEC Patient Safety Improvement and Knowledge, Evaluation and Research teams to reach a consensus to ensure reliability and validity of codes.

Results

During the three-week period, a total of **530** survey responses were received from clinicians. The number of surveys distributed is unknown and hence a response rate is unable to be calculated.

The findings are reported into five key sections (i) clinical recognition of sepsis, (ii) escalation of care, iii) use of a sepsis pathway, (iv) management of sepsis and (v) environmental factors. Limitations were identified with survey design, collection of demographic data and use of open-ended questions as described in the limitations section.

1. Clinical recognition of sepsis

Clinicians were asked '*What are some of the challenges with the clinical recognition of sepsis?*'. A total of 513 responses were received for this question. Table 1 presents the synthesised key themes which include challenges associated with patient factors, monitoring and surveillance, clinical diagnosis and decision making in the clinical recognition of sepsis; examples of direct quotes from responses are also included.



Table 1: Challenges with clinical recognition of sepsis

Theme	Subtheme	Examples of responses
Patient factors	 Age Population and at-risk groups 	"Complex elderly patients with multiple comorbidities"
	 Comorbidities 	"Poor history from patient and difficulty
	 Cognitive impairment, behavioural challenges, delirium 	"Dementia and behavioural challenges"
	 Language barriers (non-English speaking, non-verbal) 	<i>"Underlying cognitive impairment"</i>
	 Pre-existing mental health conditions, drug and alcohol use 	"Complex mental health and substance use patients"
	 Disability and developmental delay 	"Challenging in patients who have developmental delay at baseline and no parents
	 Non-compliance, withholding information and refusing 	or carers to determine change in baseline" "Patients refusing observations"
	 treatment Patient / family / carer involvement and presence 	<i>"Patient factors such as dementia, language barrier, communication barriers, multiple comorbidities"</i>
	 Vague historian 	"Neonatal unable to verbalise symptoms"
	o Limitations of care	
Monitoring /	 Variation in vital sign monitoring and assessment practices 	"Nil observations done at triage"
Surveinance	 Knowledge of signs and symptoms, risk factors, "soft subtle" signs 	"No full set of observations for paediatric and adult" "Delayed observations taken due to high workload and acute patients for one nurse
 Level of clinical experience 	• Level of clinical experience	allocation"
	 Recognition of patient deterioration in different age groups 	<i>"Vital signs not being re-assessed, and this can lead to delayed recognition and treatment of sepsis"</i>
	 Listening to patient, family, carer, staff concerns 	"Subtle signs in neonates of sepsis and often with differential diagnosis"
	 Impact of time pressures, 	"Knowledge of paediatric populations"
	workload, acuity, staffing, and skill mix	"Experience of assessment skills"
		"Pre-judgmental of families and patients"
		"Physiological responses in particular populations (older, younger)", "maternity populations"
		"Lack of knowledge and recognition of early signs of sepsis", "identifying red flags for potential patients with sepsis"
		"Nurses don't complete observations anymore e.g., BPs and proper physical assessments either because there is no time, or they just don't do it for unknown reasons?"





Theme	Subtheme	Examples of responses
Clinical diagnosis of sepsis	 Atypical / non-specific symptoms and presentations Inter-patient variation Cold sepsis difficult to recognise and diagnose Viral illness / seasonal variation / secondary bacterial infections High number of presentations, complacency Other causes for deterioration (disease progression versus sepsis) Unknown source or cause Undifferentiated patients 	"Atypical presentations especially in children and elderly", "often non-specific and vague symptoms" "It presents differently in all individuals, there's not always a straightforward presentation" "Cold sepsis always picked up later", "still baffles people" "Frequent viral infections in children" "Complacency of staff" "Assumptions that all fever and flu like symptoms are viral related and not bacterial" "Ambiguous symptoms, delayed presentation, partial treatment (e.g., community GP antibiotics)" "Differentiating between different cause of origin of sepsis", "between expected symptoms from disease progression and sepsis" with "multiple other causes of same symptoms" "Like finding a needle in a haystack"
Decision making	 Diagnostic anchoring / cognitive bias Clinician autonomy and judgement Concerns with overtreatment versus missing sepsis Decision / reluctance to investigate, treat and commence sepsis pathway Sudden and rapid deterioration 	"Cognitive bias with ignoring abnormal vital signs", "towards viral illnesses" "Confirmation bias, keep on looking for symptoms that fit your original idea" "Often leads to over-treatment (especially in paediatrics / neonates)", "In my opinion, sepsis is over diagnosed, and antibiotics are overused" "Differentiating and acknowledging trends – not appreciating the whole picture and looking at symptoms in isolation" "Once someone has allocated a diagnosis it is difficult for clinicians to review and change" "Wide differential and sometimes rapid deterioration" "Normalisation of majority of adult behaviours, observations and clinical presentations biases even the best clinicians" "Over diagnosing sepsis and treating / investigating cases that don't actually have sepsis, and now breaching cases that 'did not recognise sepsis' early enough when in fact sepsis was not present to begin with"

Clinicians were also asked '*What clinical decision support tools could help to better support clinicians in recognising sepsis*?' and '*What else could support clinicians in recognising sepsis*?'. These questions were considered important to support the implementation of the revised sepsis



pathways in early 2024. The answers to these questions were themed together due to similar themes. The key themes were education and training, supervision and leadership, communication, tools, technology, monitoring, and workforce. These themes are displayed in Table 2 with examples of quotes from respondents. There was an overwhelming response related to sepsis education and training, and technological support (i.e., digital sepsis pathway) for sepsis recognition.

Table 2.	Support f	or	clinicians	in	recoanisina	sepsis
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Theme	Subtheme	Examples of responses
Education and training	 Availability and frequency of education and training 	"Mandatory annual training", "mandatory in- services"
 Modalities for education Access to training 	"More training with clear delineation of SEPSIS across the lifespan (neonates, child, adolescents', adults) and mandatory modules", "education especially of adult ED trainees looking after paediatric patients".	
		"Grand round education", "education, simulations", "Face-to-face education:", "HETI online learning but also please make sure staff are given paid time to complete HETI", "Ongoing awareness, regular education, simulation", "virtual reality training"
		<i>"Increased teaching to junior medical staff around pathway use and suspecting sepsis / ruling it out with full sepsis screen"</i>
		"As humans we learn from pattern recognition, so hearing case stories of how sepsis can present could help", "case studies are very powerful too, makes it real", "case presentations of both good and bad outcomes of sepsis"
		<i>"Generally, there is a staff shortage, so education is not seen as a priority"</i>
Supervision and leadership	RoundingMentorship and supervision	"Regular rounding of medical staff", "regular rounding of patients attended by clinical nurse, doctors and allied health staff"
o Feedback	"Senior colleagues vocalising it as a possibility and people sharing their mental models"	
	<i>"More buddying", "more buddying especially when skill mix poor"</i>	
		"Better supervision by experienced clinicians"
		"Good mentorship with experienced staff members or nurse educators"
		<i>"More longitudinal clinical bedside experience which would allow clinicians to see errors and correct their future behaviours"</i>



Theme	Subtheme	Examples of responses
Communication and Documentation	 Prompts in handover Safety huddles Listening to concerns Awareness campaign Documentation requirements 	"Updates included as part of a handover huddle reminder" "Reduce amount of paperwork to be completed so that staff have more hands-on time with the patient" "Listening to patients and relatives" "Awareness campaign", "re-invigorate the CEC could it be sepsis campaign" "Improve collaboration between Mental Health and general medical hospitals" "Sepsis awareness day/week promote via news bulletins, intranet page"
Tools	 Cheat / lanyard cards Flow charts Posters Policy 	"Cheat cards for new medical and nursing staff" "Flip cards for ID badges, when to escalate etc." "Flow charts, posters, eMR alerts" "Mandatory policy that aligns with referral to higher level care"
Technology	 Digital pathway Alerting in eMR / FirstNet Artificial intelligence Integration Alert fatigue 	 "Digital pathways", "digital solutions" "Alerts on BTF / SAGO", "alerts from SPOC charts" "Add 'could it be sepsis?' to BTF alerts", "digital alerts questioning 'is this sepsis?' when calling CRC and MET?' "Alerts on lab results", "alerts in eMR or ICCA when blood results returned", "an alert for the second lactate (often missed on the ward if the ED are busy and don't flag as follow up)" "Alerts not useful, too easily triggered, alarm fatigue" "An alert system on FirstNet if observations meet sepsis criteria that triggers", "Alerts at triage after inputting specific vital signs", "prompts at triage – similar to COVID screening" "Have alerts for patients that are high risk" "A magic AI tool – similar to what is being developed at Westmead and in use overseas", "query creation of sepsis alert on eMR when vital signs showing positive shock index or fever or reduced GCS" "eMR integration", "eMR interface between LHDs – no access to other LHDs = patients' information"
Monitoring	 Morbidity and Mortality meetings 	"M&M meetings, clinical reviews, medical record audits – all being done"





Theme	Subtheme	Examples of responses
	 Clinical and case reviews Auditing Surveys 	"Sepsis surveys" "Regular reviews, audits of patients who met the sepsis pathway who weren't put on the pathway as QI project"
Workforce	 Improved staffing Sepsis champions (ward, facility) Dedicated sepsis lead / teams 	 "Adequate staffing", "better staff ratio", "more senior staffing" "Clinical championing", "ward champions" "Dedicated sepsis CNCs / afterhours APN or NP" or "clinical risk nurse 24/7", "increase use of nurse practitioners" "Dedicated role for leadership / monitoring / management / education across the facility e.g., CNC role" "Dedicated sepsis diagnostic support and management teams (including infectious disease expertise) either as part of MET teams or as a standalone"

2. Escalation of care

There was no specific survey question to identify challenges with the 'Respond and Escalate' section of the CEC Sepsis Pathway. However, respondents reported barriers with response and escalation amongst several survey questions. These insights are important to understand in the broader concept of NSW Deteriorating Patient Safety Net System and local Clinical Emergency Response Systems (CERS). Feedback received across all questions related to escalation and referral of care has been incorporated into Table 3, to present a consolidated and representative view of the themes on this topic. Five key themes emerged; these were models of CERS, response, communication and teamwork, senior supervision, and culture. These themes are displayed in Table 3, along with examples of respondents' feedback for each theme.

Table 3: Barriers to escalation of care

Theme	Subtheme	Examples of responses
Models of CERS	 Variation in escalation systems and response models 	<i>"Will escalate early for a medical review who will likely advise will need urgent ambulance and transfer to ED"</i>
		"No CERS in remote facilities", "reliance on virtual services"
		<i>"Reviewed by junior medical officer and cannot always attend clinician reviews within 30 minutes"</i>
		"Rural site with GPVMO on-call model of care"



Theme	Subtheme	Examples of responses
Theme Response Communication and Teamwork	Subtheme O Delayed medical reviews Competing priorities Availability of medical staff Availability of medical staff No response to pages Poor or lack of clinical handover Communication between teams Conflicting opinions and rapport between nursing and medical staff	Examples of responses "Delay in MO response", "unable to get timely review", "medical responses varied", "doctor review by phone" "Simultaneously looking after several sick patients", "other competing priorities", "competing demands at front of house: trauma calls, stroke calls, general business" "Limited MO availability particularly after-hours", "lack of medical officer onsite 24/7", "no on-site doctor", "lack of doctors in town", "lack of doctor guidance" "Delay in response to Cat 2 – then if a JMO they want to talk to a boss" "Medical team availability or staffing issues" "Delay in seeing doctor or senior nurse after triage" "Ability to contact medical team", "poor communication from teams / not responding to pages" "Handovers that don't capture the important details", "attempting to relay urgency of condition to on-call GP and having to contact a tertiary level facility for advice" "Silo care where specialist staff not responding to deteriorating patient" "We work as a team and usually refer the doctors to look and make early decision if concerned for sepsis" "Noncollaboration with medical staff" "Handover issues between emergency response teams and the regular ward medical cover, especially after-hours or on holidays"
		"Differing opinions on whether sepsis is a potential differential diagnosis"
Senior supervision	 Escalation to seniors and decision makers Senior oversight and supervision Support from senior colleagues 	 "Junior doctors sitting on the fence and not feeling confident to escalate" "Poor support for medical officers" "Resistance from specialists and inter-departmental colleagues" "Lack of sufficient senior staff such that timely assessment possible" "Lack of senior supervision", "clinical supervision"
		"Lack of effective mentorship programs"





Theme	Subtheme	Examples of responses
Culture	o Local culture	"Some staff lack confidence to escalate for fear of being made feel silly for doing so"
	 Fear Expectations 	<i>"ICU refusing to review patients in timely manner outside of a code blue"</i>
		"Culture of escalation"
		<i>"Local culture regarding escalation of ambiguous findings"</i>
		"Fears to escalate in busy department"

3. Use of sepsis pathways in clinical practice

In the survey, clinicians were asked to rate how often they use a sepsis pathway using a 5-point Likert scale (always to never). The term 'use' was described in the survey, as physically using, or referring to, the sepsis pathway as a clinical decision support tool. Out of 524 responses, 28% of clinicians (n=147) reported they never or rarely use a sepsis pathway in clinical practice. Figure 1 shows the frequency of sepsis pathway use by clinicians when caring for a patient with possible or probable sepsis.



Figure 1. Frequency of sepsis pathway use

Q: When caring for a patient with possible sepsis, how often do you use a sepsis pathway to guide recognition and management?

One quarter or 25% (n=131) of respondents reported they always use a sepsis pathway and 28% (n=147) reported most of the time a sepsis pathway is used for patients with possible or probable sepsis. Qualitative feedback was gathered to understand the reasons why the paper-based sepsis pathway is not being used in practice. Some clinicians positively commented to this question stating *"I always use the paper-based sepsis pathway", "I do use the paper-based pathway and find it very*



useful", "it's clear and the pathway is followed", "I use it every time" and "I work in ED so I am well versed and aware of where to find the pathway, I can see its tricky in the wards'.

Key themes that emerged from responses of reasons why the sepsis pathway is not used in clinical practice included knowledge, accessibility, pathway design, pathway relevance, culture, professional roles, communication, and documentation. These themes and quotes indicative of survey responses from clinicians are shown in Table 4. When asked about reasons for not using the pathway, respondents also reported the impact of environmental factors (i.e., time pressures, workload, and acuity); for reporting purposes these are included in Table 5.

Theme	Subtheme	Examples of responses
Knowledge	 Varying levels of knowledge of the sepsis pathway Perceptions of use 	<i>"I know it off by heart", "know it well", "clinical habit"</i> <i>"I didn't know it exists", "only knew about it recently",</i> <i>"forgetting to use it"</i> <i>"Many years of clinical experience"</i> <i>"It is a pathway used often enough that steps have become knowledge, and the paper is referred back to when needed"</i> <i>"Infrequent exposure"</i>
Accessibility	 Hybrid environment Availability of sepsis pathway in clinical area / department Timing and quality of initial implementation and local governance 	 "Workflow processes are electronic", "all other documentation is electronic format" "Hardly use any paper with computers now", "paper is banned" "Availability, charts have not been restocked or ordered" "Clunky implementation in ED" "Hard to find, not a lot of time to go looking for it", "not always available, particularly in case of emergency"
Pathway design	 Too long, difficult to follow Generalised criteria – oversensitive, large proportion of patients meet criteria Needs updating to align with current evidence Never been published or validated to assess impact on outcomes Clarification on when to stop / take a patient off the sepsis pathway 	"Long, not easy to understand or follow, not practical" "Too broad criteria", "very basic and not specific to patient", "over sensitive" "It has never been published / disseminated as other than a 'sample' from 2013, and it does not integrate into the Power chart" "Pathway is out of date, too much IV fluid, not early enough use of pressor" "Gets outdated, difficult to keep up to date"

Table 4: Reasons for not using the sepsis pathway





Theme	Subtheme	Examples of responses
Relevance of pathway	 Use of other guidelines over sepsis pathway 	<i>"Exclusion for renal patients", "neutropenic sepsis guideline used"</i>
	 Not used in certain clinical settings / specialty 	<i>"Working in critical care, the sepsis pathway is not applicable", "sepsis is always on our differentials"</i>
	 Relevance for patients 	"Neonatal intensive care treats possible sepsis too often"
	with limitations of patient	"Not standard practice in my ward", "not often well used in maternity care", "outpatient clinic setting"
		<i>"For those with ceilings of caresome of the pathway steps become irrelevant as alter management"</i>
Culture	 Medical staff refusal and reluctance to use 	"A tool that hasn't been encouraged to be used a lot"
	 Clinical experience 	"Doctors refusal", "MOs don't engage in protocols" "Resistance from consultants", and "most consultants
	favoured overuse of decision support tool	have a working sepsis pathway due to training and rarely use a paper-based pathway"
	 Discouragement from seniors to use – nursing / medical 	<i>"Use my expertise, not a pathway" and "I do not need to go and look at a piece of paper to tell me what to do next"</i>
	 Perceptions of more useful tool for junior staff 	"Institutional culture"
		<i>"I do tell JMOs to follow it though, so it does have value, just not if I'm seeing the patient myself" and "more appropriate for junior staff"</i>
Professional roles	 Role clarity – who should commence document 	"Not sure whose role it is to commence the pathway nurses' doctors?"
	and sign pathway?	"Too many steps (initial, prescribing and follow-up – who is responsible?"
	officers	"Confusion who should document, can multiple people write on it"
	stop / take a patient off the sepsis pathway	"As a JMO I'm not the decision maker in these situations"
		<i>"When I do use it, the medical team often won't follow it"</i>
		"Once a patient enters the decision tree for management of sepsis then only an ED FACEM or Inpatient Physician is allowed to exit the pathway"
Documentation and clinical	 Delays in sourcing pathway 	"Prioritising treatment commencement over paperwork"
handover	 Retrospective and duplication on documentation 	"Duplication of documentation", "double handling information on electronic record", "no point writing on the form", "actions directly documented into eMR
	 Clinical handover of pathway and transfer of 	Instead of pathway" "The pathway not handed over"
	care	<i>"If started, doesn't get handed over as someone else's name is on it"</i>





Theme	Subtheme	Examples of responses
		"Difficulty sharing/communicating with RFDS and other non-NSW health services"
		"The patients may arrive to the ward post commencement of the pathway and the actions should take place. Frequently the pathway is commenced but is not completed or handed over to the ward who receives the patient"

4. Management of sepsis

Clinicians were asked 'What factors prevent you from following <u>all</u> the actions on the 'Resuscitate and Refer section' of the sepsis pathway when the patient has sepsis or probable sepsis?'. A total of 470 survey responses were received for this question, which provides insight into the management of sepsis as outlined in CEC Sepsis Pathways. Responses were divided into key actions of sepsis management including clinician skillset, pathology, vascular access, fluid resuscitation, antimicrobial therapy, and monitoring of vital signs. These are displayed in Table 6, along with examples of respondent's feedback for each theme.

Theme	Subtheme	Examples of responses
Clinician skill set	 Venepuncture and cannulation Accessing of central venous access devices (CVAD) Scope of practice 	"Skill level of clinician for IVC and pathology collection", "can be difficult or delayed if no staff available to cannulate or venepuncture quickly" "Lack of nursing staff skilled in venepuncture", "some nurses feel not in scope for them" "Delays to CVAD blood culture collection due to lack of CVAD accredited nurses, especially in the ED", "CVAD competency can prevent cultures"
Pathology	 Lactates not routinely taken or repeated Response to abnormal lactates Ordering of and waiting for pathology results to guide diagnosis and treatment Utility of certain pathology tests in sepsis (i.e., procalcitonin, CRP, LFTs, Coags and Glucose) Delays and timeliness of 	"VBG not routinely done", "not reordered as per the pathway", "missed serial lactates at the specific 4- and 8-hour mark" "Medical resistance to take blood cultures or VBG to check lactate", "red zone lactates being excused for other reasons" "I don't routinely order LFT, coags and glucose as not aware of their utility or why they would be abnormal", "occasionally order CRP because some inpatient teams struggle to make decisions without this test to guide them" "Doctors like to wait for results", "waiting for blood cultures, some clinicians order to withhold

Table 5: Factors that prevent following actions of the Resuscitate section



Theme	Subtheme	Examples of responses
	 Access to pathology and imaging 	"No pathology on-site", "pathology services after- hours", "POC testing of VBG for lactates not available", "only some sites have point of care testing"
		"No imaging on-site", "after hours" – delaying diagnostic results"
		"No imaging after hours and no pathology on site (except basic POCT", "readily availability of resources"
		<i>"Lack of resources in the hospital and sometimes the patient has to be transferred to a different hospital for these to be initiated"</i>
		<i>"Working in sub-acute facility, all resources unavailable"</i>
Vascular access	 Difficult vascular access causing delays to treatment 	"Difficult vascular access causing delays in getting blood cultures", "lack of IV access", "difficult cannulation"
	 Availability and over-reliance of medical officers to venepuncture, cannulate and 	"Sometimes difficult to obtain 2 sets of blood cultures in critically ill patients"
	 take blood cultures Patient refusal 	"Having a doctor available to collect blood cultures"
		"Patients refuse to receive more invasive procedures"
Fluid resuscitation	 Appropriate versus excessive fluid resuscitation 	"Delays to chart IVF", "reluctance to administer fluid bolus"
	 Delays and reluctance to prescribe fluid resuscitation 	"Not agreeing to prescribe IVF or antibiotics", "agreeing with the amount of fluid resus"
	 Preference for early vasopressor support 	<i>"Fear of overloading a patient with heart conditions / renal conditions", "the fluid dose recommendations may be appropriate for some patients but may be excessive in others"</i>
		<i>"Fluid resuscitation is too liberal. Prefer to start a pressor earlier", "resuscitation with boluses of fluid should be supported with inotropes and this can be difficult to initiate in a peripheral paediatric centre"</i>
		"Unable to prescribe medications/fluids due to not being FLECC trained or have endorsement of medications", "the role of rural nurse in being able to initiate IV therapy"
Antimicrobial therapy	 Decision and reluctance to administer antimicrobials 	"Doctors decide antibiotics are not indicated", "often say wait to give antibiotics"
 Concerns of over Withholding antim whilst awaiting res 	 Concerns of over treatment 	"Needing doctors to agree and prescribe the correct
	 Withholding antimicrobials whilst awaiting results 	"Overuse of antibiotics"
	 Access and supply 	





Theme	Subtheme	Examples of responses
	 Antimicrobial stewardship Timely prescriptions, doctors' orders, reliance on prescribers 	"Some clinicians order to withhold antibiotics until culture results, results get delayed" "Not able to access antibiotics in a timely manner due to antimicrobial stewardship", "antibiotic approvals" "Timely access to antibiotics in after-hours timeframe"
Ongoing monitoring	 Increasing frequency and documenting vital signs Perceptions of increased workload 	<i>"The areas I miss are documenting frequency of vital signs"</i> <i>"Managing increased frequency of observations with limited midwives on the floor"</i>

5. Environmental factors

Clinicians were asked *'What environmental factors do you think contribute to a delayed recognition of sepsis?*' A total of 523 responses were received for this question. The key themes identified from respondents were workforce, acuity and workload, leadership and supervision, and the physical environment. These themes are presented in Table 6 with examples of responses for each theme.

Theme	Subtheme	Examples of responses
Workforce	 Staffing levels (nursing / medical) Skill mix (junior, inexperienced) Transient staffing, use of agency, rotating staff, redeployment of staff Rostering of workforce High rates of overtime – fatigue / burnout 	 "Inadequate staffing levels and ratios" "Junior skill mix and lack of ability to escalate, workload and competing high priorities", "poor senior to junior skill mix" "Continue to lose experienced nursing staff and cannot recruit middle grade medical staff" "Staffing demand and supply mismatch" "Fatigue and complacency" "Staff working at a level beyond capacity with minimal support" "Lack of medical staffing, skill mix (too junior), patient load especially Winter and increase comorbidities / complexities clouding accurate diagnosis", "not enough medical staff especially on night shift that are able to act quick enough because of their workload" "Inexperienced staff and junior staff", "lack of triage competent staff"
	<i>"High amount of agency 80% coming through the facility"</i>	

Table 6: Environmental factors contributing to delay recognition of sepsis



Theme	Subtheme	Examples of responses
Acuity and workload	 Acuity (patient / department / facility) 	"Patient load and acuity of patients", "acuity of the ward / ED department"
C	 Patient to staff ratios Time pressures to provide 	tasks to complete"
	care	"Delays in care due to overwhelmed facility"
	 Workload of clinicians and senior staff supervising iunior staff 	<i>"Current case mix of patients", "patient presentation load"</i>
	 Information / task / documentation overload 	<i>"Workload on in-charge and seniors to supervise all juniors and their workload to ensure all tasks are being completed"</i>
		"Busy departments and heavy patient load also mean vital signs may not be monitored as frequently as ideal for deterioration not recognised as early as they could be"
		<i>"For a 30-minute home visit, more time looking at computer screen with PCM, patient care board and handover documentation online – we need assistance to document handovers so midwives can actually do the handover with the patients"</i>
Leadership and	• Lack of senior nursing /	"Too many juniors and not enough decision makers"
supervision	medical staff to provide leadership	<i>"Inability to provide role-modelling and clinical supervision due to demands"</i>
	 Availability and accessibility to senior staff / specialist expertise Junior staff not empowered 	<i>"Lack of leadership and support can lead to significance of findings not being recognised or escalated in a timely manner by more junior nursing staff"</i>
	to make decisions	"No available senior MO to review patients due to acuity of other patients"
		"Lack of senior supervision"
		"Inadequate early senior supervision"
		"Lack of experienced staff"
		<i>"Large junior staff with lack of support from senior (or they are all burnout)"</i>
Physical Environment	 Access block and patient flow – overcrowding and overcapacity. 	<i>"Access block leading to high patient loads in waiting room. Preferential to offload ambulance patients versus self-presenters"</i>
	 High number of presentations 	"Overflowing, overcapacity, high presentations, and high patient loads"
	 Design / layout of 	"Layout of ward and facility - distance"
	rooms, single rooms)	"Lock down by Correctional Services NSW, limited access at times to patients"
	 Limited space to examine and commence treatment 	<i>"Lack of enough treatment space" and "limiting clinical spaces to examine and treat patients", "lack"</i>
	• Patient access	





Theme	Subtheme	Examples of responses
		of assessment spaces in ED due to access block in the hospital"
		<i>"Patients located in single rooms who are infectious and require PPE to be donned"</i>
		"Not having a dedicated paediatric area and staff in general (very adult focused) ED"

Discussion

The recognition and management of sepsis is highly complex and multi-faceted. Sepsis recognition is highly reliant on clinicians to monitor for and recognise the risk factors and subtle signs and symptoms, which can often present as *"atypical, non-specific symptoms with inter-patient and seasonal variation"*. This makes the clinical diagnosis of sepsis challenging to distinguish from other conditions in the early stages. Given the morbidity and mortality associated with sepsis, it should be considered in any patient with an acute illness or clinical deterioration that may be due to infection. Even if the cause of deterioration is unknown, clinicians should promptly consider sepsis as a differential diagnosis during any CERS response until excluded. The survey found that there are multiple challenges associated with diagnosis and management of sepsis, and that use of the sepsis pathway in practice is limited.

Clinicians must in the first instance use the sepsis pathway to recognise that the patient has possible or probable sepsis and based on the findings, elect to escalate to a senior clinician by activating the local CERS process. The survey results demonstrated barriers to using the pathways based on cognitive and confirmation bias, diagnostic anchoring, and preferential practice which all, contribute to delays in recognition, escalation, and treatment of patients with sepsis. This can result in profound negative consequences associated with patient morbidity and mortality in situations of missed or delayed clinical diagnosis of sepsis, contributing to poor patient outcomes. Clinicians reported often hearing of case stories with negative outcomes (i.e. Serious Adverse Event Reviews) following missed or delayed clinical diagnosis of sepsis which may cause unintentional secondary harm (moral injury).

The use of sepsis case stories and presentations with positive outcomes were supported by clinicians, with some suggesting that they could be useful to demonstrate how sepsis presents and powerful to enhance learning. Shifting the focus using a Safety-II approach to conduct and present sepsis case reviews, to share learnings of what went well in terms of treatment and outcomes for the patient, allows analysing daily practices and human factors in a more restorative way (Hollnagel et al 2015). Additionally, this promotes reflective practice by increasing clinician knowledge and awareness of cognitive risks in complex decision-making during sepsis diagnosis.

Early escalation to senior clinicians (i.e., senior medical officer) is crucial to support and guide a junior workforce with clinical decision making to commence sepsis treatment. These actions may





influence perceptions of treatment adequacy with antimicrobials, and address clinician concerns of under and over-treatment of sepsis. Senior leadership and supervision can set clear expectations through role modelling best practice, shaping clinician behaviours, providing feedback to junior staff, and fostering a positive learning culture. The survey found that experienced clinicians were unable to provide adequate oversight, mentorship, supervision, support, and feedback due to clinical demands. Regular medical and multi-disciplinary rounding, sharing of mental models and vocalising the possibility of sepsis and sharing personal and clinical knowledge and skills can empower junior clinicians to raise their concerns when further support is required, creating psychological safety.

Clinician response demonstrated variation in monitoring and assessment practices and alerting systems, within Emergency Departments, triage, and inpatient wards. These variations may contribute to delayed recognition of early signs of organ dysfunction and/or features of severe illness and the subsequent management of sepsis. Clinicians reported that having alerting systems (for example "Could it be sepsis?", flagging of high-risk patients, laboratory results, and patient or family concerns) could be useful although care should be taken to avoid excessive alerting and alarm fatigue. Environmental factors (acuity, workload, staffing shortages) were reported to impact patient monitoring and assessment practices in the recognition of sepsis.

Variation in clinician knowledge impacts the use of the CEC Sepsis Pathways. Some clinicians reported infrequent exposure to patients with sepsis, whilst others reported mental models developed through pattern recognition of caring for patients with suspected and confirmed sepsis. Sepsis awareness training, using a variety of modalities dependent on target audience, can minimise knowledge variation.

Local monitoring of the effectiveness of the Deteriorating Patient Safety Net System and addressing any barriers to escalation of care is essential. Delayed response, communication and teamwork factors, supervision and culture can impact patient outcomes. Formalised CERS systems (i.e., within Emergency Departments) were identified as an enabler for clinicians to escalate care, as patient deterioration can be missed or delayed due to high levels of presentations, acuity and competing priorities.

All NSW Health facilities will be required to implement the revised sepsis pathways (planned release is in February 2024) and ensure they are available for use in all clinical settings. Pathway accessibility, culture, professional roles and responsibilities of commencing, documenting and knowing when to cease the pathway were other factors that influenced pathway use. Some clinicians refer to retrospectively documenting on the paper pathway with preference to prioritise and treat the patient first during emergency situations. Others expressed concern around duplicating documentation on the pathway and within the electronic medical record. There were gaps in clinical handover and communication practices amongst clinicians and teams, for patients who were commenced on a pathway and treated for sepsis, including during transfers of care. Some clinicians questioned the relevance of using the sepsis pathways in certain specialty areas (i.e., intensive





care, non-inpatient settings) or use of other local clinical guidelines (i.e., neutropenic, and renal guidelines) were referred to for certain patient cohorts. The sepsis pathways are a clinical decision support tool designed to be used in any clinical setting. They may not account for every clinical presentation or scenario, relying on clinicians' clinical judgement and expertise of a senior clinician in managing sepsis. As such, the role of experienced senior clinicians and the importance of escalating care needs to continue to be refined and communicated in the implementation of the revised sepsis pathways to improve patient outcomes.

Reliance on medical officers to establish vascular access, collect pathology and obtain blood cultures was evident. There were accounts of clinicians waiting for laboratory and culture results prior to commencement of treatment due to diagnostic ambiguity. Lactates were reportedly not routinely being taken or repeated in suspected sepsis, and feedback that abnormal lactate results were dismissed for other reasons or not acted upon. Clinicians disclosed that some sites have limited access to pathology, point of care testing devices and imaging services.

Fluid resuscitation and decisions to treat with antimicrobials were deemed to be challenging in sepsis. Commonly, there is resistance to prescribe and administer antimicrobials with a preference to wait for culture results. Navigating between appropriate fluid resuscitation and fears of overloading with excessive amounts was apparent in certain patient cohorts. Clinicians voiced a preference for early commencement of vasopressors with referral to Intensive Care or retrieval services for additional support. Some reported that antimicrobial stewardship principles, access and supply, approval processes were reported as barriers and should not compromise care or adversely impact antimicrobial stewardship.

The CEC acknowledge the considerable strain on the NSW Health system currently and the pressures and dedication of NSW Health clinicians in providing safe and quality care. Factors impacting care delivery such as workforce shortages, clinician skill-mix and workload, acuity, leadership and supervision, and physical environments. All of these can significantly impact the delivery of safe and quality of care to patients with sepsis and can hinder the recognition, escalation, response, and management of any deteriorating patient which may result in poorer patient outcomes.

Limitations

There are several limitations that should be considered when interpreting the survey findings. A limitation of this survey design was that demographic data were not collected and therefore the results may not be fully representative of the entire population of NSW Health clinicians. It is uncertain how many responses were from members of the nursing, medical or allied health workforce, and if respondents were likely to have varying levels of clinical knowledge, skills, experience, exposure, behaviours, and levels of seniority in recognising and managing sepsis. Furthermore, it is not known if responses came from few or all local health districts or specialty





health networks, and certain regions may be over or underrepresented, which could impact the generalisability of results. All sites across NSW have different operational systems, processes, workforce, level of acuity and local governance to support the recognition and management of sepsis. Finally, the survey was voluntary and distributed in different ways across NSW. It is therefore open to response, recall and social desirability bias.

Conclusion

In summary, the findings highlight several challenges and barriers reported by clinicians towards the overall recognition and management of sepsis. The survey feedback has been invaluable in understanding the current use and the re-design of the CEC Sepsis Pathways. As well as informing the newly revised sepsis pathways to improve overall usability and adoption by clinicians in clinical practice, the survey feedback has informed several system wide opportunities for improvement and to support the work of the LHDs/SHNs. These so far include eMR enhancements, revision of the SEPSIS KILLS e-learning modules and the creation of a QIDS Sepsis Data Dashboard to improve monitoring of sepsis morbidity and mortality to support improvement. The survey results will be shared widely to raise awareness amongst clinicians and inform local improvement initiatives, to help reduce preventable harm from sepsis.

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