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Strengthening regional public health intelligence: insights and experiences from the Pacific Public Health Surveillance Network, 2023

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Abstract

Objective

This study aimed to evaluate the performance of the Pacific Public Health Surveillance Network (PPHSN) from the perspective of those who use it to determine whether it had helped to strengthen surveillance and response in the Pacific Island countries and territories (PICTs). The evaluation focused on the six established service arms.

Methods

An online, bilingual (English and French) cross-sectional survey was administered in October–November 2023. Respondents were recruited using convenience sampling. Survey domains included demographics of the respondents and their understanding of the PPHSN's purpose, engagement with its surveillance arms, utilization of tools and guidance, and perceived strengths and challenges. Summary statistics were calculated. PPHSN activities were systematically mapped against the International Health Regulations IHR (2005) core capacities.

Results

After excluding 37 surveys for incomplete responses, a total of 149 respondents completed the survey (80%)., including public health officers (77; 52%) and respondents working at the national level (76; 51%). The most commonly identified purpose for PPHSN (42; 28%) is as a "communication platform for surveillance and response". High proportions of respondents found PPHSN services to be useful, depending on the service arm; for example, 55/60 (92%) found the weekly outbreak map moderately to extremely useful and 55/59 (93%) found surveillance through PPHSN effective for early warnings and emergency responses. Challenges were identified with deployment and retention of the trained workforce, timely data reporting, a lack of routine monitoring, and funding to maintain PPHSN.

Discussion

Since inception, participants perceive that PPHSN has supported and strengthened regional surveillance and response. Evaluation findings supported the need for coordinated investments, multisectoral collaboration and sustained capacity-building to advance regional health security in the PICTs.

INTRODUCTION

Pacific Island countries and territories (PICTs) face unique public health and infectious disease challenges due to the difficulties of providing health services to small, geographically dispersed populations in areas with few transport links, which increases the burden of noncommunicable diseases,

chronic workforce shortages and other logistical issues associated with island nations.[1] According to the 2019 Global Burden of Disease study, the proportion of disability-adjusted life-years attributed to infectious diseases in PICTs is 29.3%, surpassing that of other regions, including South-East Asia at 21.46%, which has comparable climate-related risks.[2,3]

The Pacific Public Health Surveillance Network (PPHSN), established in 1996 by the Pacific Community (SPC), previously known as the South Pacific Community, and the World Health Organization (WHO), aims to strengthen regional surveillance by enhancing cooperation, harmonization of data systems, training and timely communication.[4–6] The Network supports PICTs in meeting International Health Regulations (IHR; 2005) obligations across the core capacities of surveillance, laboratory capacity, preparedness and health security.[7] The PPHSN has seven service arms: PacNet (outbreak alert and communication, established in 1997), LabNet (laboratory network coordination, established in 2000), the Pacific Infection Prevention and Control Network (PICNet, established in 2006), EpiNet (outbreak response teams, established in 2001), the Pacific Syndromic Surveillance System (PSSS, established in 2010), Strengthening Health Intervention in the Pacific–Data for Decision Making (SHIP–DDM, established in 2014), and the Pacific Vector Network (PVN, established in 2023).[4] The PSSS was first piloted in Tuvalu, adapted from an outbreak surveillance model from Africa, and subsequently adopted across the PICTs.[8,9]

PPHSN's core members include ministries of health (MOH) from the 22 PICTs.[10] Allied members comprise regional training institutions, laboratories and other organizations involved in public health surveillance.[4,7] A Coordinating Body governs PPHSN and is responsible for its strategic direction and monitoring its activities.[4,11] The Coordinating Body consists of seven core members representing MOHs or related departments ; there are also six allied members, four of whom are permanent, and two of whom are chosen from among allied institutions every 3 years.[4,11]

Evaluation of public health surveillance systems is critical to identify strengths and weaknesses, improve data quality and system performance, and determine whether surveillance activities meet public health objectives and strategic priorities.[12–14] Although components of the PPHSN have undergone reviews,[15–17] the Network has not been formally evaluated. With the support of the Coordinating Body, in 2023, an evaluation of the PPHSN was conducted to assess the status, effectiveness and impact of its six service arms (as PVN was launched in 2023, it was not included) and to identify opportunities to strengthen regional surveillance and health security. This study specifically presents findings from an online survey of PPHSN's users.

METHODS

Technical Advisory Group

A Technical Advisory Group (TAG) comprising public health experts from the Coordinating Body (Solomon Islands MOH, SPC, the WHO Division of Pacific Technical Support, and the United States Centers for Disease Control and Prevention) was formed at the inception of the evaluation. The TAG members reviewed study tools, supported recruitment and ensured findings were contextually relevant.

Study design

The complete evaluation included a document review, a bilingual (English and French) online survey, focus group discussions with policy- and decision-makers, and laboratory and surveillance data analyses.[18] This study presents findings from the online survey of PPHSN users. For the purposes of the survey, users included managers and staff of surveillance and response programmes, development assistance agencies and other staff responsible for implementing PPHSN functions.

The survey was designed to inquire about users' understanding of PPHSN's goals and objectives and included five domains: demographics of respondents (Supplementary Material 1); and their understanding of PPHSN's purpose, engagement with its service arms, utilization of tools and guidance, and perceived strengths and challenges. The survey consisted primarily of close-ended questions with several conditional free-text fields to provide extended responses. The survey was distributed via Qualtrics (Provo, UT, USA) (Supplementary Material 1). The survey was developed in English and then translated into French using Qualtrics' automatic translation capabilities. A certified translator from SPC reviewed the translation for accuracy. TAG members reviewed and pilot-tested the survey alongside the research team to ensure clarity, relevance and logical flow.

Data collection and recruitment

Respondents were recruited using convenience sampling through SPC contact lists, the TAG members' professional networks, and by distributing the survey through PacNet's electronic mailing list. The survey used open convenience sampling without a defined sampling frame. The survey was open from 16 October to 6 November 2023, with reminder emails sent during the final week of October. The survey allowed respondents to select and answer questions about their direct involvement in PPHSN's arms, with respondents completing only the sections relevant to the service arm (or arms) with which they were engaged.

Data analyses

Summary statistics were used to describe respondents' characteristics and responses to the survey sections. Microsoft Excel (v. 2603) and R Studio[19] were used for analysis. Narrative analysis was conducted on the free-text responses to identify common themes. All results were synthesised to identify key recommendations to support PPHSN's 5-year strategic plan. PPHSN activities were also

systematically mapped by the authors against the International Health Regulations IHR (2005) core capacities.

RESULTS

A total of 186 responses to the survey were received, of which 37 (20%) were incomplete and were excluded. The remaining 149 (80%) were included in the final analyses. Of the 149 respondents, 110 (74%) worked in government health departments, 23 (15%) in nongovernmental organizations, six (4%) in hospitals, five (3%) in other government departments, two (1%) in academic institutions and three (2%) in other sectors (Table 1). Respondents primarily worked at the national level (76; 51%), followed by regional or multi-jurisdictional levels (36; 24%). Roles included public health officers (77; 52%), health facility workers (24; 16%), leadership positions (23; 15%), laboratories (9; 6%), research/data analysts (5; 3%) and health educators (4; 3%). The majority (102; 68%) had 10 or more years of public health experience, with 71 (48%) having 6 or more years of experience with PPHSN (Table 1). The demographic characteristics of survey respondents are presented in Supplementary Table 1.

Table 1
Professional characteristics of survey respondents (*N* = 149)

Characteristic	No. (%)
Current organization[a]	
Ministry of Health	110 (74)
Nongovernmental organization	23 (15)
Hospital	6 (4)
Other government department	5 (3)
Academic	2 (1)
Other	3 (2)
Primary role	
Public health officer	77 (52)
Health facility worker	24 (16)
Health leadership	23 (15)
Laboratory officer	9 (6)
Research/data analysts	5 (3)
Health educator	4 (3)
Other	7 (5)
Jurisdiction	
National level	76 (51)
Regional/multi-jurisdictional	36 (24)
Provincial/divisional level	22 (15)
Community level	15 (10)
Years of experience in public health[+]	
1–4 years	21 (14)
5–9 years	26 (17)
≥ 10 years	102 (68)
Years of experience with PPHSN	

[a] Responses may not add up to 100% due to rounding.

Characteristic	No. (%)
< 1 year	24 (16)
1–5 years	54 (36)
6–10 years	30 (20)
11–15 years	28 (19)
≥ 16 years	13 (9)
[a] Responses may not add up to 100% due to rounding.	

Perceptions of the main purpose of PPHSN varied. The most commonly identified purpose (42; 28%) is “communication platform for surveillance and response”, followed by 34 (23%) who saw it as “strengthening outbreak detection and response”, and 27 (18%) who viewed it as a mechanism for “strengthening health systems” (Table 2).

Table 2
Main purpose of the Pacific Public Health Surveillance Network as reported by survey respondents

Response	No (%)
Communication platform for surveillance and response	42 (28)
Strengthening outbreak detection and response	34 (23)
Strengthening health systems	27 (18)
Advancing regional approaches to public health security	21 (14)
Strengthening laboratory capacity in the Pacific	9 (6)
Capacity building on epidemiology and data management	7 (5)
Syndromic surveillance	7 (5)
Other	2 (1)

PPSHN arms

PacNet

Of the 149 respondents, 60 (40%) completed the PacNet section of the survey (Supplementary Table 2). Among these, the majority (53; 88%) reported receiving PacNet alerts, and 41 (68%) indicated they had used the platform to disseminate alerts about outbreaks or public health emergencies. Respondents were asked to select among ten choices all of the benefits of PacNet, and the top four were providing alerts of potential threats (56; 93%), outbreak response (43; 72%), public health prevention and control

measures (42; 70%), and supporting preparedness and planning (41; 68%). Furthermore, 55 (92%) respondents found the weekly outbreak map shared on PacNet to be moderately to extremely useful. Most respondents (45; 75%) agreed that PacNet effectively facilitated communication.

Pacific Syndromic Surveillance System

Of the 149 respondents, 63 (42%) completed the PSSS section of the survey (Supplementary Table 3). The number of sentinel sites conducting syndromic surveillance varied from < 5 (20; 32%) to > 10 (15; 24%), with 9 respondents indicating that they did not know how many there were. Sixty respondents answered questions about the type of surveillance conducted at sentinel sites, with 47/60 (78%) indicating that national surveillance systems include both indicator-based surveillance and event-based surveillance. Furthermore, 55/59 respondents (93%) viewed the PSSS as moderately to extremely effective for disseminating early warnings and aiding emergency response. Respondents primarily utilized PSSS data to identify outbreaks (48; 81%), monitor diseases (48; 81%) and trigger investigations (45; 76%).

Of the 60 respondents who completed the question on the sources of syndromic data reported by sentinel sites, 37/60 (62%) reported using clinic or hospital logbooks, 28 (47%) weekly paper tally sheets, 25 (42%) electronic patient records and 14 (23%) event reporting forms. Frequent reporting delays were noted by 42 respondents (70%) (Supplementary Table 3). Among these, multiple challenges were reported, including tally sheets not being received on time by sentinel site staff (33/42; 79%), no or inconsistent internet coverage (20; 48%), insufficient mobile and internet data credit (15; 36%) and limited access to phones or computers (12; 29%).

LabNet

Of the 149 respondents, 30 (20%) completed the LabNet section of the survey (Supplementary Table 4). Of these, 26/30 (87%) reported an increase in laboratory capacity during the COVID-19 pandemic. Nearly all respondents (28; 93%) perceived LabNet as moderately to extremely effective in strengthening laboratory services. Respondents reported receiving training in various areas, including testing methodologies (22; 73%), laboratory equipment (17; 56%), management systems (12; 40%), procurement and stock management (10; 33%), sample referral networks (9; 30%) and occupational health and safety (8; 27%). Additionally, 12 (40%) reported using a laboratory information management system (LIMS). Among the 30 respondents who completed the LabNet section, 12 (40%) reported using a LIMS.. Only two of these 2 respondents (17%), from the Cook Islands and Guam, indicated that their LIMS reported data to PPHSN. Use of the PacNet-Lab email was reported by 12/30 respondents (40%), with 6 (20%) reporting that they did not know. The average time to receive confirmation on specimens from reference laboratories varied, with seven (23%) receiving confirmation results in < 1 week, 18 (60%) within 1–3 weeks, three (10%) after more than 4 weeks and 2 (7%) responding that they did not know.

Pacific Infection Prevention and Control Network

Of the 149 respondents, 16 (11%) completed the PICNet section of the survey (Supplementary Table 5). Among these, 13 (82%) rated PICNet as moderately to highly effective in building professional capacity in infection prevention and control (IPC). Of the 11 who answered, 10 respondents (91%) reported using the PPHSN Infection Prevention and Control Guidelines (2021)[20] often or sometimes, and nine (82%) indicated that their organizations had adjusted internal policies to align with these guidelines. Fourteen respondents (87%) found PICNet to be moderately to extremely effective in raising awareness about IPC issues. Twelve respondents (75%) reported the presence of trained IPC staff within their organizations. The top three categories in which IPC practices had changed included nine (56%) reporting improvements in IPC programme management, and eight each (50%) reporting enhanced hand hygiene practices and monitoring of IPC practices.

EpiNet

Of the 149 respondents, 47 (32%) completed the EpiNet section of the survey (Supplementary Table 6). Of these, 43 (91%) reported having a response team, while 33 (70%) indicated their team comprised ≥ 5 members. While EpiNet teams engaged in a range of activities to support the effective management and mitigation of health events, they also faced several challenges. Only 27 of 43 respondents (63%) indicated that their team is formally referred to as an EpiNet team. Most respondents (29; 63%) reported being deployed < 10 times in the prior 5 years, while 5 respondents (11%) had never been deployed. The majority (33; 72%) described their teams as well-prepared and offering a broad range of expertise, while a minority (13; 28%) indicated the need for improved resources and skills.

Strengthening Health Intervention in the Pacific–Data for Decision Making

Of the 149 respondents, 36 (24%) completed the SHIP–DDM section of the survey (Supplementary Table 7). Among these, 20 (55%) were current Postgraduate Certificate or Postgraduate Diploma in Field Epidemiology trainees and 16 (45%) were graduates of these programmes. Most respondents (28; 80%) reported enhanced networking capabilities. The majority (31; 86%) had participated in outbreak responses, including 30 (83%) during the COVID-19 pandemic. Only four respondents (11%) reported progressing to the Postgraduate Diploma in Applied Epidemiology. Thirty-four (95%) strongly or somewhat agreed that the training was relevant to their work. The majority (31; 86%) also reported receiving mentoring by faculty during the programme's Workplace Support module, during which participants apply epidemiology skills to public health tasks under faculty guidance. Of the 32 respondents who provided feedback on how helpful the SHIP–DDM training was, 31 (97%) rated it as moderately to extremely helpful.

DISCUSSION

In this first-ever systematic evaluation of the PPHSN, the Network was found to have made significant contributions towards strengthening public health surveillance and response across PICTs. Across service arms, survey respondents (PPHSN users) highlighted improved communication, enhanced

diagnostic capacity, strengthened IPC practices, expanded training opportunities, and contributions to early warning and event monitoring. These advances reflect PPHSN's role in supporting countries in meeting IHR (2005) surveillance and response obligations, as assessed through the authors' systematic mapping of PPHSN activities against IHR (2005) indicators.[7] The PPHSN has contributed to meeting core capacities, supporting real-time surveillance indicators D2.1 and D2.2, as well as laboratory indicators D1.1 and D1.2.[7] However, the study identified ongoing challenges and gaps, particularly in timely reporting, surveillance data quality, interoperability, operational coordination, and the consistent application of standardized procedures across PPHSN.

Delays and inconsistencies in data reporting, often due to infrastructure or resource limitations, unclear data sources, and underdeveloped or fragmented communication channels, were evident across several PPHSN service arms, including PacNet, PSSS and LabNet.[21,22] These challenges are not limited to the Pacific.[23] These findings underscore the global relevance of investing in interoperable, timely and coordinated communication systems to fulfil IHR (2005) obligations and strengthen epidemic preparedness.[7]

Delays in laboratory reporting were identified by respondents as a major concern, with turnaround times of 3–4 weeks reported in some PICTs.[21] While referral pathways for priority pathogens were in place, as indicated by PPHSN Regional Meeting notes, the absence of standardized procedures for data referral times limited their effectiveness, leading to delayed reporting.[24] LIMS use remained limited.[24] This limited interoperability also highlighted the challenges in meeting core capacities under the IHR (2005) and Joint External Evaluations, which emphasize the importance of comprehensive laboratory quality systems.[7] These issues are not unique to PICTs; similar challenges have been reported in multiple countries globally,[25–27] and within regional networks such as the Africa Cetres for Diseases Control and Prevention.[28] To address these challenges, the Coordinating Body should establish guidelines and routinely collect timeliness indicators across the Network, specifically capturing referral turnaround times for priority pathogens. Expanding the use of LIMS with a pathway for electronic reporting should also be considered to enhance data management and reporting efficiency. Emerging technologies also offer promising avenues to address delayed laboratory results. Point-of-care testing could reduce turnaround times in remote settings where specimen transport to reference laboratories is a major bottleneck.[29,30] While these innovations hold potential, their deployment in PICTs must account for limited infrastructure, regulatory frameworks, cold-chain requirements, and ongoing maintenance capacity.

Challenges with the timeliness of reporting by early warning systems in the Pacific are not new. This is coupled with previous evaluations that highlighted the need and opportunities to harmonize case definitions and enhance early detection.[15–17,31] Despite these efforts, persistent challenges continue to affect system performance.[15–17,31] This underscores the need to support and strengthen the epidemiology workforce, enabling national MOHs to prioritize and facilitate more timely reporting of

regionally significant public health events. Strengthening these capacities would enhance a national surveillance system's ability to rapidly detect, report and analyse public health data.[32]

Improvements in workforce capacity – in outbreak response skills, IPC practices, and laboratory capabilities across multiple service arms – were major achievements, but continue to be challenges for PPHSN. Respondents valued training delivered through SHIP–DDM, LabNet and PICNet, and reported improvements in skills and outbreak response experience. However, needs remain for more frequent training, ongoing mentoring, stronger retention strategies and broader access to competency-based development.[21,24,33] Training programmes should continue to prioritize continuing professional development and adherence to standardized guidelines to ensure the sustained quality of public health education and practice.[34] The limited deployment of staff trained in epidemiology raises the question about whether SHIP-DDM graduates are being placed in roles that allow them to apply their skills, and whether sufficient surge capacity exists to respond to concurrent or large-scale health events. Strengthening the systematic placement and utilization of field-epidemiology-trained staff within national MOH structures should be made an explicit PPHSN recommendation. Regional bodies could work with national governments to evaluate and map trained epidemiologists against deployment needs, and advocate for protected positions and institutional support to enable their sustained contribution to public health surveillance and response.[35]

Based on this evaluation, we provide recommendations to support PPHSN's future strategic plan (Table 3), including the use of a systematic monitoring, evaluation and learning framework to regularly review the performance of PPHSN. Examples of performance indicators are also proposed (Table 4). PPHSN's next 5-year strategy should also align more closely with the new WHO Pandemic Agreement,[36] the Asia Pacific Health Security Action Framework[37] and other related regional strategies. The Network should consider focusing on One Health, emphasizing cross-sectoral collaboration, integrated training programmes and a coordinated surveillance design. In line with this direction, the recent endorsement of PVN as the seventh service arm reflects the Network's expanding capacity in vector monitoring and surveillance.[38] To monitor progress and promote quality improvement, an indicator-based performance measurement framework should be developed, with baseline data, clear targets and regular performance reviews across all service arms. In parallel, a coordinated mechanism for technical assistance, led by SPC and WHO, and aligned across partners, would reduce duplication and maximize impact. An in-depth evaluation of each service arm is also recommended. Although the PPHSN Strategic Framework for 2026–2035 is still under development, the insights and recommendations outlined in this discussion may help shape its direction, ensuring that PPHSN remains a cohesive, adaptive and high-performing network, well-positioned to support PICTs in addressing evolving health security priorities.[1,34]

Table 3
Recommendations of activities for PPHSN's 5-year strategic plan*

Focus area	Short term (up to 2 years)	Medium-long term (3–5 years)
PPHSN governance and coordination	• The PPHSN–Coordinating Body should identify key priorities for the next PPHSN strategic plan. • The PPHSN–Coordinating Body should develop a monitoring, evaluation and learning framework to review the performance of PPHSN and its service arms to monitor progress on a regular basis (could be developed as part of the new strategic plan). Some proposed indicators that can be considered are provided in the next section by the review team.	• The PPHSN–Coordinating Body should identify opportunities to align PPHSN activities with global and regional health security and one health frameworks for e.g. through establishment of collaborative disease surveillance, meetings, and training. • PPHSN permanent allied members should encourage and provide technical support to each PICT to undertake in-depth evaluations of each service arm (e.g. PSSS, LabNet) to assess performance and identify gaps or challenges for future improvement. • The PPHSN–Coordinating Body should consider how best to ensure ongoing professional development for its members.
PacNet	• The PPHSN-Focal Point should consider the use of visualisation platforms and social media platforms for timely communication between PICTs.	• The PPHSN–Focal Point should review existing approaches for communication within the region and identify the best approaches in relation to coordination and dissemination of PPHSN data and information. • The PPHSN–Focal Point should review PacNet in relation to the types of information shared to ensure the service remains fit-for-purpose for dissemination of public health surveillance data and information across PICs and the broader network.

PICT: Pacific island countries and territories; PPHSN: Pacific Public Health Surveillance Network; PICNet: Pacific Infection Prevention and Control Network; PSSS: Pacific Syndromic Surveillance System; SHIP-DDM: Strengthening Health Interventions in the Pacific – Data for Decision Making

The recommendations of the activities are derived from a synthesis of the results of the evaluation and deliberations with the Technical Advisory Group, Table 4. Suggested indicators for PPHSN's monitoring and evaluation efforts

Focus area	Short term (up to 2 years)	Medium-long term (3–5 years)
PSSS	• The PPHSN–Focal Point should review processes and databases used for monitoring PSSS at a regional level. • The PPHSN–Coordinating Body should establish guidelines and collect completeness and timeliness indicators across the network.	• The PPHSN–Coordinating Body should review if PSSS is the best system for epidemic response considering the growing needs and expanded capacity in the PICTs (e.g. laboratory capacity, infection prevention and control.
LabNet	• The PPHSN–Coordinating Body should develop and implement guidelines to collect and analyse LQMS assessments across the network. • The PPHSN–Coordinating Body should establish guidelines and collect timeliness indicators across the network, specifically to capture referral turnaround times for priority pathogens.	• The PPHSN–Coordinating Body should conduct a needs-based assessment based on individual laboratories LQMS scoring to target training and laboratory development provided by PPHSN. • PPHSN should consider the implementation of digital laboratory information management systems throughout the network with pathways for electronic reporting into other PPHSN service arms. • The PPHSN–Coordinating Body should establish guidelines on resource maintenance to ensure critical laboratory infrastructure is maintained, replaced and updated.
PICNet	• The PPHSN–Coordinating Body should support the implementation of the 2021 infection prevention and control guidelines at health facility level in all PICTs.	• The PPHSN–Coordinating Body should consider comprehensive mechanism for end-to-end surveillance for infection prevention and control in each PICT.
EpiNet	• The PPHSN–Focal Point should develop an agile repository of team members within EpiNet. This is particularly important due to movement of staff from ministries of health internally as well as to technical partners in the region.	• The PPHSN–Coordinating Body should consider the role of deployable EpiNet teams within the PICs to enhance local surge capacity. • The PPHSN–Coordinating Body should consider ongoing professional development and systematic training of EpiNet teams.

PICT: Pacific island countries and territories; PPHSN: Pacific Public Health Surveillance Network; PICNet: Pacific Infection Prevention and Control Network; PSSS: Pacific Syndromic Surveillance System; SHIP-DDM: Strengthening Health Interventions in the Pacific – Data for Decision Making

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Focus area	Short term (up to 2 years)	Medium-long term (3–5 years)
SHIP–DDM	• The PPHSN–Coordinating Body should develop a complete database of graduates and their contact details.	• The PPHSN–Coordinating Body should review how to ensure field epidemiology training provided through SHIP–DDM is relevant for PICTs. • The PPHSN–Coordinating Body should consider the role of online and remote learning for their graduates.
PICT: Pacific island countries and territories; PPHSN: Pacific Public Health Surveillance Network; PICNet: Pacific Infection Prevention and Control Network; PSSS: Pacific Syndromic Surveillance System; SHIP-DDM: Strengthening Health Interventions in the Pacific – Data for Decision Making		
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Strengths and limitations

A key strength of this study was the strong leadership of a Pacific-led TAG, which ensured contextual relevance with regional priorities. TAG contributions were instrumental in refining tools and interpreting findings within Pacific health system realities. The survey captured perspectives from stakeholders across all 22 PICTs and allied partners, and bilingual (English and French) versions improved accessibility.

Our study had several limitations. Convenience sampling and recruitment via PPHSN channels may have introduced selection bias, favouring respondents more engaged with PPHSN activities or with better access to communication channels. As the sampling frame and total number of invitees were not recorded, a formal response rate could not be calculated, which limits our ability to assess non-response bias. The survey was cross-sectional and perception-based, so the findings reflect respondents' views at a single point in time. Survey findings indicate respondents' perceptions; however, the assessment of PPHSN's contribution to IHR (2005) core capacities was conducted separately by the authors through mapping of PPHSN activities against IHR (2005) indicators, and was not solely reliant on respondent-reported data. One in five surveys was incomplete and excluded from analysis. Potential reasons for non-completion were not explored, representing a further potential source of bias. Variations in the number of responses to queries about the different service arms may reflect differing levels of recent activity or role clarity. It may also indicate that the various PPHSN service arms have distinct functions, with some involving smaller groups of people who are engaged in more specialized aspects of the Network's work. Some components of the Network, particularly SHIP–DDM, may have had reduced engagement due to concurrent external evaluations. Although efforts were made to minimize bias through the use of multiple recruitment channels and an extended survey period, the views captured may not fully represent all potential users.

Table 4. Suggested indicators for PPHSN’s monitoring and evaluation efforts*

Focus area	Indicator	Description
PPHSN governance	Governance and strategy; stewardship	Publication of a review of the strategic plan that lays out the aims and objectives of the network, and the theory change to achieve them.
	Governance and strategy; stewardship	As an appendix to the strategic plan, develop a comprehensive time-bound indicator-based MEL framework to help track and report on PPHSN's impact over time.
	Quality assurance	A formal review of the PSSS (and more broadly, an optimal mix of early warning outbreak and surveillance strategies).
PacNet	Use; timeliness	≥80% of significant outbreaks identified in Pacific are reported on PacNet within 5 days of their detection (or confirmation).
	Use; coverage	At least two users from ≥80% of PICTs access PacNet posts monthly.
	Use	On average, the number of new topics (threads) 'discussed' on PacNet increases by ≥10% per year from 2025–2030.
PSSS	Timeliness	≥80% of PICTs report data are reporting surveillance data from all sentinel sites all weeks.
	Coverage	Over a 5-year timeframe, the number of sites reporting data to each PICT SSS increase by 25%.
	Data quality	Formal evaluation of PSSS data quality be conducted in at ≥25% of PICTs by Dec 2026, ≥50% by Dec 2027, and 100% by Dec 2029.
	Integration	Integrated surveillance is routinely practice as part of outbreak intelligence generation in ≥25% of PICTs by Dec 2029.
	Integration, diversification	Event-based surveillance mechanisms are operational in 50% of PICTs by Dec 2027.
LabNet	Define priority diseases and guidelines for testing	Develop and implement testing in 50% of PICTs by 2028 and 75% by Dec 2030.
	LQMS	Yearly collection of LQMS data from 50% of LabNet members by Dec 2026, 75% by Dec 2028. Transparent needs-based assessment of LQMS completed by Dec 2027 to target laboratory training by 2028.
PICNet	IPC workforce	75% of all designated IPC focal points in the region have completed the Foundations of IPC course via ACIPC by end of 2027 and credentialed at least at a primary level by 2028.
	IPC workforce	100% of health curricula across the region have IPC core content embedded in program of study by end of 2027.
	Communication	Regional dashboard is established for the benchmarking of surveillance data for hand hygiene, surgical site infections,

		healthcare-associated bloodstream infections, and multi-resistant organisms by end of 2028.
	Workplan	100% of member states have an IPC workplan with key performance indicators by end 2025. 100% of all national IPC workplans include at least one healthcare associated surveillance priority by end 2025.
	Data quality	75% of outbreak alerts posted by PICT members comply with PPHSN's reporting guidelines (include information about time, place, and person) by end 2027.
EpiNet	Skill enhancement	EpiNet teams receive professional development and systematic training.
SHIP–DDM	Skill enhancement	≥75% of relevant staff operating at the national levels have completed at least two DDM modules by Dec 2028.
	Skill enhancement	≥50% of relevant staff operating at the subnational levels have completed at least two DDM module by Dec 2028.
	Skill enhancement	By Dec 2028, ≥3 people from each South Pacific and ≥4 people from each North Pacific Island working in outbreak disease surveillance and/or response roles have a formal field-epidemiology qualification (including that obtained by completing all DDM modules and assessment tasks) by Dec 2028.
	Accreditation	DDM pedagogy is assessed and acknowledged (and accredited) as being on-par with global best practice in field epi training by Dec 2028.

ACIPC: Australasian College for Infection Prevention and Control; LQMS: Laboratory Quality Management System; IPC: Infection Prevention and Control; PICT: Pacific island countries and territories; PPHSN: Pacific Public Health Surveillance Network; PICNet: Pacific Infection Prevention and Control Network; PSSS: Pacific Syndromic Surveillance System; SHIP-DDM: Strengthening Health Interventions in the Pacific – Data for Decision Making

*The suggested indicators are informed by the evaluation findings and existing global frameworks for surveillance system performance monitoring.

Conclusion

This survey found that PPHSN and its six evaluated service arms have made significant contributions to strengthening surveillance, preparedness response capacities across PICTs. Despite this progress, respondents noted challenges remain in communication, data consistency, workforce preparedness, training delivery and laboratory systems, as well as delays in timely result reporting. Strengthening reporting systems, expanding and retaining a skilled workforce, improving interoperability, and ensuring consistent adoption of IPC and surveillance practices will be essential. Coordinated investments, multisectoral collaboration and sustained capacity-building remain critical to advancing regional health security and ensuring that PICs are prepared to respond effectively to emerging threats.

Declarations

All participants provided informed consent prior to their voluntary participation in the study. Participants were informed that they could withdraw from the study at any time without consequence. Ethical approval, including approval of the consent procedures, was granted by the University of Sydney Human Research Ethics Committee (protocol number 2023/634).

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