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Real-Time Suicide Surveillance: Comparison of International Surveillance Systems and Recommended Best Practice

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ABSTRACT

Objective: Some countries have implemented systems to monitor suicides in real-time. These systems differ because of the various ways in which suicides are identified and recorded. The main objective of this study was to conduct an international comparison of major real-time suicide mortality surveillance systems to identify joint strengths, challenges, and differences, and thereby inform best-practice criteria at local, national, and international levels.

Methods: Five major real-time suicide mortality surveillance systems of various coverage levels were identified and selected for review via an internet-based scoping exercise and prior knowledge of existing systems. Key information including the system components and practices was collated from those organizations that developed and operate each system using a structured template. The information was narratively and critically synthesized to determine similarities and differences between the systems.

Results: The comparative review of the five established real-time suicide surveillance systems revealed more commonalities than differences overall. Commonalities included rapid, routine surveillance based on minimal, provisional data to facilitate timely intervention and postvention efforts. Identified differences include the timeliness of case submission and system infrastructure.

Conclusion: The recommended criteria could promote replicable components and practices in real-time suicide surveillance while offering flexibility in adapting to regional/local circumstances and resource availability.

KEYWORDS

Data; prevention; real-time; suicide; surveillance

HIGHLIGHTS

- Evidence-informed recommendations for current best practice in real-time suicide surveillance.
- Proposed comprehensive framework can be adapted based on available resources and capacity.
- Real-time suicide mortality data facilitates rapid data-driven decision-making in suicide prevention.

INTRODUCTION

Suicide is a significant public health issue globally, with the latest statistics published by the World Health Organization (WHO) indicating an estimated 703,000 deaths annually

(WHO, 2020). Although deaths by suicide have reportedly declined worldwide between 2000 and 2019 (WHO, 2021a), it is challenging to determine if this trend has continued considering the lag between suicide incidence and published national mortality data by official statistical agencies. Verifying, registering, and classifying deaths by suicide takes several months or even years due to medico-legal or coronial investigations involving legal authorities, certifiers, pathologists, and vital statistics registrars (Hynes, 2012; Ikeda et al., 2014; Värnik et al., 2010). Although reliable mortality data are essential for surveillance, research, and targeted prevention efforts, suicide is one of the most underreported vital statistics and is seldom overestimated (de Leo, 2015; Sainsbury & Jenkins, 1982; Tøllefsen, Hem, & Ekeberg, 2012).

The public health prevention model of suicide prevention begins with and relies heavily on surveillance data (Ikeda et al., 2014; Potter, Powell, & Kachur, 1995). Monitoring a public health phenomenon such as suicide requires continuous systematic data collection, analysis and interpretation, and dissemination to those involved in prevention efforts (Thacker, Qualters, & Lee, 2012). Several surveillance systems currently collect and store data on confirmed suicides, including The National Confidential Inquiry into Suicide and Safety in Mental Health (2021) in England, the Norwegian Surveillance System for Suicide in Mental Health and Substance Misuse Services (Walby, Myhre, & Kildahl, 2019), the Suicide Mortality Review Committee (2016) in New Zealand and the Queensland Suicide Register in Australia (Leske, Adam, et al., 2020). These systems facilitate trend analysis, risk profiling, and examining the circumstances surrounding deaths by suicide. However, data recording for such systems is contingent on prolonged coronial or medico-legal processes, which impacts timely reports. Provisional suicide mortality data, verified according to validated criteria, may facilitate timely prevention work (Thacker et al., 2012), which can then be measured against official mortality statistics to determine accuracy, once the latter are released (Leske, Kõlves, Crompton, Arensman, & de Leo, 2020). Accessibility to real-time data is essential for many reasons, including early identification of emerging suicide clusters (Hawton et al., 2020), new methods amenable to means restriction measures, and locations of concern, as well as timely responses to individuals bereaved by suicide, evidence-based policy planning and targeted service provision (Baran, Gerstner, Ueda, & Gmitrowicz, 2021).

Based on recommendations for improving national data systems for surveillance of suicide-related events (Hynes, 2012), The Data and Surveillance Task Force of the National Action Alliance for Suicide Prevention in the United States emphasized the value of collecting real-time data to provide an evidence-based framework for rapid action by decision-makers in suicide prevention (Ikeda et al., 2014). The World Health Organization (2018, 2019, 2021b) has endorsed the value of real-time surveillance frameworks for mental health issues, including suicide, and highlights the need for reliable data to inform decision-making, to determine matters requiring immediate action, and to verify if and where progress has been made. The United Nations Sustainable Development Goals echo this concept through target 3.4, which aims to reduce premature mortality from non-communicable diseases by one-third by 2030 (United Nations General Assembly, 2015). This target identifies the suicide mortality rate per 100,000 people as an indicator of progress and

relies on timely monitoring of suicide rates internationally to assess the efficacy of prevention strategies.

While there have been calls for real-time suicide surveillance data in the past, the demand for such data has increased significantly recently. The coronavirus (COVID-19) pandemic has had significant implications for the mental health of the population (O'Connor et al., 2020), however, it remains a challenge to determine whether this has led to a rise in suicide rates globally. Unsubstantiated reports of increasing suicide rates have circulated in the media during this global health crisis (FactCheckNI, 2020), but it is difficult to verify such statements with certainty due to the limited availability of current data in many areas. In some high and middle-income countries, these reports have been verified as untrue (Appleby et al., 2021; Coroners Court of Victoria, 2020; Leske, Kõlves, et al., 2020; Pirkis et al., 2021; Qin & Mehlum, 2020; The Office of the Chief Coroner of New Zealand, 2020), while a rise in suspected suicide cases was observed in Japan following an initial decline during the first wave of the pandemic (Ueda, Nordström, & Matsubayashi, 2021; Tanaka & Okamoto, 2021). Ultimately, the COVID-19 pandemic has reinforced the need for real-time surveillance data to help track changes in suicide rates occurring alongside the pandemic and to identify risk factors that may be heightened and vulnerable groups that may be disproportionately affected (Gunnell et al., 2020; John, Pirkis, Gunnell, Appleby, & Morrissey, 2020; Niederkrötenhaler et al., 2020). Such data are vital to facilitate timely, targeted, public health responses during and after the crisis (Holmes et al., 2020).

Variations in data collection and dissemination models within and between regions and countries limit a comprehensive approach to real-time suicide surveillance. The main objectives of this study were to review and compare the components and practices of established real-time suicide surveillance systems. Enhanced consistency across real-time suicide surveillance globally will contribute to improved accuracy and comparability of international suicide statistics.

METHODS

Five real-time suicide surveillance systems functioning at various levels of data coverage were selected based on existing knowledge, inquiries within our network, and a systematic internet search of existing systems worldwide that have been pilot-tested and in operation for at least two years, as of January 2021. Information was sourced from key personnel involved in developing and operating each system, using a structured instrument (Appendix A) to gather data on specific components, based on the Centers for Disease Control and Prevention (2001, 2004) guidelines for evaluating public health surveillance systems, including:

- System description (i.e., purpose and use of the system, and system stakeholders).
- System characteristics (i.e., data custodians, data items, data format, data security, privacy, and confidentiality).
- System operation (i.e., data collection, case classification, data processing, statistical and epidemiological analysis).

- System practices (i.e., timeliness, data quality, usefulness, simplicity, flexibility, sensitivity, applicability to suicide prevention efforts).

The selected systems were narratively synthesized, and critical attributes collated in tables to facilitate comparisons between their components and practices.

RESULTS

Five real-time surveillance systems of suicide data were identified and selected for inclusion in this study. [Table 1](#) displays the specific attributes of each real-time surveillance system. [Table 2](#) highlights common data items across the systems. [Table B1](#) lists system experiences. Each system is described below:

Coronial Suspected Suicide Data Sharing Service; New Zealand

The New Zealand Ministry of Health, Coronial Services New Zealand, and Clinical Advisory Services Aotearoa established the national Coronial Suspected Suicide Data Sharing Service (CDS) in 2014. This implementation actioned section 11.2 of the New Zealand Suicide Prevention Action Plan (2013–2016), to establish a function to analyze and share up-to-date provisional coronial data on suicide deaths with agencies working in local areas to help prevent further suicides (New Zealand Ministry of Health, 2013). Clinical Advisory Services Aotearoa, which delivers the CDS, is responsible for delivering the National Community Postvention Response Service. The Community Postvention Response Service has access to CDS data on suspected suicides to support the early detection of emerging suicide clusters and contagion and the resulting coordination of community responses. The CDS securely and swiftly notifies the 20 regional District Health Boards across the country of recent suspected suicides in their regions. Uniquely, the CDS uses an encrypted email system to securely send data to District Health Boards, of which registered authorized recipients with their unique passwords can decrypt the notifications. The CDS system works within the parameters of an agreed Memorandum of Understanding between the Coronial Services New Zealand, the Ministry of Health, Clinical Advisory Services Aotearoa, and all 20 District Health Boards in New Zealand. The CDS's functions and processes meet the required standards of all relevant New Zealand privacy legislation and frameworks.

The Interim Queensland Suicide Register; Queensland, Australia

The Australian Institute for Suicide Research and Prevention (AISRAP) developed the state-based interim Queensland Suicide Register (iQSR) in 2011 to provide real-time information about suspected suicides in Queensland as an addition to the existing Queensland Suicide Register. It is used for trend analysis; regional breakdowns of age, sex, and motives/triggers for suspected suicides; and investigation of suicide clusters and locations of concern (e.g., locations where individuals frequently take their lives, Hospital and Health Service catchment areas, and Primary Health Networks), to inform targeted suicide prevention activities. Queensland Police Service officers share reports of

TABLE 1. Attributes of existing real-time surveillance systems of suicide mortality data.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
Location	New Zealand	Queensland, Australia	Victoria, Australia	Buckinghamshire, Berkshire, and Oxfordshire, England	County Cork, Ireland
Data coverage	National	Statewide	Statewide	Regional	Regional
Population	5.08 million	5.24 million	6.7 million	2.34 million	691 thousand
Type of system	Electronic (encrypted)	Electronic	Electronic	Electronic	Electronic
Method of data collection	Email	Email	Manual review of an electronic case management system	Manual input to a spreadsheet	Telephone and onsite manual input to Excel spreadsheet.
Case submission interval	Within 6–12 h after a death was first attended by Police	Triweekly updates of deaths that have occurred within this timeframe	Within 24–48 h after a death has occurred	Within 24–72 h after a death has occurred	Fortnightly updates of deaths that have occurred within this timeframe
Statistical analysis	Statistical analysis is undertaken by the national Community Postvention Response Service which accesses the data to help determine emerging suicide clusters and contagion. Deaths are also reviewed by the Suicide Mortality Review Committee.	Routine epidemiological analysis and regressions conducted in-house by the research team.	Statistical analysis of data is undertaken in particular projects rather than as a matter of course. External statisticians typically analyze the data.	Routine epidemiological analysis conducted in-house by central police resource in Thames Valley Police.	De-identified data transferred to SPSS for statistical analysis. SaTScan analysis conducted on geographical data to analyse the presence of clusters.
Data source(s)	The National Initial Investigation of Coronial Services New Zealand.	The Coroners Court of Queensland.	Victoria Police and The Coroners Court of Victoria.	Thames Valley Police [Sudden death Form (Gen 19) completed by police ^a]	The Coroners of Cork and HSE Patient Mortality Register

(continued)

TABLE 1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
Terminology, classification, definitions, and operational criteria used to select cases recorded in the system	Deaths are recorded as suspected self-inflicted deaths (SSIDs). Data are provisional. Notifications may be sent as "identity not yet confirmed" or "believed to be" if identity of the deceased has not been officially confirmed. Cases are not reviewed after inquest. However, overall numbers of SSIDs are reported annually by the Coroner's office.	Applying a decision-tree classes suspected deaths received as suspected suicides that are "possible," "probable," or "beyond reasonable doubt." Those in the latter two categories are considered "suspected suicides." Cases are reviewed when the coronial investigation is completed.	Cases of probable suicide are classified as "intentional self-harm" and cases of possible suicide are classified as "unable to be determined" while the coronial investigation is underway. Cases are reviewed when the coronial investigation is completed.	Data initially relates to cases of "suspected suicide" as identified by attending police officers or suspected by the coroner's team. Then later confirmed and validated with coroner records following inquest outcomes.	Data related to instances of "suspected suicide," classified by the coroner based on evidence from various sources, including the police, witnesses, and family accounts. Cases are reviewed once the inquest has concluded.
System access	CDS and Community Postvention Response Service staff and a minimum of two authorized staff recipients per District Health Board.	Principal researchers, senior research assistant, four research assistants	All members of the Coroners Prevention Unit and all Victorian Coroners.	Police and coroner county teams and Local Authority Prevention Leads.	Ph.D. researcher, Chief Scientist, Head of Research, HSE ROSP for the Cork region.
Data security and ethical considerations	Memorandum of Understanding between Coronial Services New Zealand, the Ministry of Health, CASA (Clinical Advisory Services Aotearoa who developed and deliver CDS on behalf of the other parties to the MoU), and all 20 regional District Health Boards.	Data analysts added to the ethics application for the Victorian Department of Justice and Community Safety Human Research Ethics Committee. The Griffith University ethics committee is the secondary review body. Data stored on a secure password-protected	Ongoing data-sharing agreements are in place with state and Commonwealth government health bodies. Additionally, we have project-based data-sharing agreements with other government bodies, health services, and academic researchers mediated by a	Data collated by Thames Valley Police is shared with National Health Service, Public Health England, the Coroners' Officers, and local authorities, based on partner agreements.	A double-encrypted laptop in NSRF offices stores data. Data sharing agreements with both data sources. The Clinical Research Ethics Committee for the Cork Teaching Hospitals grants ethical approval. System development and operation is EU GDPR compliant. Legal approval granted by

(continued)

TABLE 1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSH-O)
	The CDS system meets all requirements of relevant New Zealand privacy legislation and frameworks, including the Privacy Act (1993) and the Health Information Privacy Code (1994) as determined through a formal Privacy Impact Assessment.	Suicide Register (IQSR) network drive with restricted access rights.	Victorian Suicide Register (VSR) memorandum of understanding and (where required) approved human research ethics applications.	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSH-O) the legal department for the HSE.
Use of data	Data are provided to the CDS on the basis that it will be used by: <ul style="list-style-type: none">- the national Community Postvention Response Service in the early detection and management of suicide clusters and contagion and- by all 20 District Health Boards across New Zealand to support of their timely local postvention responses to suspected suicides.	Cluster investigation, specific subgroups (e.g., small towns, missing people, homeless, migrants, people impacted by specific natural disasters), emerging geographical trends, investigation of frequently used locations.	Informs local suicide prevention planning; dispels or confirms community concerns around the vulnerability of at-risk individuals, identifying priorities for coronial investigation; educating the public about suicide; monitoring suicide trends based on location, method, and deceased socio-demographics; and alerting local health services to potential emerging issues.	Real-time aberration identification in suspected suicide cases. Links to Police Negotiator Database to identify vulnerable individuals. Data is shared with the Local Authority Leads to facilitate early response to linked suicides, clusters, or contagion.	Real-time aberration detection of suspected suicide cases. Data is shared with the ROSP to facilitate early response to suicide clusters by providing support to schools and communities.

(continued)

TABLE 1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (QSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
Dissemination to stakeholders	The CDS disseminates data to authorized recipients of impacted District Health Boards. Based on District Health Boards' privacy protocols, suspected suicide data from CDS is only on-shared with other agencies if such sharing helps to prevent or lessen a serious threat to an individual or public health or safety and fulfills one of the purposes of obtaining the data.	QSR staff produce fortnightly updates for the QMHC (funding agency) and the AIHW and quarterly reports for the QMHC and the MHAoDB within Queensland Health. Annual reports are released publicly.	Real-time data is disseminated to Victorian and Commonwealth health authorities. Monthly update reports on suicides are published publicly. Data access for other purposes is contingent on approval from the CCOV.	Information is shared with relevant partners in aggregated form to inform service responses to emerging suicide links, identify clusters, increase capacity for early intervention, assist with optimizing resource allocation and facilitate implementation or activation of local plans.	Information is shared with the HSE ROSP to inform bereavement support and community prevention activities. Aggregated information is periodically shared with key stakeholders involved in suicide prevention plans in the region on a need-to-know basis.

AIHW: Australian Institute for Health and Welfare; CCOV: Coroners Court of Victoria; CDS: Coronial Suspected Suicide Data Sharing Service; CPU: Coroners Prevention Unit; DHBs: District Health Boards; EU GDPR: General Data Protection Regulation; HSE: Health Service Executive; MHAoDB: Mental Health, Alcohol and Other Drugs Branch; NIIQ: National Initial Investigation Office of Coronial Services; QMHC: Queensland Mental Health Commission; ROSP: Resource Officer for Suicide Prevention; SSIS: Suicide Support and Information System; SSIDs: suspected self-inflicted deaths; TV-RT-SSS: Thames Valley Police Real-Time Suicide Surveillance System.

^a<https://www.nspa.org.uk/wp-content/uploads/2017/10/TVP-Sudden-Death-Form.pdf>.

TABLE 2. Data items in real-time surveillance systems of suicide data.

Data item	Coronial Suspected Suicide Data Sharing Service	Interim Queensland Suicide Register	Victorian Suicide Register	Thames Valley Police Real-Time Suicide Surveillance	Suicide and Self- Harm Observatory
Unique file number		✓	✓		✓
Number assigned by police		✓		✓	
Name of the deceased	✓	✓	✓	✓	✓
Date of death	✓	✓	✓	✓	✓
Sex/gender	✓	✓	✓	✓	✓
Date of Birth/age	✓	✓	✓	✓	✓
Religion		✓		✓	
Residential address	✓	✓	✓	✓	✓
Geocoding of residential address		✓	✓		✓
Ethnicity	✓	✓			
Education level		✓			
Marital status		✓	✓	✓	✓
Method of death	✓	✓	✓		✓
Cause of death					✓
Location of death/ fatal incident	✓	✓	✓		✓
Geocoding of location of death/ fatal incident		✓	✓		
Employment status		✓	✓		
Occupation		✓		✓	✓
Country of birth		✓	✓	✓	
Medical history including mental and physical health		✓		✓	
Substance abuse history		✓			✓
Domestic abuse history		✓			✓
General practitioner details				✓	
Medications		✓			
Prior suicide attempts		✓			
Suicidal intent		✓			
Suicide note		✓			
Motives/triggers for suicide		✓			
Mental Health Service user prior to death (inpatient/ outpatient)					✓
Next of kin details		✓			
Incident summary		✓			

suspected suicides by email while sending them to the Coroners Court of Queensland. Based on the evidence, two independent assessors examine the probability of each death being a suicide, which a third assessor then validates and resolves any outstanding discrepancies. Most information from the police report is automatically extracted tri-weekly using macros in Microsoft Word and Excel. Data are then added to a dataset to be cleaned, stored, and analyzed. The Coroners Court of Queensland has custody of the police reports and provides case-by-case approval for data releases outside state government agencies. Upon approval, AISRAP independently prepares and disseminates the requested data in the relevant format, including email communications, spreadsheets, or formal reports. The iQSR contains 107 core variables covering demographic items,

“motives/triggers” for suicide, next-of-kin details (dependent on consent to contact for research purposes), circumstances of death, internet use, communications of intent, prior suicide attempts, and incident summaries.

Victorian Suicide Register; Victoria, Australia

The Victorian Suicide Register (VSR), developed by the Coroners Court of Victoria (CCOV), Australia, commenced operation in 2012. The system consists of a core dataset to collect and record real-time suspected suicide data that is updated each weekday, and an enhanced dataset to record more in-depth data following the conclusion of coronial investigations. The primary purposes of the VSR are to inform coroners’ investigations; to identify trends in suicide over time; to disseminate timely information on suicide to government bodies, health services, and the public; and to evaluate the effectiveness of local suicide prevention strategies. Data items recorded in the VSR core dataset include the deceased’s demographic information and circumstances of death, which typically take 10 minutes to enter. Deaths based on circumstances consistent with suicide are identified for inclusion primarily via surveillance of all deaths reported to the CCOV. Also, regular, systematic searches of CCOV databases and the National Coronial Information System occur to identify any possible or probable suicides classified as “intentional self-harm,” “undetermined intent,” or “still enquiring,” that may have been missed during initial surveillance. VSR contents are regularly reviewed as coroners’ investigations progress.

The VSR is integrated within the CCOV’s broader case management system and stored on secure servers accessible to Court employees only, with record editing restricted to VSR coders. Since the VSR is a coronial investigation tool, data is retained indefinitely for this purpose. Access to VSR data is dependent on the approval granted by the CCOV, which considers requests from some community or non-profit organizations, public sector agencies, and researchers. Ethics approval is not required for government bodies and non-government organizations seeking VSR data to inform their work. However, research-based data requests are granted after initial endorsement from the Court’s Research Committee and the State Coroner, followed by the approval of an appropriately constituted human research ethics committee.

Thames Valley Police Real-Time Suicide Surveillance System; Thames Valley, United Kingdom

Thames Valley, in the Southeast region of the United Kingdom, established a police-led real-time suicide surveillance system in 2015 to ensure timely support to bereaved families, early identification of suicide clusters, and information gathering to inform local suicide prevention strategies. The Thames Valley Police area comprises three counties (Buckinghamshire, Berkshire, and Oxfordshire), each with separate coroners, public health departments, and healthcare systems. Police leadership of the Thames Valley Police Real-Time Suicide Surveillance System (TV-RT-SSS) is vital as the single police force covers all three counties. Police officers attending the scene of a suspected suicide collect information via a sudden-death form and email this to the TV-RT-SSS police

lead. The police lead establishes contact with bereaved families to provide a support resource, refer to relevant local charities, and offer referral to dedicated suicide bereavement support. Data are collated from the sudden death forms using a Microsoft Excel spreadsheet, which is stored confidentially on the Thames Valley Police computer system. The TV-RT-SSS contains 11 variables: the deceased's demographic information, possible triggers, mental health history, health service use, and circumstances of death. Although complete data may not be available at the time of completing the sudden death form, the TV-RT-SSS police lead maintains regular communication with all Thames Valley coroners to assist with data collection and validation, and links with Public Health Suicide Prevention Leads to share and cross-reference data, and to highlight potential cluster concerns within or across county borders. Formal agreements are in place with the region's National Health Service mental health providers to enable additional data sharing where required to understand mental health history, check for possible connections between individuals or identify common service provision issues.

Suicide and Self-Harm Observatory, Southwest Ireland

The Suicide and Self-Harm Observatory (SSHO) was established in County Cork, Ireland, by the National Suicide Research Foundation (NSRF) and the School of Public Health, University College Cork (UCC), in 2018. The SSHO collates real-time data on suspected suicides to identify emerging clusters, provide a timely response to people affected by suicide, and verify unfounded statements on suicide and self-harm disseminated via media outlets. It comprises a core database of 16 variables that capture demographic information relating to the deceased, circumstances of the death, history of abuse, and mental health service use. The SSHO captures all deaths of which the circumstances are consistent with a suspected suicide, based on operational screening criteria (Rosenberg et al., 1988). NSRF-UCC researchers collect data fortnightly from the Coroners of the Cork and Kerry counties via onsite manual data entry to an encrypted Microsoft Excel spreadsheet. Coded, de-identified data are transferred to SPSS for trend analysis purposes. Both data files are stored on an encrypted laptop in the NSRF offices. The Resource Officer for Suicide Prevention in the Health Service Executive provides data relating to service user deaths by suspected suicide from the Health Service Executive Patient Mortality Register via fortnightly telephone contact with the researchers. A two-way pathway exists with the Health Service Executive, as data captured by the SSHO are shared with the Resource Officer for Suicide Prevention to initiate a crisis response plan for emerging suicide clusters and provide timely support to bereaved communities.

Comparative Real-Time Suicide Surveillance System Components

Both commonalities and differences exist between the components of the five systems, as presented in Table 1. All systems have an electronic database, typically a password-protected Microsoft Excel file, with one system collating data at the national level, employing an encrypted web-based portal to store data and automatically notify key stakeholders of a death. The number of data items per system ranges between 8 and 107, and averages at 31. Common data items among the systems are listed in Table 2. A high

level of data security is applied to the systems, ensuring compliance with all relevant data protection legislation and access limited to trained and ethically cleared personnel in the organizations that operate the systems. The terminology varies considerably between the systems, from “suspected suicide,” “suspected self-inflicted death,” “intentional self-harm,” “probable suicide,” or a suicide “beyond reasonable doubt,” and a death of “undetermined intent” or “still enquiring,” depending on the availability of evidence at the time of case submission to the database. Data collated by all the systems is either primarily or secondarily sourced from the coroner. One system, embedded within the police force, directly extracts the data from the police report and cross-checks this information with the coroner. Another system verifies data coming from the coroner with a health service patient mortality register for suspected suicide deaths of service users. Data collection approaches vary between systems from onsite manual data entry or telephone communication with the source to email notification. Data dissemination predominantly occurs on a need-to-know, periodic basis via aggregated-level data reports shared with relevant stakeholders, with ad hoc reports and briefings prepared in the event of emerging clusters, contagion, or concerning trends to inform a timely response. However, one system reports to both state and national health departments on a weekly, fortnightly, and quarterly basis and has recently commenced monthly public reports.

Comparative Real-Time Suicide Surveillance System Practices

The range of timeliness of case submission varies across the systems from immediately upon notification to fortnightly and averages between 24 and 72 hours after a death has occurred (Table B1, Appendix B). The disparity in system infrastructure (integrated into legislated organization vs. unintegrated) impacts data quality given that unintegrated systems rely on the completeness of externally sourced death reports. Using secondary data sources has demonstrated the benefits of cross-checking data completeness. Furthermore, the review of cases collated by most systems ranged from continuous to bimonthly to capture any missing cases that meet inclusion criteria.

Common uses were identified among the systems, particularly the ability to identify emerging trends, locations/suicide methods of concern, and opportunities to implement means restriction. The systems have collectively reported value in refuting unfounded claims and concerning reports within the media and community by establishing the facts, as well as informing provision of support and other postvention services to the bereaved and outreach to those identified as vulnerable.

Crossover exists in system practices based on applicability to suicide prevention and their utility, with additional reported benefits including offering the most reliable and evidence-based source of data to inform postvention activities, target prevention initiatives, and inform response plans by identifying potential contagion, clusters, or linked incidents, thereby supporting those at-risk.

Accessibility varies across the systems depending on their infrastructure, with integrated systems facilitating access to personnel within their legislated organization and external bodies on a need-to-know basis. Most systems disseminate aggregated data to stakeholders, governmental bodies, and researchers upon request. Two systems notify health service providers in affected districts to facilitate timely bereavement support and

outreach to impacted communities, with one system adopting an automated notification approach and the other designing an encrypted web-based interface to store and display the data for those with authorized access.

A high level of flexibility exists among most systems, with three declaring adaptations to the original model to meet the needs of the system and the stakeholders for whom the system exists to service. Such adjustments include the expansion of the surveillance area, modifications to IT infrastructure, and the addition of further data items.

The systems collectively reported a high level of sensitivity, with comparisons of provisional data captured by the systems against official mortality statistics reported to average between five to seven percent by the two systems. Stakeholder feedback relating to the systems detailed high levels of satisfaction, a model that is fit-for-purpose and worthy of replication elsewhere.

DISCUSSION

This study identified more similarities than differences exist among the systems. The shared purpose of all systems is to inform suicide prevention efforts, particularly by providing an evidence-based data source to invalidate misinformation, inform response plans, and detect emerging trends, links, and clusters, thereby mitigating further detrimental impacts on affected communities. These common aims demonstrate consistency within the primary functions of the systems. Most systems collate geographical data based on residential address, location of death, or in some cases, both. This data informs aberration detection which often involves an algorithm that evaluates the presence of spatial, temporal, and spatio-temporal clusters, typically using scan statistic software (Kulldorff, 1997).

All systems apply a legal approach whereby data is sourced from a coronial service. Most systems include the coronial service as the primary data source, with two systems sourcing data from the police primarily and incorporating coronial data as a secondary cross-checking source. A health service patient mortality register was documented as an alternative cross-checking source; however, data is limited to service users at the time of death. Despite some systems involving a secondary source, one is evidently sufficient when case reporting to the data source is mandatory under the legislation and thereby data is of high quality and complete. Fundamentally, suicide registration isn't always based on a coronial system, with many countries implementing a medico-legal system (Värnik et al., 2010). Thus, surveillance should be based on the most reliable and comprehensive source available.

Though the terminology applied across all systems to capture relevant cases lacks consistency, the classifications demonstrated homogeneity in their recognition of the provisional status and limitations of this determination, since the coronial investigation is ongoing at the time of case identification. Review of case classification, either on a continuous or periodical basis depending on capacity, can improve data quality, completeness, and sensitivity by ensuring only those correctly classified deaths are detailed in the system. Standardized guidelines and training on criteria to identify relevant cases for inclusion are required to inform staff involved in determining cases to be recorded in a system of this kind. Caveated information relating to the interpretation of provisional data is typically included in reports and presentation slides, highlighting the possibility of changes to the death classification at the conclusion of the cause of death

investigation. While the information on deaths by suspected suicide is not routinely publicized in the media, the added value of the real-time suicide surveillance systems is the ability to confirm minimal details relating to case numbers or verify unsubstantiated reports relating to suicide rates upon request. The systems include a fact-checking function whereby unsubstantiated reports may be verified in advance of publication; however, individual case details are not disclosed. In addition, aggregated data from some systems have contributed to international projects examining the impact of the COVID-19 pandemic on suicide (Pirkis et al., 2021), with opportunities to compare data with other countries, although data from some regions and countries have been accessed from preliminary data sources on an ad hoc basis. Comparative research at a national level has been possible for one regional system in this study which feeds into a recently developed national real-time suicide surveillance system that is being used to examine differences in rates of suspected suicide between both areas and countries within the UK (Appleby et al., 2021).

Timeliness, the cornerstone of real-time surveillance, tends to be influenced by system infrastructure. The most significant difference identified between the systems was the case submission interval, ranging from immediately upon notification of a death to fortnightly routine submission. Those systems embedded within the original data source agency have the advantage of instant data access, while external systems typically rely on added resources and capacity to ensure timely data collection. The speed of data entry impacts system utility due to the need for prompt notification to inform the rapid response. Case submission for a suicide surveillance system averages at 2 hours, but can range between 15 minutes and 8 hours, depending on the size of the database and the information available (Sutherland et al., 2018). As evidenced, a core database facilitates the objective of real-time suicide surveillance by collating minimal data, swiftly. Flexibility in adapting system components, such as the inclusion of additional variables if required, is crucial to ensure a system continues to meet the needs of those it exists to serve.

Strengths and Limitations

This study compared and synthesized information from national and regional systems, demonstrating the international adaptability of the recommended best practice criteria. It involved a systematic assessment of existing established real-time suicide mortality monitoring systems, examining their practices and components in close detail to identify joint strengths and challenges that contribute to a system of this kind. This study is timely due to the limitations in the availability and accuracy of current suicide data, particularly in low- and middle-income countries, as previously highlighted by the WHO (2021). It is further well-timed in providing an experience-based template in response to a call for real-time surveillance of suicide data to monitor the ongoing impact of the COVID-19 pandemic on suicide and the effects of natural population-based experiments and exposures. Member States of the UN may adopt the comprehensive approach outlined in this study to evaluate their progress in achieving a significant reduction in the suicide rate, as per target 3.4 of the SDGs (United Nations General Assembly, 2015). This study is limited by a lack of representation of systems outside

developed countries. However, while recent data has been sourced from 21 countries to monitor suicide trends during the early months of the COVID-19 pandemic (Pirkis et al., 2021), information on established real-time suicide surveillance systems that have been either piloted or evaluated in low- and middle-income countries was unavailable. Future research should address the impact of real-time suicide surveillance systems on prevention practices in the relevant areas to determine the usefulness of such systems from a broader stakeholder perspective. Furthermore, the surveillance systems included in this study are inadvertently restricted to English-speaking countries. Efforts were made to include the Japanese real-time suicide system and contact was made directly with individuals involved in the operation of the system who indicated that the system was undergoing modifications at the time of the data collection for this study and the information would be soon outdated.

CONCLUSION

To establish a real-time suicide surveillance system in line with current international best practices, we conclude that the following criteria should be met: a rapid, routine collection of provisional data sourced from at least one reliable data source to facilitate timely prevention efforts, ongoing data review to ensure high sensitivity; the development of a core, automated machine learning system to assist rapid data entry and quick transition to analysis, visualization, and reporting of emerging spatial, temporal or spatio-temporal clusters, as well as risk factors and vulnerable populations on a need-to-know basis.

DISCLOSURE STATEMENT

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DATA AVAILABILITY STATEMENT

While the primary focus of this study was to compare the components and practices of five major real-time surveillance systems, data from these systems was not directly analyzed and therefore unavailable. Regarding materials, the structured questionnaire used to retrieve the information analyzed in this study is available as an Appendix. The responses collated from the completed questionnaires are listed both within the tables included in the manuscript and as an Appendix.

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APPENDIX A. STRUCTURED QUESTIONNAIRE

Name of organization

Please include all relevant details relating to each aspect of the real-time suicide surveillance system operated by your organization.

- System description
- **System characteristics**

Name of surveillance system

Purpose of the system

Use of data collected by the system

Dissemination of outputs

Personnel granted access to the system

Level of data collection, i.e., national, regional, etc.

Data custodians, i.e., sources from where original data is obtained

Number and description of data items comprising system

Terminology, classification, definitions used to select cases

Data format, i.e., email, hard file, etc.

Ethical considerations in developing system

Data storage, i.e., data security, access to database

Data ownership and retention; existence of protocols and agreement with data custodians

- **System operation**

Method of data collection

Frequency of data collection, i.e., case submission interval

Decision making on probability of death, operational criteria applied to determine relevancy of cases for inclusion

Data input and output: automated or manual

Rate of data processing

Statistical analysis: software used; analysis applied

Epidemiological analysis

- **System practices**

Timeliness

Data quality

Usefulness

Simplicity

Flexibility

Sensitivity

Acceptability

Applicability to suicide prevention efforts

APPENDIX B

TABLE B1. System practices.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
Timeliness	<p>The CDS receives data on suspected suicides from the National Coronial Services Processing Center on a 24/7 basis, usually within a few hours of the death being attended by police.</p> <p>The CDS operates on standard business working days and hours, processing suspected suicide notifications and alerting impacted District Health Boards.</p>	<p>The IQSR is updated three times a week and updated before fulfilling any new data requests to ensure completeness. The count relative to previous years is provided fortnightly to stakeholders, and there are quarterly reports detailing counts and rates by geography and counts by Indigenous status by geography.</p>	<p>All suspected external cause deaths in the state of Victoria, Australia are required to be reported to the Coroners Court of Victoria. Reporting occurs immediately upon occurrence or notification of death.</p> <p>Every weekday morning the VSR team review Victorian deaths reported during the previous 24 h (or 72 h after the weekend) to identify new suspected suicides for immediate inclusion in the VSR.</p>	<p>The TV-RT-SSS is updated daily throughout the week, not on weekends. The timing of the report capture can vary and is subject to how quickly the report from the Police Officer or Coroners office is received centrally (usually within a few days of the death being reported). Once received it is added to TV-RT-SSS on the same day.</p> <p>Monitoring for links/trends etc. is continuous.</p>	<p>The fortnightly case submission interval applied by the SSHO is based on the capacity of the data custodians to facilitate data collection.</p> <p>In exceptional circumstances whereby notification of an unconfirmed media or community report of a potential cluster or contagion occurs, the coroner's office is immediately contacted to verify whether the unsubstantiated report is valid.</p> <p>Aggregated data is reported periodically to relevant stakeholders, as per the Standard Operating Procedure. The SSHO data has been used for multiple requests from policymakers during the COVID-19 pandemic.</p>

(continued)

TABLE B1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
Data quality (representativeness and completeness)	<p>CDS receives data in notifications about all suspected suicides known to Coronial Services New Zealand. All cases of suspected suicide in New Zealand receive the final classification of cause of death by Coronial determination. Some cases initially classified as suspected suicides may ultimately be determined to have had another cause of death. There may also be a small number of cases not initially thought to be suicides but ultimately are determined as a suicide.</p> <p>The data provided in suspected suicide notifications to CDS are provisional; data can be subject to inaccuracies and elements may be missing particularly ethnicity. All recipients of the data are advised of these limitations.</p>	<p>Reporting to the register is not mandatory, so a monthly cross-check occurs with the Coroners Court of Queensland's list of suspected suicides to obtain any missing cases. The completeness of the register depends on the availability and completeness of police reports but a high amount of missing data is tolerated for some variables as clusters may only relate to two to three people, for which there may be no missingness.</p> <p>Standard caveats for IQSR approved by the state coroner are issued in each annual report.</p>	<p>The VSR is fully integrated with the Coroners Court of Victoria's death surveillance program. This integration enables cases to be reviewed continually as coroners' investigations progress, to remove wrongly-included deaths, and add suicides missed during initial surveillance.</p> <p>The VSR's core dataset of basic information (socio-demographic, location, method) about each death is complete for every case and is reviewed regularly as coroners' investigations progress.</p> <p>These processes ensure the VSR data is as representative and complete as possible.</p>	<p>The data is captured from police officer reports of suicide, recorded for coronial purposes, received centrally within the force. Coroners Offices equally send reports of suicide, especially where officers do not attend in the first instance i.e., hospital-reported deaths following a suicide attempt. The data is audited every two months or so, via a cross-check with each of the four area coroners' offices. Some cases initially classified as suspected suicide may ultimately be determined to have had another cause of death. There may also be a small number of cases not initially thought to be suicides but ultimately are determined as a suicide. The data provided in suspected suicide notifications to TV-RT-SSS is provisional; some data points can be subject to</p>	<p>All suspected suicide deaths are reported to the local coroner of each jurisdiction. All coroners' records in Counties Cork and Kerry are reviewed for cases that meet the criteria for a suspected suicide, ensuring a high level of completeness.</p> <p>The cross-check feature based on the inclusion of a second data source, i.e., the HSE Patient Mortality Register which records deaths by health service users has been effective in capturing all cases of suspected suicide accurately since the inception of the SSHO.</p> <p>The core dataset of minimal variables about each death is predominantly complete. Data relating to the history of abuse may not be readily available at the time of data collection for all cases, thus missing data for these fields is tolerated, with the</p>

(continued)

TABLE B1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
				inaccuracies and elements may be missed by the reporting officers. All recipients of the data are advised of these limitations.	intention to complete all data fields when data becomes available either during or post-coronial investigation. All data recipients are advised of these limitations.
Usefulness	<p>Timely provisional coronial data on suspected suicides is an important element of local postvention responses. The CDS has been useful in:</p> <ul style="list-style-type: none"> - verifying and informing the provision of timely and appropriate active outreach, support, and other postvention services to families, friends and communities bereaved by suicide. - Facilitating the timely identification of potentially vulnerable 	<p>The IQSR has been useful in identifying frequently used locations and providing the impetus for means restriction at those sites, and for refuting unsubstantiated claims made to state and federal governments.</p>	<p>VSR data informs Victorian coroners' investigations and has been used to formulate prevention-focused recommendations in a wide range of areas. VSR data is regularly provided to Victoria's Department of Health, and to Commonwealth government bodies, to assist in monitoring suicide and to inform suicide prevention initiatives.</p> <p>The VSR team notifies emerging suicide trends and issues to the</p>	<p>The TV-RT-SSS provides monthly statistics for internal force use and four Suicide Prevention Groups, plus relative comparable data month on month from January 2017 to date.</p> <p>The data is also shared with the national PHE RTSS database.</p> <p>The data is equally used for supporting those bereaved by suicide by facilitating the timely identification of those potentially vulnerable individuals impacted by exposure to a</p>	<p>The SSHO has been both effective and highly valuable in dispelling misinformation reported via both traditional and social media of unsubstantiated figures of suspected suicide that often contribute to community concern.</p> <p>The system has informed response plans, outreach, and bereavement support for communities impacted by suicide.</p> <p>The SSHO provides a data source for ad hoc briefings to educate</p>

(continued)

TABLE B1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
Applicability to suicide prevention efforts	Individuals impacted by exposure to a suspected suicide. In turn, this helps ensure that such individuals are linked with appropriate support and services. - Helping establish the facts. Establishing the facts can reduce community rumors, distress and anxiety and minimize the risk and contribution of this to further suicidal behavior. - Assisting with the accurate assessment of current local patterns of suicides to discern possible suicide cluster(s) or suicide contagion. - The emergence of novel methods of suicide can be tracked and appropriate action taken.		government and answer government questions about suicide (for example confirming or refuting concerns about reported clusters and trends). VSR data is published on a monthly basis by the Coroners Court of Victoria to inform and educate the Victorian public. The VSR has been the data source for multiple papers published in peer-reviewed journals.	suspected suicide. In turn, this helps ensure that such individuals are linked with appropriate support and services.	stakeholders, the media, and the general public on the facts.
	Bereaved families and friends require care and support for their own health and wellbeing, and as suicide prevention. The utility of the CDS in priming	The IQSR is the best source of information to inform the Queensland community about the characteristics of suspected suicides and	Many Victorian coroners' suicide prevention recommendations informed by VSR data, have been accepted and implemented. These include	In terms of direct support for those bereaved and therefore being at greater risk of taking their own lives, the process cannot be judged as correlating to	Data analyses have informed the development of regional suicide prevention initiatives, including means restriction efforts at

(continued)

TABLE B1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
	postvention activities (above) is also of course priming prevention. Learnings from postvention activities will help District Health Boards further develop their district suicide prevention plans aimed at building community resilience and well-being and targeting modifiable risk factors evident in their communities.	therefore has high applicability to suicide prevention efforts.	recommendations addressed to means restriction; current and former serving defense force members; international students; perpetrators of intimate partner violence; and inpatients in mental health units. VSR data has informed multiple Victorian initiatives to intervene in communities where emerging suicide issues have been identified.	reduced suicide rates. However, the successive positive feedback from those affected is reassuringly convincing. The data is used extensively in the four area Suicide Prevention groups to inform suicide prevention strategies and direct actions. Where patterns, potential contagion, clusters, or linked incidents are identified, then response plans and activities follow to support those at risk, communities, or the organizations, i.e., schools, linked to those incidents.	locations of concern and targeted media campaigns on mental health support, based on the risk profiles identified via trend analysis.
Accessibility	Data received by the CDS about suspected suicides is disseminated to all impacted District Health Boards. District Health Boards have designated authorized recipients for receiving this sensitive personal data from CDS who ensure that it is managed according to national	Data is currently disseminated to those who “need to know” and released publicly once a year. A current data request template is being formulated to more systematically capture and respond to data requests from government and non-government agencies.	VSR data is accessible to all Victorian coroners without restriction. VSR data is available upon request to government bodies and health services for prevention purposes, contingent on the VSR team having the resources and capacity to fulfill the request, and on the State Coroner’s	Data received by the TV RTSSS is widely disseminated to all partners within the area Suicide Prevention Groups. i.e., strategic and operational leads. It is further reviewed by the TV SPIN (Suicide Prevention Intervention Network).	SSHO data is available to the Health Services Executive Resource Officers for Suicide Prevention to inform their practice and ensure timely support in bereaved communities. Data is available upon request to government bodies for the purpose of informing the

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TABLE B1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
	Privacy laws and frameworks.		approval. VSR data is available to the Victorian Department of Health to inform its suicide prevention work. VSR data update reports are published for the public on a monthly basis. VSR data is available to researchers in approved collaborative projects that have a suicide prevention focus.		development of prevention strategies and policies. A data visualization tool is currently in development with the aim of augmenting data analysis and efficient dissemination of de-identified data via an encrypted interactive dashboard, accessible to key stakeholders only.
Flexibility	The main constraint to flexibility of the service has been the number of stakeholders that are party to the Memorandum of Understanding which sets out the purpose and process to provide data from Coronial Services New Zealand to District Health Boards. The parties to the MoU include the provider of CDS (Clinical Advisory Services Aotearoa), two government agencies (Coronial Services New Zealand & the Ministry of Health), and 20	The IQSR has been flexible in response to the need for reporting data by Local Government Area and doing additional coding when investigating clusters. There is a need to revise the code extracting information from the data source to capture additional information on a long-term basis.	The VSR design has been revised over time to meet emerging needs. Examples include the addition of latitude and longitude information for locations relevant to the suicide; and revisions to how information on cultural and linguistic diversity is captured. In 2020, the VSR implementation was shifted from Microsoft Access to the Microsoft Power Platform (Dynamics 365), demonstrating flexibility in information technology	The system has demonstrated both flexibility and adaptability, as per demand for additional data. It has been particularly flexible in response to the need for reporting data by Local Government/ Authority Areas. As far as possible meeting the needs of local stakeholders and bereavement support services.	The system has demonstrated both flexibility and adaptability, as per demand for additional data. Based on the outcomes of the pilot phase, the SSHO has been expanded from the original nine-item database to include an additional six data items. The amended database captures additional information to further assist in risk identification and detection of emerging clusters and locations of concern. Based on interest from key

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TABLE B1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (IQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
	District Health Boards. In 2021, a project is underway to expand the original eight item data set in notifications to include an additional six items: Unique identifier (NHI number), summary of the incident, next of kin details, discoverer details, employment status, and occupation.		infrastructure. VSR coding processes are also flexible and responsive, with the project team having the ability to assign coding resources based on current coroners' priorities, external project funding, and government need.		stakeholders, the SSHO has been extended also to include the County now covering the entirety of the Health Service Executive Community Health Organization area four.
Sensitivity	The number of suspected suicides notified via CDS is typically slightly higher than the number of cases where there is a formal coronial finding of suicide. The two sets of publicly available are slightly difficult to compare as one is based on calendar year, the other on financial year but between 2008 and 2015 the variance averaged 5%.	Sensitivity and specificity are similar compared to the final QSR, although the final QSR also locates additional misclassified suicides. Studies reporting sensitivity and specificity, and misclassification in greater detail are currently being considered.	As discussed above, the VSR is integrated with the Coroners Court of Victoria's broader death surveillance system. This system records initial death classification (intent and mechanism) upon report, and revised death classification as the coroner's investigation progresses to the conclusion. Comparison of initial and revised death classifications shows that ~7% of deaths the VSR team initially classify as suicides are ultimately found not to be suicides. Additionally, ~5% of	The number of suspected suicides notified via TV-RT-SSS is typically slightly different than the number of cases where there is a formal coronial finding of suicide. The suspected data is most useful for immediate and medium-term planning and response. The data available nationally through the Office of National Statistics is used more at a strategic level.	Internationally validated criteria are applied to each case screened for inclusion, demonstrating a high level of sensitivity for capturing all suicide cases. It has been difficult to determine the variance in cases captured by the SSHO since its inception in late 2018 by comparing with official mortality statistics because of the lag in the publication of national figures in Ireland associated with delays in the conclusion of coronial inquests, further compounded by

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TABLE B1. Continued.

Name of system	Coronial Suspected Suicide Data Sharing Service (CDS)	Interim Queensland Suicide Register (iQSR)	Victorian Suicide Register (VSR)	Thames Valley Police Real-Time Suicide Surveillance (TV-RT-SSS)	Suicide and Self-Harm Observatory (SSHO)
			deaths ultimately confirmed to be suicides are missed in initial surveillance. Overdose (acute drug toxicity) is the mechanism most frequently implicated in misclassification.		the COVID-19 pandemic.
Acceptability	Feedback received from all stakeholders about CDS has been entirely positive in respect of both its usefulness and satisfaction that the data in suspected suicide notifications is being received, analyzed, and disseminated by CDS in a timely and accurate way and following agreed protocols. CDS was found to be a fit for purpose by an external review in 2020. CDS maintains strong effective working relationships with all stakeholders to ensure the ongoing fidelity and acceptability of the service.	The reporting structure for the project was revised from triennial reports to annual reports, including iQSR data, in response to the needs communicated by stakeholders when consulted by the funding agency.	The acceptability of the VSR was evaluated in 2018. The primary strength of the VSR was found to be the quality of data it contains; the primary weakness was the variability in detail and quality of source information (police reports and coronial case files) that underpins the VSR coding.	The TV-RT-SSS is widely acknowledged, beyond the local force area, as a system worthy of replication and many areas have taken elements of the approach as the foundation of their own systems. Local stakeholders are very positive in relation to its usefulness and accuracy for the purposes for which it is applied.	Communication between the lead researcher and the data custodians works effectively. Capacity issues within the Coroners' offices contributed to some delays in data collection during the pilot phase. These issues have since been rectified by adjusting the approach from telephone communication to onsite data collection in some instances to meet the needs of the data custodians. The results of analyses have been effectively used to inform the implementation of additional community supports in vulnerable communities identified using trend analysis.