Western Pacific Regional Sentinel Surveillance System of Suicidal Behavior (WPR4S) Preliminary Framework

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Background

In 2019 approximately 703,000 people died by suicide around the world, with around 160,000 deaths occurring in the Western Pacific region (WPR).[1] Reducing the far-reaching impact of suicidal behavior is crucial and this requires strong commitment across government and health departments. To support countries in implementing core suicide prevention activities, the World Health Organization (WHO) have recently developed the LIVE LIFE implementation guide.[2] The LIVE LIFE guidelines are underpinned by several central components including multisectoral collaboration, awareness raising, **surveillance**, financing, and monitoring and evaluation. The LIVE LIFE framework also endorses key interrelated suicide prevention activities that should inform national strategy, including restricting access to means of suicide, responsible media coverage, supporting adolescents in developing life skills, and the early assessment, intervention and follow up of those experiencing suicidal behaviors. The **surveillance of suicidal behaviors** is considered central to suicide prevention, as accurate data collection arguably strengthens all other core activities by assisting planning, identifying key risk groups and areas for targeted interventions, and is useful for evaluating the effectiveness of suicide prevention activities/strategies. [3] Figure 1 (see [4]) provides the age standardized rates of suicide by gender across countries in the WPR, as well as the WPR and global average, based on WHO Global Health Estimates.[5]

The WPR is incredibly diverse, with countries varying greatly in the size of their landmass, economies, health services and populations (see https://www.who.int/westernpacific/about/where-we-work). Consequently, there are considerable differences across countries regarding existing systems and future needs. It is relatively common for countries in the WPR to record suicide mortality in their respective civil registration and vital statistics (CRVS) systems; however, the timeliness and/or comprehensiveness of these systems varies, with poorer quality data acquired in low- and middle-income countries.[6] Very few countries in the WPR have surveillance mechanisms in place to collect data on self-harm and suicide attempts or prioritize the reporting and analysis of such data. Indeed, only high-income countries such as Australia, Japan and Republic of Korea have comprehensive self-harm information (often at an emergency department level). Establishing, enhancing, and maintaining

[1] Suicide worldwide in 2019: Global Health Estimates. Geneva: World Health Organization; 2021
[2] Live life: An implementation guide for suicide prevention in countries. Geneva: World Health Organization; 2021
[3] Preventing suicide: A global imperative. Geneva: World Health Organization; 2014.
[4] Kõlves K, Mathieu S, Fleischmann A. Suicide and self-harm surveillance across the Western Pacific: A call for action. *The Lancet Regional Health – Western Pacific*. 2022; 19: 100367
[5] World Health Organization. Suicide worldwide in 2019: Global Health Estimates. Geneva: World Health Organization; 2021.
[6] Suicide worldwide in 2019: Global Health Estimates. Geneva: World Health Organization; 2021

(real time) **surveillance systems** for suicide *and* self-harm is therefore an important priority for the region.

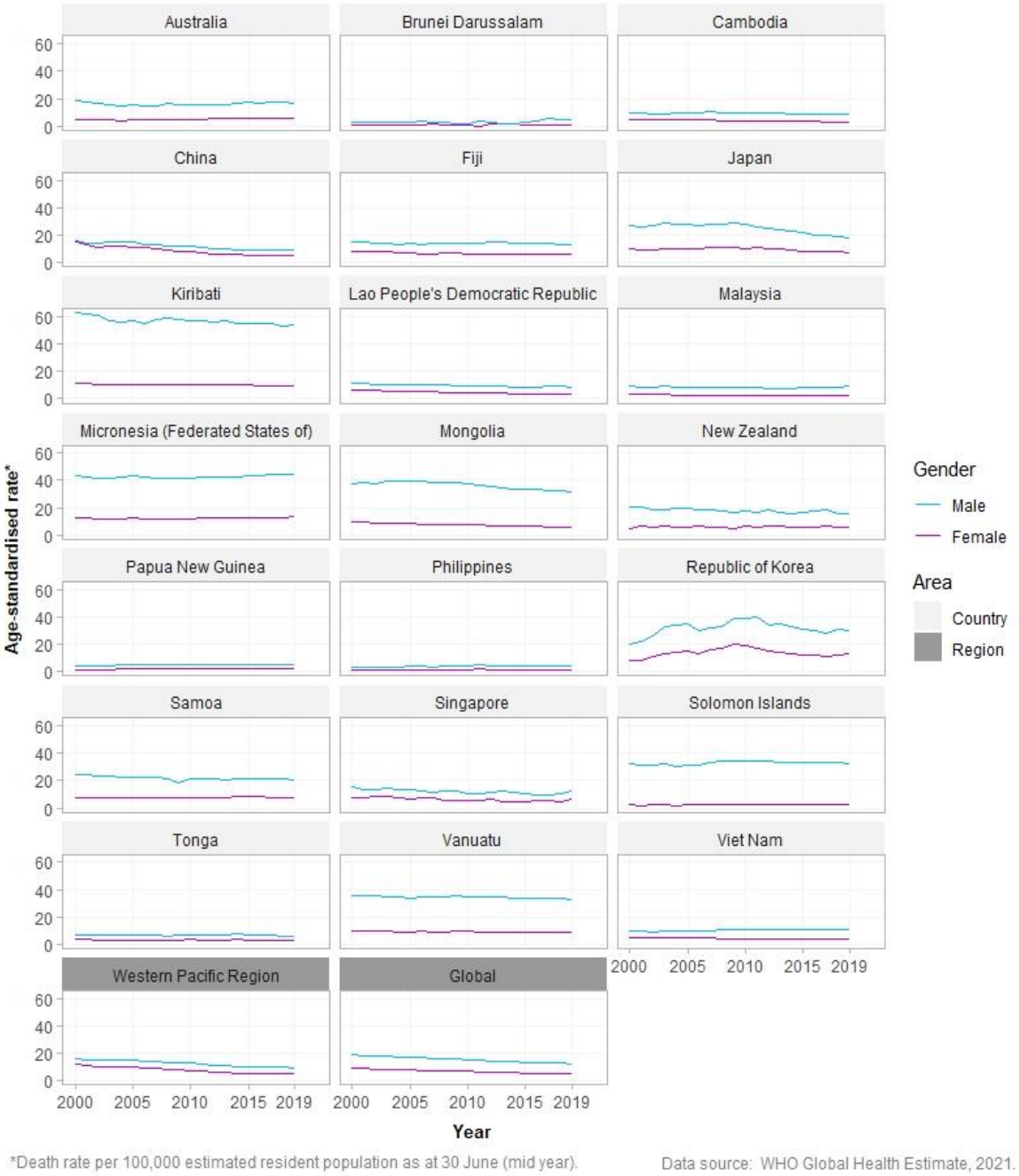


Figure 1. *Age-standardized suicide rates by gender across the Western Pacific Region (See Kõlves et al, 2022[7])*

[7] Kõlves K, Mathieu S, Fleischmann A. Suicide and self-harm surveillance across the Western Pacific: A call for action. *The Lancet Regional Health – Western Pacific*. 2022; 19: 100367

Recognizing this important priority, the WHO Western Pacific Regional Office approached the Australian Institute for Suicide Research and Prevention (AISRAP) as a WHO Collaborating Centre for Research and Training in Suicide Prevention and a key proponent of the previously existing WHO START (Suicide in At Risk Territories) Study,[8] to undertake a collection of research activities aimed at **strengthening the evidence base for data-informed suicide prevention strategies within the region, including supporting the establishment of a sentinel surveillance system for the region** for the WHO Western Pacific Regional Office (WPRO). These research activities would then be used to inform and introduce a preliminary framework for the regional surveillance of suicide and self-harm across the WPR. A collaborative approach was taken between AISRAP and WPRO in completing the background research activities. As per recommendation from WPRO, the research conducted was focused on selected countries across the WPR, including Australia, China, Fiji, Japan, Mongolia, Philippines, Republic of Korea, and Tonga. These countries were selected in order to cover a mixture of high and low- and middle- income countries that vary greatly in their size and geography, as well as their existing suicide prevention infrastructure and activity.

The aims of the current document are:

- Provide a brief overview of the background research activities and main outcomes
- Introduce a preliminary framework for the regional surveillance of suicide, self-harm, and suicidal ideation across selected countries in the Western Pacific, including the main aims of the framework, indicators, and points of consideration

[8] De Leo D, Milner A. The WHO/START Study: Promoting suicide prevention for a diverse range of cultural contexts. *Suicide and life-threatening behavior.* 2010;40(2):99-106

Part A – Background Research Activities

Background research activities

In an effort to improve the evidence base for data-informed suicide prevention strategies within the Western Pacific, researchers from AISRAP conducted a series of background research activities that could be used to develop a preliminary framework for a sentinel surveillance system of suicidal behavior. The background research activities were aimed at understanding existing surveillance and suicide prevention activities across selected countries in the region, in order to identify notable gaps and feasible indicators, and to provide a rationale for the preliminary framework. The background activities included two rapid mapping reviews on existing health information systems and recently identified risk and protective factors, a case study of the development, implementation and evaluation of a national strategy for suicide prevention in the Republic of Korea, and an overview of suicide and associated prevention activities in Fiji. A summary of each activity is described below, and original deliverables are provided in the Appendices (including recent figures and trends in suicide related mortality across the region).

1. Mapping of health information systems

A systematic rapid mapping review to determine existing suicide health information systems, key barriers and facilitators, indicators, and potential gaps within the region was conducted in early 2021 focusing on English language peer-reviewed literature published since 2015. Searches were limited to a pre-defined list of countries (see above). These included Australia, China, Fiji, Japan, Mongolia, Philippines, Republic of Korea, and Tonga. Most studies relied on retrospective analyses of health system data or cross-sectional survey results. There were only a few studies using prospective or longitudinal designs. As may be expected, most studies identified were from Australia, China, Japan, Republic of Korea. Suicide mortality appeared to be routinely collected across the selected countries, however, the timeliness and quality could be improved in lower income countries. Multicenter self-harm surveillance systems were more limited, with examples only from higher income countries such as Australia (using emergency department level information). This is an important direction for future suicide prevention across the region. Other available self-harm data sources across the region included hospital admissions, and for Australia, paramedic attendances. Further detail, including features of a high-quality surveillance system and review references, are provided in Appendix A. Based upon the review findings, there appears considerable opportunity for establishing and maintaining regional sentinel surveillance of self-harm across the region.

2. Risk and protective factors

Using similar procedures described above, a second rapid mapping review was conducted to identify risk and protective factors for suicide and self-harm across the selected countries. In this instance, exclusion criteria were articles that did not contain original research or referred exclusively to suicidal

ideation. An additional search was conducted in an attempt to privilege information published in smaller countries such as Fiji, Philippines, Mongolia, and Tonga. While arguably designed to 'protect' individuals and communities from suicidal behaviors, articles about prevention activities and interventions were deemed outside the scope of the current rapid review. Overall, there was a noticeable skew in focus on risk groups and risk factors/correlates as opposed to protective factors. For brevity, only the most common findings are presented below. Key review studies from across the region are provided in Table 1, this table was updated on 14th December 2021. Further detail, including the original table and review references, are provided in Appendix B.

- Risk groups for suicide: Men, those living/working in rural areas, workers in male-dominated industries, elderly
- Risk groups for self-harm/suicide attempts: young girls/women, LGBTQ, Aboriginal and/or Torres Strait Islander peoples
- Main means for suicide: Hanging, self-poisoning by medication and/or chemicals
- Main means for self-harm/suicide attempts: Self-poisoning and self-cutting
- Risk correlates for suicide: Environmental conditions (e.g., drought), substance use, depression or other mental illness, negative life events, physical illness, poverty, or low education
- Risk correlates for self-harm/suicide attempts: Previous self-harm, mental illness and substance use, physical illness, bullying, social withdrawal, body mass index, rural, low education
- Protective correlates for suicide: self-esteem and social support
- Protective correlates for self-harm/suicide attempts: resilience, emotion regulation, self-efficacy, and coping

An emerging challenge that may influence suicide and self-harm across the Western Pacific is the ongoing impact of COVID-19 and associated public health measures. Further articles related to COVID-19 published in the English language are provided in the updated Table 1. These additional studies highlight the importance of responsive and comprehensive surveillance systems in responding to unanticipated negative life events. For instance, a substantial portion of information for the WPR on the impact of COVID-19 on suicidal behavior is coming from Japan and Australia where comprehensive suicide and self-harm surveillance data is routinely compiled.

Table 1. A selection of key studies from the Western Pacific Region (updated 14th December 2021)

Authors	Title	Highlights
Dickson et al. 2019	A systematic review of the antecedents and prevalence of suicide, self-harm and suicide ideation in Australian Aboriginal and Torres Strait Islander youth	Despite disproportionate rates of suicide and self-harm there was limited research on risk factors in this group. Factors identified included substance use and being incarcerated, and authors highlight the pressing need for First Peoples led research in this area
Holman et al. 2020	Suicide risk and protective factors: A network approach	One of the few studies identified that provides a detailed model of protective factors as well as risk factors, while not specific to the WPR it does include participants from Australia (and other Western, English speaking countries)
Kwak et al. 2019	Adolescent suicide in South Korea: Risk factors and proposed multi-dimensional solution	Provides a proposed model for suicide prevention in youth based upon a socio-ecological framework tailored to the Korean context
Lee et al. 2018	Clinical epidemiology of long-term suicide risk in a nationwide population-based cohort study in South Korea	Using a nationally representative sample across a 12-year period, this study identifies six key risk factors (Parkinson's disease, major depression, liver problems, male gender, and older age, with an inverse association for the presence of OCD)
Li & Katikireddi, 2019	Urban-rural inequalities in suicide among elderly people in China: a systematic review and meta-analysis	Given changing social structure and population, this study found that rates are higher for elderly people living in rural areas and that poisoning and hanging are most common
Mathieu et al. 2021	Suicide and suicide attempts in the Pacific Islands: A systematic Literature Review	Rates for suicide are particularly high in small Pacific Islands countries as compared to other countries in the region, and self-harm is particularly high in youth. There is a strong need for ongoing implementation and evaluation of suicide prevention activities across the Pacific Islands
McHugh et al. 2019	Association between suicidal ideation and suicide: meta-analyses of odds ratios, sensitivity, specificity and positive predictive value	High heterogeneity of studies makes the moderate pooled association between ideation and suicide undependable despite this often being used in clinical settings as a measure of suicidal risk
Onishi, 2015	Risk factors and social background associated with suicide in Japan: A review	Provides an overview of key risk factors (such as previous suicide attempts, mental illness) and highlights that multiple factors are often present prior to suicide
Page et al. 2017	Suicide by pesticide poisoning remains a priority for suicide prevention in China: Analysis of national mortality trends 2006-2013	Highlights the reduction in the use of pesticides may be a consequence of changing social factors and may be driving declining suicide rates in China (still most prevalent method, followed by hanging)
Song et al. 2020	Comparison of suicide risk by mental illness: a retrospective review of 14-year electronic medical records	Psychiatric inpatient records at one hospital in Seoul, Republic of Korea were examined and showed that the presence of any mental disorder meant a higher risk for suicide than general population but especially so for psychotic conditions
Wasserman et al. 2021	Suicide prevention in childhood and adolescence: a narrative review of current knowledge on risk and protective factors and effectiveness of interventions	Not specifically to the WPR; however does provide rates of youth suicide for WPR which highlight different patterns for gender to the rest of the world; also discusses prevention strategies

Yang & Feldman, 2018	A reversed gender pattern? A meta-analysis of gender differences in the prevalence of non-suicidal self-injurious behavior among Chinese adolescents	As with suicides, Chinese youth display differential gender patterns for non-suicidal self-harm whereby there are no gender differences in clinical samples, college aged men are more likely to report self-harm, whereas in younger years girls are more likely to report self-harm
Yu et al. 2021	Factors associated with suicide risk among Chinese adults: A prospective cohort study of 0.5 million individuals	One of the few prospective studies identified in this search, after an approximate 10 year follow up period 80% of suicides were from rural areas and the annual rate of suicide was 10.2 per 100,000. Risk factors were male gender, older age, rural, mental health diagnoses etc.
COVID-19 RELATED		
Eguchi et al. 2021	Suicide by gender and 10-year age groups during the COVID-19 pandemic vs previous five years in Japan: An analysis of national vital statistics	This study utilized daily reported data from the National Police Agency and determined an increase in suicides for women (across all ages) and for men less than 30 years or older than 80 years at certain points during COVID-19 pandemic
John et al. 2021	The impact of COVID-19 pandemic on self-harm and suicidal behavior: update of a living systematic review	This living review has been updated once already and does present some findings from countries across the WPR
Kim, 2021	The short-term impact of the COVID-19 outbreak on suicides in Korea	This letter to the editor provides preliminary information that points to a negligible rise in suicides overall during the initial months of the pandemic (although there are gender differences)
Leske et al. 2021	Real-time suicide mortality data from police reports in Queensland Australia, during the COVID-19 pandemic: an interrupted time-series analysis	Initial findings do not indicate substantial change in suicide rates during the first seven months of the COVID-19 pandemic as compared to the pre-exposure period (Jan 2015- Jan 2020)
Pirkis et al. 2021	Suicide trends in the early months of the COVID-19 pandemic: an interrupted time-series analysis of preliminary data from 21 countries	This global study of 21 countries does include information provided from Australia, Japan, New Zealand, and Republic of Korea. Overall, there was no increase in suicide risk in the first months of the pandemic
Sakamoto et al. 2021	Assessment of suicide in Japan during the COVID-19 pandemic vs previous years	This study provides information that suicide rates may have increased in the second half of 2020, especially for men less than 30 years and women less than 50 years
Sveticic et al. 2021	Reduced suicidal presentations to emergency departments during the COVID-19 outbreak in Queensland, Australia	In this letter to the editor researchers from one health service precinct in Australia present preliminary administrative data on emergency presentations for self-harm and ideation. These figures indicate that during heightened periods of COVID-19 cases there was a decrease in presentations whereas at other periods there was an increase. Overall, however, there were less presentations than projected.
Tanaka & Okamoto 2021	Increase in suicide following an initial decline during the COVID-19 pandemic in Japan	This study provides information on changes in suicide rates over the course of the COVID-19 pandemic whereby initially there was a decrease in suicide rates which has recently risen (especially in women and youth). The authors highlight the unprecedented social welfare safety net during the early stage of the pandemic may have been protective

Again, this rapid review had certain limitations that should be noted and are consistent with the previous review (e.g., English language, 2015 onwards, single database). Nevertheless, identified risk and protective correlates correspond well to current conceptual models of suicide risk.[9] Countries across the WPR have already began to implement strategies aimed at reducing access to main means such as pesticide bans in the Republic of Korea[10] or Fiji.[11] Continued and/or enhanced surveillance will allow for evaluation of the impact of these important prevention activities. The establishment of a regional (WPR) sentinel surveillance system for suicide and self-harm will facilitate this at a regional level.

3. Regional case study on suicide prevention activities in the Republic of Korea

The Republic of Korea has developed and implemented a national whole-of-government suicide prevention plan, which includes comprehensive surveillance of suicidal behaviors as well as other key prevention activities. These activities and local expertise provide an important opportunity for shared learning throughout the region. To go beyond information available in the English language, researchers from AISRAP conducted two interviews with experts in suicide prevention from the Republic of Korea to understand the key components, barriers and facilitators to implementation, and evaluation of aspects of their National Plan.

Key components of the National Plan as identified by the experts map well onto those reported in the literature,[12] and included:

- Multisectoral collaboration
- Surveillance
- Evidence-based policy development
- Broad community gatekeeper awareness training
- Means restriction
- Media guidelines
- Promotion of mental health and reducing stigma

Several important barriers and facilitators were identified by the experts.

Barriers included:

- Limited social security safety net to combat socio-economic risk factors for suicidal behaviors and instead a focus on supporting those already in crisis
- Multisectoral collaboration (a key strength) is difficult to achieve in practice with different systems, priorities, funding, and levels of bureaucracy
- Limited access to trained professionals in rural areas (hence development of community level gatekeeper training, however, relies on funding)

[9] Turecki G, Brent DA, Gunnell D, O'Connor RC, Oquendo MA, Pirkis J, Stanley BH. Suicide and suicide risk. *Nature reviews Disease primers 5, no. 1.* 2019;5(1):1-22.
[10] Kim H, Kwon SW, Ahn YM, Jeon HJ, Park S, Hong JP. Implementation and outcomes of suicide-prevention strategies by restricting access to lethal suicide methods in Korea. *Journal of Public Health Policy*. 2019;40(1):91-102.
[11] Live life: An implementation guide for suicide prevention in countries. Geneva: World Health Organization; 2021
[12] Platt, S., Arensman, E. & Rezaeian, M. (2019). National Suicide Prevention Strategies – Progress and Challenges. *Crisis*, 40(2), 75-82.

- Data protection and ethics regarding linkage of records
- Stigma preventing help-seeking

Facilitators included:

- Suicide prevention is a whole of government priority
- Suicide prevention policy committee
- Establishment of the Korean Foundation for Suicide Prevention, National Suicide Prevention Center, and the National Psychological Autopsy Center

There are several examples of published evaluations of key suicide prevention activities and components of the National Plan in the English language (see Appendix C for full case study and associated references). These interviews highlight the extensive work that has been achieved in suicide prevention in the Republic of Korea and rich information was shared by the experts. These discussions and the information provided, represent a unique opportunity for shared learning across the region.

4. Suicidal behavior and suicide prevention in Fiji

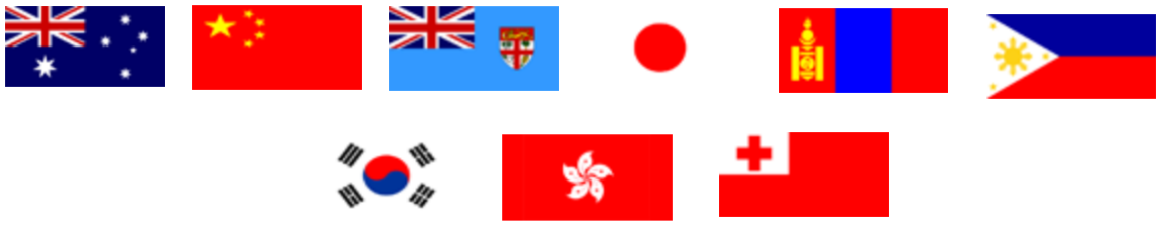
The final background research activity was to present an overview of suicidal behavior and suicide prevention activities in Fiji (see Appendix D). First, age-standardized rates of suicide for men and women across the Pacific Islands were compared. Second, the age-standardized rates for men and women in Fiji were presented to show trends over time (2000-2019) and across different age groups. Finally, suicide rates in Fiji were compared to those in other countries with a large proportion of Indian diaspora population (e.g., Suriname). Regarding an overview of suicide prevention strategies, information relating to Fiji was extracted from a recently published systematic literature review on suicide and suicide attempts across the Pacific Islands.[13] While there has been some recent activity (e.g., pesticide restriction[14]) there is a need for ongoing evaluation of suicide prevention strategies. This would be aided by enhancing the quality and comprehensiveness of surveillance mechanisms for suicidal behavior across the country.

[13] Mathieu S, de Leo D, Koo YW, Leske S, Goodfellow B, Kõlves K. Suicide and suicide attempts in the Pacific Islands: A Systematic Literature Review. *The Lancet Regional Health-Western Pacific*. 2021;17:100283.
[14] Live life: An implementation guide for suicide prevention in countries. Geneva: World Health Organization; 2021

Part B – Preliminary Framework

Western Pacific Regional Sentinel Surveillance System of Suicidal Behavior (WPR4S) Preliminary Framework

The Western Pacific Regional Sentinel Surveillance System for Suicidal Behavior (WPR4S) Preliminary Framework is based upon the research activities summarized in Part A, ongoing consultations with the WHO and WPRO, and current best practice recommendations from the WHO regarding surveillance of suicide and self-harm.[15,16] The WPR4S framework was introduced to representatives from academia, government, and non-governmental experts working in the field of suicide prevention across the Western Pacific Region (WPR), including representatives from Australia, China and Hong Kong, Fiji, Japan, Mongolia, Philippines, Republic of Korea, and Tonga in the first 'Suicide and self-harm prevention in the Western Pacific' regional expert roundtable and showcase (a meeting report is provided in Appendix E). Further written feedback on the framework will be sought from selected and interested attendees and continued country level interviews are proposed to assist with the ongoing mapping of existing surveillance activities unavailable in the English language literature and to identify possible areas of future technical support. It is hoped that future activity will include an expansion of this network to other countries in the WPR over time. The collaborative development of this framework provides an initial step in establishing a regional sentinel surveillance system with a focus on suicidal behavior and ideation that has considered local context and is feasible for countries across diverse WPR.



Definition of suicidal behavior

According to recent research, suicide is generally considered a fatal act whereby the cause of death was initiated and effected by the individual, with or without clear intent to die and varying underlying

[15] Live life: An implementation guide for suicide prevention in countries. Geneva: World Health Organization; 2021

[16] Practice manual for establishing and maintaining surveillance systems for suicide attempts and self-harm. Geneva: World Health Organization; 2016

motives.[17] However, in practice, assigning suicide as a cause of death (usually by way of ICD[18] codes subject to change over time) is often impeded by stigma, unusual or difficult to determine methods, insufficient information to distinguish it from other causes of death such as accidents, and so on, which negatively influences the reliability of surveillance information.[19] Across the WPR, different cultural and linguistic interpretations of the term 'suicide' may further impact regional consensus.

Defining non-fatal suicidal behaviors, such as suicide attempts and self-harm, is arguably more complex. For example, in addition to 'suicide attempts' and 'self-harm', WHO acknowledges a further 16 or so alternative terms which have been used to describe these types of behaviors over time.[20] Nevertheless, initial steps in generating international consensus reveals that 'suicide attempt' generally describes the situation where a person causes harm to themselves with the intention of dying but survives, and 'self-harm' can be seen as a situation where someone causes harm to themselves *with* and/or *without* clear intent to die.[21] Unfortunately, difficulties in establishing the intent associated with acts of self-harm is extremely challenging, and WHO recommends recording *all* self-harm cases without delineating between non-suicidal self-harm or attempted suicide with suicidal intent so as to avoid potentially missing cases and opportunities for support.[22] Again, for regional surveillance across the WPR it is important that definitions and terminology are acceptable across languages.

Finally, when reporting on surveillance activities, terms which further stigmatize individuals experiencing suicidal thoughts or behaviors, or their loved ones, are unacceptable (e.g., "committed" suicide). Instead, person-centered language that is respectful of those with lived experience of suicide is essential and every care should be taken to communicate findings responsibly and appropriately.

Defining cases in the WPR4S framework

In deciding how best to capture regional sentinel data (particularly for self-harm and suicide attempts), it is recommended countries across the WPR refer to current best practice guidelines provided by the WHO for establishing and maintaining self-harm surveillance systems when deciding how best to define cases.[23] These guidelines provide a detailed series of vignette exercises and provide a comprehensive overview of issues with terminology and definitions of suicidal behavior. In addition,

[17] De Leo D, et al. International study of definitions of English-language terms for suicidal behaviours: a survey exploring preferred terminology. *BMJ Open*. 2021;11:e043409
[18] ICD = International Classification of Diseases and related health problems; see https://www.who.int/standards/classifications/classification-of-diseases
[19] De Leo. Can we rely on suicide mortality data? *Crisis.* 2015;36(1):1-3
[20] *Practice Manual for establishing and maintaining surveillance systems for suicide attempts and self-harm;* 2016. Geneva: World Health Organization
[21] De Leo et al. International definitions of English-language terms for suicidal behaviours. *BMJ Open*. 2021;11:e043409 p. 3
[22] *Practice Manual* (see above)
[23] *Practice Manual* (see above)

more recent literature provides helpful discussion, particularly on suicide terminology.[24] For the purposes of this preliminary framework, no uniform terminology is imposed upon countries. Instead, countries, particularly low- and middle- income countries in earlier stages of their surveillance set-up, are encouraged to adapt recommendations and learnings to their local context and language to maximize feasibility.[25] For example, there may be country level preferences for using 'suicide attempts' over 'self-harm' based upon local political or policy-based reasons. **Nevertheless, regional comparability in the sentinel surveillance system is important.** So, while flexibility around terminology is provided for in the current framework, there will need to be consistent operational definitions for each term across countries. The use of ICD codes is widely accepted and may be helpful for regional comparability. For simplicity and operational clarity, the WHO practice manual provides vignettes and case examples based upon the ICD codes. It is important to note, however, that these codes can be unreliable in capturing all cases of suicide[26] or self-harm (including suicide attempts).[27] This is due to variation of definitions across cultures, stigma and bias, data collection error, and ambiguity of intent and/or circumstances of death or injury previously described.

The proposed framework

Suicide and self-harm surveillance is a core pillar of the WHO LIVE LIFE implementation guide for suicide prevention.[28] Overall, country level indicators for surveillance are provided in the guide and include: the establishment or strengthening of a civil registration and vital statistics (CRVS) system (see also CRVS implementation plan[29]), a proportion of hospitals/regions collecting information on self-harm, data is disaggregated by age, sex, and means (at least), data is of high-quality, monitoring of framework indicators is reported annually, and evaluations of LIVE LIFE implementation is published (p. 107).[28] Further guidance on establishing a tailored self-harm and suicide attempt surveillance system responsive to the individual circumstances of the country is provided in the WHO *Practice manual for establishing and maintaining surveillance systems for suicide attempts and self-harm*.[30] According to this manual, standard operating procedures should be developed and regularly refined over time, and include procedural guidance on issues such as data collection, case ascertainment, data items (sex, age, date of self-harm etc.).

[24] Goodfellow B. Definitions in suicide research pp:17-27. In Kõlves K et al. (Eds) Advancing Suicide Research. 2021. Hogrefe: Gottingen, Boston
[25] *Practice Manual;* 2016. Geneva: World Health Organization p.2
[26] De Leo. Can we rely on suicide mortality data? *Crisis.* 2015;36(1):1-3
[27] Sveticic J et al. Suicidal and self-harm presentations to Emergency Departments: The challenges of identification through diagnostic codes and presenting complaints. *Health Information Management Journal.* 2020;49(1):38-46
[28] *Live life: An implementation guide for suicide prevention in countries*. Geneva: World Health Organization; 2021
[29] *WHO civil registration and vital statistics strategic implementation plan 2021-2025.* Geneva: World Health Organization; 2021
[30] *Practice Manual for establishing and maintaining surveillance systems for suicide attempts and self-harm;* 2016. Geneva: World Health Organization

The preliminary WPR4S Framework was independently prepared by AISRAP based upon previous research (see Part A) and collaborative discussion with representatives from the WHO and WPRO. It is guided by the *Suicide Surveillance Indicator Framework* (SSIF) in Canada[31] and the iceberg model of suicidal behaviors[32] and associated indicators.[33] The SSIF provides detailed indicators for suicide, suicide attempts and self-harm, suicidal ideation, and associated risk factors. Based upon initial discussions, for the purpose of the sentinel WPR4S system and to ensure feasibility in the short term these have been limited to suicide, self-harm, and ideation (see Figure 1). The rationale and purpose for each indicator is further outlined in Table 1.

[31] Public Health Agency of Canada, Centre for Surveillance and Applied Research. Suicide Surveillance Indicator Framework Quick Statistics, Canada, 2019 Edition. 2019; Ottawa (ON): Public Health Agency of Canada.
[32] McMahon et al. The iceberg of suicide and self-harm in Irish adolescents: a population-based study. *Social Psychiatry and Psychiatric Epidemiology*. 2014;49:1929-1935
[33] Pollock et al. Tracking progress in suicide prevention in Indigenous communities: A challenge for public health surveillance in Canada. *BMC Public Health.* 2018;18:1320

Table 2. The rationale and purpose for each proposed indicator in the preliminary WPR4S Framework

	Rationale/ Purpose
National/ Regional Vital Registration Systems including information on suicide and/or coronial datasets	Identifying national or regional causes of death (including suicide)
Purpose built Suicide Registers	Identifies, compiles, and records cases of suicide nationally or regionally
Purpose built Self-harm/Suicide Attempts Surveillance Systems	Identifying national or regional episodes of intentional self-harm and suicide attempts that integrate health information data from emergency and hospital admissions
Hospital Admission Self-Harm Databases	Identifying episodes of self-harm or suicide attempts that required in-patient admission to a hospital, or suicidal behaviors identified in an in-patient admission (for any cause)
Emergency Department Self-Harm Databases	Usually regional or multi-center for identifying episodes of self-harm that required emergency medical attention (or severe ideation)
Ambulance Databases	Identifying episodes of intentional self-harm or suicidal ideation that required paramedic support with/without emergency department or hospitalization
Periodical Surveys	Identifying self-reported suicide attempts, self-harm, suicidal ideation and/or mental distress that may go unidentified if health care was not obtained. E.g., WHO Global Schools-based Student Health Survey, WHO STEPwise Approach to non-communicable disease risk factor Surveillance Survey (optional module)
National/ Regional Crisis Helplines	Anonymous data of self-reported mental distress and/or suicidal ideation and self-harm (some helplines service specific populations and there may be variation in hours of operation extending all the way to 24/7)

NB: Crisis Helplines are not typically considered an evidence-based intervention for suicidal behaviors; however, provide a highly common and unique possible source of anonymous surveillance data

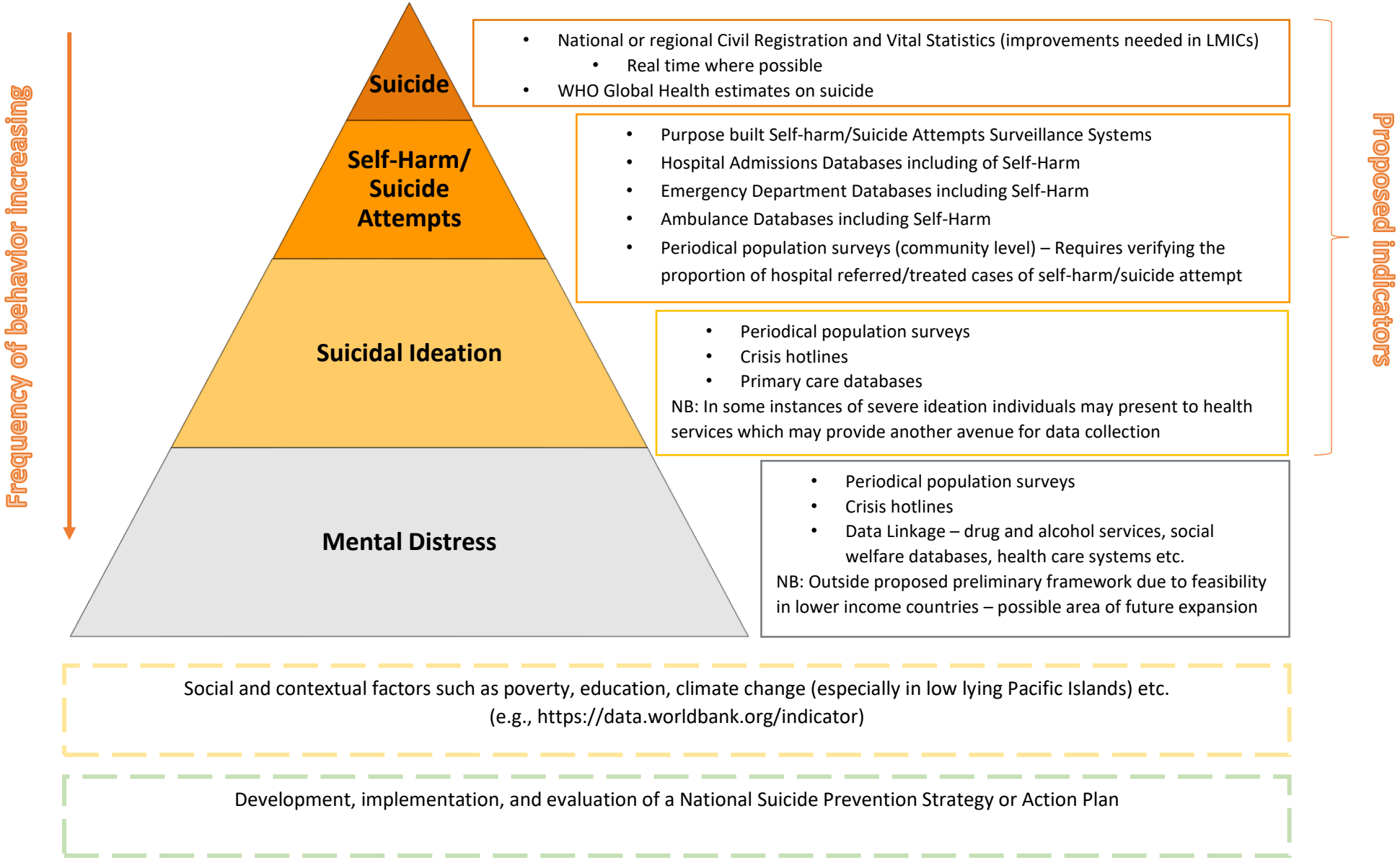


Figure 2. Preliminary WPR4S Framework

Role and expectations of the focal points

To successfully monitor and report surveillance activities in countries and compile suicide and self-harm related data from the proposed indicators it is necessary to identify country focal points. It is recommended to have a country focal point for suicide surveillance and other one for self-harm/suicide attempt surveillance due to the different agencies and stakeholders involved. A regional focal point would be expected to co-ordinate country focal points who in turn would be expected to complete activities as follows:

- Provide ongoing contribution and feedback to the suicide surveillance framework for the region (WPR4S framework);
- Support implementation of the framework in countries/catchment areas;
- Provide surveillance data with a focus on self-harm, and related thoughts and behaviors to the central WPR4S database as agreed in the framework.

Country focal points should have knowledge about their local health care systems and available national and regional surveillance systems. Preferably, country focal points will be working in the field of mental health and/or suicidal behaviors in their country/sub-region of the country. They could be working as academic researchers, and/or in the civil registration and vital statistics or hospital settings. All country focal points should either have firsthand experience with surveillance systems or relevant data collection or be in a position where they can regularly maintain communication and collaboration with relevant surveillance data officers/researchers.

Barriers to feasibility

Surveillance is incredibly important, yet, not without significant challenges. In addition to issues with definitions, several important barriers exist in establishing and maintaining a regional sentinel suicide and self-harm surveillance system in the WPR. These have been described in more detail elsewhere.[34,35] A summary of key helpful resources are provided in Appendix F.

- **Stigma:** An important barrier to accurate case identification at two levels (1) there can be reluctance for individuals to present to healthcare services or disclose suicidal thoughts/behaviors, and (2) issues with (past) criminalization, cultural and religious perceptions, and bias of data reporters (doctors, police etc.), lack of governmental priority, and so on, can lead to inaccurate coding and reporting etc.

[34] Witt K, Robinson J. Sentinel surveillance for self-harm: Existing challenges and opportunities for the future. *Crisis.* 2019;40:1-6
[35] *Practice Manual;* 2016. Geneva: World Health Organization p.2

- **Cost and funding:** Training personnel, collecting data from multiple sources, emphasis on quality and timeliness etc. can lead to large costs and there is a need for obtaining ongoing funding.
- **Data storage, data protection, and ethics:** For regional surveillance there needs to be appropriate steps taken to ensure data protection both within individual countries and across the sentinel surveillance system. Data protection practices need to align with relevant national privacy regulations and legislation. The collection and analysis of surveillance data must be done so in an ethical manner often with formal approvals required (e.g., to access hospital records) which can be difficult to obtain due to the sensitive nature of the data and patient confidentiality. Finally, data storage and retention are important issues that need to be considered thoroughly before establishing the surveillance system – such issues include where to store the data (e.g., cloud-based storage or physical servers), the security of such data, and capabilities of storage systems to back up and retain data safely for many years.
- **Sustainability:** Given the costs associated with an ongoing, timely, and high-quality surveillance system, the issue of sustainability over time is important. Obtaining or maintaining long term funding will be important. This will require the ongoing *monitoring* and refinement of the system quality and standard operating procedures, as well as the routine *evaluation* of surveillance data to provide timely evidence of key risk groups and priority information for governments, policy makers, and funding bodies (e.g., annual reports, peer-review publications). Ongoing monitoring and evaluation of the surveillance system is crucial, however, does consume funding, time, and resources.

Facilitators and mitigating factors

Across the WPR significant steps have been taken to raise awareness throughout the region on the importance of suicide prevention as a national priority, and the centrality of high-quality surveillance as a mechanism for achieving this and enhancing activities in the future. Changing attitudes over time and the hard work of suicide prevention experts across academia, government and the community are an important facilitator that cannot be understated. The introduction of this network of regional experts, from which the WPR4S framework has evolved, can foster real opportunity for collaboration and shared learning. Such activities may go toward mitigating the above issues of stigma (by improving attitudes toward suicide prevention over time), cost and funding (by greater awareness and priority within governments and funding bodies), and sustainability (by ongoing collaboration, monitoring, evaluation, and advocacy).

Conclusion

This WPR4S Framework is a preliminary first step in developing a regional sentinel surveillance system for suicide and self-harm across the Western Pacific. This framework was initially developed by the Australian Institute for Suicide Research and Prevention (WHO Collaborating Centre) Griffith University in close collaboration with experts from WHO WPRO and headquarters. A regional network of local suicide prevention experts from Australia, China, Hong Kong SAR, Fiji, Japan, Mongolia, Philippines, Republic of Korea, and Tonga was established. Experts will be further consulted on the feasibility and appropriateness of proposed indicators included in the framework. Ongoing collaboration across the network, with eventual expansion to include more countries across the WPR, will enhance the framework, surveillance of self-harm, and further suicide prevention activities across the region.

Part C - Appendices

Appendix A – Approaches to suicide health information systems across the Western Pacific Region: A rapid mapping exercise

1. Background

Around the world, more than 800,000 people die by suicide each year,[36] with approximately 25% of these occurring in the Western Pacific Region (WPR).[37] In addition, for each suicide there are more than 20 times as many suicide attempts[1] and even more within families, communities, and networks, that become bereaved or are otherwise impacted.[38]

Suicidal behaviors are preventable. However, as highlighted by the World Health Organization (WHO), effective suicide prevention relies upon establishing and maintaining comprehensive, reliable, and timely **suicide and self-harm surveillance systems**.[1] Scaling up and developing new systems of surveillance for suicide, suicide attempts, and self-harm will strengthen suicide prevention strategies. More specifically, surveillance enables the planning of public health actions by identifying risk groups and geographical areas to be targeted, and helps to measure the effect of suicide prevention strategies and set new targets. This has the potential to contribute to saving thousands of lives in the WPR.

1.1 Features of a surveillance system

A public health surveillance system is the routine and systematic collection, consolidation, interpretation, and dissemination of health-related data, including incidence rates of disease or injury, risk and environmental factors, and health behaviors etc.[39,40] Surveillance systems rely on identification and confirmation of a case occurrence, and data can be managed at one or more of three levels before dissemination: primary (e.g., local health department), secondary (e.g., state health department), and tertiary (e.g., agency).[41] There are many different types of surveillance systems (e.g., active, passive, integrated) and strategies (e.g., sentinel, periodic surveys), with varying methods and trade-offs.[5] Regardless of type, the overarching goal of a surveillance system is to provide timely, accurate information that can be used to inform public health policy and guide evidence-based decisions and interventions.[5] In establishing and maintaining a surveillance system, there needs to be clear goals and case definitions, staff need to be hired or trained, and ethical permissions and practical resources need to be obtained before the system can be implemented, and there needs to be routine evaluation of the system for continual enhancement that aligns with changing goals over time.[5] There

[36] WHO. *Preventing suicide: A global imperative.* WHO; 2014.
[37] WHO. Suicide in the Western Pacific. https://www.who.int/westernpacific/health-topics/suicide
[38] Cerel J et al. How many people are exposed to suicide? Not six. *Suicide Life Threat Behav.* 2019;49:529-534
[39] Thacker SB, Berkelman RL. Public Health Surveillance in the United States. *Epidemiol Rev.* 1988;10:164-190
[40] Nsubuga P et al. Chapter 53 Public Health Surveillance: A tool for targeting and monitoring interventions. In Jamison DT et al (Eds). Disease Control Priorities in Developing Countries 2nd Edition. 2006. New York: Oxford University Press
[41] Centers for Disease Control and Prevention. Updated Guidelines for evaluation public health surveillance systems: Recommendations from the guidelines working group. *MMWR.* 2001;13:1-45

are several key criteria for determining the quality of a surveillance system: simplicity, flexibility, acceptability, sensitivity, specificity, representativeness and timeliness.[42,43,44]

For suicide and self-harm specifically, surveillance is the cornerstone of suicide prevention.[45] While vital death registration systems usually include suicides, the quality of these systems remain poor in many low- and middle-income countries and oftentimes do not provide real-time or even timely data. Furthermore, there is a distinct lack of reliable high quality suicide attempt and self-harm surveillance systems globally.[46] The WHO provide guidance and practical advice on establishing suicide and self-harm surveillance systems in their *Practice manual for establishing and maintaining surveillance systems for suicide attempts and self-harm*.[47] This manual acknowledges the importance of feasibility requirements reflective of the national/regional context(s) and provides five key steps. These include:

- Step 1: Inform and engage government and local stakeholders and establish an advisory committee (where practical).
- Step 2: Set up the surveillance system by developing a feasible budget, a stepped pilot and implementation strategy, standard operating procedures, and identify/recruit all key personnel.
- Step 3: Clarify and obtain ethical approvals for the collection and use of health data.
- Step 4: Implementation (including staff training, coding and data entry, data cleaning etc.).
- Step 5: Review and Evaluate by way of annual reporting and implementation refinement.

There are many possible sources/methods of collecting suicide and self-harm data that can inform a surveillance system, many of which may already be routinely collected and may lend themselves to real-time surveillance (see Figure 1). Collecting data from each level increases the comprehensiveness of the suicide and self-harm surveillance system(s) for each country and/or region. Having a high quality (i.e., timely, sensitive, etc.) surveillance system will facilitate prevention efforts through the allocation of funding/resources, evaluating interventions, identifying risk factors, targeting at-risk groups etc.[11] Accurate, high-quality surveillance will also facilitate the calculation of suicide and/or self-harm incidence per 100,000 of population.[48]

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[42] Thacker SB, Berkelman RL. Public Health Surveillance in the United States. *Epidemiol Rev.* 1988;10:164-190
[43] Centers for Disease Control and Prevention. Updated Guidelines for evaluation public health surveillance systems: Recommendations from the guidelines working group. *MMWR.* 2001;13:1-45
[44] Declich S, Carter AO. Public health surveillance: historical origins, methods and evaluation. *Bulletin of the World Health Organization.* 1994; 72:285-304
[45] WHO. *Preventing suicide: A global imperative.* WHO; 2014.
[46] Witt K, Robinson J. Sentinel surveillance for self-harm. *Crisis.* 2019;40:1-6
[47] WHO. *Practice Manual for establishing and maintaining surveillance systems for suicide attempts and self-harm.* 2016.
[48] Värnik P & Arensman E. Measures in suicide research. In Kõlves K et al. (Eds) Advancing Suicide Research. 2021. Hogrefe: Gottingen, Boston

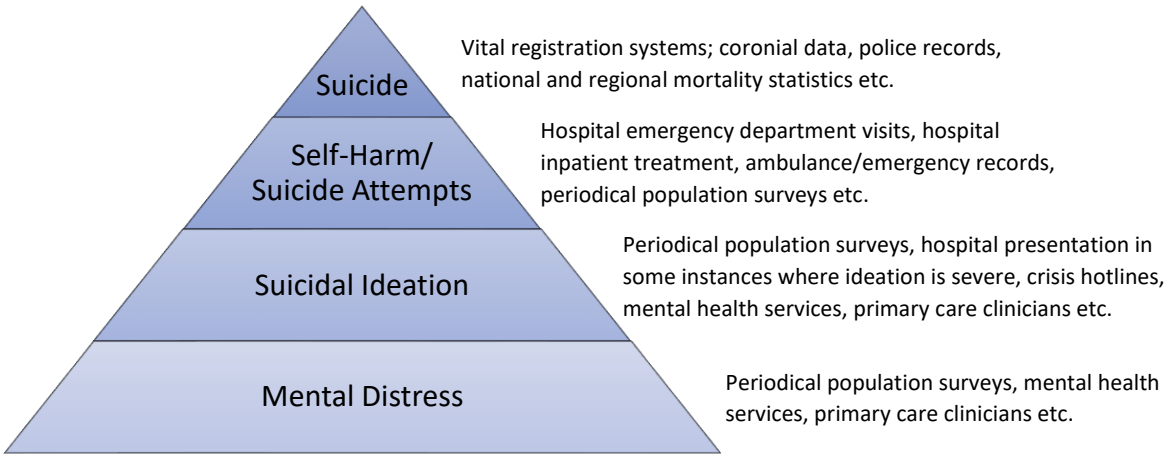

Figure 1. Example methods for the surveillance of suicidal behaviors

1.2 Complexities and Barriers

Unfortunately, there exist several challenges to establishing and maintaining a sentinel suicide and self-harm surveillance system in the WPR. First and foremost, surveillance relies upon accurate case identification and classification; however, no consistent and agreed upon definitions for the spectrum of suicidal thoughts and behaviors exist, and many individuals may not present to healthcare services and are thus missed.[49,50]

Regarding terminology, the way suicidal thoughts and behaviors are defined and perceived across the world continues to evolve and there is a need for internationally accepted nomenclature.[51] Unlike medical diseases with clear pathology-based tests and criteria, suicidal thoughts and behaviors rely on patient disclosure, healthcare observations, and differing conceptualizations of 'intent' which may be transient, ambivalent, and/or in some situations not present at all. In a recent study, De Leo and colleagues (pp. 8)[52] found that among international experts the preferred definition for suicide was "an act initiated and carried out by the individual to the end of that action" (intent may be ambiguous, unclear or not present) and a suicide attempt was "an act in which a person harms themselves with the intention to die and survives". Whereas self-harm more broadly was "a non-fatal act in which a person harms themselves intentionally, with varying motives including the wish to die." In their practice manual, the WHO provide a graphical overview of self-harm related terminology, and given the difficulties in establishing intent, a series of case examples are provided with the surveillance of

[49] WHO. *Practice Manual for establishing and maintaining surveillance systems for suicide attempts and self-harm.* 2016.
[50] Witt K, Robinson J. Sentinel surveillance for self-harm. *Crisis.* 2019;40:1-6
[51] Goodfellow B. Definitions in suicide research pp:17-27. In Kõlves K et al. (Eds) Advancing Suicide Research. 2021. Hogrefe: Gottingen, Boston
[52] De Leo D, et al. International study of definitions of English-language terms for suicidal behaviors: a survey exploring preferred terminology. *BMJ Open*. 2021;11:e043409

all self-harm instances recommended (see Figure 2).[53] However, for the WPR it is important that definitions in English are acceptable and have consistent meaning across languages.[54] It is also important to note, that certain terms may have undue implications and further stigmatize individuals experiencing suicidal thoughts or behaviors and are thus unacceptable (e.g., "committed" suicide). Stigma itself is an important barrier to accurate case identification given reluctance for individuals to present to healthcare services or disclose behaviors, issues with (past) criminalization, inaccurate coding and reporting etc.

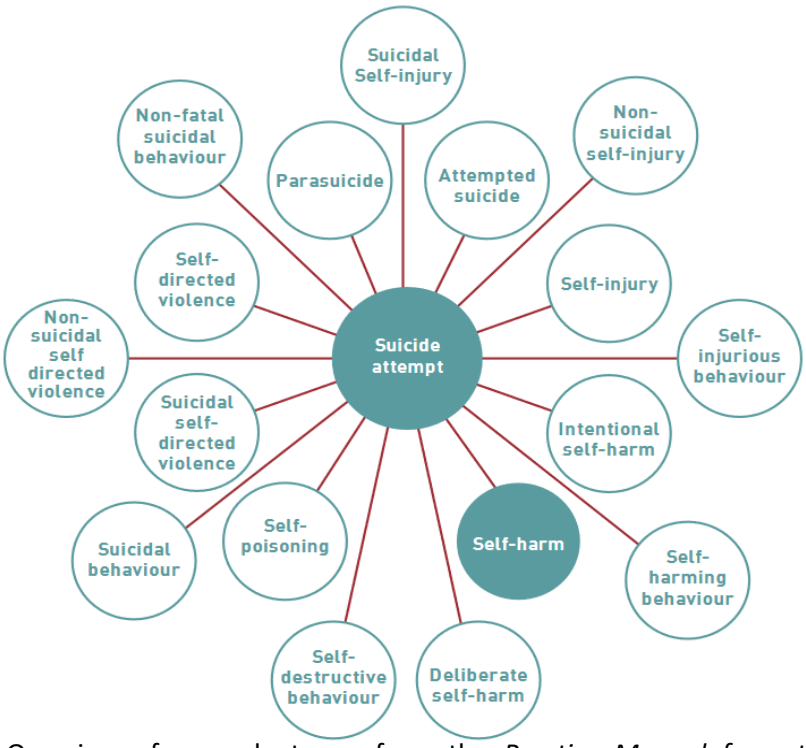

Figure 2. Overview of example terms from the *Practice Manual for establishing and maintaining surveillance systems for suicide attempts and self-harm,* highlighted sections recommended for surveillance (WHO, 2016; p.58)[18]

Another important barrier to establishing and maintaining a sentinel suicide and self-harm surveillance system in the WPR is cost and funding.[55] Given the multiple possible sources of data (Figure 1), and the importance of data accuracy and timeliness, the cost of implementing a sentinel surveillance system can be large and needs to be considered.

2. Rationale

[53] WHO. *Practice Manual for establishing and maintaining surveillance systems for suicide attempts and self-harm;* 2016.
[54] Goodfellow B. Definitions in suicide research pp:17-27. In Kõlves K et al. (Eds) Advancing Suicide Research. 2021. Hogrefe: Gottingen, Boston
[55] Witt K, Robinson J. Sentinel surveillance for self-harm. *Crisis.* 2019;40:1-6

Preventing suicide and self-harm is a key priority in the WPR. Given the importance of comprehensive, timely and accurate suicide and self-harm surveillance systems in suicide prevention,[56] this Technical Brief sought to map existing health information systems, such as national and/or subnational registries and surveys suitable for suicide and self-harm surveillance across selected countries in the WPR. To achieve this aim, a mapping review of the literature was conducted to map and categorize the topic to identify gaps and opportunities for future work.[57]

3. Methods

3.1 Inclusion criteria

The current review aimed to target recent English language papers published from 2015 onwards. To satisfy the need for rapid turnaround of search results, searches were limited to one database. Given the diversity of the WPR, it was also decided to limit the search to certain countries within the region as representative examples from Asia, Oceania, and the Pacific Islands. These countries included Australia, China, Fiji, Japan, Mongolia, Philippines, Republic of Korea, and Tonga. These countries are a mix of high and low/middle income countries, and large and small sizes in both geography and population. While mental distress/health was not a focus of this review, it is noted where applicable. Papers were excluded if they were a systematic review or meta-analysis or did not include suicide, suicidal or self-harm in the title.

3.2 Search strategy

A search of PubMED was conducted in the week beginning 8th March, 2021. Database specific Boolean operators (AND, OR, NOT) and truncation symbols (* and “”) were used. Search terms are presented in Box 1.

Box 1. Search terms used in this review.

Search Terms (Title/Abstract)

1. Suicid* OR “suicide attempt” OR “self-harm” OR “non-fatal suicide*”

AND

2. Surveillance OR “monitoring system” OR registr* OR prevalence OR mortality OR coronial OR “real time” OR hospital

AND

3. “Western Pacific” OR Fiji OR Korea OR Tonga OR Japan OR China OR Philippines OR Australia OR Mongolia

3.3 Data Extraction and Synthesis

Descriptive data was exported from PubMED into a Microsoft Excel file to record author(s), title, year of publication, journal/volume/issue, and abstract. Given the need for a rapid turnaround of search

[56] WHO. *Preventing suicide: A global imperative.* WHO; 2014.
[57] Grant MJ et al. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info Libr J*. 2009; 26:91-108

results it was not possible to account for each individual health system or cross-sectional survey identified within the region (e.g., small local health districts, standalone regional surveys etc.). Therefore, following title/abstract screening, it was decided to spotlight the major surveillance systems mentioned across studies or surveys that reoccur periodically. Results are separated by included country. Specific findings are presented in a tabular form without formal quality assessment, as consistent with mapping review methodology.[58] Given the expertise and local knowledge of the review authors, an in-depth case example of suicide and self-harm surveillance systems in Australia was presented first, followed by each of the selected countries.

4. Results

A total of 787 individual studies were identified. Following the exclusion of titles that did not refer to suicide or self-harm, there was a final sample of 463 studies. These were separated by country, with a further category developed for those studies that referred to multiple countries. The vast majority of studies were retrospective analyses of health system data or cross-sectional survey-based studies. There were few instances of prospective or longitudinal designs.

4.1 Case Study: Australia

Table 1 provides information about data sets and surveillance systems that include information about suicidal behavior and ideation in Australia. In November 2020, Australia launched the National Suicide and Self-harm Monitoring System[59] which aims to provide a better understanding of suicide and self-harm in Australia and to inform responses by providing information about emerging trends, emerging areas of concern using a variety of different data sources and by building new surveillance systems.

Suicide

Australia has an advanced vital mortality statistics system which includes reliable information about suicides. State based information is provided to the Australian Bureau of Statistics (ABS)[60] by the Registry of Births, Deaths and Marriages and via the National Coronial Information System (NCIS). Appendix A.1 includes a flowchart of the Australian cause of death statistics system. In addition to the ABS, death records are further maintained by the Australian Institute for Health and Welfare (AIHW). The ABS is using ICD-10 to code mortality and provides preliminary mortality statistics nine months after the end of the calendar year (information is further updated within three years). In addition, there are State based suicide registers (Queensland, Victoria, Tasmania, New South Wales, and

[58] Grant MJ et al. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info Libr J.* 2009; 26:91-108
[59] https://www.aihw.gov.au/suicide-self-harm-monitoring
[60] https://www.abs.gov.au/statistics/health/causes-death/causes-death-australia

Western Australia), which provide more detailed information utilizing police and coronial information and include real-time surveillance.

Suicide attempts, self-harm, and suicidal ideation

Australia does have a few information sources about suicide attempts, self-harm, and suicidal ideation (Table 1). Information about the hospitalized intentional self-harm on episode level is included in the National Hospital Morbidity Database (NHMD).[61] The new National Ambulance Surveillance System (NASS) also provides information about self-harm related ambulance attendances, which includes self-injury (without suicidal intent), suicidal ideation, suicide attempt, and suicide (all with suicidal intent).[62] Currently efforts are being made to set up the first state based monitoring systems of intentional self-harm presentations to the emergency departments of eight hospitals in Victoria.[63] There have also been some surveys conducted to measure suicidality in adult[64] and adolescent populations,[65] however, they have not been repeated and therefore do not enable the measurement of changes over time.

[61] https://www.aihw.gov.au/about-our-data/our-data-collections/national-hospitals-data-collection
[62] Lubman DI, et al. National Ambulance Surveillance System: A novel method using coded Australian ambulance clinical records to monitor self-harm and mental health-related morbidity. *PloS One.* 2020;15:e0236344
[63] Robinson J, et al. Development of a self-harm monitoring system for Victoria. *IJERPH*. 2020;17:9385
[64] Johnston AK, et al. Suicidal thoughts and behaviours among Australian adults: findings from the 2007 National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry.* 2009;43:635-643
[65] https://youngmindsmatter.telethonkids.org.au/

Table 1. Surveillance systems including suicidal behavior from Australia

Surveillance System	Description	Suicide related measures	Other relevant information	Example reference(s)
Suicide				
The Australian Bureau of Statistics - Causes of Death	All death records in Australia are managed by the Australian Bureau of Statistics (ABS)[66] with the information being provided through the Registry of Births, Deaths and Marriages in each state or territory and via the National Coronial Information System.	ICD-10 Codes X60-84, Y87.0	ABS releases Causes of Death mortality statistics 9 months after the end of the calendar year (numbers will go through revision rounds in following years).	Law et al. 2016[67]
The National Coronial Information System	Online repository of coronial data from Australia and New Zealand, including all deaths registered by coroners since 2000.[68]	International Classification of External Causes of Injury (ICECI) – Self-inflicted injury	Coronial processes may be time consuming, and the number of open cases is high in recent years.	Milner et al. 2016[69]
The National Mortality Database (NMD) & National Death Index (DHI)	The cause of death data is compiled and coded by the ABS and further maintained at the AIHW in the NMD.[70] The DHI is used in data linkage for epidemiological studies.[71]	ICD-10 Codes X60-84, Y87.0	NA.	Karim et al. 2019[72]
Queensland Suicide Register (QSR)	Queensland suicide surveillance system including records on all suspected suicides since 1990. Since 2011, QSR has a real-time data component - the interim QSR (iQSR) including information from police reports of suspected suicides to coroners. QSR is managed by the Australian Institute for Suicide Research and Prevention.[73]	ICD-9 E950-E959	NA.	Kolves et al. 2020[74]
Victorian Suicide Register, Tasmanian Suicide Register, NSW Suicide Monitoring System	State based suicide registers including real-time data of suspected suicides based on police forms (VSR – 2010, TSR – 2017, NSW SMS – 2019). All are managed by their respective Coroners Offices.	ICD-10 Codes X60-84, Y87.0	NA.	Sutherland et al. 2018[75]

Table 1. Surveillance systems including suicidal behavior from Australia *(continued)*

Suicide Attempts/Self-Harm				

[66] https://www.abs.gov.au/statistics/health/causes-death/causes-death-australia/latest-release
[67] Law CK, et al. Influences of population-level factors on suicides in older adults: a national ecological study from Australia. *Int J Geriatr Psychiatry.* 2016;31:384-391
[68] https://www.ncis.org.au/
[69] Milner A, et al. Suicide by health professionals: a retrospective mortality study in Australia, 2001–2012. *MJA* 2016;205:260-265
[70] https://www.aihw.gov.au/about-our-data/our-data-collections/national-mortality-database
[71] https://www.aihw.gov.au/about-our-data/our-data-collections/national-death-index
[72] Karim RS, et al. Mortality in hospital patients with and without mental disorders: a data-linkage cohort study. *J Psychiatr Res*. 2019;111:104-109
[73] Leske S, et al. Suicide in Queensland: Annual Report 2019. 2019, AISRAP
[74] Kolves K, et al. A drink before suicide: analysis of the Queensland Suicide Register in Australia. *Epidemiol Psychiatr Sci*. 2020:29
[75] Sutherland G, et al. Implementation and evaluation of the Victorian Suicide Register. *Aust N Z J Public Health.* 2018;42:296-302

The National Hospital Morbidity Database (NHMD)	A compilation of episode-level records from admitted patient morbidity data collection (including intentional self-harm) systems in Australian hospitals.[76] Managed by the Australian Institute of Health & Welfare (since 2008).	ICD-10 Codes X60-84	The data quality may vary between states and territories.	AIHW, 2016[77]
The National Ambulance Surveillance System (NASS)	A public health surveillance and monitoring system of ambulance attendance including timely and comprehensive data on intentional self-harm. Information is sourced from paramedic electronic patient care records provided by Australian state and territory-based ambulance services. Managed by Turning Point in partnership with Monash University.[78]	Self-harm related ambulance attendances are coded as: (a) self-injury (without suicidal intent); (b) suicidal ideation; (c) suicide attempt; (d) suicide (all with suicidal intent).[43]	NASS covers more than 90% of the Australian population across seven of the eight Australian states and territories (excludes South Australia).[43]	Witt et al. 2019[79]
The Victorian Self-Harm Monitoring System	A new surveillance system including data on all self-harm presentations from eight hospital emergency departments in Victoria utilizing machine learning.[80]	A natural language processing (NLP) classifier will be developed to identify cases of self-harm from free-text triage case notes (will be further coded by the ICD-10).	In the development phase - a natural language processing classifier using machine learning to identify episodes of self-harm is being developed.	NA.
The 2007 National Survey of Mental Health and Wellbeing	A nationally representative household survey of 8,841 individuals aged 16-85years.[46]	The survey used the World Mental Health Survey Initiative version of the WHO Composite International Diagnostic Interview including suicidality (lifetime and past 12 months suicidal ideation, suicide plans and attempts).[81]	Has not been repeated since 2007, mental and behavioral conditions were included in the 2017 National Health Survey.[46]	Johnston et al. 2009[82]
The Australian Child and Adolescent Survey of Mental Health and Wellbeing 2013–14	A survey of the mental health and wellbeing of Australian children and adolescents involving 6,310 families with children and adolescents aged 4-17.[83]	Participants aged 12 years and over were asked about serious thoughts about taking their own life, planning or attempted suicide in the past 12 months.	NA.	Kyron et al. 2020[84]

[76] https://www.aihw.gov.au/about-our-data/our-data-collections/national-hospitals-data-collection
[77] AIHW. Healthy Communities: Hospitalisations for mental health conditions and intentional self-harm in 2013–14. Cat. no. HSE 177. 2016, Canberra
[78] Lubman DI, et al. National Ambulance Surveillance System: A novel method using coded Australian ambulance clinical records to monitor self-harm and mental health-related morbidity. *PloS One.* 2020;15:e0236344
[79] Witt K, et al. Trajectories in suicide attempt method lethality over a five-year period: Associations with suicide attempt repetition, all-cause, and suicide mortality. *Plos One*. 2021;16:e0245780
[80] Robinson J, et al. Development of a self-harm monitoring system for Victoria. *IJERPH*. 2020;17:9385
[81] https://www.abs.gov.au/statistics/health/mental-health/national-survey-mental-health-and-wellbeing-summary-results
[82] Johnston AK, et al. Suicidal thoughts and behaviours among Australian adults: findings from the 2007 National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry.* 2009;43:635-643
[83] https://youngmindsmatter.telethonkids.org.au/
[84] Kyron M, et al. Factors differentiating adolescents who consider suicide and those who attempt: Results from a National Survey of Australian Adolescents. *Aust J Psychol.* 2020;72:145-155

4.2 China

Most studies identified in this review were from, or about, China. This was highlighted by a proliferation of cross-sectional survey studies. A few of the surveys identified were nationwide and were used to measure self-harm/non-suicidal self-injury (e.g., [85]) and suicidal ideation (e.g.,[86]). However, most of these surveys were local or regional, or focused on university samples and were also largely concerned with reporting non-fatal behaviors (e.g.,[87,88]). Table 2 presents information on mortality information systems identified in the current review.

Table 2. Surveillance systems including suicidal behavior from China

Surveillance System	Description	Suicide related measures	Other relevant information	Example reference(s)
Suicide				
Chinese Disease Surveillance Points System	A population-based mortality registration system covering 161 counties or districts (i.e., Points), covering approximately 73 million people and uses a stratified sampling strategy.[89]	ICD-10 Codes X60-X84, Y87.0	Cause of death established by trained coders in hospitals and Center for Disease Control and Prevention (CDC) through data exchange with surveys, police, civil affairs, and maternal and children departments.[90]	Liu et al. 2014.[55]
Vital Registration System	Similar to above system and shares some geographical overlap – covers 319 counties or districts mostly in the east.[54]	ICD-10 Codes X60-X84, Y87.0	May be biased toward more prosperous areas of China with access to better reporting and was not based on random sampling.[91]	Sha et al. 2018. [56]
Integrated National Mortality Surveillance System	Integration of above systems for more national and balanced spread from 2013 onwards. [54]	ICD-10 Codes X60-X84, Y87.0	Increases the sampled population to approximately 24%.[54]	Zhong et al. 2016[92]
Chronic Disease Surveillance Information Management System	Mortality data covering the Zhejiang Province of China (comprised of 90 districts, approx. 48 million people), published by the Zhejiang CDC.[93]	ICD-10 Codes X60-X84	Cause of death established by doctors in hospital instances, and a community doctor in instances outside a hospital.[58]	Fei et al. 2019[94]

[85] Tang J, et al. Prevalence of and risk factors for non-suicidal self-injury in rural China: Results from a nationwide survey in China. *J Affect Disord*. 2018;226:188-195
[86] Chen R, et al. Suicidal ideation and attempted suicide amongst Chinese transgender persons: National population study. *J Affect Disord*. 2019;245:1126-1134
[87] Li GZ, et al. Work stress, family stress, and suicide ideation: A cross-sectional survey among working women in Shenzhen, China. *J Affect Disord*, 2020
[88] Liu Y, et al. Association between parenting and non-suicidal self-injury among adolescents in Yunnan, China: a cross sectional survey. *PeerJ*, 2020
[89] Liu S, et al. An integrated national mortality surveillance system for death registration and mortality surveillance, China. *Bull World Health Organ*. 2016;94:46-57.
[90] Liu S, et al. Spatiotemporal variation and social determinants of suicide in China, 2006-2012: findings from a nationally representative surveillance system. *Psychol Med*. 2014;45:3259-3268
[91] Sha F, et al. Suicide rates in China, 2004-2014: Comparing data from two sample-based mortality surveillance systems. *BMC Public Health.* 2018;18:1-9
[92] Zhong BL, et al. Rates and characteristics of elderly suicide in China, 2013-14. *J Affect Disord.* 2016;206:273-279
[93] Fei FR, et al. Impact of injury-related mortality on life expectancy in Zhejiang, China based on death and population surveillance data. *BMC Public Health*. 2017;18:1-7
[94] Fei FR, et al. Suicide rates in Zhejiang Province, China, from 2006 to 2016: a population-based study. *J Epidemiol Community Health*. 2019;73:745-749

4.3 Japan

Table 3 provides information about data sets and surveillance systems that include information about suicidal behavior and ideation in Japan.

Table 3. Surveillance systems including suicidal behavior from Japan

Surveillance System	Description	Suicide related measures	Other relevant information	Example reference(s)
Suicide				
Vital statistics registration system	Data provided by the Municipalities through to the Ministry of Health, Labor and Welfare, this system provides complete records of all the deaths that have occurred in Japan.[95]	ICD-9 E950-E959, ICD-10 X60-84, Y87.0	Data available to researchers based in Japan.[60]	Dhungel, Sugai & Gilmour, 2019[60] Gilmour et al., 2019[96] Yoshioka et al., 2016[97]
Ministry of Health, Labour and Welfare Suicide Statistics	Data provided by the *national police agency* and downloadable from the Ministry of Health, Labour and Welfare website.[98]	Due to language issues, unclear for this review.	This surveillance system has been used to discuss suicide in relation to the COVID-19 pandemic.	Anzai et al. 2021[63]
Suicide Attempts/Self-Harm				
Japanese Diagnosis Procedure Combination Database	Discharge and administrative data covering 1200 acute care hospitals (approx. 90% of all inpatient places for critically ill people in Japan). From 2015-2017 it was mandatory to report all suicide attempts or self-harm, if this could not be determined staff assigned 'none'.[99]	ICD-10 Codes (unspecified; presumed 60-84, Y87.0)	Does not include patients who were admitted to psychiatric hospitals or who were not admitted as acute care.[64]	Ohbe et al., 2020[64] Shigemi et al., 2021[100] Shigemi et al., 2020[101]
Ambulance records, Osaka	Ambulance records from the Osaka Municipal Fire Department that provides information on demographics and reason for call-out.[102]	Staff recorded self-harm based on methods	In the instance of a further hospital admittance this was confirmed by treating physicians.[67]	Matsuyama, Kitamura, Kiyohara et al. 2016[67]
Suicidal Ideation/Mental Distress				
Longitudinal Health Checks following 'Great East Japan Earthquake'	A health check survey performed in the Higashi-Matsushima city and Miyagi Prefecture (most heavily effected regions) from 2012 (one year from disaster) to 2014.[103]	Mental distress was measured by the Kessler 6 Scale (with mild and serious cut-offs). Suicidal ideation in the last 30 days was measured 5-point Likert scale None of the time – All of the time.[68]	NA.	Morishima, Ando, Araki, et al. 2019.[68]

[95] Dhungel B, et al. Trends in Suicide Mortality by Method from 1979 to 2016 in Japan. *IJERPH*. 2019; 16:1-13
[96] Gilmour S, et al. Suicide mortality in foreign residents of Japan. *IJERPH*. 2019; 16:3013
[97] Yoshioka E, et al. Time trends in method-specific suicide rates in Japan 1990-2011. *Epidemiol Psychiatr Sci*. 2016;26:58
[98] Anzai T, et al. Excess mortality from suicide during the early COVID-19 pandemic period in Japan: A time-series modelling before the pandemic. *J Epidemiol*. 2021;31:152-156
[99] Ohbe H, et al. Clinical trajectories of Suicide attempts and self-harm in patients admitted to acute-care hospitals in Japan: A nationwide inpatient database study. *J Epidemiol*. 2020. JE20200018-1
[100] Shigemi D, et al. Suicide attempts during pregnancy and perinatal outcomes. *J Psychiatr Res*. 2021;133:101-105
[101] Shigemi D, et al. Suicide attempts among pregnant and postpartum women in Japan: a nationwide retrospective cohort study. *J Clin Psychiatry*. 2020; 81
[102] Matsuyama T, et al. Incidence and outcomes of emergency self-harm among adolescents: a descriptive epidemiological study in Osaka City, Japan. *BMJ Open*. 2016;6:e011419
[103] Morishima R, et al. The course of chronic and delayed onset of mental illness and the risk for suicidal ideation after the Great East Japan Earthquake of 2011. *Psych Res*. 2019;273:171-7

4.4 Republic of Korea

Table 4 provides information about data sets and surveillance systems that include information about suicidal behavior and ideation in the Republic of Korea.

Table 4. Surveillance systems including suicidal behavior from the Republic of Korea

Surveillance System	Description	Suicide related measures	Other relevant information	Example reference(s)
Suicide				
National death records	Does include all death records, managed by the Korean National Statistical Office.	ICD-10 Codes X60-84, Y87.0	NA.	Jung et al., 2021[104]
Suicide Attempts/Self-Harm				
National Health Insurance Service-National Sample Cohort	All Korean residents are covered by national health insurance and/or medical aid – the sample cohort is a representative sample of health care use from this exhaustive data base.[105]	Uses ICD-10 Codes X60-84, Y87.0 for self-harm, also codes mental illness (e.g., F32, F33 – for below)	Does not capture people who did not attend a health service.	Choi et al., 2019[106]
Annual Korean Youth Risk Behavior Surveillance Survey	Annual online survey conducted from 2005 onwards, uses a multi-phase stratified cluster random sampling strategy of middle and high-school aged youth.[107]	Single yes/no item assessing a suicide attempt in the previous 12 months.	NA.	Jo, Yim, Lee et al. 2015[72] Rim, Lee & Park, 2020[108]
Annual Korea National Health and Nutrition Examination Survey	Annual interview style survey conducted from 1998 onwards, uses a multi-stage clustered probability method for sampling.[109]	Single yes/no item assessing suicide attempt in the previous 12 months.	NA.	Jung et al. 2019.[74] Kim et al. 2016.[110]
Suicidal Ideation/Mental Distress				
Annual Korean Youth Risk Behavior Surveillance Survey	As above.	Single yes/no items to assess ideation in the previous 12 months, and to assess depressive symptoms over the previous 12 months.	NA.	Kim, Kim & Park, 2019[111] Lee & Shin, 2017[112]
Annual Korea National Health and Nutrition Examination Survey	As above.	Single yes/no item to assess suicidal plans, suicidal ideation, and depressive symptoms in the previous 12 months.	NA.	Jang, Jung, Wang et al. 2021.[113]

[104] Jung SJ, et al. Fluctuations in influenza-like illness epidemics and suicide mortality: A time series regression of 12-year mortality data in South Korea. *PLoS One*.
[105] Lee J, et al. Cohort Profile: The national health insurance service- National sample cohort (NHIS-NSC) South Korea. *Int J Epidemiol*. 2017;46:e15
[106] Choi JW, et al. Suicide risk after discharge from psychiatric care in South Korea. *J Affect Disord*. 2019;251:287-292
[107] Jo SJ, et al. Korean Youth Risk Behavior Surveillance Survey: Association between part-time employment and suicide attempts. *Asia Pac J Public Health*. 2015;27:323-334
[108] Rim SJ, Lee MG, Park S. Suicide attempts and Contributing factors among South and North Korean-Family Youth Using the Korean Youth Risk Behavior Web-based Survey. *J Korean Acad Child Adolesc Psychiatry*. 2020;31:33-40
[109] Jung SJ, Cho SMJ, Kim HC. Association of oral contraceptive use with suicidal behavior among representative Korean population: Results from Korea National Health and Nutrition Examination Survey (2007-2016). *J Affect Disord*. 2019; 243:8-15
[110] Kim SM, et al. Gender differences in relations of smoking status, depression and suicidality in Korea: Findings from the Korean National Health and Nutrition Examination Survey 2008-2012. *Psychiatry Investig*. 2016;13:239-246
[111] Kim EM, et al. How are depression and suicidal ideation associated with multiple health risk behaviors among adolescents? A secondary data analysis using the 2016 Korea Youth Risk Behavior Web-based Survey. *J Psychiatr Ment Health Nurs*. 2020;27:595-606
[112] Lee S, Shin A. Association of atopic dermatitis with depressive symptoms and suicidal behaviors among adolescents in Korea: the 2013 Korean Youth Risk Behavior Survey. *BMC Psychiatry*.2017;17:1-11
[113] Jang J, et al. Effects of health-related quality of life on Suicidal ideation and Depression among older Korean adults: A cross-sectional study. *Psychiatry Investigation.*2021;18:31-38

4.5 Fiji & Tonga

There was only one study identified that focused solely on Fiji and none on Tonga. However, both countries are reported on in studies that utilized global/multi-country data (section 4.8). The study in Fiji utilized a study specific injury surveillance system in all trauma admitting hospitals in Vitu Levu, Fiji, and while focused on traffic related injury the system does report fatal and non-fatal intentional injuries.[114] The WHO practice manual does report a national Public Health Information System (PHIS) for Fiji.[115]

4.6 Mongolia

There was only one study identified that focused solely on Mongolia. This study used suicide mortality data from Inner Mongolia (2008-2015) based upon the Death Registry System maintained by Chinese Ministry of Health and uses ICD-10 X60-84.[116]

4.7 Philippines

There was only one study identified that focused solely on Philippines. This study utilized a mixed-methods approach to determine suicidal ideation and attitudes towards suicide and suicide prevention in students/teachers in an alternative learning system.[117] For quantitative analyses the prevalence of suicidal ideation was measured using the Columbia Suicide Severity Rating Scale (English version). However, the WHO practice manual[80] does report a subnational health database 'Online Electronic Injury Surveillance System' (ONEISS) does exist for Philippines.

4.8 Global and Multi-Country Information

There are a few different WHO surveillance systems providing information about suicidal behavior and ideation (see Table 5). A number of countries provide mortality data to the WHO Mortality Database,[118] which is further linked with the Cause-specific mortality, 2000–2019 (based on the Global Health Estimates), including estimates of suicide mortality for all countries.[119] Estimates are based on deaths by cause, age and sex using preferably civil registration with complete coverage, but also household surveys, population census, sample or sentinel registration systems, special studies, and other surveillance systems. Data quality is considered high in Australia, Japan, Philippines and Republic of Korea, for other countries in this review – China, Fiji, Mongolia and Tonga – data quality is

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[114] Herman J, et al. Epidemiology of fatal and hospitalised injuries among youth in Fiji (TRIP 15). *J Paediatr Child Health.* 2016;52:1026-1031

[115] WHO *Practice Manual for establishing and maintaining surveillance systems for suicide attempts and self-harm;* 2016

[116] Qin P, et al. The waterfall pattern of suicide mortality in Inner Mongolia for 2008-2015. *J Affect Disord*. 2019;256:331-336

[117] Estrada CA, et al. Suicidal ideation, suicidal behaviors, and attitudes towards suicide of adolescents enrolled in the Alternative Learning system in Manila, Philippines – a mixed methods study. *Trop Med Health*. 2019;47

[118] https://www.who.int/data/data-collection-tools/who-mortality-database

[119] https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates

considered low or very low.[120] Figure 3 presents the estimates of age-standardized suicide rates in the selected countries in WPR.[121] Different WHO cross-sectional surveys across several countries include questions about suicidality and target different age groups (i.e., school students,[122] college students,[123] adults[124]). Unfortunately, their frequency seems to vary.

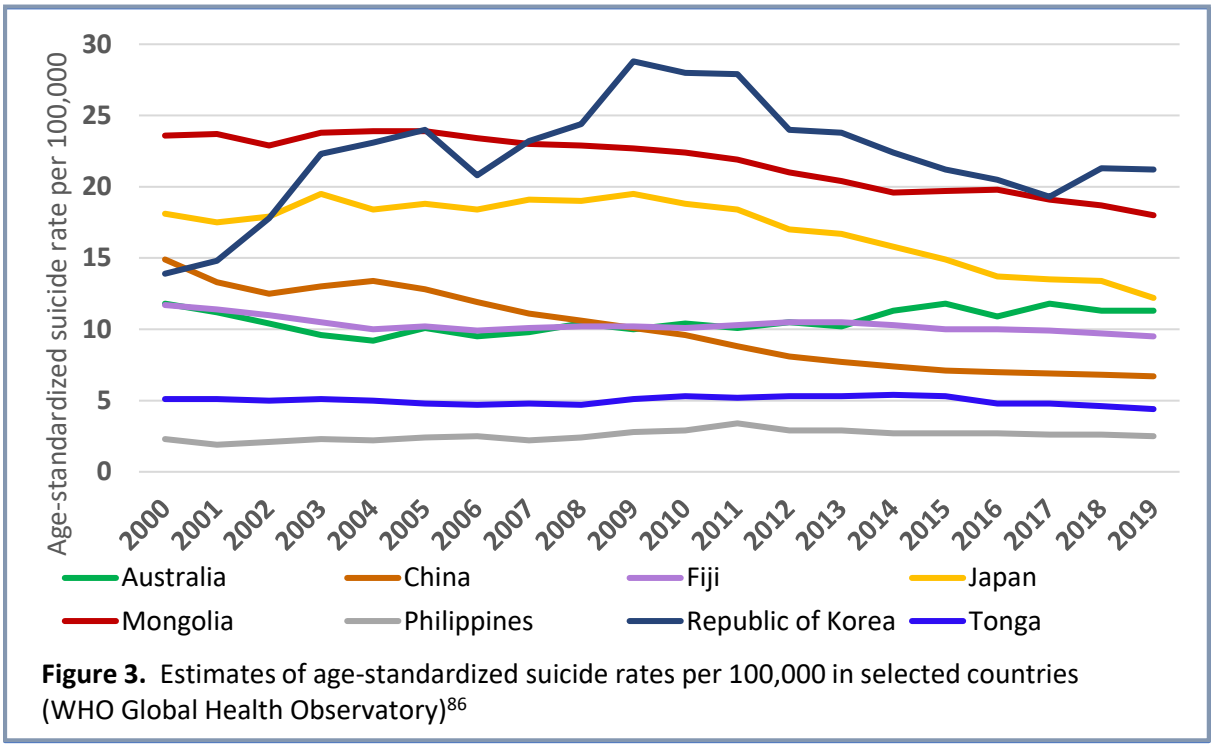


Figure 3. Estimates of age-standardized suicide rates per 100,000 in selected countries (WHO Global Health Observatory)[86]

[120] WHO. Global Health Estimates Technical Paper WHO/DDI/DNA/GHE/2020.2
[121] https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates
[122] https://www.who.int/ncds/surveillance/gshs/en/
[123] https://www.hcp.med.harvard.edu/wmh/college_student_survey.php
[124] https://www.hcp.med.harvard.edu/wmh/index.php

Table 5. Global and multi-country surveillance systems including suicidal behavior

Surveillance System	Description	Suicide related measures	Other relevant information	Example reference(s)
Suicide				
The WHO Global Health Observatory (GHO)	Cause-specific mortality, 2000–2019.[125] The estimates are derived from the WHO Global Health Estimates (GHE). Updates every 2-3 years.	Crude suicide rate, age-standardized suicide rate (per 100,000 population) by sex.	Estimates are based on data of deaths by cause, age and sex using preferably civil registration with complete coverage, but also household surveys, sample or sentinel registration systems, special studies etc.	Does include all countries.
The WHO Mortality Database (WHO-MD)	Registered deaths by age, sex, year, and cause under the World Health Data Platform[126,127] Links with the GHO (above). The WHO-MD is utilized for estimates.[128]	ICD-7, ICD-8, ICD-9 and ICD-10 codes for suicide (intentional self-harm)	The database is limited by incomplete coverage from some countries, there is considerable delay in reporting.[129] Does include data for Australia, Japan, Republic of Korea on ongoing basis.	Example study including Japan, Philippines, Republic of Korea and Australia – Alicandro et al. 2019[130]
The WHO Global Burden of Disease Study	The Global Burden of Disease Study is the largest global initiative to measure burden of disease, injury, and risk factors managed by the Institute for Health Metrics and Evaluation.[131]	Facilitates the measurement of disability-adjusted life year, years of life lost, and years lived with disability across diverse global samples for suicide, self-harm and risk factors associated with suicidality.	The study began in the 1990s and has been supported by the World Health Organization.	Example study including China – Pan et al. 2018[132]
Suicide Attempts/Self-Harm				
The WHO Global School-based Student Health Survey	A collaborative surveillance initiative measuring key health areas in young people through school based cross-sectional surveys,[133] using two-stage cluster sampling of youth in schools.[134]	Yes/no items to determine suicide attempts in the previous 12 months and how many times (also suicidal ideation, planning, and other mental health variables).	Reports on each of the focus countries in this review except Australia, Japan, Republic of South Korea. There may be some variation in years where suicidal behaviors are collected.	Example studies including: Fiji, Mongolia and Philippines – Kushal et al. 2021[99] China, Fiji, Mongolia, Philippines, Tonga – Tang et al. 2020[135]

[125] https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates
[126] https://www.who.int/data/data-collection-tools/who-mortality-database
[127] https://www.who.int/healthinfo/statistics/mort/en/
[128] https://cdn.who.int/media/docs/default-source/gho-documents/global-health-estimates/ghe2019_cod_methods.pdf?sfvrsn=37bcfacc_5
[129] https://www.who.int/healthinfo/statistics/mortcoverage/en/
[130] Alicandro G, et al. Worldwide trends in suicide mortality from 1990 to 2015 with a focus on the global recession time frame. *Int J Public Health*. 2019;64:785-795
[131] http://www.healthdata.org/gbd/about
[132] Pan J, et al. Sharply reduced but still heavy self-harm burdens in Hubei Province, China, 1990-2015. *IJERPH*. 2018;15:391
[133] https://www.who.int/ncds/surveillance/gshs/en/
[134] Kushal SA, et al. Parent-adolescent relationships and their associations with adolescent suicidal behaviours: Secondary analysis of data from 52 countries using the Global School-Based Health Survey. *EClinicalMedicine*. 2021
[135] Tang JJ, et al. Global risks of suicidal behaviours and being bulling and their association in adolescents: School-based health survey in 83 countries. *EClinicalMedicine*. 2020;19

Table 5. Global and multi-country surveillance systems including suicidal behavior *(continued)*

The WHO World Mental Health Survey Initiative	Standardized diagnostic surveys used to analyze the prevalence and correlates of mental illnesses across the world.[136]	The WHO Composite International Diagnostic Interview which uses ICD/DSM based definitions.[101]	There is variation in national representativeness (e.g., on municipalities in Japan).[101]	Example study including China and Japan – Blasco-Fontecilla et al. 2019.[137]
The WHO World Mental Health International College Student Initiative (WMH-ICS)	Embedded in the World Mental Health Survey Initiative (above).[138]	As above, as well as self-injurious thoughts and behaviors.[139]	Wave 1 was only in middle-high income countries, one university from Australia.[140]	Example study including Australia - Auerbach et al. 2018.[105]

[136] Kessler RC, et al. The WHO World Mental Health (WMH) Surveys. *Psychiatrie*. 2009;6:5-9
[137] Blasco-Fontecilla H, et al. A proposal for using the ratio of attempted to completed suicides across several countries worldwide. *Epidemiol Psychiatr Sci*. 2019;28:476-7
[138] Cuijpers P, et al. The World Health Organization World Mental Health International College Student initiative: An overview. *Psychiatr Res*.2019;28:e1761
[139] Nock MK, et al. The Self-injurious thoughts and behaviours interview: development, reliability, and validity of a new measure. *Psychol Asses*.2007;19:309-317
[140] Auerbach RP, et al. Mental disorder comorbidity and suicidal thoughts and behaviours in the World Health Organization Mental Health Surveys International College Student initiative. *Int J Methods Psychiatr Res*. 2018;28:e1752

5. Gaps and opportunities in the region

Several health information and surveillance systems were identified across the selected countries with majority existing in high-income countries. ***Suicide mortality*** statistics are routinely collected and reported to the WHO consistently also by high-income countries (Australia, Japan, Republic of Korea), the quality of mortality statistics is considered as low or very low in the other selected countries. There is substantial opportunity to work with countries who have low quality mortality statistics (i.e., issues with completeness), such as areas in the Pacific Islands or Mongolia. Nevertheless, the WHO does provide Cause-specific mortality, 2000–2019 (based on the Global Health Estimates), which does enable monitoring of suicide mortality for all countries. There were only a few instances of real-time surveillance throughout the region (mainly in Australia). Improved timeliness of health data indicates higher quality surveillance and will facilitate responsive suicide prevention activities.

Regarding the information of ***self-harm*** and ***suicide attempts***, there were only a few examples of national and subnational self-harm surveillance systems in selected high-income countries reported in the literature. Much of this information for the region appeared to come from cross-sectional surveys at both a subnational, national, and international level. However, it was not clear for all the countries how regularly these surveys (e.g., Global School-Based Student Health Survey) were conducted, with the Republic of Korea demonstrating the most consistent periodical population surveys. Comprehensive and reliable self-harm surveillance was, therefore, an important gap throughout the region (and indeed globally[141]). Establishing and maintaining a dedicated, high-quality sentinel self-harm surveillance system, based upon the recommendations from the WHO practice manual[142], would be an important opportunity for suicide prevention in the region. The WPR has already demonstrated capacity in establishing similar networks with the multicenter WHO/Suicide Trends in At-Risk Territories (START) Study.[143]

6. Limitations

Several important limitations must be acknowledged. First, the rapid mapping review methodology was selected as most suitable for the purpose of the technical brief, however, by restricting papers to English language, publication from 2015 onwards, and only using one database to search for literature, it is likely that some key studies and surveillance systems may have been missed. This is most evidenced by a lack of studies from Philippines, Fiji and so on. Furthermore, it is possible that some surveillance systems and strategies publish their findings in reports and grey literature and may not have been picked up in the current searches, and the intricacies of local healthcare systems and

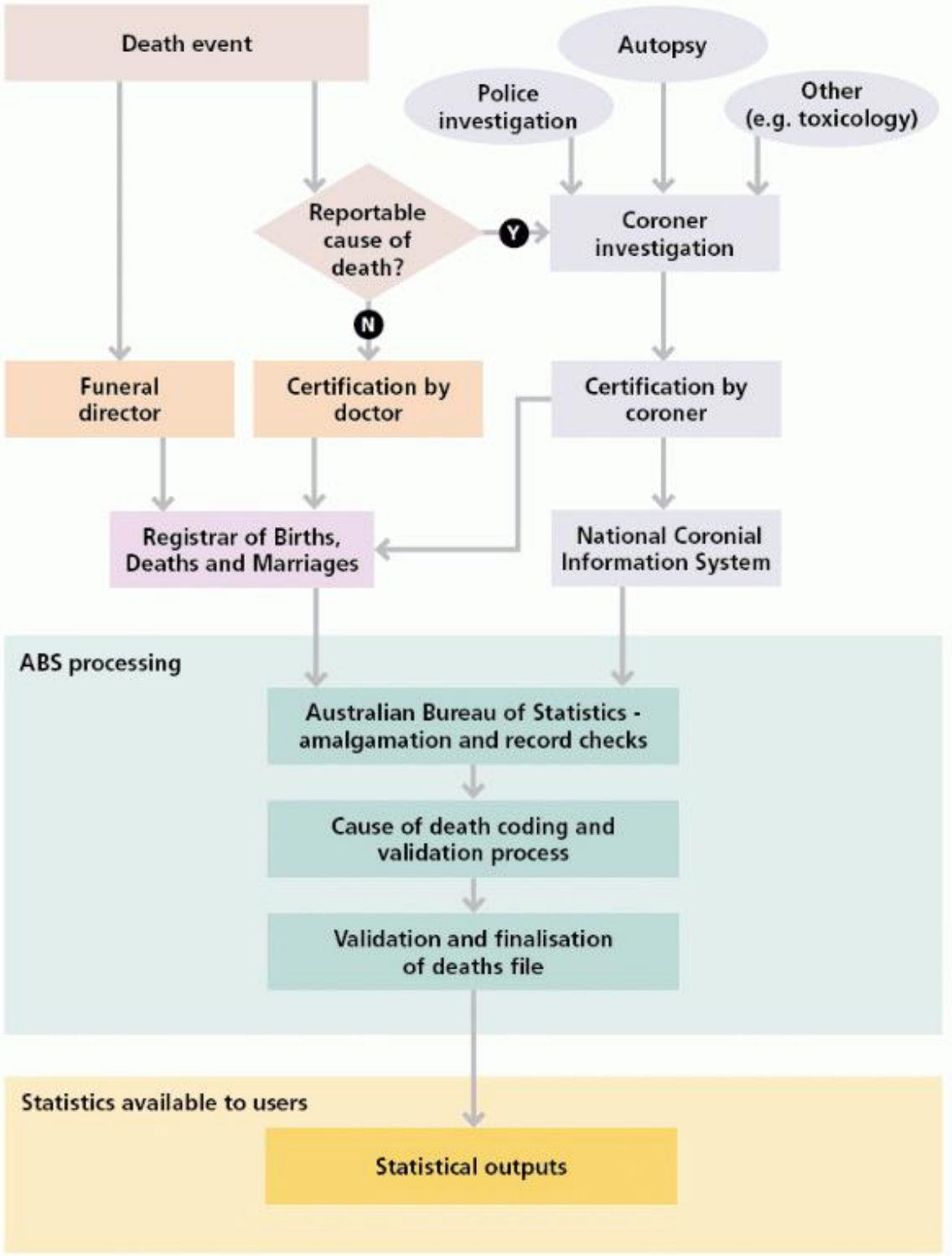
[141] Witt K, Robinson J. Sentinel surveillance for self-harm. *Crisis.* 2019;40:1-6.
[142] WHO. *Practice Manual for establishing and maintaining surveillance systems for suicide attempts and self-harm;* 2016
[143] De Leo D, et al. The WHO/START study: suicidal behaviors across different areas of the world. *Crisis*. 2013;34(3):156-

databases may necessitate further review. It is recommended that an expert survey with local focal points be conducted to ensure completeness of mapping. This will also facilitate the development of a sentinel surveillance system for the region by identifying data collection methods and storage, timeliness etc. that can be more readily aggregated to a minimal dataset for the region.

7. Conclusions

The current rapid mapping exercise of approaches to suicide health information systems across the Western Pacific Region identified several health information and surveillance systems across the selected countries, with the majority of high-quality information coming from high-income countries. There is a pressing need to improve mortality systems in low/middle income countries within the region. Furthermore, the surveillance of self-harm (including suicide attempts) could be improved throughout the entire region, and there is a significant opportunity to improve suicide prevention throughout the Western Pacific by setting up and maintaining a sentinel self-harm surveillance system.

Appendix A.1 Australian cause of death statistics system (ABS, 2020)[144]



[144] https://www.abs.gov.au/methodologies/causes-death-australia-methodology/2019

Appendix B – A rapid scoping review of risk and protective factors for suicidality in the Western Pacific Region

1. Background

Understanding the factors that predispose or protect against suicide is key to its prevention.[1] However, identifying risk and protective factors for suicidality relies upon high-quality surveillance systems, [1] which can often be constrained by issues with consistent terminology and definitions of suicidal behaviors, social stigma and case identification, and cost.[2] Nevertheless, research has accrued over the years and there are now well accepted biopsychosocial models and theories for why suicidal behaviors may occur. These models showcase the myriad of cumulative, interrelated, and co-occurring factors that influence suicidal behaviors and highlight the complexity of developing and evaluating interventions that address some or all these factors.[1] These factors can be conceived of as correlates (i.e., associated with suicidal behaviors and determined by cross-sectional designs) or risk/protective factors (i.e., precede suicidal behaviors and rely on longitudinal designs).[3]

1.1Models of suicide risk

The World Health Organization (WHO) provide an overview of common risk factors across multiple levels, including health systems and society, the community, interpersonal relationships, and individual level factors, and how these may inform universal, selective, and indicated suicide prevention interventions (see Figure 1).[1]

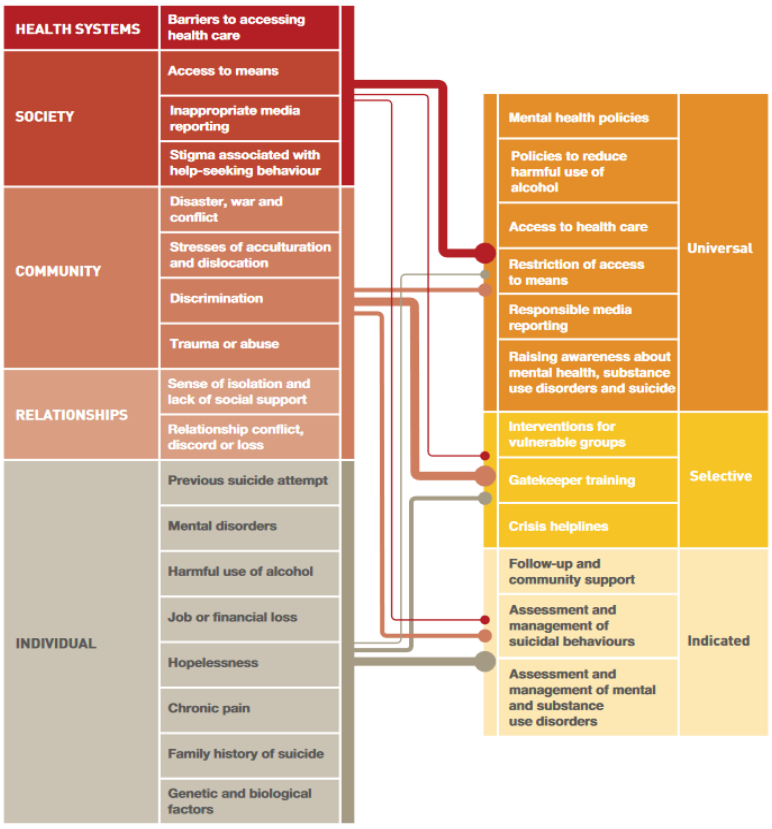


Figure 1. Key risk factors and interventions from Preventing suicide: A global imperative (WHO, 2014; p.31)

This has been further refined in Turecki and colleagues' biopsychosocial model of suicide risk (see Figure 2).[4] This model includes the **social context** (e.g., location, access to means, appropriate media coverage), **distal factors** which influence genetic expression (e.g., early life adversity), **developmental factors** which increase vulnerability to stress (e.g., cognitive deficits), **and proximal factors** which influence mood, hopelessness, and behaviors (e.g., mental illness, acute substance use).[4] Further psychosocial theories such as the Interpersonal Theory of Suicide, highlight the importance of having a sense of thwarted belongingness/loneliness, perceived burdensomeness, and an increased capability for suicide (e.g., prior self-harm or suicide attempts, access to means).[5] Each of these models are important in providing key targets for suicide prevention interventions; however, more research aimed at testing these models across diverse contexts is required.

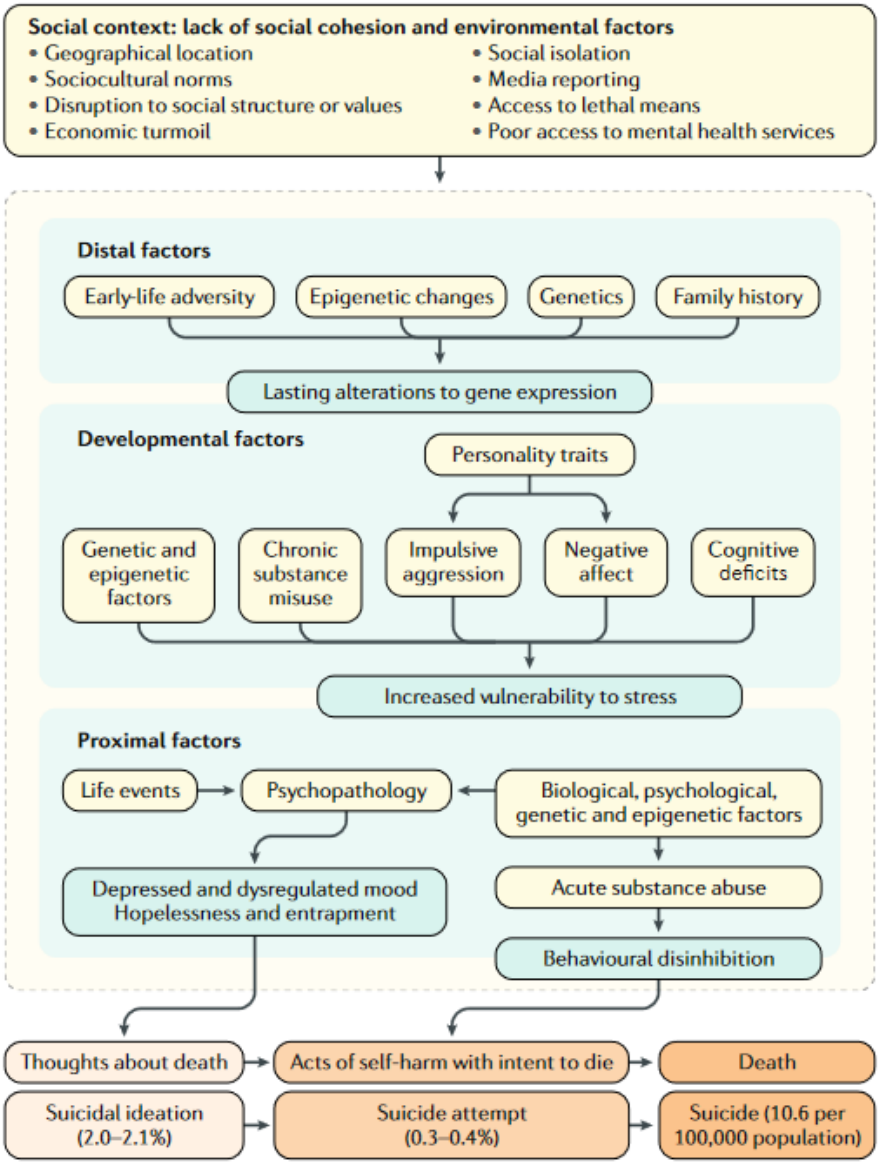


Figure 2. Biopsychosocial model of suicide risk from Turecki et al. 2019 (p.6)

1.2. Suicide in the Western Pacific

The Western Pacific Region (WPR) is a vast geographical region comprised of a diverse mixture of high and low/middle income countries of varying sizes, and socio-political and cultural backgrounds. While it is likely that the risk factors presented in the above models broadly apply to suicides and related behaviors in the region, there are several unique differences in the patterns and extent of suicidal behaviors throughout the region that make it important to have an accurate sense of risk and protective factors specific to the region. First, suicide rates have consistently been among the highest globally in the Republic of Korea,[6] but also in Kiribati and Federates States of Micronesia (see Table 1 for the WHO estimates). Second, while men are overrepresented in suicide deaths and women more frequently attempt suicide in Western countries such as the USA which is mirrored in the Western Pacific country of Australia, this pattern of gender difference is reversed in youth attempting suicide in the WPR overall,[7] or non-existent for suicide deaths in countries such as China[8] or the Pacific Islands.[9] Finally, countries such as China or the Republic of Korea have high rates of suicide in youth and elderly populations, whereas suicidal behaviors are more prevalent in youth across the Pacific Islands as opposed to middle-aged or older people in Japan who are particularly at-risk.[9]

Table 1. Age-standardized suicide rates in the Western Pacific Region compared to the UK and the USA (2015-2019)

	Both sexes	Male	Female
Australia	11.4	17.2	5.7
Brunei Darussalam	2.6	4.2	0.8
Cambodia	5.7	8.6	3.1
China	6.9	8.9	5.0
Fiji	9.8	13.6	6.1
Japan	13.5	19.4	7.7
Kiribati	31.1	54.5	9.6
Lao People's Democratic Republic	6.2	8.8	3.6
Malaysia	5.5	8.5	2.4
Micronesia (Federated States of)	28.7	44.0	12.9
Mongolia	19.1	32.7	6.1
New Zealand	11.1	16.6	5.9
Papua New Guinea	3.6	5.2	1.9
Philippines	2.6	4.1	1.3
Republic of Korea	20.7	29.9	12.3
Samoa	14.8	21.3	7.9
Singapore	7.9	10.4	5.3
Solomon Islands	17.7	32.9	2.5
Tonga	4.8	6.4	3.2
Vanuatu	21.1	33.4	8.9
Viet Nam	7.5	11.0	4.2
The UK	7.3	11.2	3.5
The USA	13.9	21.6	6.5

Data source: WHO Global Health Observatory

NB: Green highlight indicates countries focused on in this review, blue shading indicates low rates and red shading indicates higher rates.

2. Aims

To aid in prevention decision-making for the region, this Technical Brief aimed to provide an overview of risk and protective factors for suicide, suicide attempts, and self-harm in the WPR. A rapid scoping review of the literature was conducted to identify major contributing factors and spotlight key studies.

3. Methods

3.1. Inclusion criteria

The current review focused on English-language papers published from 2015-onwards. This was due to the language capabilities of the authors and the importance of up-to-date information relating to risk and protective factors in selected countries (many of which have undergone rapid development and social change in the last few years that may have implications for who is at risk of suicidal behaviors). For example, there has been a decrease in suicides in China in recent years following economic growth and changing social structures.[4] Given the need for a rapid turnaround of search results, one database was selected for searches. As with previous reviews in this series (see above), to provide a feasible yet representative overview of findings, a subset of countries within the WPR were selected as the focus for this review. These included Australia, China, Fiji, Japan, Mongolia, Philippines, Republic of Korea, and Tonga. These countries are a mixture of size (geography and population), as well as high and low/middle income. Papers were excluded if they did not contain original research (e.g., Letters) or referred exclusively to suicidal ideation.

3.2. Search strategy

A search of PubMED was conducted in the week beginning 5th April, 2021. Database specific Boolean operators (AND, OR, NOT) and truncation symbols (* and " ") were used. Search terms are provided in Box 1.

Box 1. Main search terms

Search Terms (Title/Abstract)

4. Suicide OR "suicide attempt" OR "self-harm"

AND

5. "risk factor*" OR "protective factor*"

AND

6. "Western Pacific" OR Fiji OR Korea OR Tonga OR Japan OR China OR Philippines OR

Additional search was conducted to identify further papers from Fiji, Tonga, Philippines and Mongolia.

Box 2. Additional search terms

Search Terms (Title/Abstract)

1. Suicide OR "suicide attempt" OR "self-harm"

AND

2. Fiji OR Tonga OR Philippines OR Mongolia

3.3. Data Extraction and Synthesis

Descriptive data was exported from PubMED into a Microsoft Excel file to record author(s), title, year of publication, journal/volume/issue, and abstract. Given the need for a rapid turnaround of results, there was no formal quality assessment conducted for each study. One important decision was made regarding the extraction of prevention activities and interventions, while important and arguably conceivable as a 'protective factor' these were deemed beyond the scope of the current rapid scoping review and were not extracted for synthesis. Instead, readers are directed to a recent chapter by Pirkis and colleagues[10] which provides an overview of suicide prevention activities in the WPR.

Specific findings are presented in a tabular form for suicide, followed by one for self-harm and/or suicide attempts. A distinction is made between 'risk groups' and 'risk' or 'protective' factors. This was done to account for some of the complexities in parsing out the cumulative and overlapping factors that contribute to suicidality. For the purpose of this review, 'risk groups' include whole groups of people based on modifiable and/or non-modifiable characteristics that are at risk of suicide (e.g., gender, age group, Indigenous peoples, occupational group), and may have themselves been further studied to determine specific risk and protective factors for suicidal behaviors within the group (e.g., access to means, social disadvantage etc.). Risk and protective factors refer to individual characteristics or traits that increased or decreased risk of, or were associated with, suicidal behaviors and may be relevant on their own, or across multiple risk groups. Where studies refer to factors for specific risks groups (e.g., elderly) this has been noted. We have reported findings consistent with the intention of the original study and its' research questions. For example, if something was noted as a risk factor, such as male gender, we did not then say that female gender was a protective factor (although it could be implied).

4.Results

A total of 191 studies were identified. One title was excluded as it was a response to a Letter to the Editor, one title was excluded as it was not about the Western Pacific region or selected countries, and a further six titles were excluded as they referred exclusively to suicidal ideation. A final sample of 183 studies was retained.

Findings for Australia, China, Japan, and Republic of Korea were briefly synthesized and presented in Tables 2 and 3. Overall, there was a focus on factors that may predispose one to suicidality as opposed to protective factors. The majority of studies were from China and the Republic of Korea, which largely utilized large population-based surveys or healthcare system usage. In particular, the scale and consistency of these surveys and coverage of healthcare insurance in Republic of Korea has facilitated the use of machine learning to develop preliminary predictive models (e.g., [11,12]) which provide examples of how the application of cutting-edge technology may aid suicide prevention in the future.

There were no studies identified in this search that focused on Mongolia or Philippines. Only one study was identified focused specifically on Tonga, which reported on the prevalence (16.5%) of self-reported suicide attempts in Tongan adolescents in the previous 12-months and associated factors (female sex, substance use, self-reported loneliness etc.).[13] One review study was identified that presented information on Hinduism and suicide in India and people of Indian ethnicity in other countries, including Fiji, where being Hindu/Indian and female was a substantial risk factor for suicide and suicide attempts.[14] Our additional search for Fiji, Mongolia, Philippines and Tonga identified 18 papers, including 3 papers overlapping with previous search. Only one paper from Mongolia[15] and one study including Philippines[16] were relevant for this review. The Mongolian study reported the prevalence of suicidal plans (14.7%) and attempted suicide (approx. 10%) in the past 12 months and associated risk factors (female gender, feeling lonely and worried, smoking cigarettes, drinking alcohol, and having fights at school). The study including Philippines, showed that overall prevalence of past 12-month suicide attempt was 9.0% in students from five Southeast Asian countries, ranging from 3.9% in Indonesia to 16.2% in the Philippines. Associated risk factors were analyzed using pooled dataset. Studies involving Mongolia, Philippines and Tonga were all using information from the WHO Global school-based student health survey (GSHS).[17]

In order to spotlight key studies from the region, those that were a systematic review or meta-analysis or included recent general population data were further extracted into Table 4.

Table 2. Risk and protective factors for *suicide* across selected countries in the Western Pacific Region

	Australia	China	Japan	Republic of Korea
Risk Groups	Men[18] (particularly from remote or disadvantaged areas)[19] Aboriginal and Torres Strait Islanders (including youth)[20] Medical professionals[21] Rural, farming Australians[22] Construction workers[23,24] Resource workers[25] Those with mental health diagnosis[26]	People living in rural areas[27]	Men[28]	Men and older age[29] Post-discharge psychiatric patients[30] (Recent liver cirrhosis diagnosis[31])
Main Means	In descending order: Hanging, overdose of medication (particularly for women), carbon monoxide poisoning, firearms[19]	Pesticides[32] and insecticides[33] (especially in rural areas) Followed by hanging[34]	Overdose of medication[35]	Sedatives in elderly[36] Hanging in older adults (in comparison to Japan)[37] Pesticides in rural and elderly (prior to Paraquat ban)[38]
Risk Correlates	Environmental conditions such as drought, and suicide stigma in rural, farming communities[39] Acute alcohol use in men[40] Family non-acceptance of sexuality in LGBTQI+[41]	Depression and hopelessness in older adults[42] and depression and anxiety in earlier years[43] Negative life events in elderly[44] Poor family functioning for elderly women[45] Low education, mental illness, family history of suicide, negative life events (rural China)[46] Air quality/pollution[47]	Mental illness, previous suicide attempt, negative life events[35] Psychological distress[48] Sleep problems and verbal communication of intent[49]	Academic stress, depression in teens[50] Schizophrenia, Depression, and physical illness[51] Parkinson's disease, depression[29] Previous suicide attempt in previous year[52] Alcohol use[53] Poverty in old age[54] Media exposure to high-profile celebrity suicides[55]
Protective Correlates	Self-esteem and social support[56]		Community social support in older ages[57]	Positive peer relations in teens[50] Church attendance and education[53]

Table 3. Risk and protective factors for *self-harm and/or suicide attempts* across selected countries in the Western Pacific Region

	Australia	China	Japan	Republic of Korea
Risk Groups	Young girls[58] Young people involved in the criminal justice system[59] Aboriginal and Torres Strait Islanders (including youth)[20]	Adolescents (particularly girls, report harsh parenting, or poor academic performance etc.)[60] Transgender individuals[61]	Young girls/women	Young girls/women
Main Means	Self-cutting in youth[62]		Overdose of medications[63]	Self-poisoning and self-cutting[64,65] (particularly for adolescent girls[66])
Risk Correlates	Previous self-harm instances, Borderline Personality disorder, impulsivity, and substance use disorders[67]	Depression, anxiety, stress, and hopelessness[68] Depressive symptoms[69] Substance use disorder in men, major depression in women[70] Physical illness[71] Psychological strain[72] Bullying victim[73] and/or perpetration[74] in adolescence Low education, farming occupation, negative life events, mental illness (rural China)[75]	Previous self-harm instances and living alone (risk for further repeated self-harm)[76] Hikikomori (excessive social withdrawal)[77]	Being bereaved by suicide[78] Substance use[11] Being underweight (being overweight for suicidal ideation only)[79]
Protective Correlates		Resilience in youth[80] Female gender, no religion, non-"peasant" occupation[81] Emotion regulation self-efficacy[82]		

Table 4. Key studies from the Western Pacific Region

Authors	Title and key highlights (arranged by alphabetical order)
McHugh et al. 2019[83]	Association between suicidal ideation and suicide: meta-analyses of odds ratios, sensitivity, specificity and positive predictive value - High heterogeneity of studies makes the **moderate pooled association** between ideation and suicide undependable despite this often being used in clinical settings as a measure of suicidal risk
Yang & Feldman, 2018[84]	A reversed gender pattern? A meta-analysis of gender differences in the prevalence of non-suicidal self-injurious behavior among Chinese adolescents - As with suicides, Chinese youth display differential gender patterns for non-suicidal self-harm whereby there are no gender differences in clinical samples, college aged men are more likely to report self-harm, whereas in younger years girls are more likely to report self-harm
Dickson et al. 2019[20]	A systematic review of the antecedents and prevalence of suicide, self-harm and suicide ideation in Australian Aboriginal and Torres Strait Islander youth - Despite disproportionate rates of suicide and self-harm there was limited research on risk factors in this group. Factors identified included substance use and being incarcerated, and authors highlight the pressing need for First Peoples led research in this area
Kwak et al. 2019[50]	Adolescent suicide in South Korea: Risk factors and proposed multi-dimensional solution - Provides a proposed model for suicide prevention in youth based upon a socio-ecological framework tailored to the Korean context
Lee et al. 2018[29]	Clinical epidemiology of long-term suicide risk in a nationwide population-based cohort study in South Korea - Using a nationally representative sample across a 12-year period, this study identifies six key risk factors (Parkinson's disease, major depression, liver problems, male gender, and older age, with an inverse association for the presence of OCD)
Song et al. 2020[85]	Comparison of suicide risk by mental illness: a retrospective review of 14-year electronic medical records - Psychiatric inpatient records at one hospital in Seoul, Republic of Korea were examined and showed that the presence of any mental disorder meant a higher risk for suicide than general population but especially so for psychotic conditions
Yu et al. 2021[27]	Factors associated with suicide risk among Chinese adults: A prospective cohort study of 0.5 million individuals - One of the few prospective studies identified in this search, after an approximate 10 year follow up period 80% of suicides were from rural areas and the annual rate of suicide was 10.2 per 100,000. Risk factors were male gender, older age, rural, mental health diagnoses etc.
Onishi, 2015[35]	Risk factors and social background associated with suicide in Japan: A review - Provides an overview of key risk factors (such as previous suicide attempts, mental illness) and highlights that multiple factors are often present prior to suicide
Page et al. 2017[86]	Suicide by pesticide poisoning remains a priority for suicide prevention in China: Analysis of national mortality trends 2006-2013 - Highlights the reduction in the use of pesticides may be a consequence of changing social factors and may be driving declining suicide rates in China (still most prevalent method, followed by hanging)
Wasserman et al. 2021[8]	Suicide prevention in childhood and adolescence: a narrative review of current knowledge on risk and protective factors and effectiveness of interventions - Not specifically to the WPR; however does provide rates of youth suicide for WPR which highlight different patterns for gender to the rest of the world; also discusses prevention strategies
Holman et al. 2020[56]	Suicide risk and protective factors: A network approach - One of the few studies identified that provides a detailed model of protective factors as well as risk factors, while not specific to the WPR it does include participants from Australia (and other Western, English speaking countries)
Li & Katikireddi, 2019[33]	Urban-rural inequalities in suicide among elderly people in China: a systematic review and meta-analysis - Given changing social structure and population, this study found that rates are higher for elderly people living in rural areas and that poisoning and hanging are most common

NB: These references have been bolded in the final reference list

5.Important Considerations

Overall, there was a limited amount of literature identified that focused on protective factors as opposed to, or in conjunction with, risk factors for suicide or self-harm. Given the comprehensive models for suicide risk described in earlier sections this represents a distinct gap in knowledge and important avenue for future research in the region. Nevertheless, for Australia, China, Japan and Republic of Korea, several key risk groups, risk factors, and predominant methods were described in the literature reviewed. Importantly, these appear to map well onto the social and proximal levels of Turecki's biopsychosocial model of suicide risk[4] with some variation between countries. This provides important information as to possible targets for suicide prevention interventions. For example, with recent changes in the social structure of China (i.e., increasing urbanization) there may have been a decrease in access to lethal pesticides and insecticides and an associated drop in suicide rates. This was shown in the Republic of Korea, where suicides utilizing pesticides reduced following the enforced restriction of access to such chemicals.[38] However, in contrast, as populations age in these countries elderly people became a focus for research and appear to be a key risk group for suicide. Unfortunately, less research was identified focused on the risk and protective factors for self-harm and suicide attempts. Furthermore, the literature may benefit from consistent and accurate use of terms (e.g., risk factor or correlate).[3]

6.Limitations

There are several important limitations to the current review that need noting. While the rapid and scoping nature of this review was important to meet the required turnaround time for results, it does mean that papers were restricted to English language and only one database was used for searching. As a result, it is likely that some key studies were missed. Furthermore, given the recent declines in suicide in large countries such as China, it was important to restrict searches to 2015 onwards so as to capture the most up-to-date information on risk and protective factors and correlates. While this decision aided the need for quick results, it also means that any key papers published prior to 2015 were also missed. There was a distinct lack of papers from Fiji, Tonga, Mongolia and Philippines, and it is not clear whether this was a result of the rapid review methodology or, more likely, that more research is needed on risk and protective factors for suicide and self-harm in these countries.

A further limitation is the lack of quality assessment as might be expected in a scoping review. Instead, the authors selected key studies to spotlight based upon them being systematic reviews and/or meta-analyses or utilizing large samples and prospective designs.

7.Conclusion

In conclusion, there are clear groups and individuals that may be vulnerable to suicide and/or self-harm; however, more research is required in determining what factors may be protective against such actions. Given the importance of high-quality surveillance in determining risk and protective factors, this could be aided by the creation of a sentinel suicide and self-harm surveillance system throughout the region.

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Appendix C – A regional case study on suicide prevention activities in the Republic of Korea: The National Action Plan for Suicide Prevention (2018)

1. Background

Suicidal behaviors impact millions of lives each year, from the 703,000 who die by suicide and their bereaved families, friends, and colleagues to those who live through suicide attempts, and endure episodes of self-harm and suicidal ideation.[145] It is crucial therefore, for countries to prioritize suicide prevention as a means of saving lives, reducing suffering, and supporting those impacted by suicidal behaviors. Despite the significance and complexity of this issue, relatively few countries have dedicated suicide prevention strategies that incorporate a whole-of-government approach at the national level.[146] A recent editorial in *Crisis* highlights the importance of establishing such strategies.[147] Reasons provided include providing a framework for the strategic objectives, outcomes, and monitoring and evaluation, providing clear indication as to resource management, and highlighting the leadership and commitment of the government in addressing this complex social health issue. Key components a national strategy should include multisectoral collaboration, restricting access to common means of suicide, regulating appropriate media coverage of suicides, training and awareness, enhanced care of people who have attempted suicide, crisis services, high quality surveillance, and postvention/aftercare services.[148]

To support countries in implementing these core suicide prevention activities, the World Health Organization (WHO) have recently provided resources aimed at developing suicide attempt and self-harm surveillance systems,[149] providing important indicators and country examples of national suicide prevention strategies,[150] and more recently, the LIVE LIFE implementation guide.[151] The LIVE LIFE framework is underpinned by several core pillars including those mentioned in the *Crisis* editorial such as multisectoral collaboration, awareness raising, surveillance, financing, and monitoring and evaluation. The LIVE LIFE framework also endorses those key suicide prevention activities that should inform a national strategy, including restricting access to means of suicide, responsible media coverage, supporting adolescents in developing life skills and the early assessment, intervention and follow up with those experiencing suicidal behaviors.

One country that has developed and implemented a national whole-of-government suicide prevention plan is the Republic of Korea. As background to the current case study, an overview of the extent of suicidal behavior within the Republic of Korea and the preceding developments that led to the National Action Plan in 2018 are provided.

1.1 Suicidal behavior in Republic of Korea

The Republic of Korea has the third highest rates of suicide in the Western Pacific Region (WPR) and has consistently had the highest rates of suicide out of the other OECD member countries (The Organization for Economic Co-operation and Development).[152] Figure 1 presents age-standardized

[145] Suicide worldwide in 2019: Global Health Estimates. Geneva: World Health Organization; 2021
[146] National suicide prevention strategies: Progress, examples and indicators. Geneva: World Health Organization; 2018
[147] Platt, S., Arensman, E. & Rezaeian, M. (2019). National Suicide Prevention Strategies – Progress and Challenges. *Crisis*, 40(2), 75-82.
[148] Platt et al., (2019) As above.
[149] Practice manual for establishing and maintaining surveillance systems for suicide attempts and self-harm. Geneva: World Health Organization; 2016
[150] National suicide prevention strategies: Progress, examples and indicators. Geneva: World Health Organization; 2018
[151] Live life: An implementation guide for suicide prevention in countries. Geneva: World Health Organization; 2021
[152] World Health Organization. Suicide worldwide in 2019: Global Health Estimates. Geneva: World Health Organization; 2021

suicide rates in the WPR and highlights the rates in Republic of Korea. Suicide rates show a rapid increase from 2000 (beginning earlier).[153] The rates reach the highest point in 2009, remaining a similar level until 2011, which is followed by a decline from 27.9 per 100,000 in 2011 to 21.2 in 2019.

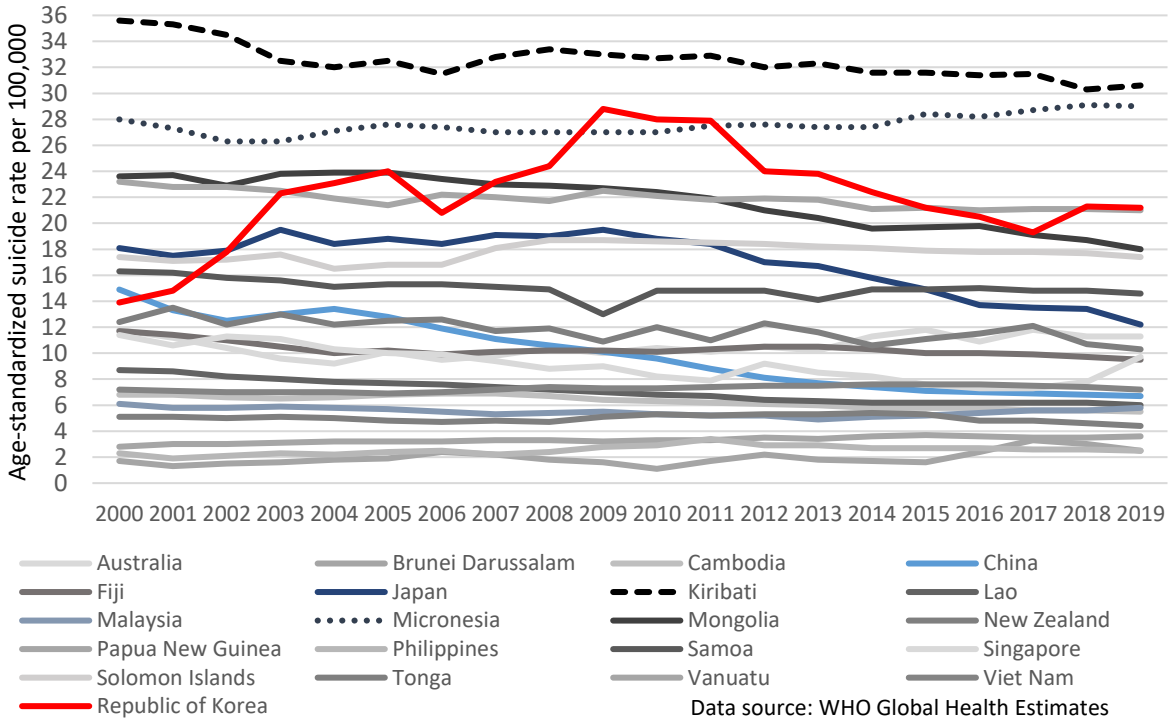

Figure 1. Age-standardized suicide rates in WPR in 2000-2019, highlighting the Republic of Korea

Suicide rates in Republic of Korea are higher in men (male to female ratio between 1.9 and 2.5; see Figure 2 for time trends) and increase with age, with a particularly rapid rise after retirement age.[154] The increase in suicide rates corresponds with the increase in suicides by hanging, with half of suicides using this method, followed by poisoning (gas, medicine, pesticides) and jumping from a height.[10,155] Recent ecological level analyses have linked regional suicide rates positively with divorce rates, poverty, prevalence of heavy drinking and negatively with income level, financial independence, and social welfare budget.[10,156,157] On an individual level, suicide mortality has been linked with psychiatric and physical health conditions; however, the psychiatric conditions seem to be less common in people who died by suicide compared to Western countries.[158]

[153] Kino, S., Jang, S. N., Gero, K., et al. (2019). Age, period, cohort trends of suicide in Japan and Korea (1986–2015): A tale of two countries. *Social Science & Medicine*, *235*, 112385.
[154] Kim, A. M. (2020). Factors associated with the suicide rates in Korea. *Psychiatry Research*, *284*, 112745.
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[156] Choi, M., & Lee, Y. H. (2020). Regional variation of suicide mortality in South Korea. *International Journal of Environmental Research and Public Health*, *17*(15), 5433.
[157] Lee, J. (2020). Municipal-level determinants of suicide rates in South Korea: exploring the role of social capital and local government policies. *Journal of Asian Public Policy*, *13*(3), 277-294.
[158] Na, E. J., Lee, H., Myung, W., et al. (2019). Risks of completed suicide of community individuals with ICD-10 disorders across age groups: a nationwide population-based nested case-control study in South Korea. *Psychiatry Investigation*, *16*(4), 314.

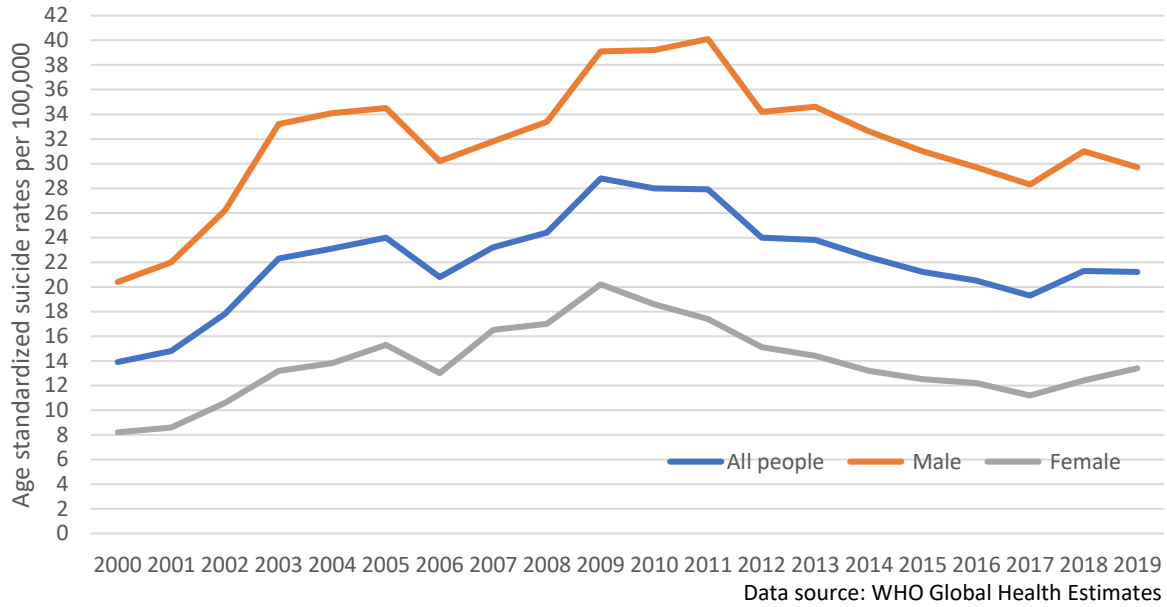


Figure 2. Age-standardized suicide rates by sex in the Republic of Korea, 2000-2019

There is a lack of information about suicide attempts and self-harm in the Republic of Korea in English language literature. Much of the information is based on the Korean National Health and Nutrition Examination Survey, conducted every year since 2007, showing an annual prevalence of below 0.4% for total population (0.4% for men and 0.5% for women in 2019).[159]

1.2 Development of the National Action Plan (2018)

Suicide prevention in the Republic of Korea was made a whole-of-government priority at the national level through the introduction of the Act for Prevention of Suicide and the Creation of Culture of Respect for Life (Korean Suicide Prevention Act 2011). This Act is focused on preventing suicide and creating a 'culture of respect for life'. Following the introduction of the legislation, the Korean Suicide Prevention Center was established in 2011, the Korean Psychological Autopsy Center was established in 2014, and the Ministry of Health and Welfare and a coalition of associated Ministries introduced the National Action Plan for suicide prevention in 2018. More recently, in 2021 the Korean Suicide Prevention Center and the Korean Psychological Autopsy Center were merged to create the Korean Foundation for Suicide Prevention led by President Dr Tae-Yeon Hwang. A copy of the National Action Plan for suicide prevention can be found on the World Health Organization's (WHO) MiNDbank database of national and regional level policies regarding mental and physical health, substance use and disability among other items (please see https://www.mindbank.info/item/6785 accessed 9th June 2021). This National Action Plan begins by providing an overview of the epidemiology of suicide and the socio-economic cost of suicide in the Republic of Korea that led to the development of the Plan. Specific goals of the Plan are to reduce suicides by 1,000 persons each year so that by the end of 2022 a total of 15,000 people will have been prevented from dying by suicide (p.18). According to previous studies, where suicide risk factors (e.g., economic anxiety in young people[160]) are impacted worldwide due to the outbreak of COVID-19 in 2020, and the implications on suicide rates after such a disaster are still unfolding, it was determined that it would be difficult to achieve the target. Based on this, the target for suicide among the Health Plan 2030 performance indicators was reset to 17.0

[159] Ministry of Health and Welfare, Korean Foundation for Suicide Prevention (2021). *White Paper on Suicide Prevention*.
[160] Mann FD, Krueger RF, Vohs KD. Personal economic anxiety in response to COVID-19. Personality and Individual Differences. 2020; 167:110233.

in 2030 and 21.5 in 2025 to achieve this goal. To achieve this goal a series of planned tasks were outlined. These require inter-ministerial collaboration and are briefly summarized in Table 1.

Table 1. Planned implementation tasks in the National Action Plan for suicide prevention in the Republic of Korea (2018)

National Action Plan Implementation Tasks	Planned Activities
Implementation of Scientifically Based Strategies (p. 20)	- Nationwide level investigation of suicide cases from police records have been conducted for evidence-based suicide prevention strategies since 2018. So far, about 90,000 suicide cases from 2013-2019 have been corrected and investigation of 2020 is now underway. - Establish a national surveillance system on suicide trends by linking vital registration statistics with emergency department information to gather timely information on suicide and suicide attempts. - Support local governments to implement evidence-based policies tailored to their region. - Dissemination of suicide prevention programs based on local certification.
Establish a full-scale social network to discover high-risk groups (p. 25)	- Training 1 million suicide gatekeepers across local organizations and visiting service workers. - Strengthen the linkage between social security institutions/services (e.g., Domestic/Family Violence Protection Agencies, Case Management, Employment/Financial services). - Enhance the routine screening for depression across healthcare.
Engage in active intervention and management (p. 30)	- Establish a comprehensive support system for high-risk suicide groups across mental health centers, social security and welfare services, financial services, social supports. - Provide community-level suicide prevention services. - Eliminate risk factors (e.g., means restriction, online/social media regulations).
Strengthen aftercare services (p. 34)	- Establish and strengthen case management of people who have recently made suicide attempts through emergency departments. - Strengthen bereavement services. - Establish celebrity suicide response system.
Implement targeted suicide prevention strategies (p. 37)	- Suicide prevention and aftercare in the workplace and unemployed. - Develop supports for recently discharged mental health admissions into the community. - Implement suicide prevention strategies targeted at young people and the elderly, military workers, and university/out of school youth.

1.3 Aim of the current case study

The current case study sought to provide an in-depth understanding of the suicide prevention activities that are supported by the National Action Plan in the Republic of Korea. Given difficulties in accessing English language literature and policy documents, as well as the important priority of establishing collaborative links with experts in the Republic of Korea, two expert interviews were conducted (in English) with the purpose of understanding the development and implementation of

the National Action Plan better. Specifically, these interviews were used to identify the most important components, key barriers/facilitators to implementation, and evaluation aspects of the Plan.

2. Methods

Interview questions were developed by the research team from the Australian Institute for Suicide Research and Prevention (AISRAP). The questions were discussed with colleagues based at WHO Western Pacific Regional Office (WPRO) and with Dr Alexandra Fleischmann (WHO). The final interview questions are provided in Box 1.

Box 1. Interview questions

1. What was the context and motivations for the development of the National Action Plan in the Republic of Korea?
2. In your opinion, what are the more important components of the National Action Plan and why?
3. What are the barriers and facilitators of implementing the National Action Plan in the Republic of Korea?
4. The plan includes evaluation, do you have any English language examples and outcomes of this being done (e.g., publications or reports)?
5. What are the main learnings and recommendations for other countries?
6. What are future steps that need to be taken, what should be covered in future editions of the Plan?

Two experts in suicide prevention in the Republic of Korea were identified by colleagues at WPRO. Interviews were scheduled to take place separately via online video conferencing software. Interviews were attended by the expert, AISRAP researchers, and key personnel from WPRO (including Technical Lead, Mental Health and Substance use). Permission was obtained to record the interviews and video conferencing software was used to produce audio transcripts. Additional notes were taken by AISRAP researchers during the interviews. One expert also chose to provide their responses to the interview questions in writing, alongside presentation slides that elaborated on their responses.

Results from each interview were synthesized together and are briefly discussed.

3. Results

3.1 Context and motivation for developing the Plan

Both experts highlighted the high rates of suicide in the Republic of Korea as a key motivation for making suicide prevention a national priority. In particular, the experts both noted the Republic of Korea had the highest rate of suicide as compared to other OECD member countries, and from the late 1990s to 2010s these rates were increasing.

3.2 Important components of the Plan

Several components were highlighted by the experts as essential components to the National Action Plan. These included:

- Multisectoral Action Plan
    - Inter-ministerial collaboration was seen as very important to the success of the Plan by the experts. Suicide prevention relies upon the collaboration between the Ministry for Health and Welfare, Ministry of Education, Ministry of Employment and Labor, and Ministry of Gender Equality and Family, who then further collaborate with local governments and the private sectors and non-governmental organizations. This collaboration recognizes that suicide in the Republic of Korea is a social issue, and its successful prevention cannot solely be the responsibility of one Ministry or the health sector.
- Surveillance
    - Comprehensive, timely and consistent surveillance of suicide as well of those at high risk of suicide, such as people who have attempted suicide or people experiencing depression, was also described as important to the success of the Plan. Accurate and high-quality surveillance informs suicide prevention activities at the local and regional level within the Republic of Korea. It also facilitates the timely identification of trends.
    - One expert noted that depression/mental illness may not be as important a risk factor as it is in Western countries but the regular, broadscale screening on this throughout the population is important and serves to promote mental health in the general community.
    - Identifying those who have recently experienced a suicide attempt is also key to aftercare services. Both experts described an important case management program being implemented in large Emergency Departments across the country, whereby medical and psychiatric professionals work together with individuals who have attempted suicide. These individuals are then followed up in the community by allied health professionals such as psychiatric nurses or social workers who are able to do outreach and service linkage. According to the experts this multicenter program is gradually expanding.
- Evidence-based suicide prevention policy development
    - Nationwide level investigation of suicide cases from police records has been conducted to inform evidence-based suicide prevention strategies. Accumulated data has been used for various purposes such as (1) Analysis of the current status and characteristics of suicide at the local and provincial level, (2) Analysis of the decedent's health economic level, mental illnesses, chronic physical illnesses, and disability through data linkage processes with the National Health Insurance Service, (3) Analysis of 'suicide hotspots' which is a specific and accessible site frequently used as a location for suicide, (4) Analysis of the relationship between present social issues and suicide tendency. Final results of this analysis will be used for establishing suicide prevention plans and policy at the Ministry of Health and Welfare, local governments and community suicide prevention centers.
- Broadscale gatekeeper awareness training
    - One expert indicated there is an increasing focus on developing and implementing broadscale gatekeeper awareness training programs to the general population as per the National Action Plan. By upskilling the general population there will be an increase in awareness of suicide and suicide prevention, and people in vulnerable social situations may be offered help earlier (e.g., young people accessing financial support through a bank during the COVID-19 pandemic). There is also a focus on upskilling

health professionals to be more aware of suicide which will be especially beneficial to rural and regional areas of the Republic of Korea.

- Means Restriction
    - One expert highlighted that since 2011 there has been a country wide focus on restricting access to lethal pesticides such as Paraquat. For example, banning Paraquat and using pesticide storage boxes. This has been associated with a reduction in suicides.
- Media Guidelines
    - The Republic of Korea have initiated a series of recommendations for media coverage of suicide so as to minimize emulation in the community. One expert described key aspects of the 'Korean Guideline for Suicide Reports 3.0' which included not reporting suicide in the title, not reporting on exact methods/locations, minimize and be socially responsible when including photographs, not rationalizing, or endorsing the suicide but rather focus on negative outcomes and provide prevention information, and respect the privacy of the bereaved.
- Promotion of mental health
    - One expert highlighted that promoting mental health literacy and reducing stigma was also an important aspect of the Plan. In particular, reducing mental health and suicide stigma for vulnerable groups such as men living in the Republic of Korea.

3.4 Barriers and facilitators to implementation

According to the experts there were several barriers to successful implementation of the National Action Plan and suicide prevention across the Republic of Korea. First, one expert indicated that socio-economic factors are important risk correlates for suicide, especially in young Koreans; however, the social safety net provided by the government is not strong enough to support individuals experiencing financial difficulties and the role this could play in preventing suicidal behavior. Instead, there is a focus on medical/psychiatric intervention of people already experiencing a suicidal crisis or suffering from suicidal thoughts. Second, while inter-ministerial collaboration is a key strength of the National Action Plan it is also an aspect of the Plan that is more difficult to achieve in practice as each department has their own priorities, funding, staffing etc. Third, there are difficulties with access to trained mental health professionals, especially in rural areas of the Republic of Korea where there may be little or no professionals who have training in suicide prevention. This has motivated the development and implementation of gatekeeper programs and upskilling of health workers which was mentioned by experts as an important component; however, relies heavily on funding allocation and resource management. Fourth, there are difficulties with data protection policies and the ethical linkage of data records in surveillance that are not easily overcome. Finally, the role of stigma against suicide and mental health was cited by one expert as crucial in preventing people from seeking help and the successful implementation of the Plan as intended.

Regarding facilitators, one expert described the current government's whole of government priority to the prevention of suicide. This includes the establishment of a suicide prevention policy committee which helps coordinate suicide prevention activities across the country and helps to review the progress of local areas and metropolitan cities in rolling out the National Action Plan, as well as the establishment of the Korean Foundation for Suicide Prevention including the National Suicide Prevention Center and the National Psychological Autopsy Center. This Foundation can help with service and policy development that will assist local and regional areas in suicide/mental health surveillance and implementation of the Plan.

3.5 Evaluation

One expert briefly described the role of an evaluation committee as part of the Suicide Prevention Policy, who utilize a standardized checklist to assess the performance and progress of provinces and metropolitan cities in the rollout and implementation of the National Action Plan. Based upon the outcomes of this evaluation process the evaluation committee spotlight a few cities/provinces that have demonstrated most advanced implementation as per the standardized criteria. These regions are then provided with an award during Suicide Prevention week and can serve as good practice models for other areas. Some local governments may also do their own internal evaluations of policy implementation. Unfortunately, the standardized tool was not available in the English language.

One expert provided examples from the literature of specific studies aimed at evaluating the impact of means restriction in the Republic of Korea (particularly pesticides), the impact of media guidelines, and the ongoing investigation of national level psychological autopsy studies that can provide feedback to the community regarding suicide prevention. These studies, and additional key papers addressing components of the National Action Plan, are provided in Table 2 (overleaf).

Table 2. Key papers published in the English language that refer to key components of the National Action Plan

Authors (Year)	Title	Main findings
Media Coverage		
Chun et al. (2018)	Fidelity assessment of the suicide reporting guidelines in Korean newspapers	There is a need for stronger fidelity to the guidelines.
Means Restriction		
Myung et al. (2015)	Paraquat prohibition and change in suicide rate and methods in South Korea	Following the paraquat prohibition in 2011 there has been an associated decrease in total suicides and suicides by pesticides in Korea.
Cha et al. (2016)	Impact of paraquat regulation on suicide in South Korea	The prohibition of paraquat is associated with a decrease in suicides by pesticides in all demographic groups and future legislative action should be taken to prevent access to other common methods.
Kim et al. (2019)	Implementation and outcomes of suicide-prevention strategies by restricting access to lethal suicide methods in Korea	There has been an overall decline in suicide rates that corresponds to national efforts at restricting access to pesticides, charcoal fumes, jumping from heights, subway barriers, and hanging.
Case Management		
Kim et al. (2020)	Effectiveness of a flexible and continuous case management program for suicide attempters	A non-randomized study in one hospital in Korea found that those who received case management and follow-up after a suicide attempt were less likely to re-attempt or die by suicide.
Gatekeeper Program		
Na et al. (2020)	Contents of the Standardized Suicide Prevention Program for Gatekeeper Intervention in Korea, Version 2.0	Presents the contents of the revised 'Suicide CARE' gatekeeper training program developed for the general population (a first of its kind).
Park et al. (2020)	"Suicide CARE" (Standardized Suicide Prevention Program for Gatekeeper Intervention in Korea): An Update	Presents the standardized process through which the Suicide CARE program was updated*
Surveillance		
Na et al. (2019)	Design and methods of the Korean National Investigations of 70,000 Suicide Victims Through Police Records (The KNIGHTS Study)	Describes the methods, including the utilization of the Korea-Psychological Autopsy Checklist (K-PAC) for Police Records (KPAC-PR 1.0) to conduct a large-scale psychological autopsy study in Korea.
Kim et al. (2021)	Predictive factors associated with methods of suicide: The Korean National Investigations of Suicide Victims (The KNIGHTS Study)	Describes most common methods of suicide based on the KNIGHTS study and associated risk factors.
Yook et al. (2020)	Psychological autopsy study comparing suicide decedents with and without a history of suicide attempts in a nationwide sample of South Korea	Based upon the KNIGHTS study it was determined that the majority of suicides were the individuals first attempt (60%), associated risk factors as described.
Kim et al. (2020)	Comparing warning signs of suicide between suicide decedents with depression and those non-diagnosed psychiatric disorders	The most common psychiatric diagnosis of suicide decedents was depression however regardless of mental illness there were warning signs (e.g., talking about suicide).

*Does cite a publication indicating that as of 2019 1.2 million Koreans had participated in the gatekeeper training however original reference is in Korean language.

3.6 Main learnings

While both experts acknowledged the high rates of suicide in the Republic of Korea, they also provided a host of important recommendations and teachings that can be adapted in other countries/contexts regarding suicide prevention. The first main learning expressed by the experts was that for successfully reducing suicide at a national level, there needs to be a whole of government approach whereby multiple departments are committed to preventing suicide and work collaborative with the private and non-governmental sectors. This ensures that suicide prevention is an actionable priority and further acknowledges the role of multiple social, psychological, financial and physical risk factors for suicide. The second main learning expressed by experts was that suicide prevention needs to be evidence-based. This means that wherever feasible, countries/regions should establish and maintain high quality surveillance systems of suicide and self-harm/suicide attempts. While challenging in practice, having high quality and timely access to surveillance data ensures that countries are aware of trends, prominent risk and protective factors, and main methods that can inform targeted and responsive suicide prevention strategies. This also means that countries should engage in rigorous evaluation of suicide prevention strategies as part of their national/subnational suicide prevention plans. The experts described the standardized procedures for evaluating the rollout of the National Action Plan and how this informs best practice models for other local regions and cities. Finally, the experts reiterated the importance of means restrictions, appropriate media coverage and promotion of mental health as crucial elements in suicide prevention at the national level. These recommendations align well with recommendations from the literature and the recently introduced LIVE LIFE guidelines from the WHO.

3.7 Future Steps

The experts identified a number of steps that need to be taken in the future to continue to support the National Action Plan and suicide prevention in the Republic of Korea. Both experts identified that in order to continue to support local/regional areas and the general public to participate in suicide prevention programs, there needs to be a continued emphasis on adequate funding allocation from the government. The Republic of Korea has many community-level mental health and substance use treatment centers, and an important focus will be on training health professionals to become suicide prevention experts in a ‘training the trainer’ approach to support individuals experiencing suicidal behavior as well as to support the rollout of a gatekeeper training program for the general population. This is an ambitious and promising next step that will require funding and will be an important example to other countries in the future.

4. Conclusions

The experts interviewed for this case study provided an important insight into the development and implementation of the National Action Plan for suicide prevention in the Republic of Korea. This plan provides an encouraging and ambitious example for other countries for a whole-of-government approach to suicide prevention. Since the introduction of the Korean Suicide Prevention Act in 2011 and the implementation of the National Action Plan in 2018 there has also been a decline in national suicide rates in the Republic of Korea. While there is a need for further systematic evaluation, this suggests the national strategy may be having a beneficial impact on national suicide mortality. More information is required regarding the prevention of suicide attempts and ideation. The main learnings for other countries expressed by the experts relate to multisectoral collaboration (and its importance), enhanced surveillance (including suicide attempts), continual evaluation and refinement tailored to the needs of specific groups and areas, and the importance of means restriction and media guidelines.

These teachings and crucial elements of the Plan align well with WHO guidelines and recommendations in the literature.[161,162]

[161] Platt, S., Arensman, E. & Rezaeian, M. (2019). National Suicide Prevention Strategies – Progress and Challenges. *Crisis*, 40(2), 75-82.
[162] Live life: An implementation guide for suicide prevention in countries. Geneva: World Health Organization; 2021

Appendix D – Suicidal behavior and suicide prevention in Fiji: Companion piece to an introductory presentation

1. Background

According to the most recent estimates compiled by the World Health Organisation (WHO) in their 2019 report, approximately 703,000 people lose their lives to suicide around the world in a year (WHO, 2021a). Nearly a quarter of these suicides occur in the Western Pacific Region (WHO, 2021a). Of note, suicide rates are quite high in some Pacific Island countries. **Accurate, comprehensive, and timely collection of surveillance data regarding suicide, self-harm, and suicidal ideation is crucial for prevention and can inform priorities for national strategies.**

The current document is part of a research collaboration between the Australian Institute for Suicide Research and Prevention and the World Health Organization Western Pacific Regional Office focused on expanding the evidence base for developing a sentinel system for the surveillance of suicide and self-harm across the Western Pacific. In particular, this document aims to support Fiji in identifying important areas for future research and highlighting key areas where surveillance/data collection could be beneficial, as well as supporting the development of future national suicide prevention strategies. To achieve this we begin by first providing an overview of suicide mortality in Fiji based upon the most recent Global Health Estimates (WHO, 2019). We then provide a background to previous research investigating suicide and suicide attempt in Fiji as identified in a systematic litearture review we recently published, and finally we outline current best practice with regard to national suicide prevention strategies.

1.1. Suicide in Fiji

In Figure 1, age-standardised suicide rates for men and women living in the Pacific Islands are provided. As can be seen, rates for men in Fiji were around the global average in 2019 and were considerably lower than other Pacific Island countries such as Kiribati, Micronesia, Vanuatu, Solomon Islands, and Samoa. Overall, the rates for women were lower than men across the Pacific Islands, and again, women in Fiji were roughly comparable to the global average in 2019.

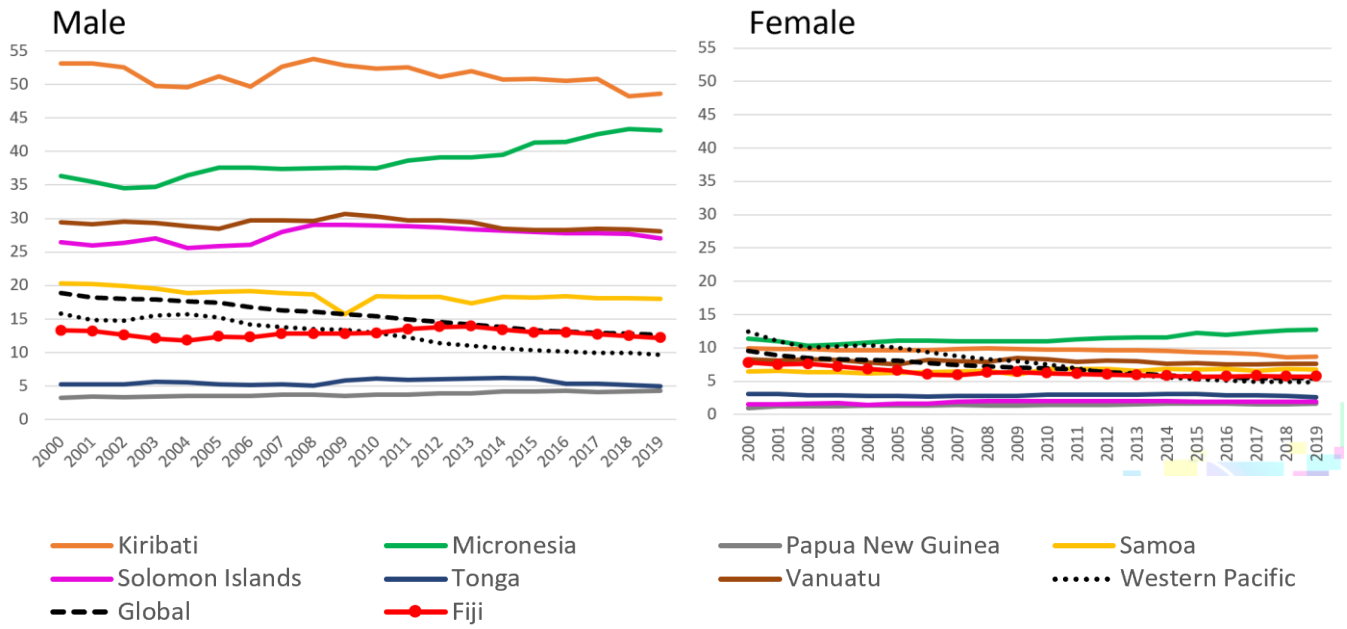


Figure 1

AGE-STANDARDISED SUICIDE RATES FOR MEN AND WOMEN IN THE PACIFIC ISLANDS (DATA SOURCE: WHO GLOBAL HEALTH ESTIMATES)

Further information relating to the age-standardised rates of suicide in Fiji for men and women over time using Joinpoint modelling is provided in Figure 2. It appears that overall, suicide rates in Fiji have been decreasing somewhat in last two decades (Average Annual Percentage Change: 0.8%) and specially in recent years since 2013 (Annual Percentage Change: 1.7%). Suicide rates by gender and age groups for 2019 are presented in Figure 3. It appears that for men suicide rates are highest in those aged 15-34 years and for those aged 65 and older. For women suicide rates were highest in the 15-24 years and 75 and older age groups. This information provides useful information relating to suicide prevention strategies in the future; however, it should be noted that the high rates observed in the 85 and older category may be influenced by small population numbers, and the WHO acknowledge that the quality (i.e., comprehensiveness, timeliness, specificity etc.) of suicide related data provided by Fiji could be improved (WHO, 2021a).

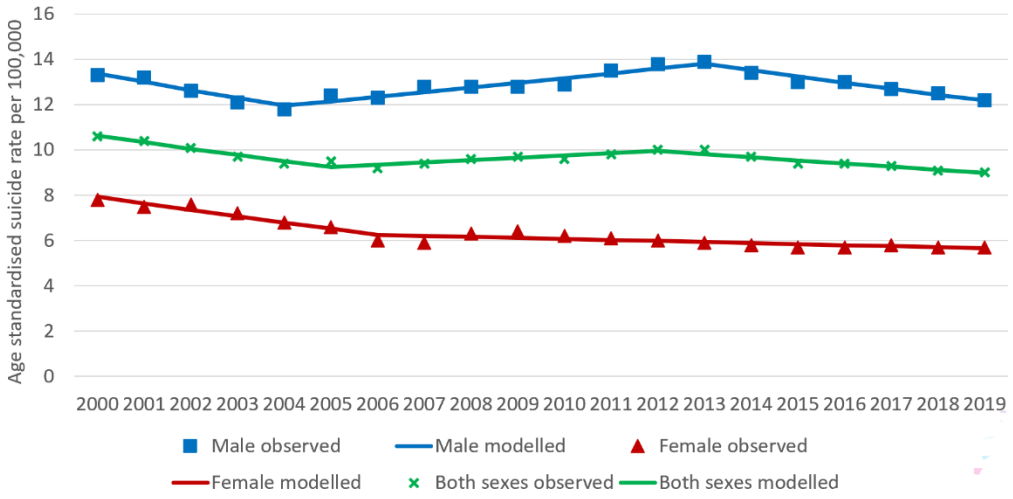
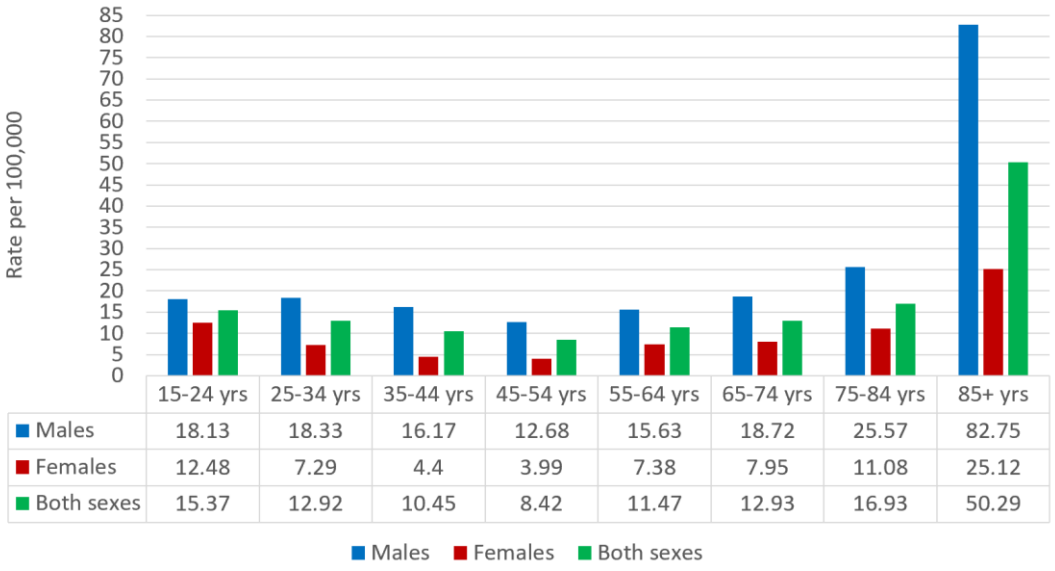


Figure 2

AGE-STANDARDISED SUICIDE RATES FOR MEN AND WOMEN IN FIJI (DATA SOURCE: WHO GLOBAL HEALTH ESTIMATES)



	15-24 yrs	25-34 yrs	35-44 yrs	45-54 yrs	55-64 yrs	65-74 yrs	75-84 yrs	85+ yrs
Males	18.13	18.33	16.17	12.68	15.63	18.72	25.57	82.75
Females	12.48	7.29	4.4	3.99	7.38	7.95	11.08	25.12
Both sexes	15.37	12.92	10.45	8.42	11.47	12.93	16.93	50.29

Figure 3

AGE-STANDARDISED SUICIDE RATES BY GENDER AND AGE GROUPS IN FIJI IN 2019 (DATA SOURCE: WHO GLOBAL HEALTH ESTIMATES)

Figure 4 presents the age standardised rates of suicide over time in Fiji alongside other countries with approximately 30% of Indian diaspora community members and India. As can be seen, men in Suriname and Guyana high substantially higher suicide rates than men and women in Fiji or India.

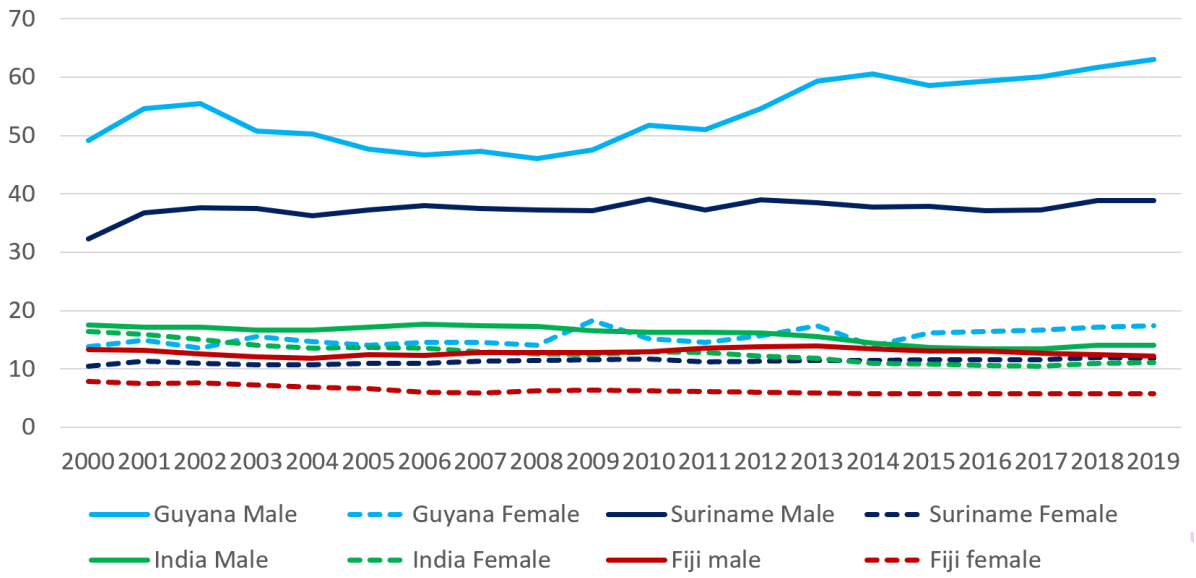


Figure 4

AGE-STANDARDISED SUICIDE RATES FOR MEN AND WOMEN IN FIJI, INDIA, SURINAME, AND GUYANA (DATA SOURCE: WHO GLOBAL HEALTH ESTIMATES)

2. Suicide and suicide attempts in the Pacific Islands: A systematic literature review

For the purposes of this companion document and associated presentation we have extracted information relating to suicide and suicide prevention in Fiji from our team's recent systematic literature review we published in *The Lancet Regional Health – Western Pacific* titled "Suicide and suicide attempts in the Pacific Islands: A systematic literature review" (Mathieu et al., 2021). Details on study searches and inclusion/exclusion criteria are outlined in the article and will be discussed during the presentation.

Overall, it was harder to determine the prevalence of suicide attempts in Fiji. One previous study did provide an estimate of 34.8 per 100,000 based upon consecutive cases assessed at a single hospital (Aghanwa, 2000). However, this was restricted to a region of Fiji (Suva) and is now over 20 years old. There are many reasons why determining the prevalence of suicide attempts and self-harm is difficult (yet essential), including stigma, self-disclosure, classification issues (WHO, 2016). Furthermore, there did not appear to be a consistent or comprehensive surveillance system of this information in Fiji available in the literature. One example, that may be useful if still active and has the capacity to expand was the 'Fiji Injury Surveillance in Hospitals' Database which was focused on traumatic injury requiring emergency treatment, including intentional self-harm (e.g., Herman et al., 2016; Peiris-John et al., 2013; Wainiqolo et al., 2012). There is a need for enhancing or establishing more comprehensive and high-quality surveillance systems for collecting data and conducting future research on suicide attempts and self-harm.

2.1 Main methods identified in the literature

- For suicide: Hanging appeared to be a commonly used method followed by self-poisoning with chemicals and pesticides (Booth, 1999a; 1999b; De Leo et al., 2013; Haynes, 1984; Pridmore et al., 1996; Ree, 1971)
- For suicide attempts: Self-poisoning appeared to be a commonly used method, including medications, chemicals, and pesticides (Aghanwa, 2000; 2001; De Leo et al., 2013; Henson et al., 2012; Herman et al., 2016; Peiris-John et al., 2013; Pridmore et al., 1995; Wainqolo et al., 2012)

2.2 Key risk groups identified in the literature

Suicidal behaviors are complex and associated with several interconnected risk factors (Turecki et al., 2019). Within the Fijian context specifically there was a lack of research utilising prospective longitudinal designs which makes determining risk factors for suicidal behaviors difficult (Franklin et al., 2017). Nevertheless, there did appear to be some consistent risk correlates across studies for both suicide and suicide attempts. Namely, male gender, Indian ethnicity (especially for young women), and younger age group (Mathieu et al., 2021). Other less consistent correlates of suicide attempts appeared to be social and relationship problems, depressive symptoms, alcohol use (particularly for men), and lack of employment (Aghanwa, 2000; 2001; 2004; Henson et al., 2012). There were no protective factors identified in the literature.

2.3 Suicide prevention strategies and interventions

The World Health Organization (2014) has outlined key components of a comprehensive national suicide prevention strategy. These were further elaborated upon by Platt and colleagues (2019). The key components include:

- Surveillance, monitoring and evaluation of suicide (and self-harm)
- Means restriction
- Responsible media reporting guidelines
- Increase access to health and social services
- Training and education (e.g., community gatekeepers, health professionals, police, social welfare workers)
- Mental health and suicide stigma reduction
- Appropriate and safe awareness raising
- Oversight/co-ordination and multisectoral collaboration
- Psychological interventions
- Enhanced follow-up and care for people who have attempted suicide or self-harmed
- Crisis intervention
- Postvention

Those components should be considered in the new Suicide Prevention Strategy in Fiji.

Based on our literature review, there was a lack of evaluations of interventions or prevention activities identified across in Fiji and the Pacific Islands more broadly – this highlights a further strong need for increased research on suicide prevention in Fiji. Based upon initial consultations and information outlined in the National Mental Health and Suicide Prevention Policy (2015) there are highly important and valuable suicide prevention activities being conducted across Fiji. For example, the recent restriction of access to highly hazardous pesticides (WHO, 2021b). Not only are these activities commendable and highly valuable and serve as excellent examples to other countries in the Western Pacific region, but the implementation of these strategies also provides an important opportunity for future research and evaluation that may facilitate a better understanding of what is working and for whom.

3. Conclusion

Rates of suicide in Fiji in 2019 are roughly comparable to the global average and may have been decreasing somewhat in recent years. However, suicide prevention in Fiji remains an important priority. Several important steps have been taken in preventing suicide and self-harm and raising awareness of issues surrounding mental health and suicide. There is still a need for enhanced collection of suicide, suicide attempts, and related data using comprehensive, timely and sensitive/specific surveillance systems. Such advances in data collection will facilitate a more confident understanding of contemporary risk and protective factors for suicide in Fiji and will allow for the ongoing evaluation and improvement of suicide prevention strategies implemented at a local and national level.

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Appendix E – Meeting report of the first 'Suicide and self-harm prevention in the Western Pacific' virtual expert roundtable and showcase

As a World Health Organization (WHO) Collaborating Centre for Research and Training in Suicide Prevention, researchers from the Australian Institute for Suicide Research and Prevention at Griffith University engaged in several background research activities for the WHO Western Pacific Regional Office (WPRO). These activities were focused on data-informed suicide prevention strategies for the region, including the future establishment of a regional sentinel surveillance system. Outcomes of the background activities will be provided on the purpose built 'Suicide and self-harm prevention in the Western Pacific' knowledge hub.

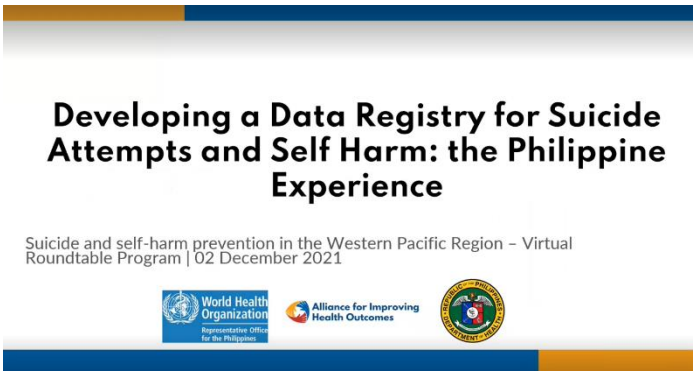
Based upon the initial background research activities it became clear that a regional sentinel surveillance of suicide and self-harm would be an important opportunity for the region, and low- and middle- income countries should be supported in enhancing their suicide prevention activities across the region. Establishing a regional network of suicide prevention experts across academia, government and non-governmental organizations would facilitate a greater in-depth understanding of local health systems and current or future suicide prevention activities, and may provide an opportunity for shared learning and collaboration. This network could also facilitate the establishment of the regional sentinel surveillance system, whereby an important first step is to collaboratively develop a regional framework that is responsive to local needs.

As a WHO Collaborating Centre, the Australian Institute for Suicide Research and Prevention hosted the first 'Suicide and self-harm prevention in the Western Pacific' regional expert roundtable discussion and showcase. The virtual event was held on 2nd December 2021. Representatives included experts and interested parties working in suicide prevention across the region, including key personnel from WHO Western Pacific Regional Office (WPRO). Based upon the background research activities the theme for the event was 'Suicide and self-harm surveillance', however, during the discussion local representatives were encouraged to discuss all aspects of current and future suicide prevention activities in order to stimulate interest, identify possible areas of future support, and establish connections and areas of shared knowledge. Representatives from Australia and Philippines were invited to present a showcase of surveillance activities in their country. Additional keynote presentations were provided by Professor Ella Arensman on 'Establishing surveillance systems in low- and middle- income countries', and Professor Diego De Leo on 'Experiences of the WHO/START (Suicide in At Risk Territories) Study'. A copy of the letter of invitation, event program, and guest list are provided (see below).

Summary of events

The roundtable and showcase was held over three hours, and was opened by Professor Kairi Kõlves (Australian Institute for Suicide Research and Prevention). Dr Martin Vandendyck (Technical Lead, Mental Health and Substance use WHO WPRO) provided an overview of mental health and suicide prevention activities for the region which included the rationale for the virtual roundtable event. Given the limitations of virtual events, dedicated time was allocated for roundtable participants to introduce themselves and their relevant experience. An overview of the background research activities were presented by Dr Sharna Mathieu (Australian Institute for Suicide Research and Prevention), and a copy of the presentation slides are provided below.

Country level regional showcase



The first showcase presentation, by Paula Melizza V. Valera, was on the development of a data registry for suicide attempts and self-harm across the Philippines. This presentation provided an in-depth background to suicide mortality within the country before outlining the process from which the registry originated. The team began in early 2021 with a situational analysis and expert consultations, developing and piloting the registry, and now continue with ongoing monitoring (until present). An overview of data collection and storage, the registry process, and pilot was provided. Preliminary results highlight the higher burden of self-harm in people aged less than 30 years. Certain practical challenges with resources/manpower and the private and ethical storage of were discussed. Definitional issues arising from the numerous local languages across the Philippines as compared to English and a reliance on ICD-10 codes were emphasized. For instance, a relatively notable method of self-harm in the Philippines does not fall within the codes assigned to self-harm. Nevertheless, the training of personnel according to current best practice[163] and prioritization of 'ease of use' and seamless integration within existing systems were key learnings.

The second showcase presentation, by Dr Katrina Witt, was on the development of a surveillance system for emergency department presentations for self-harm in Victoria, Australia.[164] This presentation highlighted the common pitfalls of existing self-harm data collection methods and the importance of a timely, emergency department level, multicenter surveillance system. Again, important practical challenges such as variable and unstable funding sources and limited appropriate utilization of ICD-10 codes were highlighted. This presentation also described the capacity for machine learning and natural language processing as a means of detecting suicidal behaviors in clinical notes which is an important future direction for the field of suicide prevention and surveillance. Various practical applications of the self-harm monitoring system were also provided which demonstrated the importance and the capacity for a timely surveillance system in responding to crucial events (e.g., media, pandemics etc.).

The two country level showcases provided an interesting and important opportunity for roundtable guests to ask questions and discuss novel methods of surveillance, for example, the use of paramedic records in Australia.[165] The benefits and limitations of the use of, and reliance upon, ICD-10 codes were also discussed. Issues included inter-rater reliability, the potential for missed cases when external codes are omitted (e.g., intentional/unintentional), the differing priorities for use of the codes

[163] Practice manual for establishing and maintaining surveillance systems for suicide attempts and self-harm. Geneva: World Health Organization; 2016
[164] Robinson J, et al. Development of a self-harm monitoring system for Victoria. *International Journal for Environmental Research and Public Health.* 2020;17:9385
[165] Lubman DI, et al. National ambulance surveillance system: A novel method using coded Australian ambulance clinical records to monitor self-harm and mental health-related morbidity. *PLoS ONE.* 2020;15(7):e0236344

(e.g., billing purposes vs. surveillance), and the importance of working collaboratively with emergency departments and staff. Recordings of the showcase presentations will be made available to members of the regional network and stored on the online knowledge hub.

The Western Pacific Regional Sentinel Surveillance System of Suicidal Behavior (WPR4S) – Preliminary Framework

The second half of the virtual event was structured around the introduction of a preliminary framework for the regional surveillance of self-harm. Based upon the background research activities, researchers from the Australian Institute for Suicide Research and Prevention developed a preliminary version of the WPR4S framework, including feasible indicators for suicide, self-harm, and suicidal ideation. Professor Kõlves presented on the initial development of this framework as provided to WPRO (see below).

The objective of the roundtable discussion was to collaboratively inform and refine the framework, continue with mapping proposed indicators and surveillance activities across the region, determine the needs and priorities for suicide prevention in general across the countries, and identify possible areas of future technical support. Country representatives and experts were also encouraged to ask questions from each other and the presenters. There was keen interest in the roundtable panel on the use of machine learning and natural language processing for surveillance and the novel application of ambulance databases. Issues with whole-of-country coverage and the benefits of scaling up self-harm systems from one or more centers were discussed, particularly for countries with limited resources. Specific advice on establishing connections between different stakeholders involved in surveillance (e.g., police, healthcare) was sought and provided.

However, due to time zone differences for experts across the WPR and Europe, the allocated time for discussion fell short of the objectives with regards to providing feedback on the preliminary framework. Nevertheless, the roundtable showcase and discussion provided an important opportunity for establishing and strengthening collaborative discussion among suicide prevention experts across the region.

Future directions

To ensure the WPR4S Framework is a collaborative endeavor, attendees will be offered the opportunity to provide written feedback on the framework document. In particular, local opinion on the feasibility of proposed indicators will be sought. As a WHO Collaborating Center, researchers from the Australian Institute for Suicide Research and Prevention also propose to conduct ongoing country level interviews/discussions to further identify needs with regard to suicide prevention across low-

and middle- income countries in the Western Pacific. The 'knowledge hub' will continue to be updated where relevant. The 10th Asia Pacific Conference (International Association for Suicide Prevention) in May 2022 provides an important regional event whereby roundtable attendees can present the outcomes of their work in suicide prevention to an international audience, and where further networking with interested parties across the Western Pacific region may result in an expansion of the current network of experts. It is hoped that future roundtable events on various aspects of suicide prevention are held, further strengthening network connections, increasing opportunities for shared knowledge, and enhancing support and prioritization of the implementation and evaluation of suicide prevention activities across the region.

Roundtable letter of invitation

Griffith UNIVERSITY
Queensland, Australia

Australian Institute for Suicide Research and Prevention & WHO Collaborating Centre for Research and Training in Suicide Prevention, School of Applied Psychology
Mount Gravatt
Griffith University, Queensland 4222
Australia
k.kolves@griffith.edu.au

SUICIDE AND SELF-HARM PREVENTION IN THE WESTERN PACIFIC

Regional expert roundtable discussion and showcase

December 2021

Dear INSERT

Preventing suicide and self-harm remains an important public health priority across the Western Pacific, with particularly high rates observed across the Pacific Islands and the Republic of Korea. With the recent release of the World Health Organization's LIVE LIFE suicide prevention implementation guide for countries, there has never been a timelier opportunity to come together to discuss current and future suicide prevention across the region. The *Australian Institute for Suicide Research and Prevention* is planning a virtual roundtable discussion and showcase with experts in suicide prevention across the Western Pacific Region. This discussion is taking place as part of a current research collaboration with the *World Health Organization Western Pacific Regional Office (WPRO)*.

The discussion will provide an important opportunity for local representatives from academia, non-governmental and governmental departments to come together to discuss the current situation in relation to suicide prevention in their country, provide a showcase of regional activities, as well as articulate needs and preferences for strengthening prevention efforts in the future. These discussions are intended to **enhance collaboration across the region, facilitate shared learning, and identify areas for further technical support**. While participants are encouraged to share knowledge, expertise, and needs in relation to all areas of suicide and self-harm prevention there will be a particular focus on **surveillance and data collection**. There will be opportunity to discuss the feasibility of, and make contributions to, a framework for a regional sentinel surveillance system of self-harm for the Western Pacific Region.

Current efforts in suicide surveillance across the Western Pacific Region will be shared and learnings from the WHO/START (Suicides in At-Risk Territories) Study will be discussed. In addition, Professor Ella Arensman (Research Professor, School of Public Health & Chief Scientist with the National Suicide Research Foundation, University College Cork, Ireland) will share insight on her experiences establishing self-harm surveillance systems around the world, including low- and middle-income countries.

Considering your work and expertise, we are inviting you to join us for this important virtual roundtable and showcase. We propose the **2nd of December 2021**. The virtual meeting will take **three hours** and every effort will be taken to accommodate your respective time zone. A final program will be supplied upon confirmation of attendance. Please advise of your interest and availability to participate as soon as possible.

Best Wishes,
Associate Professor Kairi Kõlves
Principal Research Fellow Australian Institute for Suicide Research and Prevention
& Director WHO Collaborating Centre for Research and Training in Suicide Prevention
School of Applied Psychology, Griffith University

Event Program

Suicide and self-harm prevention in the Western Pacific Region – Virtual Roundtable Program
Thursday 2nd December 2021

Meeting Details

Host: Australian Institute for Suicide Research and Prevention (Griffith University) - in collaboration with World Health Organization Western Pacific Regional Office
Location: Microsoft Teams (Invite supplied via email)
Date: 2nd December 2021
Time: 12pm – 3pm AEST/Brisbane Australia Time (see below)
Etiquette: While listening to presenters please keep your camera switched off and your microphone muted. There will be ample opportunity to ask questions and engage in the roundtable discussion where you will be asked to have your camera and microphone switched on. Thank you.

Start: Session 1 – Surveillance showcase	**10:00 PHST/Manila & HKT/Hong Kong & CST/Beijing** **11:00 JST/Tokyo & KST/Seoul** **12:00 AEST/Brisbane** **13:00 AEDT/Melbourne** **14:00 FJT/Suva** **15:00 TOT/Nuku'alofa** **02:00 GMT/Dublin**
Welcome	Associate Professor Kairi Kõlves
Introduction of the project (5 min)	Dr Martin Vandendyck
Introductions of participants (15 min)	Everybody
Background activities (10 min)	Dr Sharna Mathieu
Sentinel Surveillance in the Region (10 min)	Associate Professor Kairi Kõlves
Country showcase example: Philippines (15 min)	Paula Melizza V. Valera, Caroline Mae Ramirez, Gabriel Soong
Country showcase example: Australia (15 min)	Dr Katrina Witt
Questions/Roundtable discussion #1 (20 min)	Everybody
Break (5 minutes)	
Start: Session 2 – Expert presentations and roundtable	**11:40 PHST/Manila & HKT/Hong Kong & CST/Beijing** **12:40 JST/Tokyo & KST/Seoul** **13:40 AEST/Brisbane** **14:40 AEDT/Melbourne** **15:40 FJT/Suva** **16:40 TOT/Nuku'alofa**

	03:40 GMT/Dublin
Roundtable Group Discussion #2 (40 minutes) Presentation: Experiences of the WHO/START (Suicides in At Risk Territories) Study (10 min) Presentation: Establishing and maintaining suicide and self-harm surveillance in low- and middle- income countries (15 min) Questions/Roundtable discussion #3 (10 min) Close (5 minutes)	Everybody Professor Diego de Leo Professor Ella Arensman Everybody Associate Professor Kairi Kõlves
Finish	**13:00 PHST/Manila & HKT/Hong Kong & CST/Beijing** **14:00 JST/Tokyo & KST/Seoul** **15:00 AEST/Brisbane** **16:00 AEDT/Melbourne** **17:00 FJT/Suva** **18:00 TOT/Nuku'alofa** **05:00 GMT/Dublin**

Roundtable guest list

Suicide and self-harm prevention in the Western Pacific Region – Virtual Roundtable Guest List (December 2021)

Preventing suicide and self-harm in the Western Pacific region is an important public health priority. The purpose of the virtual roundtable is to provide an opportunity for representatives across academia, non-governmental and governmental departments to come together to discuss current and future suicide prevention within their country and across the region. The virtual roundtable will also include a showcase of regional activities, as well as provide a forum for participants to articulate needs and preferences for strengthening prevention efforts in the future. These discussions are intended to **enhance collaboration across the region, facilitate shared learning, and identify areas of technical support**. While participants are encouraged to share knowledge, expertise, and needs in relation to all areas of suicide and self-harm prevention there will be a particular focus on **surveillance and data collection**. There will be opportunity to discuss the feasibility of, and make contributions to, a **framework for a regional sentinel surveillance system for the Western Pacific Region**, including ongoing mapping of surveillance activities or plans, determining local priorities and barriers to surveillance, and clarifying feasible indicators and expectations.

Host: Australian Institute for Suicide Research and Prevention & WHO Collaborating Centre for Research and Training in Suicide Prevention, School of Applied Psychology, Griffith University (Australia)
Organiser & Presenter: Associate Professor Kairi Kõlves
Senior Research Assistant & Presenter: Dr Sharna Mathieu

Invited Presentations

Professor Ella Arensman Research Professor School of Public Health & Chief Scientist National Suicide Research Foundation, University College Cork **Topic: Establishing and maintaining suicide and self-harm surveillance in low- and middle- income countries**
Professor Diego de Leo AO Director, Slovene Centre for Suicide Research, Primorska University, Slovenia **Topic: Experiences of the WHO/START (Suicide in At Risk Territories) Study**
Dr Katrina Witt Senior Research Fellow in Suicide Prevention, Orygen Centre for Youth Mental Health **Country showcase example: Developing a surveillance system for emergency department presentations for self harm in Victoria Australia**
Paula Melizza V. Valera, Caroline Mae Ramirez, Gabriel Soong Alliance for Improving Health Outcomes **Country showcase example: Developing a data registry for self-harm surveillance: The Philippine experience**

Guest List (Alphabetical order of country)

Australia	Associate Professor Jo Robinson, Head of Suicide Prevention Research, Orygen Centre for Youth Mental Health Dr Katrina Witt, Senior Research Fellow, Orygen Centre for Youth Mental Health Mr Chris Killick-Moran, Suicide and self-harm monitoring unit, Australian Institute for Health and Welfare Dr Greg Armstrong, IASP Regional Suicide Prevention Networks Coordinator (Western Pacific), The University of Melbourne Associate Professor Kairi Kõlves, Australian Institute for Suicide Research and Prevention; WHO Collaborating Centre for Research and Training in Suicide Prevention; School of Applied Psychology, Griffith University

	Dr Sharna Mathieu, Australian Institute for Suicide Research and Prevention; WHO Collaborating Centre for Research and Training in Suicide Prevention; School of Applied Psychology, Griffith University
China / Hong Kong	Professor Paul Yip, Centre for Suicide Research and Prevention, University of Hong Kong Dr Yongsheng Tong, WHO Collaborating Centre for Research and Training in Suicide Prevention, Beijing Huilongguan Hospital
Fiji NB: Could not attend	Dr Jennifer Hall, Technical Officer, Mental Health and Substance Use, WHO Division of Programme for South Pacific, WHO Dr Devina Nand, Head of Wellness, Fiji Ministry of Health and Medical Services Wellness Unit Tavaita Sorovanalagi, National Project Suicide Prevention Officer, Fiji Ministry of Health and Medical Services Wellness Unit
Ireland / Italy	Professor Ella Arensman, School of Public Health, College of Medicine and Health, National Suicide Research Foundation; WHO Collaborating Centre for Surveillance and Research in Suicide Prevention, Visiting Professor Griffith University Emeritus Professor Diego de Leo, Griffith University, Australia; Director, Department of Psychology and Slovene Centre for Suicide Research, Primorska University, Slovenia; President, De Leo Fund, Italy
Japan	Dr Yoshi Takahashi, Manager of Department of Study on Suicide Data Analysis, WHO Collaborating Centre for Research and Training in Suicide Prevention, Japan Suicide Countermeasures Promotion Center Professor Yutaka Motohashi, IASP Regional Suicide Prevention Networks Coordinator (Western Pacific)
Mongolia	Dr Oyunsuren Davaasuren, Department of Mental Health, School of Medicine, Mongolian National University of Medical Science Professor Khishigsuren Zuunnast, Department of Mental Health, School of Medicine, Mongolian National University of Medical Science
Philippines	Paula Melizza V. Valera, Team Lead, Alliance for Improving Health Outcomes Caroline Mae Ramirez, Alliance for Improving Health Outcomes Gabriel Soong, Alliance for Improving Health Outcomes
Republic of Korea	Dr Tae-Yeon Hwang, President of the Korea Foundation for Suicide Prevention
Tonga	Reverend Fili Lilo, Secretary for the Tonga National Forum of Church Leaders, CO/ Ministry of Internal Affairs Dr Mapa Puloka, Focal point for mental health in the Ministry of Health Dr Yutaro Setoya, Technical Officer, Mental Health and Substance Use, WHO Country Liaison Officer in Tonga
World Health Organization	Dr Martin Vandendyck, Technical Lead, Mental Health and Substance use, Division of Programmes for Disease Control, WHO Western Pacific Regional Office Dr Jason Ligot, Communications and Mental Health Promotion, WHO Western Pacific Regional Office Dr Alexandra Fleischmann, Scientist from the Department of Mental Health and Substance Abuse, WHO (Could not attend)

Background activities presentation (December 2021)

Suicide and self-harm prevention in the Western Pacific: Regional expert roundtable discussion and showcase

BACKGROUND ACTIVITIES

Dr Sharna Mathieu & Dr Kairi Kõlves

Australian Institute for Suicide Research and Prevention
WHO Collaborating Centre for Research and Training in Suicide Prevention
School of Applied Psychology
Griffith University

Acknowledgements:
Dr Martin Vandendyck (WPRO)
Dr Jason Ligot (WPRO)
Cassie Redlich (WPRO)
Dr Alexandra Fleischmann (WHO)

Overview of suicide in the Western Pacific

- Approximately 703,000 people died by suicide around the world in 2019 (WHO, 2021)
  - Around 23% in the **Western Pacific Region**
- Age-standardised rates particularly high in Republic of Korea, Mongolia and across the Pacific Islands
  - Quality of data is variable
- Accurate, comprehensive, and timely surveillance of **suicidal thoughts and behaviours, including self-harm,** is crucial for prevention and can inform priorities for national strategies

Strengthening evidence-based and data-informed suicide prevention in the Western Pacific Region

- As a WHO Collaborating Centre - In 2021 we conducted a series of research activities for the **World Health Organization Regional Office for the Western Pacific (WPRO)**

Aim: To support the strengthening of evidence-based and data-informed suicide prevention strategies in the Western Pacific Region and provide strategic guidance for the development of a **regional sentinel surveillance system for suicide and self-harm prevention**

Research Activities – Rapid reviews and regional case study

- We conducted a series of **rapid mapping reviews of English language** papers published from 2015 – 2021 on PubMED
- We focused on Australia, China, Fiji, Japan, Mongolia, Philippines, Republic of Korea, Tonga
- We also conducted interviews with suicide prevention experts in Republic of Korea – regional case study on the implementation of their national strategy

1. Map existing suicide and self-harm health information systems

2. Summarize information on key risk and protective factors

= Determine feasible indicators for suicide and related data collection for regional framework

Results: Mapping of health information systems and summarising feasible indicators

- Most countries do have CRVS systems for causes of death & WHO Global Health Estimates
  - Enhance quality in low- and middle- income countries

Table 1. Self-harm related health information data sources

	Australia	China	Fiji	Japan	Mongolia	Philippines	Republic of Korea	Tonga
Purpose built Self-harm/Suicide Attempts Surveillance Systems	Y (specific to state of Victoria)	Unclear	Unclear	Unclear/In development	Unclear	Unclear	Unclear	Unclear
Hospital and Emergency Department Admission Databases	Y (National Hospital Morbidity Database)/ Y (regional & state based)	Unclear/Y (regional?)	Y (Public Health Information System)/ Y (TRIP – regional? Ongoing?)	Y/ Unclear if separate to ED visits (See below)	Unclear	Y (ONEISS – unclear if just hospital admissions or ED visits also)	Y (health insurance info)/ Y expanding ED	Unclear
Ambulance Databases	Y (early stages)	Unclear	Unclear	Unclear (Osaka based study)	Unclear	Unclear	Unclear	Unclear
Periodical Surveys	Y (infrequent)	Y	Y	Y	Y	Y	Y	Y
Crisis Helplines	Y	Y	Y	Y	Unclear	Y	Y	Y

*Based on English Language publications!

Results: Mapping of health information systems and summarising feasible indicators

Barriers to high quality surveillance/data collection of suicide and self-harm:

- Consistent definitions/terminology (especially for self-harm)
- Not everyone who is experiencing suicidal ideation or has attempted suicide presents to health services
- Stigma (contributes to the former)
- Funding and multisectoral collaboration

= Possible missed cases and opportunities for intervention and understanding

Results: Summary of key evidence on risk and protective factors on suicidality and suicide mortality in the region

Risk groups
- Men
- Older age in some countries
- People in rural areas
- Recent hospital admission or chronic illness
- Those in high-risk occupations (e.g., construction)
- Indigenous and minority groups

Main means
- Hanging
- Self-poisoning (e.g., pesticides and medication)

Risk correlates
- Environmental (e.g., drought, flooding, climate change)
- Substance use
- Loneliness, depression, and other mental illnesses
- Negative life events

Protective factors/correlates
- Social support, positive self-esteem

Risk groups
- Women (particularly young women)
- Youth
- Indigenous
- LGBTQ+

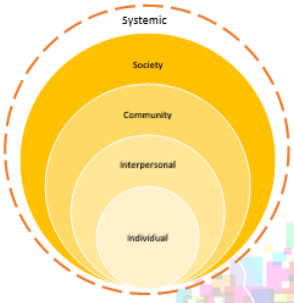
Main means
- Self-cutting
- Self-poisoning

Risk correlates
- Previous self-harm
- Borderline Personality traits, impulsivity, substance use
- Mental illness symptoms & hopelessness
- Bullying, social isolation
- Poverty, financial strain, low education

Protective factors/correlates
- Resilience, coping and adaptive emotion regulation strategies

Key models of suicide risk

- Risk correlates and groups map well onto existing models
  - Biopsychosocial model of suicide risk (Turecki et al., 2019)
  - Key risk factors and associated interventions (WHO, 2014)
  - Interpersonal theory of suicide (Van Orden et al., 2010)
- Provide important information on targets for interventions



Based on:
WHO 2014, p.31

Engage with regional experts: Case study on multisectoral national strategy for suicide prevention

- Interviews with experts:
  - Dr Hwang (President of the Korea Foundation for Suicide Prevention)
  - Dr Jeon (Department of Psychiatry, Samsung Medical Centre & Previous Director Korean Psychological Autopsy Centre)
- Key components of their national plan
  - Multisectoral action plan
  - Importance of surveillance/data collection of suicide, self-harm, and mental health (risk factors)
  - Evidence-base and ongoing evaluation
  - Broadscale community level gatekeeper training
  - Means restriction (e.g., effectiveness of pesticide regulation)
  - Media guidelines
  - Mental health promotion, literacy, andstigma reduction

These correspond to recent key components of WHO LIVE LIFE Guidelines (2021) and of National Strategies identified in Platt et al., 2019

Feasibility, practicality, and operational considerations for a regional sentinel surveillance system

- There is considerable opportunity for a regional sentinel surveillance system of self-harm
- A collaborative framework needs to be developed – **Western Pacific Regional Sentinel Suicide Surveillance System (WPR4S) Framework**
  - Mindful of practical and ethical considerations
  - Need ongoing mapping of surveillance activities and plans informed by local experts
  - Need to identify areas for technical support, training, or assistance
  - Need to clarify/confirm feasible indicators, barriers, and facilitators

The learnings from today's roundtable will be very useful

Thank you!

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Preliminary WPR4S Presentation (December 2021)

Sentinel Surveillance in the Region – Proposing a framework and feasible indicators

Dr Kairi Kõlves & Dr Sharna Mathieu
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Acknowledgements:
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Dr Alexandra Fleischmann (WHO)

Surveillance is the cornerstone of successful suicide prevention (WHO, 2014)

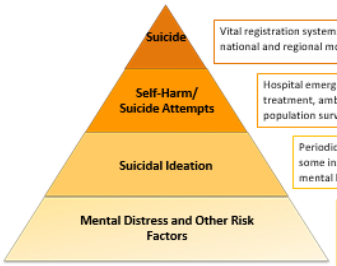
LIVE LIFE Implementation Foundations (WHO, 2021)

Source: WHO 2021, p.2

Surveillance in the time of COVID-19

- A timely example of the importance of suicide surveillance is the recent global pandemic and unknown implications for suicide and self-harm
- Surveillance systems and databases around the world have facilitated rapid identification of trends and vulnerable groups

Sources and indicators of the surveillance of suicidal behaviors, ideation, and mental distress



Vital registration systems; coronial data, police records, national and regional mortality statistics etc.

Hospital emergency department visits, hospital inpatient treatment, ambulance/emergency records, periodical population surveys etc.

Periodical population surveys, hospital presentation in some instances where ideation is severe, crisis hotlines, mental health services, primary care clinicians etc.

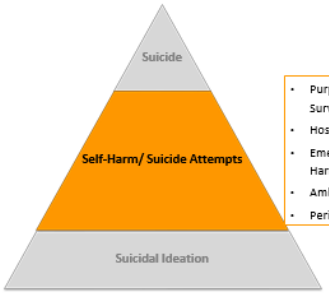
Periodical population surveys, hospital presentation in some instances, drug and alcohol services, social welfare databases, healthcare systems, data linkage, crisis hotlines, mental health services, primary care clinicians etc.

Based on the 'Iceberg Model' of suicide and self-harm (McMahon et al., 2014) for surveillance indicators (Pollock et al., 2018)

Proposed indicators for the Western Pacific Regional Sentinel Surveillance System on Suicidal Behavior (WPR4S Framework)

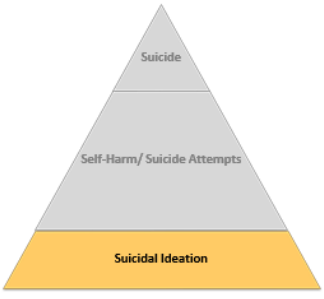
- National/ Regional Vital Registration Systems including information on suicide (improvements needed in LMICs)
- WHO Global Health estimates on suicide

Proposed indicators for the Western Pacific Regional Sentinel Surveillance System on Suicidal Behavior (WPR4S Framework)



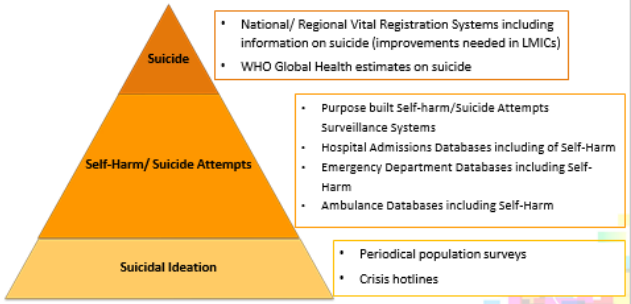
- Purpose built Self-harm/Suicide Attempts Surveillance Systems
- Hospital Admissions Databases including of Self-Harm
- Emergency Department Databases including Self-Harm
- Ambulance Databases including Self-Harm
- Periodical population surveys

Proposed indicators for the Western Pacific Regional Sentinel Surveillance System on Suicidal Behavior (WPR4S Framework)



- Periodical population surveys
- Crisis hotlines

Proposed indicators for the Western Pacific Regional Sentinel Surveillance System on Suicidal Behavior (WPR4S Framework)



Next steps– WPR4S Framework

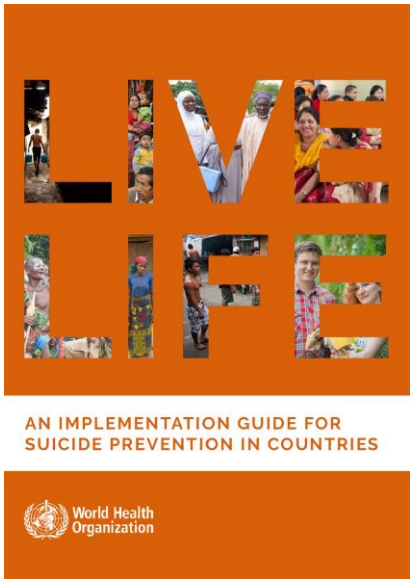
The aim is to work towards establishing and further maintain a sentinel surveillance system of suicide and self-harm (including suicide attempts) across the region.

Focus on

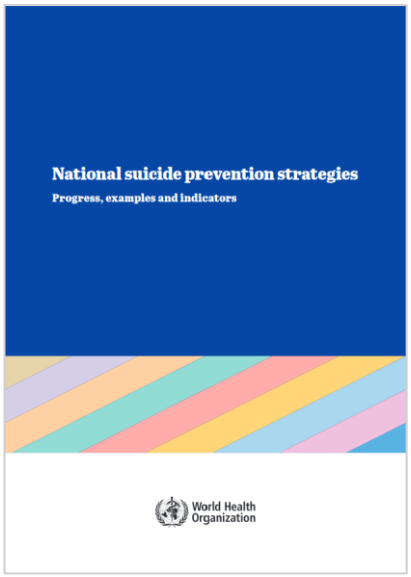
- Set up and build capacity for establishing suicide attempt/self-harm surveillance systems.
- Collaborate on a framework and associated data collecting/sharing activities for a sentinel regional surveillance system of suicidal behaviors and ideation.

Thank you!

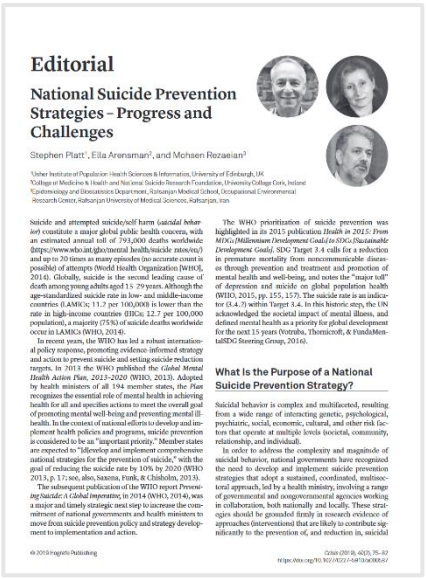
Appendix F – List of helpful resources



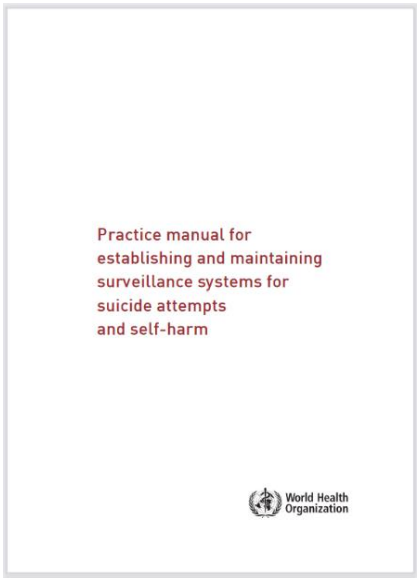
LIVE LIFE: An Implementation Guide for Suicide Prevention in Countries, World Health Organization, 2021; WHO: Geneva



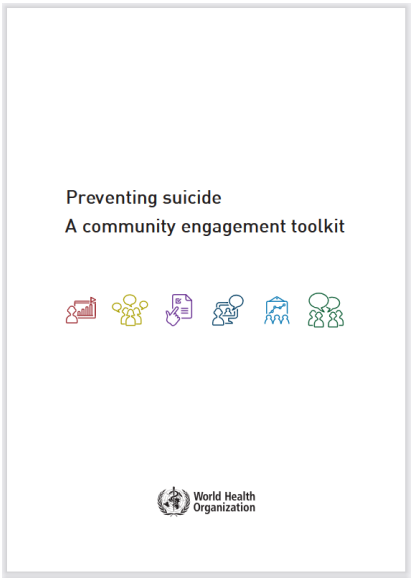
National suicide prevention strategies: Progress, examples and indicators, 2018; WHO: Geneva



Platt, S., Arensman, E. & Rezaeian, M. (2019). National Suicide Prevention Strategies – Progress and Challenges. Crisis, 40(2), 75-82.



Practice manual for establishing and maintaining surveillance systems for suicide attempts and self-harm, 2016; WHO: Geneva



Preventing suicide: A community engagement toolkit, 2018; WHO: Geneva