Australian
Commission on
Safety and Quality
in Health Care

Callida

A National Sepsis Data Plan

Strategic Analysis Report

Callida Consulting prepared this report on behalf of the Australian Commission on Safety and Quality in Health Care

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Preface

On 13 September 2019, the Hon Greg Hunt MP announced $1.5 million in funding, to support improved sepsis outcomes. The Commission established the National Sepsis Program in June 2020 under a contract for services with the then Department of Health, Disability and Ageing.

Priorities for coordinated national action on sepsis were identified through consultation with The George Institute for Global Health (TGI), state and territory health departments, sepsis clinical experts and healthcare organisations.

These priority areas formed the basis of the program's key objectives, which included:

- Improving the recognition of sepsis in all healthcare settings
- Providing healthcare professionals with nationally agreed sepsis clinical guidance materials
- Strengthening the comprehensive care planning process for sepsis survivors.

The Commission, in partnership with TGI delivered eight discrete projects including in 2022 the launch of the first National Sepsis Clinical Care Standard.

The 2022-23 Budget provided a further $2.1 million to continue a focus on improving sepsis recognition and response. The Department engaged the Commission in partnership with TGI to deliver the National Sepsis Program Extension between 2023 and 2025.

The Program Extension is made up of five additional projects:

1. Targeted national public awareness campaign
2. Education and training resources for healthcare professionals
3. Coordinated sepsis care and post sepsis support for survivors and families
4. Data collection tools for quality improvement
5. Improving recognition of sepsis in First Nation peoples.

Aim

The purpose of project four is to improve the quality and quantity of sepsis data to better understand the true burden of sepsis and to inform strategies aimed at improving early detection, treatment, and outcomes.

The Commission contracted Callida Consulting to conduct a strategic analysis of national sepsis data and propose strategies to improve the availability and validity of national sepsis data.

This report envisions the future state of sepsis data in Australia and sets out a five-year plan to realise that vision. It describes several challenges and opportunities for implementation and identifies three foundational enabling factors that are critical to success: Inter-jurisdictional commitment, strategic sponsorship and investment and inclusion of lived experience. The appointment of a national integration authority to lead, coordinate and drive implementation is recommended to ensure that short, medium and long-term goals to build a national sepsis data plan are achieved.

Australian Commission on Safety and Quality in Health Care

National Sepsis Program Extension 2023-2025

A National Sepsis Data Plan – Strategic Analysis Report

25 July 2025

Callida

Executive Summary

In 2022-23, there were over 84,000 hospitalisations for sepsis, a life-threatening condition that arises when the body’s response to an infection damages its own tissues and organs. Of this cohort, approximately 12,600 did not survive[1]; many of those who did experience ongoing health complications, including lifelong disability.

In Australia, sepsis presents not only a significant human impact, but a considerable financial burden, costing an estimated $700 million per year directly, with indirect costs exceeding $4 billion. Yet despite this, data on sepsis outcomes and initiatives – the mechanisms to reduce this human and financial impact – is limited, and the ability to effectively assess interventions is impeded.

This report considers the national state of sepsis data. Building on stakeholder consultation, a data gap analysis, and academic research, it considers the current state of sepsis data collection across Australian healthcare settings and the observed challenges to improving sepsis data. Broadly, it finds that with few exceptions, sepsis data is subject to inconsistent collection and coding practices, restrictive sharing and siloing, and resourcing vulnerability and underfunding, resulting in fragmented data collections of varying quality. Further, that clear gaps in relevant data – such as patient-recorded experience and outcome measures – are well known.

Despite these challenges, this report identifies several promising opportunities to realise improvements to sepsis data, including increased standardisation and consensus, simple collection initiatives to build an initial dataset, and demonstrated examples of successful national medical datasets. More importantly, it finds an appetite among medical professionals, data professionals, and those with a lived experience of sepsis to drive improved data outcomes.

Ultimately, this report culminates in the presentation of a five (5) year National Sepsis Data Strategy – a roadmap to realise a future state of sepsis data centred on robust standardised national data that harmonises how sepsis is recorded, coded, reported and establishes the foundation for understanding sepsis prevalence, health system impact and outcomes. With the appropriate support, this strategy can realise a future of sepsis data that enhances clinical decision making and care, patient safety, quality improvement, and health services planning. Ultimately this will reduce the burden of sepsis in Australia.

Recommendation

The Australian Government should appoint a lead agency to drive the implementation of the National Sepsis Data Plan.

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[1] ACSQHC (Australian Commission on Safety and Quality in Health Care) (2025) National Sepsis Program Extension Epidemiology Report: A national analysis of the sepsis patient journey in Australian public hospital admitted care, ACSQHC. p. 1, 10 (NOT YET PUBLISHED)

Glossary

Clinical registry. Clinical registries are databases that operate within an overall governance and management structure to systematically collect health-related information on individuals who are treated with a particular procedure, device or drug; diagnosed with a particular illness or managed via a specific healthcare resource.[2]

Data dictionary. A data dictionary is a collection of names, definitions and attributes of data elements contained in a data base or data set.

Data set. Data sets are organised collections of data that list values of variables for each element contained within the collection**.**

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[2] Australian Commission on Safety and Quality in Health Care (2024), *Australian Framework for national Clinical Quality registries 2024*, p8, available at www.safetyandquality.gov.au

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1 Overview

Sepsis is a life-threatening condition that is triggered when the body's response to an infection damages its own tissues and organs.

It is a major cause of morbidity and mortality in Australia, and globally. Beyond its human toll, sepsis imposes a significant financial burden, with direct hospital costs estimated at $700 million per year and indirect costs exceeding $4 billion.

Improving patient and clinical outcomes for sepsis – including maximising survival and minimising adverse outcomes – relies on early detection and effective care models. Despite this, efforts to measure and improve outcomes for sepsis are hindered by data quality and availability and collecting reliable and consistent sepsis data at a national level remains a challenge.

Recognising this, in 2017 the *Stopping Sepsis: A National Action Plan* called for the development of a National Minimum Data Set to address inconsistencies in documentation and coding practices.[3]

1.1 National Sepsis Program Extension

The *National Sepsis Program Extension* is a federally funded initiative coordinated by the Australian Commission on Safety and Quality in Health Care (the Commission), in partnership with The George Institute for Global Health (TGI) and Sepsis Australia.

The *National Sepsis Program Extension* builds on the foundational work of the *National Sepsis Program* which between February 2020 and June 2022 delivered eight (8) interrelated projects to support improved sepsis outcomes. The program extension was established following advocacy by TGI and Sepsis Australia, resulting in budget to continue implementing the *Stopping Sepsis: A National Action Plan*.[4]

The *National Sepsis Program Extension* seeks to deliver against five (5) key focus areas, including:

1) Developing a national awareness campaign about sepsis
2) Developing sepsis education resources for health programs and health professionals
3) Building capacity and supporting appropriate care for sepsis survivors
4) Developing and publishing data collection tools for hospitals and healthcare services to drive improvements to sepsis care models
5) Improving awareness and recognition of risk, identification and response to sepsis for First Nations peoples.

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[3] The George Institute for Global Health, (2018), Stopping Sepsis: A National Action Plan, The George Institute, Sydney. Available at: https://www.georgeinstitute.org/our-impact/policy-statements-and-recommendations/stopping-sepsis-a-national-action-plan [Accessed 14 July 2025].

[4] Ibid.

1.2 This report

This report contributes to the fourth focus area of the *National Sepsis Program Extension*:[5]

4) Developing and publishing data collection tools for hospitals and healthcare services to drive improvements to sepsis care models.

It uses information collected through a national data request and stakeholder consultation to provide a high-level assessment of the current state of sepsis data, the challenges to improve sepsis data and the opportunities to do so. It culminates in a proposed strategy to realise the desired future state of sepsis data and support the development of minimum national data collection.

1.2.1 Key findings

This report makes several key findings in relation to sepsis data:

Consistent collection practices, less restrictive sharing and siloing, and strategic investment is required to improve the quality and cohesion of Australian sepsis data.

Successful national data sets, such as that developed by ANZICS, demonstrates that the complex challenges associated with inter-jurisdictional contexts and systems maturity are surmountable to realise an effective national data strategy.

Progress is being realised at a local level, indicating an appetite among medical professionals to see and drive change. This progress must be effectively funded to realise national change.

There is a significant gap in the collection of qualitative experience and outcomes measures in the data ecosystem, and as a result, data on the lived experience of sepsis is often omitted from analysis.

Inter-jurisdictional commitment, strategic sponsorship and investment, and the participation of those with lived experience of sepsis, is required to improve national quality and safety data for sepsis.

1.2.2 Limitations

This exercise represents a high-level assessment of sepsis data collection in healthcare settings and its usage.

Due to privacy and access restrictions, the exercise underpinning this report did not include direct access to patient-level data or electronic medical record (EMR) configurations. As a result, it does not include a technical assessment of system interoperability, system architecture, or other data standards. This, in turn, limited the ability to assess the costs of a technical uplift project. Later in

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[5] ***Note***: Following initial scoping it was recognised that developing and publishing effective data tools would not realise national consistency without a supporting national strategy to ensure harmonisation and a common vision.

this report, it is recommended that a future exercise may benefit from a more technical focus while referencing the system-level challenges identified within this document.

Due to time and resourcing constraints, stakeholder consultation was limited to a select group of participants,[6] including representatives from each state and territory. Future exercises may benefit from additional breadth and deeper engagement, consulting directly with healthcare settings not represented in this report (e.g. Urgent Care Clinics), or consulting further with specialisations that involve more complex presentations of sepsis (e.g. neonatologists).

While not an explicit limitation of this exercise, this report notes that varying degrees of data maturity across jurisdictions necessitated a higher-level discussion on how data is collected and used, rather than more technical discussion on data structure. Future exercises may consider further preparatory material, provided in advance, to support more technical discussions.

Finally, a decision was made to exclude researchers from the consultation process.[7] Exclusion from this exercise considered that the development and implementation of an effective national strategy should inherently support research needs, rather than be designed specifically for research needs.

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[6] ***Note***: Consultation methodology is considered further at Section 7.1.3.

[7] ***Note***: Recognising that several of the stakeholders consulted in this exercise maintain active clinical and research roles.

2 A Vision for Sepsis Data

This section considers the vision for sepsis data that underpins this report, the importance of high-quality data, and the development of the vision statement.

2.1 Why have a national data strategy?

A national data strategy will enhance the size, quality and richness of sepsis data available in Australia, enabling access to consistent, high-quality sepsis data integrated at a national level. A national data plan would deliver a range of benefits, including:

1. Improved understanding of sepsis prevalence, supporting system activity monitoring and more accurate quantification of the burden of disease
2. Improved quality of care through more effective implementation and evaluation of the Sepsis Clinical Care Standard, including assessment of compliance and achievement of key clinical indicators
3. Benchmarking capabilities, allowing comparisons across health services and jurisdictions to identify best practice and areas for improvement
4. Better patient experience, through access to more comprehensive and informative data to support patient communication and care planning
5. Stronger research and policy development, by expanding access to high-quality, national data.

2.1.1 The vision statement

Establishing national data requires a clearly defined and agreed-upon scope to guide when, how, and why data is collected, reported, integrated, and used. However, preliminary stakeholder consultations with the Technical Advisory Group (TAG)[8] revealed differing understandings of what should be included:

To bridge this, an initial vision statement was developed to provide a clear, concise, and comprehensive definition of the desired future state for sepsis data in Australia. The initial vision statement was refined further in consultation with the TAG, resulting in:

> *Australia will have a robust standardised national data set that is contemporaneous and longitudinal. This will harmonise how sepsis is recorded, coded, reported and how that data is used. The national data set will establish the foundation for understanding sepsis prevalence, health system impact and outcomes to enhance clinical decision making and care, patient safety, quality improvement, and health services planning. It will also support and inform research priorities.*

Throughout consultations with stakeholders about national data, the vision statement was used to provide stakeholders with a clear framing of what a national data plan is and aims to achieve.

Stakeholders generally agreed with the vision, however, cautioned that some aspects would be difficult to achieve. Stakeholders noted several challenges in accurately and consistently reporting sepsis data due to the complexity of the condition. It was further identified that inconsistent record

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[8] ***Note***: See Section 7.1.1.

keeping, and limited ICT systems are barriers to maintaining contemporaneous data. Stakeholders generally acknowledged that these challenges can be addressed and that improvements in these areas would be valuable.

2.1.2 What should a national data strategy measure?

To align national data to the National Sepsis Program Extension and its goal to drive improvements in sepsis care models, indicators that capture the prevalence of sepsis, the quality of care provided, and patient outcomes should be measured. In this way, the data should capture the incidences of sepsis, time to recognition and management, treatment measures, health system impact, patient experience and finally health outcomes, including rates of readmission, and mortality.

The design of a national data strategy should build upon existing data measures as much as possible and align existing efforts, by expanding and improving the epidemiological data on the prevalence of sepsis, who is experiencing it and of what severity. Likewise, the Sepsis Clinical Care Standards Indicators can serve as a starting point for a comprehensive and nationally aligned set of measures to track and improve the provision of care for patients with sepsis. The standards include measures such as the time to treatment with antibiotics, and patient experience metrics.

3 The current state of sepsis data

This section considers the current state of sepsis data within Australia, its collection, sharing, and usage. It finds that with some exceptions, sepsis data is subject to inconsistent collection and coding practices, restrictive sharing and siloing, and resourcing vulnerability and underfunding. This results in fragmented data sets of varying quality. Further, it confirms that clear gaps in data collection – such as patient-recorded experience and outcome measures – are well known.[9]

Despite this, it is well recognised that high-quality data plays a critical role in the uplift of clinical care and professional development, including the development of sepsis pathways. Without access to more effective datasets, efforts to reduce the lived, and financial burden of sepsis will continue to be impeded.

3.1 Data collection

The current state of Australian sepsis data collection is marked by significant variability and fragmentation broadly attributable to inconsistent definitions, resourcing constraints, and the persistence of manual processes for data entry.

Within each consultation, concerns about the consistency of sepsis definitions were heard.[10] For instance, clinicians may document a primary infection (e.g., pneumonia) without explicitly noting ‘sepsis’, leading to underreporting in administrative datasets. This disconnect between clinical reality and coded data significantly hampers the ability to track sepsis incidence and outcomes accurately. At a national level, these inconsistencies undermine the comparability of data across jurisdictions and limit the ability to rely on inter-jurisdictional data sets for benchmarking.

Compounding this issue, resourcing constraints pose a consistent challenge to data collection. Throughout consultations, stakeholders noted that shortages in dedicated personnel to conduct regular data audits, validation, or quality improvement initiatives, directly impacted the ability to collect data.[11] Further, that where data was collected, it was often done by clinicians driven by professional interest rather than by systemic organisational support.

Under-resourcing has also resulted in the persistence of manual, paper-based systems, particularly in parts of regional Australia. These systems are inherently labour-intensive and prone to delays and inaccuracies. The result of manual data collection is significant delays and variable quality of coded data resulting from inconsistent clinical documentation.

Finally, it was heard that limited data was collected on those with lived experiences of sepsis. While clinical and administrative data sets capture some information on sepsis patients, there is a notable absence of structured information on patient-reported outcomes, survivor experiences, and the perspectives of caregivers. This gap limits the ability to understand the long-term impacts of sepsis, including post-discharge complications, psychological distress, and quality of life.

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[9] ***Note***: This report recognises that several of the challenges considered here, and throughout this report, may apply to the broader health data system.

[10] ***Note***: This report notes that while Sepsis-3 provides a clear clinical definition, application in real-world settings remains inconsistent. This is considered further in Sections 4.2 and 5.1.

[11] ***Note:*** Under-resourcing is considered further as a challenge to national data uplift in Section 4.1.

3.2 Data sharing

While some healthcare services have made promising progress in linking and integrating data within their jurisdictions, data sharing arrangements between institutions remains far from the norm. Further, cross-jurisdictional data sharing remains limited to a select few data sets,[12] and is hampered by legislative, technical, and cultural barriers.

At a jurisdictional level, data sharing is inconsistent. Jurisdictions with more advanced electronic medical records and data systems demonstrated effective data sharing, allowing local health districts to access and analyse sepsis data, and to improve on their processes. However, even within relatively mature systems, access was often restricted to specific user groups and only available only upon request.

Figure 1: Integrated data-sharing supporting upskilling

Integrated data-sharing supporting upskilling

Through the Queensland integrated electronic Medical Record (ieMR), health services can access patient records to determine health outcomes and support professional development and improvement. This ensures that first responders and primary care clinicians can assess how their care models impacted patient outcomes.

For example, if a patient is picked up by an ambulance service with suspected sepsis, paramedics may – at a later stage – access limited parts of the patients record to determine if their assessment was correct and if initial treatment was appropriate.

For jurisdictions with maturing systems, data sharing is fragmented and often limited to the institution that it is collected within. Within these jurisdictions, data sharing between organisations – such as ambulance services, urgent care clinics, and primary care – does not occur. As a result, pre-hospital data, which could provide valuable insights into early recognition and management of sepsis, remains siloed.

Finally, an unexpected observation of the current state of sepsis data was the relative immaturity of private hospital data systems. While public hospitals in several jurisdictions are transitioning to integrated electronic medical records, private hospitals appear to lag in both infrastructure and data capability. During consultation, it was noted that private facilities often operate on separate systems, with limited interoperability of clinical data to broader jurisdictional datasets.[13]

3.3 Data usage

Across Australia, sepsis data is used in a variety of ways, though the scope and sophistication of use vary significantly depending on local infrastructure, workforce capacity, and digital maturity.

In more digitally advanced jurisdictions, sepsis data is used to populate real-time or near-real-time dashboards that track key performance indicators such as time to antibiotics, ICU admissions, and mortality rates. These dashboards are used by clinical governance teams to monitor trends, identify outliers, and support continuous quality improvement. In contrast, jurisdictions with limited

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[12] ***Note:*** Lessons from these data sets are considered further in Section 5.7.

[13] ***Note***: This report understands that this is due, in part, to a greater discretion afforded to private services on how they handle data as a result of different funding obligations.

digital infrastructure rely heavily on manual audits and retrospective reviews, often conducted by clinicians in addition to their regular duties.

Stakeholders reported that in some jurisdictions, sepsis data is also used to inform antimicrobial stewardship programs. However, this level of analysis is typically limited to tertiary and quaternary centres with dedicated infectious disease teams and data analysts. Smaller regional or rural services often lack the capacity to conduct such detailed reviews, resulting in a patchwork of data across the country.

3.4 Key findings

The fragmented and inconsistent state of sepsis data collection has significant implications for health policy development at both state and national levels. Without access to reliable, timely, and standardised datasets, clinicians, policy makers and researchers are limited in their ability to assess the burden of sepsis, identify emerging trends, or evaluate the effectiveness of interventions.

Analysis found that in the current state of sepsis data:

- performance cannot be benchmarked across jurisdictions. In the absence of a consistent national dataset, comparisons between states and territories are often misleading, inconclusive or impossible to conduct.
- a holistic understanding of the lived experience of sepsis cannot be developed. Without this understanding, the ability to support continuity of care, discharge planning, and community-based follow-up is limited.
- a lack of robust data, perpetuates a cycle that makes it difficult to build a compelling case for investment in sepsis-related initiatives. Policymakers require a clear evidence-base to justify funding health initiatives. In the absence of such evidence sepsis may be deprioritised in favour of conditions with more visible or measurable impacts.
- without systems to monitor sepsis identification, management, and outcomes, institutions are unable to track performance over time, limiting their ability to identify existing or emerging system issues that may compromise care and to use data effectively to drive improvements.

4 Challenges to improving sepsis data

This section considers the challenges to improving sepsis data in Australia. It finds that resourcing and inconsistencies in data definitions and usage operate as impediments to effectively upscaling sepsis data nationally. It also notes that more complex issues, such as system interoperability and governance frameworks, act as more entrenched challenges to realising improvement.

4.1 Resourcing requirements and constraints

Across jurisdictions, stakeholders consistently identified resourcing limitations as critical barriers to achieving a robust and standardised data environment.

4.1.1 Workforce

Throughout consultations, it was heard that in several health services, sepsis data collection is reliant on time consuming manual processes that are not supported by appropriate staffing profiles. The result is that data-collection is often performed outside of paid hours, and not sustainable in the long term. In one jurisdiction, clinicians described initial data efforts as conducted ‘off the side of the desk’ without support from dedicated data analysts.

Similarly, participants noted that an increasing number of competing priorities in clinical governance made it difficult to maintain consistent sepsis data collection without dedicated personnel – such as a sepsis care coordinator. One jurisdiction described that access to central data teams was so limited that ‘even basic data requests could take weeks to fulfil’.

4.1.2 Information and Communication Technology (ICT)

Similarly, ICT investment presented another major constraint. While some states, such as NSW and Queensland, are transitioning to enterprise-wide Electronic Medical Records (EMRs), others remain reliant on legacy systems or paper-based workflows.[14]

Historical under-investment in health services ICT has resulted in significant differences in the digital maturity of health services both across and within jurisdictions. In turn, this has resulted in a reluctance to engage with data for clinical and professional development and a perception that data may be used for punitive purposes.

4.1.3 Insecure project funding

Consultations identified limited and often insecure financial resourcing for sepsis initiatives.

Throughout consultations, stakeholders reported that initiatives rely on short-term, ad hoc, or terminating project funding that limits the ability to move beyond proof of concept. Further, within these initiatives, outcomes are often reliant on the goodwill of healthcare providers who contribute time and expertise outside of their formal roles.

This funding insecurity has broader implications. Without clarity on how initiatives will be funded or the duration of funding, jurisdictions are hesitant to commit additional supports, resources or share data. Further, without sustained, long-term investment, the capacity of health services to build and

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[14] ***Note:*** ICT operational challenges are discussed in further detail in Sections 4.2 and 4.3.

maintain the infrastructure necessary for consistent data collection, analysis, and quality improvement will not be realised.

4.2 Data Definitions, Documentation, Coding and Reporting

A significant challenge to the development of a national sepsis data lies in the application of definitions, documentation practices, coding standards, and reporting methods across jurisdictions.

4.2.1 Definitions

Throughout consultation, the most frequently cited issue was the lack of a consistent, operational definition of sepsis that supported reliable data collection.

Unlike many other clinical conditions, sepsis does not have a single, universally accepted diagnostic test or threshold. Nor does sepsis have a single presentation or clinical speciality. Instead, it relies heavily on clinical judgement, which introduces variability in how and when it is identified and documented. Further, as sepsis develops as a complication of underlying infection, clinicians often document the underlying infection without documenting sepsis, which leads to under-reporting in coded data. For example, a patient with sepsis secondary to pneumonia may be coded only for pneumonia, obscuring the presence of sepsis in datasets.

Moreover, consultations revealed that some common sepsis terms are often excluded from formal coding definitions and naming conventions.[15]

4.2.2 Inconsistent coding

This variability in documentation flows directly into inconsistencies in coding.

Clinical coders – staff trained to assign health data codes in line with the Australian Coding Standards (ACS) – rely on the language used in medical records to assign diagnostic codes. Compounded by complex coding instructions and inconsistent documentation, if sepsis is not explicitly documented, it is unlikely to be captured by coders.[16]

This disconnect between clinical language and coding standards further complicates efforts to quantify the true burden of sepsis.[17]

4.2.3 Time zero

In several consultations, stakeholders raised the significant complexity arising from the determination of ‘time zero’ – the point at which sepsis is considered to have begun. This is a critical data element relating to the administration of appropriate antibiotics within 60 minutes.[18] However, defining this starting point is inherently difficult. As a condition of physiological

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[15] ***Note***: This report understands that terms ‘urosepsis’ and ‘biliary sepsis’ are not contemporary naming conventions, which may indicate a gap in education for healthcare providers. This gap should be considered further in subsequent activities.

[16] ***Note:*** Inconsistent use of implicit sepsis diagnoses by clinical coders when assigning diagnostic codes can further impact the accuracy and completeness of sepsis data.

[17] ***Note***: These issues build on issues of underfunding, identified at Section 4.1.

[18] ***Note***: Quality indicator 3b of the CCS considers the ‘proportion of patients with signs and symptoms of infection-related organ dysfunction who started their first dose of an empirical antimicrobial within 60 minutes of recognition.’

deterioration, sepsis often evolves gradually, and the moment of recognition may differ from the moment of onset.

In practice, different hospitals and jurisdictions have adopted varying approaches to defining time zero. Some use the time of triage, others use the time of first abnormal vital signs, and others still use the time of clinical recognition (a point that is often not clearly recorded in the medical record). This lack of standardisation makes it extremely difficult to compare performance across services or to assess compliance with time-based treatment targets and impact on patient outcomes.

Figure 2: Integrated data-sharing supporting upskilling

Time Zero

In sepsis data analysis, 'Time Zero' may refer to two distinct moments that must be considered separately to accurately assess care quality.

1) The first is the point at which sepsis should have been recognised – often inferred retrospectively from clinical deterioration – and is critical for understanding delays in diagnosis.
2) The second, more clearly defined, is the time when sepsis is first documented or the clinical pathway is activated, marking the start of management.

Both data points are critical to enabling evaluations of both sepsis recognition and response, and in turn, targeting improvements in early detection and timely intervention. However, confusion about which point to use – or worse, which point is being used – may distort inferences from datasets, suggesting that performance is either much better or much worse than it actually is.

4.3 Interoperability

A major structural barrier to comprehensive sepsis data is the fragmentation of digital infrastructure and the lack of interoperability across and within jurisdictions.

This fragmentation manifests in several ways, including the coexistence of paper-based and electronic systems, the absence of seamless data linkages between services such as ambulance and hospital care, and the lack of mechanisms for cross-jurisdictional data sharing. Together, these issues significantly constrain the ability to collect, integrate, and analyse clinical sepsis data in a timely and consistent manner.

4.3.1 Paper based systems

The coexistence of paper-based and electronic systems remains a defining feature of the Australian healthcare landscape, and some jurisdictions, continue to rely heavily on paper-based documentation.

In these settings, clinical notes, sepsis pathways, and discharge summaries are often handwritten and later scanned into digital repositories. This hybrid model introduces delays, increases the risk of data loss or misclassification, and makes it difficult to extract structured data for analysis. Even where EMRs are in place, the inconsistent use of digital forms or workflows may result in critical data points being missed or inaccurately recorded.

4.3.2 Data-sharing within jurisdictions

Interoperability between services within jurisdictions is also limited, impeding the continuity and integration of data records across a care continuum that spans multiple points of care, from pre-hospital to post-hospital settings.

One of the most frequently cited examples is the disconnect between ambulance services and hospital systems. In many jurisdictions, ambulance data is collected on separate platforms and is not routinely linked to hospital records. This means that critical information about pre-hospital care – such as early signs of deterioration, time of first contact, and initial treatment decisions – is often unavailable to hospital clinicians and is excluded from sepsis audits and quality improvement initiatives.[19]

4.3.3 Data-sharing between jurisdictions

Cross-jurisdictional data sharing presents an additional layer of complexity. There are currently no agreements or frameworks that enable exchange of sepsis data between states and territories, limiting the ability to conduct national benchmarking.

Legislative constraints, particularly around privacy and consent, further complicate efforts to establish shared data environments.[20] In some jurisdictions, data disclosure laws are decades old and were designed for paper-based systems, making them poorly suited to the demands of modern digital health infrastructure.

4.4 Governance, Legal, Ethical

The national sepsis data landscape does not just present technical or clinical challenges, but a complex set of legal, ethical, and administrative considerations.

4.4.1 Legal, privacy and ethical frameworks

Throughout the consultation process, stakeholders consistently raised the challenge of navigating the legal and ethical frameworks that govern health data sharing. Stakeholders also noted that privacy laws vary across jurisdictions, both in scope and interpretation.

While these laws play a vital role in protecting patient confidentiality, they also create uncertainty about what data can be shared and under what conditions. In some cases, legislation has not kept pace with the development of digital health infrastructure and needs of a digital health environment, making it difficult to establish interoperable data environments or pursue cross-jurisdictional linkage projects.

Additional complexity arises from the presence of sensitive and isolated data sets. For example, health information relating to Aboriginal and Torres Strait Islander peoples is subject to additional cultural and ethical considerations, particularly when collected by Aboriginal Community Controlled Health Organisations (ACCHOs).

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[19] ***Note***: See Figure 1 (p. 10) for an example of effective data sharing supporting an uplift of professional practices.

[20] ***Note***: Considered further in Section 4.4.

5 Opportunities for improving sepsis data

This section considers the opportunities available to improve the collection, integration, and use of sepsis data across Australia, and to in turn, realise a national sepsis data strategy.

It finds that a range of opportunities exist to strengthen sepsis data, including building consensus on definitions, piloting patient-reported outcome measures, investing in analytical tooling, and enabling data linkage. Further, that comparative initiatives, such as the Australian and New Zealand Intensive Care Society (ANZICS) Adult Patient Database offer tested models for governance, support, and scale.

In addition to tangible opportunities for realising change, this exercise identified a strong appetite for progress. Due to challenges canvassed, this appetite has gone unrealised to date, requiring a more focussed and coordinated effort to ensure that progress is achieved.

5.1 Standardisation of Definitions

In the short term, a clear, actionable opportunity exists to build national consensus on the definition of sepsis and its related clinical states. Without a shared understanding of what constitutes each sepsis data point, data collected from different systems and settings cannot be reliably compared or aggregated.

If shared definitions are agreed, further opportunities to harmonise between data sets can be realised by developing a national data dictionary that specifies the minimum dataset required for sepsis reporting.[21] A data dictionary could include core clinical indicators – such as lactate levels, blood pressure thresholds, ICU admission status –, administrative data – such as coded diagnoses, discharge summaries –, and patient-reported outcomes.

5.2 Improving Clinical Documentation

High-quality clinical documentation is foundational to accurate sepsis identification, coding, and data analysis. Yet, across jurisdictions, consultation revealed that documentation practices remain inconsistent, particularly outside of intensive care settings.

One suggested remediation was for training programs to be developed and delivered to health care professionals in general wards, rural hospitals, ambulance services, and general practice. This training should be practical, scenario-based, and aligned with national clinical care standards. It should also emphasise the downstream impact of documentation on coding, data quality, and ultimately, patient outcomes.[22]

5.3 Reviewing Coding Practices

Building on definitional issues, throughout consultation stakeholders noted that sepsis is frequently under- or inconsistently- coded. Clinicians and data custodians identified that the absence of a

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[21] ***Note:*** A data dictionary is a centralised repository that provides detailed information about the data used within a system, database, or project. It defines and describes the structure, relationships, and attributes of data elements, including names, types, formats, allowable values, and descriptions.

[22] ***Note***: This report notes that during this exercise, the Commission, in partnership with the TGI and Sepsis Australia, have developed an online training module for primary care, available at: https://medcast.com.au/courses/1136

consistent operational definition, particularly regarding ‘time zero’ and the inconsistent use of explicit and implicit sepsis coding, operated as key barriers to effective clinical intervention and data capture.[23]

This report notes that as part of the first *National Sepsis Program*,[24] a pilot study was undertaken to retrospectively review clinical medical records and consider the relationship between ICD-10-AM coding and the underestimation of sepsis. In the absence of other initiatives to improve medical coding not known to this report, this could form an effective basis for commencing work.

Should inconsistencies be validated through this exercise, opportunities for further improvement could be identified through developing standardised documentation templates, embedding structured sepsis fields in EMRs, and providing targeted clinician education. In the long-term, and where feasible, natural language processing (NLP) tools and Artificial Intelligence (AI) algorithms could also be piloted to extract sepsis-related insights from unstructured clinical notes.

These actions will help ensure that sepsis cases are more accurately captured in coded data, enabling better benchmarking and more responsive quality improvement.[25]

5.4 Leveraging Snapshot Audits

In the short term, there is a clear opportunity to design and commence a national snapshot audit that could serve as a baseline for future benchmarking, quality improvement, and strategic investment activities.

The design of a national snapshot audit should align with the Sepsis *Clinical Care Standard* clinical indicators and focus on capturing a representative sample of sepsis and suspected sepsis cases across healthcare settings.[26] The audit could also be designed to be technology neutral and to accommodate varying levels of digital maturity.[27]

Once designed, the audit could be rolled out nationally with support from jurisdictional leads and clinical champions. It should be timed to coincide with Sepsis Awareness Day (13 September annually) to maximise engagement and visibility. Participation should be voluntary but strongly encouraged, with clear communication about the benefits of access to comparative data, insights into local performance, and opportunities for targeted safety and quality improvement and enhanced patient outcomes.

Early audits could focus on a core set of indicators, such as blood cultures prior to antibiotics, time to antibiotics, ICU admission rates, and mortality outcomes. Over time, the scope can be expanded to include patient-reported outcomes, post-discharge follow-up, and antimicrobial stewardship metrics. Participating health care services should also be kept informed of the outcomes of the audit, with the data generated able to support funding and data maturity-uplift.

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[23] ***Note***: See Section 4.2.3.

[24] ***Note***: available at: https://www.safetyandquality.gov.au/publications-and-resources/resource-library/sepsis-medical-record-review-pilot-study

[25] ***Note***: This should be considered against, and arguably precede, the planned implementation of ICD-11.

[26] ***Note***: One option considered in preparing this report was to design the inaugural audit by focusing on a specified patient group (e.g. paediatric, maternal, neonatal) and to build out to include other patient groups over time. This report considers that in the absence of other limiting factors, all relevant patient groups should be considered. See Section 5.8.2.

[27] ***Note***: During the review of this report, it was noted that as medical data will invariably transition away from paper-based records, there is a case to be made that a snapshot audit ought to be designed for EMRs. This should be further considered during the design of the audit.

5.5 Moving towards data linkage

Sepsis is a condition that spans multiple points of care. Yet, without effective data linkage,[28] each of these touchpoints are recorded in isolation,[29] obscuring the full picture of the patient journey. Linking datasets offers an opportunity to transform how sepsis is understood, tracked, and managed, enabling:

- Continuity of insight across pre-hospital, hospital, and post-discharge care
- Feedback loops for paramedics, GPs, and others to understand outcomes
- Identification of missed opportunities for early recognition or escalation
- Longitudinal tracking of survivors and their outcomes
- Improved targeting of public health campaigns and funding models.

Throughout consultation, it was heard that several existing projects offer valuable foundations for linkage and can assist practitioners to build on proven approaches, avoid duplication, and accelerate implementation.[30] These projects also offer important insights into consumer consent models, privacy safeguards, and the technical standards required for scalable linkage.

Throughout consultation, it was identified the most impactful data linkages were:

- Ambulance to hospital, including linking paramedic assessments and early warning scores with hospital outcomes
- Hospital to primary care, including connecting discharge summaries and follow-up plans with GP records
- Hospital to mortality data, to allow more accurate tracking of outcomes and preventable deaths, and
- Hospital to post-acute services, to build more effective data sets on rehabilitation, readmissions, and long-term recovery from sepsis.

To realise this, several enabling factors must be accounted for, including:

- Common identifiers – such as patient IDs and timestamps – across datasets
- Interoperable data formats aligned with accepted standards (e.g. FHIR)[31]
- Clear governance frameworks for data sharing, access, and consent, and
- Technical infrastructure to support secure, scalable integration.

5.6 Reviewing Existing Patient Measures and Identifying Gaps

Survivors of sepsis often face long-term physical, cognitive, and psychological challenges that are not well captured by existing data measures. To better understand and respond to these outcomes,

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[28] ***Note:*** Data linkage is the process of bringing together information from different sources that relate to the same individual, family, place, or event, without generating a new data set. It may involve additional protections to ensure that personal information is preserved.

[29] ***Note***: Except QLD who have a fully integrated EMR

[30] ***Note:*** The NSW Lumos project, for example, demonstrates how primary care data can be securely and meaningfully linked with hospital records. Further information on Lumos (not considered in this report) is available here: https://www.health.nsw.gov.au/lumos/Pages/default.aspx. Similarly, pilots led by CSIRO and state-based digital health agencies are exploring technical and governance models for cross-sector integration.

[31] ***Note***: FHIR (Fast Healthcare Interoperability Resources) is a globally recognised standard developed for the electronic exchange of healthcare information. It defines how healthcare data can be structured, shared, and accessed across different systems in a consistent and secure manner.

there is a need to review and improve patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs).

This review should be conducted in conjunction with consumers, including sepsis survivors and caregivers, to ensure that the measures reflect the lived experience of sepsis. It should also consider whether new, sepsis-specific instruments are needed to fill gaps in current tools.

Following the review, selected PROMs and PREMs should be piloted in a range of clinical settings, including inpatient wards, outpatient follow-up clinics, and primary care.[32] The pilot should test both the feasibility of data collection and the relevance of the measures to patient experience and recovery. Key design considerations include:

- Determining key intervals to collect data, such as at discharge, 30 days post discharge, and 6-months post discharge
- Integrating the pilot with existing workflows and EMRs
- Engaging consumers effectively and obtaining informed consent through clear, accessible processes
- Leveraging digital platforms to enable remote and self-reported data input
- Linking PROMs and PREMs data with clinical and administrative datasets to build a more comprehensive picture of sepsis outcomes.

Once the pilot is complete, the findings should be reviewed to determine the value and scalability of PROMs and PREMs in sepsis care.

5.7 Advanced Analytics

If sepsis data can mature at a national level, there will be a growing opportunity to leverage advanced analytical tools to enhance clinical decision-making, system responsiveness, and long-term planning of health facilities, work force and systems.

Utilisation of predictive analytics, real-time dashboards, and intelligent data platforms could transform raw data into actionable insights, supporting clinicians to intervene earlier, allocate resources more effectively, and drive continuous improvement in sepsis outcomes. Enhanced data could also be used to support the development of high-quality, accessible community tools and guidance to raise awareness of sepsis symptoms.

Throughout consultation, stakeholders identified that analytical tools could include:

- Predictive analytics that use historical and real-time data to identify patterns and forecast clinical risk
- Real-time dashboards to provide clinicians information on sepsis metrics and patient outcomes
- Natural language processing to extract insights from unstructured clinical notes, such as early signs of deterioration or undocumented sepsis indicators.

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[32] ***Note***: During the review of this report, it was identified that a linkage exercise with coded sepsis patients and PREMS may have occurred in Queensland. This should be considered further in downstream activities.

Moving forward, tooling could incorporate time-series, geospatial, or anti-microbial resistance (AMR) data points to give a broader picture about the prevalence of sepsis and its relationship to other factors (e.g. environmental).

Despite this, this report cautions that advanced analytics are not an end in themselves. Rather, their value lies in the actions they enable. For example, while predictive alerts can prompt earlier clinical review, effective clinical review still relies on resourcing, training, and support. As such, this report is careful to note that these tools must be supported by appropriate datasets and commensurate funding in the healthcare system to improve outcomes for patients and efficiency across the health system.

5.8 Comparative Initiatives and National Datasets

There is significant value in examining existing national datasets and registries that have successfully captured complex health data across jurisdictions. These comparative initiatives offer tested models for governance, data collection, and reporting, and can provide insights into how a sepsis-specific system might be designed, scaled, and sustained.[33]

5.8.1 The Australian and New Zealand Neonatal Network (ANZNN)

The ANZNN registry was highlighted during consultations as an effective model for capturing high-quality clinical data across jurisdictions.[34] The registry collects detailed information on neonatal outcomes, including infection-related morbidity, and supports benchmarking, research, and service planning.

The ANZNN offers a valuable reference point for sepsis data, by demonstrating how success is realised through standardised data definitions, strong clinical engagement, and a clear governance structure.

5.8.2 The Australian and New Zealand Intensive Care Society (ANZICS) Adult Patient Database

Stakeholders identified the ANZICS Adult Patient Database as another example of a well-established national dataset.[35] Over the past 20 years, this registry has captured detailed information on Intensive Care Unit (ICU) admissions, including severity of illness, interventions, and outcomes. It supports real-time reporting, quality improvement, and research across public and private ICUs.

The ANZICS dataset offers a valuable reference point for sepsis data, by demonstrating how standardised clinical data can be collected from multiple health care services and used to monitor performance, identify variation, and support evidence-based policy. Data submissions are supported by a range of tools and resources, including collection forms, validation guidelines, a data dictionary, and training videos, to ensure that high-quality data is collected.

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[33] ***Note***: These insights should be considered against the findings of this report, particularly in Section 4.1 as it relates to unfunded contributions.

[34] University of New South Wales, (2025), *Australian and New Zealand Neonatal Network (ANZNN)*, UNSW, Sydney. Available at: https://www.unsw.edu.au/research/npesu/clinical-registries/australian-new-zealand-neonatal-network-anznn.

[35] Australian and New Zealand Intensive Care Society, (2025), Adult Patient Database (APD), ANZICS, Melbourne. Available at: https://www.anzics.org/adult-patient-database-apd/

5.8.3 Other National Datasets and Linkage Models

Beyond these registries, several other national datasets and linkage models were discussed during consultations. These include:

- The NSW Lumos project,[36] which links primary care and hospital data to support continuity of care and population health planning
- The Australian Stroke Clinical Registry (AUSCR),[37] which offers a model for blended funding and multi-disciplinary participation
- The Australian and New Zealand Emergency Laparotomy Audit (ANZELA),[38] which offers a model of data collection and ethics clearance on a national scale.

This report recommends that these models are considered further to inform the development of future data sets and supporting data platforms.[39]

5.9 Realising Improved Data Maturity

Consultations revealed a wide spectrum of data maturity across Australia.[40]

Rather than aiming for uniformity from the outset, several stakeholders considered that an effective strategy could focus on progressive uplift, allowing services with lower data maturity to develop their approach over time, while enabling services with higher data maturity to contribute more detailed and timely data from the outset.[41] A focus on progressive uplift would align with one of the pragmatic insights from consultation that waiting for a perfect data would delay meaningful action. As one participant noted,

> *'there might not be a perfect answer, but there'll be a consistent answer…[and] if you start comparing [imperfect sepsis data] in a consistent way, then we might get something meaningful out of that'.*

5.9.1 Tiered Contribution Models

To accommodate this variation, a tiered contribution model was suggested allowing services to participate at a level that reflects their current capability. For example:

- Tier 3 contributors could submit basic coded data (ICD-10-AM diagnoses, mortality)[42]
- Tier 2 contributors could include structured clinical indicators (lactate levels, time to antibiotics, blood cultures prior to antibiotics), aligned with the CCS
- Tier 1 contributors could provide real-time data, linked datasets, and patient-reported outcomes.

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[36] ***Note:*** Considered at above n 28.
[37] ***Note:*** Additional information available at https://auscr.com.au/
[38] Royal Australasian College of Surgeons, (n.d.). ANZ Emergency Laparotomy Audit – Quality Improvement. Retrieved July 22, 2025. Available at: https://www.surgeons.org/research-audit/morbidity-audits/morbidity-audits-managed-by-racs/anz-emergency-laparotomy-audit-quality-improvement
[39] ***Note***: During the review of this report, the NSW and National emergency and admitted patient data sets were raised as possible linkage opportunities. For an example of the use of administrative data sets, see Section 5.9.3.
[40] ***Note:*** Considered further as a challenge in Section 4.3.
[41] ***Note:*** This section does not consider the snapshot audit tool, considered further at Section 5.3.
[42] ***Note***: Recognising that this may already be provided, automatically, through admitted patient dataset and national death index, allowing contributors to focus on realising Tier 2 data contribution.

A tiered model would result in the development of effective data collection, while creating a target for services to progress through tiers, supported by initial investment, training, and infrastructure development.[43]

5.9.2 Building Datasets Through Strategic Expansion

Given the complexity of sepsis and the variation in data maturity across jurisdictions, an alternative approach suggested to building a national dataset was to begin with a focused, subset of the patient population – such as paediatric patients – and expand incrementally over time. This approach would enable a national dataset to build momentum and refine underpinning processes before scaling to broader cohorts.

As data systems mature and confidence grows, the dataset could be expanded to include additional cohorts, or patients with specific comorbidities. Each expansion phase should be informed by the lessons learned from earlier stages, ensuring that data definitions, collection methods, and governance models are continuously refined.

5.9.3 Administrative Data Sets

In addition to the above, there is also promising research supporting the use of administrative data sets, such as the Victorian Emergency Minimum Dataset (VEMD) and the Victorian Admitted Episodes Dataset (VAED) to understand the epidemiology and outcomes of sepsis.[44] While this provides an important source of data, it must be supplemented by improved clinical data, coding practices and data practices.

5.10 Post-Sepsis

An opportunity exists to improve information settings for those most affected by sepsis.

During consultations sepsis survivors reported that there was limited-to-no information available on what to expect once they leave hospital. Collection and dissemination of post-sepsis data could help to provide reassurance, guidance, and support for patients and caregivers on what to expect.

Sepsis survivors also require data to support access to long term supports. Feedback received included that when the long-term functional impact of sepsis is not explicitly stated in documentation, long term support can be difficult to obtain. For example, the National Disability Insurance Scheme (NDIS) does not have support packages specifically identified for sepsis patients.

Sepsis survivors want accessible information about what to expect post discharge, including the likelihood of various recovery outcomes such as post-sepsis syndrome and its symptoms. This would provide patients with valuable insights and reassure them that their experiences are shared by others. Moving forward, valuable information could include:

- Experiences of other sepsis survivors
- Expected outcomes and quality of life

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[43] ***Note***: In the review of this report, it was suggested that improved data – possibly through a tiered data set – could be to realise a evidence based protocol and reporting model, similar to the 'New York State Sepsis Care Improvement Initiative'.
[44] ***Note***: With thanks to Professor Daryl Jones for discussing his research and for providing this report with access to – Flacks N, Martin C, Liew D, Walker K, Jones D. Infectious and sepsis presentations to, and hospital admissions from emergency departments in Victoria, Australia. Emergency Medicine Australasia. 2024; 36(3):450–458. doi: 10.1111/1742-6723.143841.

- Morbidity and economic burden
- Assisting with organising care, both through primary care and the NDIS.

Data could also be used to inform ongoing care and development of a model of care. Currently, information and coordination of care post-sepsis is poor. The development and implementation of post-sepsis data collection and development of products for patients and carers should be conducted in conjunction with consumers, to ensure the information provided aligns with patients' priorities and contributes meaningfully to ongoing care and improved quality of life.

6 The future of sepsis data

This section considers the future state of state of sepsis data and presents a strategy to realise an effective dataset.

While the future vision for sepsis data is broadly accepted, the path to realising it remains somewhat unclear. A strategy to begin to realise this future is proposed. This focuses on four (4) key pillars, supported by three (3) enabling factors.

6.1 Overview

The proposed strategy is realised through four (4) key strategic pillars:

- Effective data ***governance***, to ensure robust oversight of a minimum national dataset and its development
- Improvement to ***data quality and collection***, to realise a robust and longitudinal national clinical registry.
- Uplift to ICT ***infrastructure***, to support increased and improved data storage, sharing, and structure.
- Exploring data ***linkage*** opportunities, to ensure that fragmented datasets are brought together to realise the intent of a national clinical registry.

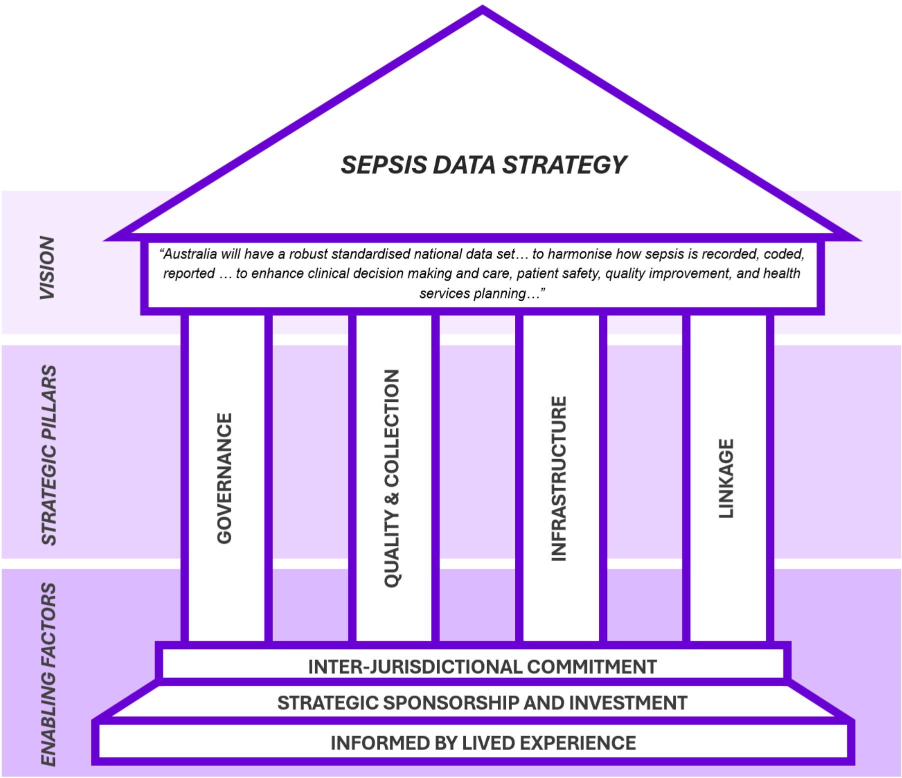
Following consultation, this report considers that there are three (3) key enabling factors to realise success against these pillars:

1) ***Inter-jurisdictional commitment*** and buy-in to the realisation of a national data strategy
2) ***Strategic sponsorship and investment*** to realise incremental improvements and increased advocacy within federal health settings
3) Centring consumer participation into the development of the dataset to ensure that it supports those with, and ***is informed by, a lived experience*** of sepsis.

The strategy has been developed with a five (5) year time horizon in mind, however this report recognises that several dependencies may warrant choosing an alternate time horizon for several actions.

Figure 3 shows the interrelation between the strategic pillars and enabling factors in realising the vision for sepsis data and the proposed strategy.

Figure 3: Sepsis Data Strategy components



“Australia will have a robust standardised national data set… to harmonise how sepsis is recorded, coded, reported … to enhance clinical decision making and care, patient safety, quality improvement, and health services planning…”

6.2 Strategic Pillars

The proposed strategy is built around four (4) key strategic pillars.

6.2.1 Governance

The future state of governance should play an active role in securing funding, supporting the continued development of the minimum national dataset, and supporting stakeholder engagement, including clinicians, researchers, and patients.

The governance pillar seeks to realise a sustainable and trusted national sepsis clinical registry, underpinned by the effective leadership, oversight, and ethical frameworks needed to ensure data is collected, shared, and used responsibly.

This report recommends commencing with the development of a national working group to drive the activities under other pillars and further refine the business case for a minimum national dataset.

From here, the program of work within this pillar should focus on the development of artefacts and initiatives required to support the realisation of effective governance. This could include:

- Identifying a lead national agency to drive and coordinate strategy implementation and reporting
- Developing a national governance framework, that outlines the mandatory privacy, legal, and ethical requirements including jurisdictional alignment

- Drafting data sharing arrangements based on the national framework, that support initial data sharing between jurisdictions
- Providing central advocacy, stewardship and accountability for funding and exploring options to build blended funding streams.

6.2.2 Data quality and collection

The future state of data quality and collection seeks to realise a consistent, clinically meaningful foundation for sepsis data, that is consistently reviewed and developed.

The quality and collection pillar begins with building consensus on key definitions and data points, to ensure consistency within national data. This should include:

- Building consensus on sepsis definitions and 'time zero' for data collection processes
- Developing a data dictionary to align data with the Sepsis Clinical Care Standard
- Reviewing PROMS and PREMS for post-sepsis care and to determine if new long-term measures are required
- Beginning the design of a national snapshot audit.

From here, the quality and collection program of work should focus on continuous improvement by supporting the development of robust process and outcome measures, enabling benchmarking, quality improvement, and more informed decision-making.

Improving clinical documentation and coding practices is essential to ensure sepsis cases are correctly reported and that comprehensive clinical observations of sepsis are captured consistently across jurisdictions.

6.2.3 Infrastructure

The future state of data infrastructure seeks to realise improved, and where possible interoperable, ICT to ensure data is effectively stored, shared, and linked with minimal manual intervention. This report recognises that improved ICT will present significant external benefits to the Australian health care system outside of sepsis care models.

The infrastructure pillar begins with a mapping exercise to understand the scope of the data differences, and the magnitude of the changes that will be required to realise a minimum national data collection. This strategy recognises that there is some additional work required to determine the overlap between the direction of this pillar, the Sparked CSIRO standard,[45] and the implementation of ICD-11 in Australia.

Perhaps more than other pillars, the infrastructure pillar will require significant investment of both time and money. As a result, this strategy positions several dependencies with infrastructure and funding and recognises that there are other opportunities that could be leveraged to partially realise this.

Positioned in the long-term, though not a dependent sequence, it is recognised that there is significant potential for investment in analytical and generative tooling to support sepsis data insights.

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[45] ***Note***: Sparked is a program run by the CSIRO to deliver a core set of FHIR standards for use in Australian settings. This report understands that the Sparked initiative was funded by a terminating budget measure.

6.2.4 Linkage

The future state of linkage seeks to realise improved interoperability between data sets (within and in between jurisdictions) to ensure that data is available on the full patient journey.

The linkage pillar takes an alternative approach to realising a national clinical registry by exploring opportunities to link data sets between discrete services. Noting the current state of sepsis data, and broader healthcare data systems, it seeks to realise national data linkage and usage in the long-term.

In the short-to-medium term, it begins with mapping where data exists and where it can be linked, followed by targeted pilot projects to test feasibility.

6.3 Enabling Factors

Following consultation, this report considers that there are three (3) key enabling factors to realise success against these pillars:

6.3.1 Inter-jurisdictional commitment

A minimum national dataset cannot be realised without national support.

Unified national commitment is essential to ensure consistency, coordination, and momentum across jurisdictions. Jurisdictional buy-in will enable interoperability, support benchmarking, and reduce duplication of effort.

6.3.2 Strategic Sponsorship and Investment

A minimum national dataset is unlikely to be realised without investment in the healthcare workforce.

Sustained and scalable funding is critical to support infrastructure upgrades, workforce development, and governance functions. Initial investment should focus on foundational elements, such as pilot projects, while longer-term funding could follow a hybrid model, combining federal, state, and research-based sources.

Demonstrable success in early initiatives will help build the case for continued investment.

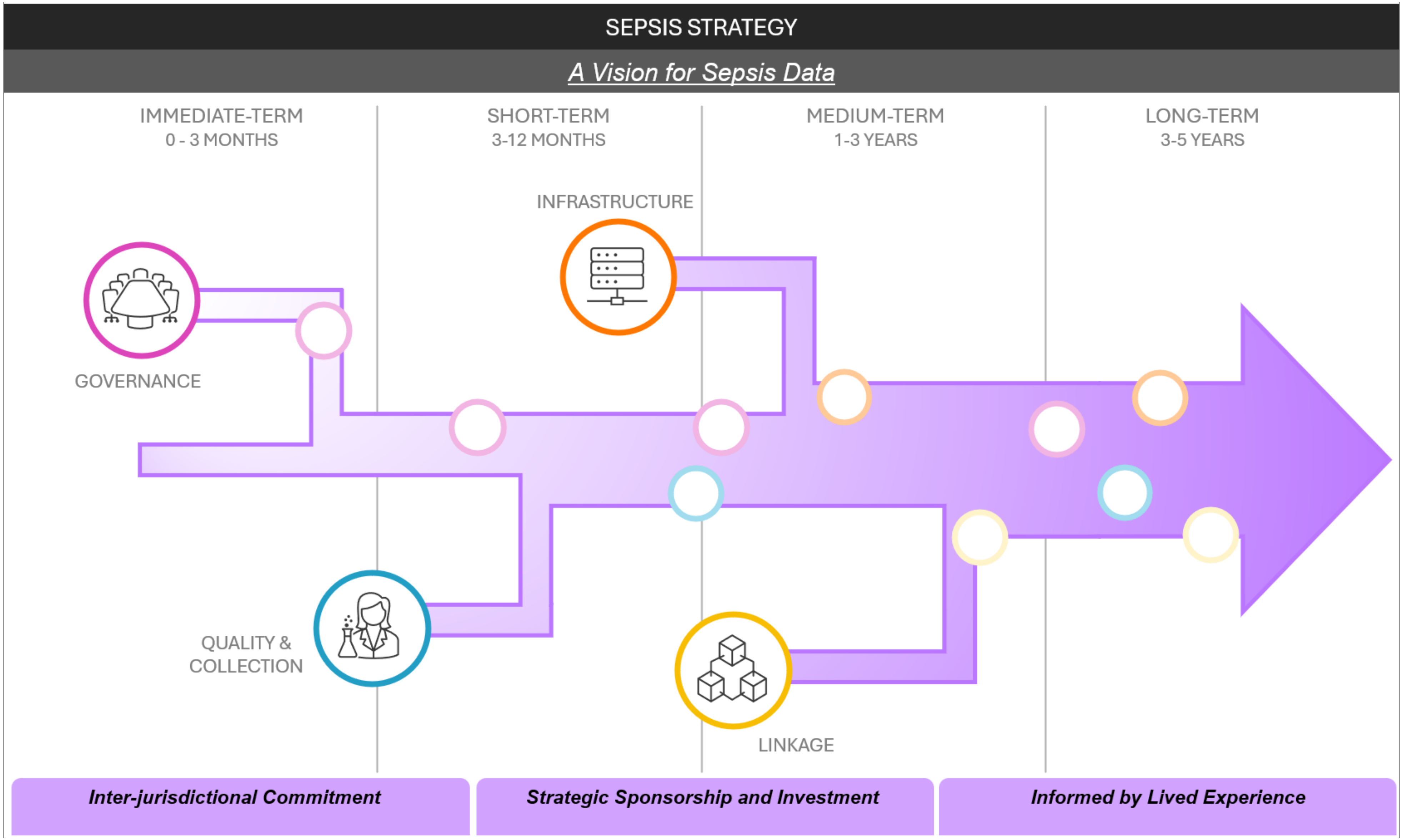
6.3.3 Informed by Lived Experience

A minimum national dataset must be realised in partnership with those who have a lived experience of sepsis.

Consumer involvement is vital to ensure that national sepsis data reflects real-world experiences and priorities. Patients and families bring unique insights into care gaps, long-term outcomes, and the importance of accessible information. Their participation in governance, indicator development, and outcome measurement will help ensure that the system is transparent, ethical, and responsive.

Embedding consumer voices in co-design processes will also strengthen public trust and support broader awareness and engagement efforts, such as public reporting.

Figure 4: Strategy Time Horizon



6.4 Strategy Plan

	STRATEGY			
	GOVERNANCE	QUALITY & COLLECTION	INFRASTRUCTURE	LINKAGE
IMMEDIATE TERM (0-3 MONTHS)	In the immediate-term, establish a national working group to govern downstream actions.			

	• ***Establish a national working group***, to:
	  • Define strategic purpose and use case(s) for sepsis data
	  • Refine and revisit the strategic vision
	  • Refine stakeholder mapping
	  • Clarify roles and responsibilities for data custodianship			

SHORT TERM (3-12 MONTHS)	In the short-term, develop a national governance framework to drive future outcomes.	...build consensus on core definitions and collection pilots.	...commence mapping to understand the scope of data differences and shared overlap.	...explore opportunities for intra-jurisdictional dataset linkage.

	• Develop a ***national governance framework*** to determine privacy, ethics, and access denominators across jurisdictions.	• ***Build consensus*** on sepsis definitions and 'time zero' for data collection process.
		• Develop a data dictionary for a national minimum dataset aligned to the Sepsis Clinical Care Standard
		• ***Begin design of a national snapshot audit*** to occur during Sepsis Awareness Month
		• ***Review PROMs and PREMs*** for post-sepsis care and determine if new long-term outcome measures are required (in conjunction with consumers).
			• Commence broad EMR / system ***interoperability mapping***,* including:
			  • Where similar successful system configurations could be adopted
			  • Digital maturity across jurisdictions
			  • EMR capabilities for sepsis data capture
			• *Note* – may be supplemented / superfluous if CSIRO project has completed this activity.
				• ***Identify key linkage opportunities*** (e.g. ambulance to hospital) and begin exploring means to link data sets.

MEDIUM TERM (1-3 YEARS)	In the medium-term, commence development of a data governance framework, centering consumers	...review collection practices and commence early pilot activities.	...invest in enabling factors for data uplift.	...begin to explore feasibility of national data linkage.
	• ***Align framework*** with existing national committees and formalise mechanisms for engaging clinicians, consumers, researchers, and data custodians in governance. • Draft and consult on ***national data sharing agreements***. • Explore comparable ***funding approaches*** (e.g. Stroke) and secure long-term funding for governance functions, including blended funding models (e.g. federal, state, research grants) to support scale-up.	• ***Commence national snapshot audit*** to occur during Sepsis Awareness Month • ***Review coding practices*** and documentation standards for sepsis and, if required, commence development of additional training and education materials. • ***Begin pilot*** on PROMs and PREMs for post-sepsis care	• Invest in workforce capability (clinical informaticians, data analysts) • ***Align with FHIR*** standards for interoperability • Ensure ***readiness to implement ICD-11*** when it is rolled out in Australia	• ***Begin mapping*** discharge and post-care data flows • Engage with NSW Lumos and other pilot projects
LONG TERM (3-5 YEARS)	In the long-term, formalise national data stewardship and access	...embed continuous improvement and initiative upscaling.	...integrate technology solutions to enhance data analytics.	...commence national data linkage and use linked data to realise improved sepsis outcomes.

	• ***Formalise national stewardship*** of data set, including:
	  • Integrate sepsis data into broader health performance frameworks
	  • Focus on uplift and mandate
	  • Establish enduring governance mechanisms for data linkage and research access
	• ***Develop tiered access*** models (e.g. public, research, policy) with clear approval pathways, and maintain a national data access register to track who and how data is being used.
		• Review PROMS and PREMS pilot to determine future ***uplift and upscaling***.	• ***Establish a national sepsis registry*** or federated data platform.
			• ***Integrate predictive analytics*** and AI for early detection.
			• Develop ***real-time dashboards for clinical monitoring*** based on common system configurations.
				• ***Develop protocols*** for linking hospital, mortality, and primary care data
				• ***Launch pilot linkage project*** between two chosen jurisdictions
				• Enable national linkage across the full patient journey (pre-hospital, hospital, post-discharge)
				• Use linked data to inform public health campaigns, funding models, and service planning
				• Support longitudinal research and outcome tracking

7 Conclusion

Sepsis is a life-threatening and time critical condition that arises when the body's response to an infection damages its own tissues and organs. It is a major cause of morbidity and mortality. Early detection, recognition and treatment of sepsis is key to preventing illness and death.

Within this, epidemiological data is used to plan and evaluate health care delivery and guide clinical practice. Health services also need robust process and balancing data to measure the impact of quality improvement activities on patient outcomes. However, collecting reliable and consistent sepsis data is challenging.

In 2017, Stopping Sepsis: A National Action Plan called for the development of a National Minimum Data set,[46] to address inconsistencies in documentation and coding. The proposed National Data Plan Strategy has been developed to outline the current state of sepsis data, create a clear future vision and guide the transition from current to future state.

Delivering the vision for the future of sepsis data will require leadership and investment. It will also require a commitment to listen and engage with sepsis survivors and their families. These foundations will support the implementation of key activities outlined in each of the four strategic pillars: governance, quality and collection, infrastructure and linkage.

Improving how sepsis data is collected, recorded, stored, managed, shared, and used will strengthen clinical practice, quality improvement and research. The progress already being realised at a grassroots level and the willingness of people to participate in the development of this report, demonstrates a strong appetite among medical professionals, data scientists, policy analysts, survivors and researchers to work together to drive this long-term change.

Recommendation

The Australian Government should appoint a lead agency to drive the implementation of the National Sepsis Data Plan.

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[46] The George Institute for Global Health (2017), Stopping Sepsis: A National Actions Plan, https://www.georgeinstitute.org.au/sites/default/files/documents/stopping-sepsis-national-action-plan.pdf

8 Appendix A Methodology

This section details the methodology that underpins this report and the consultation undertaken in support of it.

8.1.1 Technical Advisory Group

To support the development of the National Sepsis Data Plan, the Commission established a Technical Advisory Group (TAG).

The TAG comprised members nominated for their technical expertise and subject matter knowledge in areas such as sepsis care, data analytics, clinical governance, and health information systems. TAG members were appointed at the discretion of the Commission and nominating jurisdictions. This included a representative from the Department of Health, Disability and Ageing who provided national insights and facilitated engagement with the Department, and the Australian Institute on Health and Welfare.

TAG members contributed to the selection of the preferred supplier, providing expert advice on local sepsis data and reporting systems, facilitating local engagement, reviewing draft materials, and ensuring that deliverables were fit-for-purpose.

8.1.2 Data Request

As part of the initial phase in developing the National Sepsis Data Strategy, information was requested from each state and territory to build a comprehensive understanding of the current landscape of sepsis data collection and reporting. This request aimed to identify existing data sources, known gaps, and limitations to inform more targeted and effective stakeholder engagement.

A data request was sent on 9 April with responses sought by 17 April.

Following an initial review of the material, a high-level data gap analysis and targeted consultation was conducted (see Appendix B).

8.1.3 Consultation

From May to June 2025, consultations were undertaken with members of the National Sepsis Data Plan Technical Advisory Group and other stakeholders with expertise in sepsis care, healthcare data management, or with a lived experience of sepsis.

Using a semi-structured format, participants were guided through a series of open-ended questions, outlined at Figure 6, and provided in advance of consultation. This approach allowed for both targeted responses and open-ended input, ensuring a comprehensive understanding of current practices, challenges, and opportunities related to sepsis data.

Figure 6: Consultation questions

> Callida are seeking your views on realising this future state for sepsis data, considering the lifecycle of data from documentation, capture and coding of information, reporting, storage, linkage and use. Specifically:

1. How increased sepsis data and data quality will enable clinicians and health services to better meet the needs of sepsis patients, survivors, their caregivers and the bereaved?
2. How increased sepsis data and data quality will improve clincal governance and safety and quality within health care services and support clinical practice?
3. The challenges and obstacles to realising a robust contemporaneous and longitudinal national data set, based on standardised data collection.
4. The opportunities for improved sepsis data and data collection that can be replicated, or otherwise scaled, to realise a national data set.
5. Are there other data improvements that you would like to be prioritised in the short, medium, and long term?
6. What should we consider when it comes to technology and innovation and its potential to impact sepsis data collection and data quality? For example AI, machine learning etc.

Findings from this consultation have been summarised throughout this report.

8.1.4 Data Gap Analysis

In support of the consultation, a high-level thematic data gap analysis was undertaken to understand the distance between the current state and proposed future state of sepsis.

Following the initial data request (*Section 7.1.2* refers), it was determined that a full technical data gap analysis – an exercise to determine specific reforms to data structure, storage and transmission – was not feasible, due to both the maturity of data reporting and interoperability issues.[47]

As a result, a higher-level gap analysis was undertaken that provided a jurisdictional view of responses to a range of key data requirements, such as ‘approach to standardised reporting’, ‘implementation of electronic medical record’, ‘linkage to ambulance data’. The identified themes are data issues or gaps repeatedly raised by participants across the consultations and have informed the development of the strategy in this report.

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[47] ***Note***: Identified and discussed further at Section 4.3.

9 Appendix B Data Gap Analysis

9.1 Purpose

A data gap analysis is used to identify discrepancies between the desired future state of data and the current state, revealing areas needing improvement in data quality, accuracy, completeness, or usability. This data gap analysis informs the sepsis data strategy which identifies and prioritises the gaps to be addressed.

9.2 Methodology

This data gap analysis is based on a thematic analysis of information collected through a national data request and stakeholder consultations. In April 2025, an information request was sent to each state and territory on the current data collection and reporting undertaken for sepsis, including the sources of the data and any known limitations. No underlying patient data was requested or provided.

From May to June 2025, consultations were undertaken with members of the National Sepsis Data Plan Technical Advisory Group and other stakeholders with expertise in sepsis care, healthcare data management, or with a lived experience of sepsis. The themes identified in this analysis are the data issues or gaps that were raised by participants during consultations.

9.3 Future state

Although specific details for the future state of sepsis data are yet to be determined, the TAG agreed on the following vision for a future state of sepsis data:

Australia will have a robust standardised national data set that is contemporaneous and longitudinal. This will harmonise how sepsis is recorded, coded, reported and how that data is used. The national data set will establish the foundation for understanding sepsis prevalence, health system impact and outcomes to enhance clinical decision making and care, patient safety, quality improvement, and health services planning. It will also support and inform research priorities.

Consultation participants broadly agreed with this vision statement but cautioned on the practicality of achieving contemporaneous data, and the difficulty of consistently recording a complex condition such as sepsis. Participants identified that the benefits of this future state of national sepsis data would enable:

- An understanding of the burden of disease of sepsis
- Testing of compliance against the Clinical Care Standards
- Feedback on quality improvements in treatment or processes
- Benchmarking across health services and states and territories.

9.4 Current sepsis data and gaps

Current data relating to sepsis prevalence, treatment and outcomes is spread across multiple sources within the health system, including:

- Structured health service data sets such as coded morbidity data and administrative data
- Clinical data such as patient charts and clinical notes recorded in a semi-structured format within EMR systems, or unstructured data on scanned paper records
- Data external to hospitals including from death registers, primary care, ambulance services and pathology.

The format of sepsis data varies across jurisdictions and health service providers. There is also a wide range of maturity across and within each state and territory for sepsis data collection, analysis, reporting and sharing. Across consultations, the following themes consistently surfaced identifying gaps in data availability or accuracy:

1. Inconsistent definitions
2. Sepsis ICD-10 coded data quality
3. Variations in data collection for Sepsis Clinical Care Standards
4. ICT infrastructure & electronic medical record systems
5. Linkages between data sets across the patient journey
6. Patient experience and post-sepsis care.

9.4.1 Inconsistent definitions

Participants repeatedly raised the importance of a clear and actionable definition of sepsis, to reliably and consistently identify sepsis across jurisdictions. Without a consistent operational definition that can be agreed and implemented across jurisdictions, it limits the ability to accurately compare sepsis prevalence and outcomes across states and territories.

The definition of sepsis has changed over time with the current definition informed by the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) in 2016.[48] That task force concluded the term *severe sepsis* was redundant, and the term sepsis adopted for those cases.

Although there was broad agreement on the use of the Sepsis-3 definition, some participants indicated that this definition was research focused and not as applicable in a clinical setting. This is because sepsis does not have a single, uniform diagnostic test or threshold but relies heavily on clinical judgement, and in many cases requires a senior clinician to diagnose. Participants noted that this introduces variability in how and when sepsis is identified and documented.

In addition, sepsis is rarely experienced in isolation, it typically presents alongside other conditions. Participants noted that there wasn't a culture of using the word 'sepsis' in charts. As sepsis is a syndrome of organ dysfunction that occurs as a result of infection, what is documented can often be a reference to the infection or pneumonia, limiting the data to inform where sepsis develops.

9.4.1.1 Paediatric and neonatal sepsis

The Sepsis-3 definition was focused on adult patients, and similar clinical criteria does not exist for paediatric and neonatal cases. Sepsis often presents with non-specific symptoms such as fast heart or respiratory rates, particularly in younger age groups.[49] Participants working in paediatrics noted that this added additional variation to working definitions of sepsis across locations, as there

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[48] ***Note***: Additional information available at https://pmc.ncbi.nlm.nih.gov/articles/PMC4968574/
[49] ***Note:*** Sourced from the *Queensland paediatric sepsis mortality study* available at: https://www.qfcc.qld.gov.au/sites/default/files/2024-03/Paediatric%20Sepsis%20Mortality%20Study.pdf

was little to no guidance for diagnosis. Despite the difficulty in diagnosis, participants noted that sepsis remains an important issue for these groups given age is an important risk factor for sepsis, with newborns and infants particularly susceptible because their immune systems are immature.

9.4.1.2 Time zero definition

A key indicator for the Sepsis Clinical Care Standards is treatment with appropriate anti-biotics within 60 minutes of signs of sepsis.[50] Determining the point at which sepsis starts, is inherently difficult and was not consistently applied across jurisdictions.

As a condition of deterioration, sepsis evolves gradually, and the moment of onset may not be clear or determinable. As there is no standard test or simple diagnostic criteria for sepsis, the point of recognition can vary. In addition, the point of sepsis recognition may not be clearly recorded in clinical notes, so different hospitals and jurisdictions have adopted different definitions for 'time zero'. The range of definitions include:

- Time of sepsis recognition based on clinical judgment
- Time the sepsis pathway was initiated
- Triage time for emergency department presentations
- Time of emergency calls for deteriorating ward patients.

The definitions used by each jurisdiction are included later in this report in *Table 2: Sepsis clinical care indicator analysis by state & territory.*

9.4.2 Sepsis coding quality

Professional clinical coders classify and catalogue each case within a hospital and label it with a primary ICD-10 code and supplementary codes.[51] The definition and use of these codes are agreed nationally based on international standards and ICD-10 codes are used by both public and private hospitals. Coded data is collected in databases at the state and territory level and reported nationally to the Australian Institute of Health and Welfare (AIHW) as part of its Admitted Patient Care National Minimum Data Set.

As part of the initial National Sepsis Program an epidemiology of sepsis in Australia study was conducted on coded data. It found that the large increases in sepsis rates between 2013-14 and 2017-18 were correlated with the changes in coding practices between editions and the report recommended further work to assess the accuracy of sepsis coding.

As part of the development of the Sepsis Clinical Care Standard the Commission collated a list of ICD-10 codes for explicit cases of sepsis.[52] Although all jurisdictions are currently able to quantify sepsis cases using these ICD-10 codes for sepsis, participants generally agreed that this data was not sufficient, due to the inconsistency, accuracy, and timeliness of the coded data.

9.4.2.1 Sepsis coding accuracy

Participants in most jurisdictions raised concerns about the accuracy of sepsis coding. Many participants warned against relying on the explicit sepsis codes for tracking sepsis rates. In general

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[50] ***Note*:** Quality indicator 3b of the CCS considers the 'proportion of patients with signs and symptoms of infection-related organ dysfunction who started their first dose of an empirical antimicrobial within 60 minutes of recognition

[51] ***Note***: The International Classification of Diseases (ICD) is the international statistics classification of diseases, with the tenth revision (ICD-10) approved by the WHO in 1990. The Australian modification of ICD-10 was introduced in Australia in 1998.

[52] ***Note*:** available at https://www.safetyandquality.gov.au/standards/clinical-care-standards/sepsis-clinical-care-standard/sepsis-codes

participants felt that sepsis was underreported in the existing coded data. Only a subset of all sepsis cases are coded with explicit sepsis codes due to a variety of reasons raised by participants including:

- **Clinical coder directions and clinical practices –** Clinical coders rely on the clinicians notes to assign diagnostic cases. For sepsis, they require a specific reference to sepsis for an explicit sepsis code, and coders will not infer sepsis from the clinical notes. Participants across multiple jurisdictions noted that there is a culture of not using the term sepsis in charts, instead clinical notes will generally focus on the infection, its type or source. In addition, participants noted that some terms used by clinicians often do not result in an explicit sepsis code, suggesting a disconnect between clinical language and coding standards.

- **Concurrence of other conditions –** As a condition of deterioration sepsis often occurs alongside other conditions being treated. Therefore, the focus of clinical notes may be on other conditions, resulting in sepsis being underreported.

- **Complex diagnostic criteria –** As there are no simple diagnostic criteria for sepsis, diagnosis requires clinical judgement and expertise. Often requiring a senior clinician to diagnose, the references to sepsis may not be included by the junior staff who prepare the documentation.

The development of explicit sepsis pathways for treatment of sepsis may raise the prominence of sepsis and increase the accuracy of coding sepsis.

9.4.2.2 *Implicit sepsis coding*

An alternative method for measuring sepsis rates is including implicit sepsis cases where there is an infection listed as the primary or secondary ICD-10 code plus an organ dysfunction ICD-10 code. A 2025 published study conducted by the George Institute found that implicit methods were more accurate than relying on explicit sepsis codes, however, it found that *"agreement between clinical sepsis and all ICD coding methods was low"*. [53] This matched the experience of participants who had performed audits of sepsis cases. They cautioned that relying on implicit sepsis codes to identify cases, as it was only a starting point for further examination of clinical notes. The value of using implicit codes can also vary between location, as it may be more useful in emergency departments where organ failure is a less common occurrence, than in ICUs where it may overstate the prevalence of sepsis.

9.4.2.3 *Time delays in coding*

Participants raised the issue of the timeliness of coded data. The coding of data usually takes place long after a patient has been discharged from hospital. Participants indicated that data generally took between a few weeks to a few months to be coded. The table below details the estimated time (collected through consultations) for data to be coded in public hospitals.

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[53] Kumar et al. 2025, '*Accuracy of the modified Global Burden of Disease International Classification of Diseases coding methods for identifying sepsis: a prospective multicentre cohort study*'. Available at https://pubmed.ncbi.nlm.nih.gov/40457465/

Table 1: Estimates of time between treatment and coding	
ACT	3 months
NSW	3 – 6 months
NT	2 – 3 months
TAS	2 – 3 months
VIC	3 months
WA	6 weeks on average but up to 6 months
National	1 year – The Admitted Patient Care National Minimum Data Set is usually released one year after the period it covers.

9.4.3 Variations in data collection for Sepsis Clinical Care standard indicators

Over the last decade health services across Australia have been working to improve the standard of care for sepsis by developing sepsis pathways – standard care protocols for sepsis. In June 2022, as part of the National Sepsis Program, the Commission launched the Sepsis Clinical Care Standards, a national standard of care. To support the implementation of these standards the commission developed a set of 11 indicators.[54]

Health services across Australia have been working to collect data against these standards, and to improve their quality and performance. In addition, many health services began collecting data earlier to support the development of their own sepsis pathways. There is wide variation in how jurisdictions and hospitals have approached collecting this data. The main differences have been across:

- **Data collection** – The process for collecting the data varies due to the difficulty of extracting data from different systems which may be electronic or paper-based.
- **The definition of sepsis** – How to identify the cases of sepsis or suspected sepsis to include in analysis.
- **The definition of time zero** – The start of sepsis diagnosis for the purposes of time to treat with antibiotics.

Table 2 summarises some of the data collection and analysis currently undertaken across the various jurisdictions.

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[54] ***Note:*** Available at https://www.safetyandquality.gov.au/standards/clinical-care-standards/sepsis-clinical-care-standard/indicators-sepsis-clinical-care-standard and https://meteor.aihw.gov.au/content/755589

Table 2: Sepsis clinical care indicator analysis by state & territory	
ACT	**Summary:** The ACT is developing longitudinal and real-time reporting of sepsis cases based on ICD-10 coded data. This will provide regular reporting on sepsis cases, patient outcomes and re-admission rates. For compliance with Sepsis Clinical Care Standards indicators, the ACT performs manual reviews of sepsis cases and these audits are used by the hospitals for local improvements. **Sepsis definition:** The ACT uses explicit sepsis codes and ANZICS reporting data to identify records to be manually reviewed. **Time Zero:** Timing of sepsis recognition is determined on a case-by-case basis based on the clinical notes.
NSW	**Summary:** The NSW Clinical Excellence Commission (NSW CEC) maintains a database of suspected sepsis cases for quality improvement while implementing its sepsis pathways, but this database is no longer heavily utilised, as it requires significant manual data entry. NSW CEC now has a sepsis measurement framework to provide guidance to hospitals to perform their own audits of sepsis cases for quality improvement and compliance with the Clinical Care Standards. **Sepsis Definition:** The sepsis measurement framework definition for a known or suspected sepsis case is "*Any signs and/or symptoms of infection – PLUS Yellow or Red Zone criteria as per the relevant sepsis pathway. WITH or WITHOUT Any sepsis risk factors*" **Time Zero**: The sepsis recognition time zero is defined as: "*Time stamp for triage (emergency)' or CERS call (ward)*". Clinical Emergency Response Systems (CERS) is an emergency call for a deteriorating patient.
NT	**Summary:** NT Health analyses coded data for key trends and directs health services to perform manual audits of sepsis cases using an audit survey based on the Clinical Care Standards. The survey is open for one month. The manual audits are very time consuming so have small sample sizes. **Sepsis definition:** Uses explicit sepsis codes to identify sepsis cases. **Time Zero:** The administration of medications (including the time of administration) is recorded in the electronic Medication Management application (eMMa) database; however, the time of sepsis diagnosis is not electronically recorded so a manual review of clinical notes is required to determine on a case-by-case basis.
QLD	**Summary:** Brisbane metro south has a sepsis dashboard that shows 12 months of sepsis performance for each of the five emergency departments. This is created with mostly automated data extraction from the EMR. The dashboard looks at four main quality indicators and one sentinel event indicator. **Sepsis definition:** The population cohort used is patients for whom blood cultures were requested, as it implies a suspected case of sepsis. At the time the dashboard

	was designed it was not possible to automatically identify cases with positive blood cultures from the extractable pathology data. **Time zero:** The emergency department triage point. In addition to this automated dashboard, smaller hospitals in Queensland perform manual audits of a small sample of cases coded with explicit sepsis codes for compliance with the Clinical Care Standard indicators.
SA	**Summary:** Hospitals in South Australia conduct manual audits of a sample of sepsis cases and have sepsis event reviews where they engage with cases of sepsis after the fact, even if not diagnosed at the time. A temporary trial of a real-time reporting dashboard of sepsis incidences was undertaken for one hospital. **Time zero:** Manually identified on a case-by-case basis.
TAS	**Summary:** The audit process in Tasmania is heterogeneous among South, Northwest and North. Not currently using an audit tool, but in the process of developing one. Currently only review "*significant incident events*". **Sepsis definition:** Plan to audit using explicit sepsis codes, likely with addition of cases identified through use of sepsis pathway which would need to be assessed for sepsis case definition, once a process is established.
VIC	**Summary:** Safer Care Victoria developed a toolkit in 2018 to assist the implementations of adult sepsis pathways which recommended a variety of data collection methods due to the range of systems used in Victoria. These included integrating the pathway into the EMR, creating a physical logbook of sepsis cases, or linking the pathway to antibiotic approvals or pathology ordering. **Sepsis definition:** Advised to use the Victorian admitted episodes dataset (VAED) discharge codes related to sepsis to identify patient cases. **Time Zero:** For emergency departments the definition is number of minutes from triage. For wards the definition is from 'meeting sepsis criteria' – this information can be collected from the observation chart or medical record (or EMR).
WA	**Summary:** Western Australia has a statewide sepsis dashboard built from a combination of coded morbidity data, death registry and emergency department activity data to track sepsis cases and readmissions. WA Health also uses a REDCap survey tool and database to collect data on sepsis cases for Clinical Care Standard indicators. **Sepsis definition:** Uses explicit sepsis codes as well as references to sepsis on discharge summaries. **Time zero:** Time of sepsis recognition based on clinical judgement.

9.4.4 ICT infrastructure & Electronic Medical Records

A barrier to standardised national data is the variety of digital infrastructure used for data collection and storage across jurisdictions, and the lack of interoperability.

There are a range of medical record systems across Australia including both paper-based and electronic systems. In paper-based systems patient charts, clinical notes, and discharge summaries are handwritten and later scanned into digital repositories.

All ICD-10 coded data is digitally recorded in databases, however, the data fields captured are limited. Extracting additional detail or information from clinical notes such as time to receive antibiotics can require large amounts of staff time to review records. Participants in Queensland noted that manual audits of patient records for sepsis audits requires "hundreds of hours of valuable clinician time". As a result, an EMR and automated data extraction are crucial for contemporaneous reporting of sepsis data.

Table 3 summarises the electronic medical record infrastructure in public hospitals across each jurisdiction.

Table 3: Electronic Medical Records Systems

ACT	The ACT has an EMR – the ACT Health Digital Health Record (DHR), in all public Hospitals since 2022.
NSW	NSW has EMRs in all public hospitals. This is currently a patchwork of different systems, but NSW is moving to one Single Digital Patient Record with a roll-out for completion in 2029/30.
NT	All paper records that are later scanned onto a digital repository.
QLD	The integrated electronic Medical Record (ieMR) is a unified EMR that has been rolled out in most hospitals in Queensland but not all. Smaller rural and regional hospitals still use paper records. The EMR roll-out is scheduled to finish in late 2020s.
SA	Sunrise EMR is a state-based electronic medical record used at all public hospitals in South Australia. The roll-out was completed in March 2025.
TAS	Emergency department admissions are electronic, but all other records are paper based. The paper-based records are scanned after discharge to the Digital Medical Records (DMR). For all major hospitals, all admission notes are scanned, but for district hospitals only discharge summaries are scanned.
VIC	Most public hospitals in Victoria have EMRs, but some smaller hospitals still use paper records. Victoria has 60 local hospital network areas, with a patchwork of different systems across network areas. Victoria Health maintains a standard of a minimum set of functional requirements and interoperability for all EMRs.
WA	Western Australia has Digital Medical Records (DMR) in many metropolitan public hospitals, but not in regional or rural hospitals where paper-based systems are still standard. In April 2025 WA Health released an expression of interest for a single statewide EMR solution that will replace the DMR, with an expected 10-year phase-in period.

9.4.4.1 Automation and Artificial Intelligence (AI)

Participants noted that AI presents significant opportunities to improve clinical diagnosis of sepsis and reduce the time from data collection to diagnosis. Although hospitals with established EMRs and data analytics capabilities can begin to take advantage of AI, given the mix of hospitals that rely on paper-based records versus those using an EMR, any opportunities for the widespread use of AI will be dependent on ICT investment and development of systems to provide timely accessible data. Feedback from participants is that based on previous AI projects, further work is required over the longer term on the use of AI and its ability to accurately interpret clinical notes to inform patient care.

9.4.5 Data Linkages and Interoperability

Sepsis is a condition that often spans multiple points of care meaning relevant data is collected by different entities throughout the patient journey, resulting in fragmented data sets of varying value.

9.4.5.1 Primary Health data

The primary health sector (including, general practitioners, and pharmacists) plays an important role in the identification of sepsis and supporting survivors of sepsis. Most jurisdictions share very little data between primary health care and hospitals. There are some projects to address this such as the Lumos project, a collaboration between the NSW Ministry of Health, NSW Primary Health Networks (PHNs) and general practices.[55] In Lumos, de-identified patient data from primary care settings is linked with other public hospital health services data to provide a comprehensive view of patient journeys.

Currently all jurisdictions provide discharge letters which can be given to primary health care providers. However, participants noted that in many cases no reference to sepsis is included in the discharge letters and no consistent approach to what information is recorded in discharge letters for sepsis patients. The CSIRO Sparked initiative is developing a core set of Fast Healthcare Interoperable Resources (FHIR), with one component of the project aimed at developing standardised patient summaries on discharge to assist information sharing between hospitals and primary care.[56]

There may also be valuable information in the Medicine Insight data set. Medicine Insight is a national primary health care data program run by the Commission that collects longitudinal, non-identifiable data from participating primary practices, from the patient medical records in the software used to write prescriptions.[57]

9.4.5.2 Ambulance data

In most jurisdictions there is little to no regular reporting between hospital and ambulance data. As 80% of sepsis cases occur in the community,[58] participants agreed that more coordinated reporting of admission and ambulance data could be useful for training paramedics in the recognition of sepsis by providing confirmation of sepsis diagnosis.

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[55] ***Note:*** Additional information available at https://www.health.nsw.gov.au/lumos/Pages/about.aspx
[56] ***Note:*** Additional information available at https://sparked.csiro.au/index.php/products-resources/australian-patient-summary/
[57] ***Note:*** Additional information available at https://www.safetyandquality.gov.au/our-work/indicators-measurement-and-reporting/medicineinsight
[58] ***Note:*** Sourced from https://www.australiansepsisnetwork.net.au/what-is-sepsis/#causes-and-prevention

In Queensland there is some linkage between hospital and ambulance data, with paramedics able to access limited data through a master linkage file. This enables them to view information such as the ICD-10 code attached to a case and patient outcomes. However, there is currently no reporting provided to ambulance services specifically for sepsis.

9.4.5.3 Pathology

Pathology, the collection and analysis of blood samples is an important aspect of sepsis diagnosis and treatment. Participants raised the value of tracking the types of bacteria responsible for sepsis cases. However, many participants noted that this data is usually not in a format where it can be easily extracted and tracked.

9.4.6 Patient data and feedback

Participants confirmed that Patient Reported Experience Measures (PREMs) and Patient Reported Outcome Measures (PROMs) surveys were used by health services across all jurisdictions. The Australian Hospital Patient Experience Question Set released by the Commission in 2018 is a nationally consistent set of PREMs questions. The response from this survey forms part of the Sepsis Clinical Care Standards indicators – *5a-Proportion of patients with sepsis who reported they were kept informed as much as they wanted about their treatment and care*.

Despite these feedback mechanisms, survivors noted the lack of accessible, understandable data for consumers on sepsis prevalence, risks, and diagnosis. They shared that during the treatment of sepsis in hospital, difficult decisions about treatment had to be made by family members without access to reliable and contemporary data on potential outcomes of sepsis treatment options and what it would mean for patients.

9.4.6.1 Post-sepsis syndrome

Post-sepsis syndrome is a condition that affects up to 50% of sepsis survivors.[59] Participants noted that limited data is collected on post-sepsis syndrome as many of the symptoms will be experienced without interacting with the hospital. Sepsis survivors shared that this is an area where additional data would be highly valuable as it would aid with recovery planning and provide some comfort to patients that what they are experiencing is not unique to them but a common side effect of sepsis.

Survivors also noted that the lack of linkage between existing health services data and the NDIS can make it difficult to access support services, particularly where the term sepsis was not included in discharge papers.

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[59] Australian Sepsis Network, (2025), Information and Support: Post-Sepsis Syndrome, Australian Sepsis Network, Sydney. Accessed 14 July 2025. Available at: https://www.australiansepsisnetwork.net.au/information-and-support/#post-sepsis-syndrome .

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