Planning and executing a national point prevalence study: a blueprint for the future

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ABSTRACT

Healthcare-associated infections (HAIs) are a significant risk for patients and a burden on the health system. In 2021, the Te Tāhū Hauora Health Quality & Safety Commission New Zealand Infection Prevention and Control Team undertook a national HAI point prevalence survey (PPS) across all 20 district health boards (DHBs). We describe the process that was undertaken to plan for and execute the PPS. The key stages of this project were planning, communication and engagement, piloting and then refining the process, training surveyors, delivering the full PPS, and finally, data analysis and reporting. Support for the PPS was received at a national level from clinical and non-clinical management. The sharing of this information may support other health provider groups to use similar methodology to better understand the epidemiology of both infectious and non-infectious diseases locally. It provides a useful planning strategy for those considering similar surveys.

At any one time in New Zealand district hospitals, 6.6% of adult patients, or one in every 15 patients, has a healthcare-associated infection (HAI).[1] HAIs impact on a patient's wellbeing, require additional interventions delaying discharge and add to the cost of healthcare. HAIs are associated with increased mortality.[2] Understanding both the overall burden and the common types of HAIs allows for focussed quality improvement initiatives to reduce these events.

Point prevalence surveys are useful for estimating disease burden and costs. They have been shown to be a cost-effective means of providing a "snap-shot" of HAI burden and antimicrobial use.[3] Strict criteria should be applied to ensure that the survey is of good design and executed well.

In 2021, the Te Tāhū Hauora Health Quality & Safety Commission New Zealand (Te Tāhū Hauora) Infection Prevention and Control (IPC) Team undertook a national point prevalence survey (PPS) across all 20 district health boards (DHBs; now known as districts) to determine the burden of HAIs in adult inpatients. We describe the process that was undertaken to plan for and execute the PPS. We reflect on what aspects of the process would require revising for future HAI PPS. The key stages of this project were planning, communication and engagement, piloting and refining the process, training surveyors, delivering the full PPS, and data analysis and reporting.

1. Preparation and planning

Planning commenced in August 2019, 14 months before the pilot, which was delayed due to the COVID-19 pandemic. Planning included reviewing and selecting the methodology, establishing an efficient means for data collection, reviewing ethical and privacy requirements, determining the logistical support required, estimating the overall budget and developing a communication strategy.

1.1 Methodology

An important first step was to choose an existing programme with readily accessible resources. The European Centre for Disease Prevention and Control (ECDC) first ran the European Union (EU) wide PPS of HAI and antimicrobial use over a period of 2 years (12 countries in 2011 and 21 countries in 2012).[4] In 2017, a further survey was undertaken and in 2022–2023 the third EU-wide survey will be held.[5] The method has been validated and standardised and now provides reliable data that can be used at local, regional and national levels to raise awareness, improve HAI surveillance structure, identify common problems, set priorities for quality improvement initiatives and evaluate the effect of these initiatives. The ECDC definitions for HAIs were used for the New Zealand PPS.[5]

The PPS team collaborated with colleagues in Singapore and Australia who had undertaken

a PPS using the ECDC methodology in the last 5 years.[6,7] PPS data were collected and managed using REDCap, an electronic data capture tool hosted on a local server at Te Tāhū Hauora.[8] The PPS tool was developed by the team in Singapore and subsequently modified for the Australian PPS. This tool was shared with the New Zealand PPS group and modified to collect New Zealand health data. Using a tablet, a two-factor authentication process was used to record data directly into REDCap.

1.2 Ethical and privacy considerations

The key objectives of the PPS were to estimate the total prevalence of HAIs among adult inpatients and to use this information to inform the selection of future quality improvement (QI) initiatives. For this reason, during the early planning phase in 2019, the PPS was considered a QI project and it did not meet the national requirements for ethical review at that time. Despite this, an Out of Scope application was submitted to the New Zealand Health and Disability Ethics Committee and approved.

However, coinciding with the planning for the PPS, the National Ethics Advisory Committee developed the National Ethical Standards for Health and Disability Research and Quality Improvement in May 2019.[9] The Standard provides guidance for QI projects when considering confidentiality and privacy issues arising from accessing and sharing health information.

The *Privacy Act 2020* specifies how organisations should collect, use, disclose, store and give access to personal information and the *Health Information Privacy Code 2020* sets specific rules for how health information is collected, used, held and disclosed by health agencies and takes the place of the information privacy principles for the health sector.[10,11]

Health information on all adult inpatients was accessed on the day of the survey and identifiable patient information was collected to allow for access to clinical records for those patients with suspected HAIs. For this reason, a privacy impact assessment (PIA) application was submitted to, and approved by, the Northern Region Information Governance and Privacy Group. DHBs participating in the pilot reviewed and endorsed the PIA.

Once all the data had been verified, they were matched with the National Minimum Dataset and a de-identified dataset was used for the analysis.

1.3 Funding

A business case was developed and put to the board for funding of the PPS. The overall budget for the PPS was $175,000 NZD. The costs included fixed term salaries for two of the three surveyors, development of training material and delivery of training, travel and accommodation for the surveyors and clinical leads to the DHB sites, purchase of tablets for data capture and costs associated with the site visits.

The IPC team at Te Tāhū Hauora contributed to the delivery of the PPS, providing operational, logistical and analytical support as part of the IPC programme; this resource was not included in the budget. DHBs were responsible for internal funding and resourcing associated with the PPS visit.

1.4 Communication and engagement with DHBs

Participation and engagement at each DHB were necessary to undertake the survey. To gain senior leadership support, presentations were made to the DHB chief executive officers, chief medical officers, chief nursing officers and chief information officers during the planning phase to gain endorsement. Subsequently, once all 20 DHBs agreed to participate, they were required to nominate a project lead familiar with project management/quality improvement as well as having wide networks in the hospital. This person was the principal point of contact for Te Tāhū Hauora for the planning and dissemination of survey information and was responsible for establishing the DHB's local PPS team.

The local PPS team was resourced by each DHB and comprised representation from the IPC team, the Business Intelligence Unit, communication teams and, in some DHBs, the quality team. Although local teams were universally represented by their IPC teams, there was varied attendance from other key IPC stakeholders such as infectious disease clinicians, clinical microbiologists, other senior medical and nursing staff, and quality and safety teams. Having a nominated representative for communications, business intelligence and project management proved to be invaluable.

In addition to attendance at up to five virtual pre-visit planning meetings, the local team also provided IT and logistical support for the surveyors on the days of the site visits.

1.5 Pilot

The PPS process was piloted at three DHBs (one small, medium and large DHB) in October and November 2020. During a 1-day visit to each site, a sample of adult patients from medical, surgical

and intensive care wards were surveyed. Each hospital was required to provide a comma-separated values (CSV) file containing patient demographics for the wards to be surveyed, and the local IPC teams were required to provide support for the surveyors. Additionally, the ward staff were asked to manually collect patient medical device usage on a template paper form before 8:00 am on the day of the survey.

The pilot allowed the PPS team to test and make process changes. The time taken to survey each patient was recorded to estimate the duration of the PPS for each DHB, and to determine the resource required.

The pilot also identified challenges with collecting the medical device data, as the information recorded by the DHB clinical staff was often incorrect or incomplete. This remained an issue throughout the survey, and for any future PPS an alternate strategy needs to be considered.

2. Delivery of the PPS

The PPS took place from late February to late June 2021. The length of time required for each DHB visit was estimated from the pilot. This ranged from 1 to 5 days and between 1 and 5 surveyors per DHB visit.

DHBs selected their preferred dates for the PPS team visit and a schedule was drawn up covering 19 weeks. The DHB leads were tasked with communicating the dates that the PPS was being performed on. During the survey the pre-planned schedule was adjusted to accommodate a nurses' union strike, and a COVID-19 lockdown in the Auckland Region.

The survey was planned to avoid the winter months and although it was undertaken during the COVID-19 pandemic, at the time of the visits, all DHBs were operating with normal patient admissions and surgery lists. Visits were scheduled on weekdays between 8:00 am and 4:30 pm.

2.1 Clinical governance

An internal group within Te Tāhū Hauora provided clinical governance over the delivery of the PPS. A system was established for reporting incidents and adverse events. An incident was defined as an event occurring during the collection of patient data by the surveyors or any other event arising during the surveyor's time at the DHB hospital, e.g., concerns by a staff member that patient confidentiality was being breached or with the surveyors accessing medical records. An adverse event was defined as a clinical issue related to the delivery of clinical care, e.g., lack of recognition by the clinical team that the patient had an HAI. No incidents were reported. Adverse events were very uncommon and promptly responded to by the clinical teams.

2.2 Survey team

Three surveyors, of which two were experienced IPC practitioners, were recruited to collect the data for all sites. The two clinical leads for the IPC programme at Te Tāhū Hauora participated with data collection at larger DHBs. The surveyors and clinical leads underwent an extensive training programme. An experienced IPC practitioner and educator prepared a 60-page training manual and delivered training focussing on surveillance methodology, HAI definitions and learning to use the REDCap tool. Following the 10 days of classroom training, 2 days of practical training occurred at Auckland City Hospital.

2.3 DHB participation

Support from the local PPS team was essential to arrange security access for the surveyors, booking of meeting rooms, organising the completion of the medical device template and sending the CSV file of included patients each morning. The local DHB PPS team also arranged for an IPC team member to accompany and support the surveyors. This was essential to facilitate the interactions with key staff in the clinical areas, and to access patient information for the surveyor, avoiding the need for surveyors to obtain formal permission to access DHB patient information systems. This created an opportunity for DHB team members to expand their knowledge about surveillance and HAIs. They were provided with a certificate recognising their contribution, which some used for their professional development portfolio.

On the day of the survey there was an entry meeting for all the participants to discuss the format of the day. The DHB Business Intelligence team was required to securely send an 8:00 am census of basic patient demographics via a secure CSV file to the Health Quality Intelligence (HQI) team at Te Tāhū Hauora, who then uploaded this data within the normal security system into REDCap. The electronic medical record (EMR) was accessed on a ward computer by the DHB staff, and the required information was recorded into REDCap on a tablet using a secure VPN connection by the surveyor.

2.4 Case detection

While all patients were reviewed, an in-depth review was only required for those patients who had one or both of the "triggers" for HAI; temperature >38 ˚C in the previous 24 hours, and receiving antimicrobials on the day of the survey. Not all data, such as pathology or radiology reports, were available on the day of the visit. The Te Tāhū Hauora PPS team followed up with the local DHB IPC teams for this data after the visit. All proposed cases of HAI were discussed with the clinical leads daily. Where there was uncertainty as to whether the case met the HAI definition, further information was sought.

2.5 Data management and reporting

The uploaded data were reviewed by the HQI team at Te Tāhū Hauora and where there was uncertainty, clarification was sought from the surveyors or DHB team. Incomplete data were followed up by the surveyors. A data analyst was available during the data collection periods to troubleshoot data entry or IT problems.

Data verification was performed to ensure that the data gathered were as accurate as possible, and to minimise human and data migration errors. A random sample of patients was used to assess how consistently the surveyors judged a patient's HAI status. The inter-rater reliability (IRR) was calculated using the agreement coefficient proposed by Gwet.[12] Patients were assigned to the IRR group by daily random sampling from pre-determined wards. IRR was measured across the three main surveyors. The medical records of IRR patients were independently reviewed, and data entered by each surveyor on site.

The DHBs received a brief verbal report of HAIs identified during the visit at the exit meeting. Preliminary results were then reported within 4 weeks of the visit and, subsequently, a more in-depth summary was provided. A national summary report, *National point prevalence survey of healthcare-associated infections – Tiro Whānau ā-motu mō te maimoa hauroa-mate urutā*, was published on the Te Tāhū Hauora website in May 2022[13] and formally published in 2023.[1]

2.6 Actions resulting from the data

The data collected by the PPS will support the development of a national strategy to reduce HAIs. QI interventions will be established to reduce the risk of HAIs. A national collaboration to support the implementation of evidence-informed guidance for safe insertion, access and removal of peripheral intravascular devices (PIVC) is in progress. This was established in response to the high rates of device utilisation identified in the PPS and increasing rates of healthcare-associated *Staphylococcus aureus* bacteraemia attributed to these devices.[14] Subsequent PPS undertaken at regular intervals will determine the success and sustainability of these interventions.

The data will also be used to estimate the likely economic burden of HAI to inform resource and funding decisions at national, regional and local levels.

3. Lessons learned and modification to the process for future PPS

The focus on effective communication and logistics ensured that there were minimal issues on the actual days of the PPS. As this was the first national HAI PPS performed in New Zealand, we planned to engage with relevant stakeholders within each DHB with an exit meeting at the end of the last day of the survey. Waiting for the preliminary results to be reported often delayed the timing of this meeting and attendance was variable. While the exit meetings were valuable, alternative strategies for receiving and providing feedback on the delivery of the PPS and the sharing of preliminary results may need to be considered.

We have subsequently had better engagement with key stakeholder groups such as the Royal Australasian College of Surgeons, the Australian New Zealand College of Anaesthetists, and Clinical Leader Groups within district hospitals.

Having access to an existing PPS programme with readily accessible resources was very helpful, and in addition our Australian colleagues participated in several online meetings to clarify some aspects of their process. While the sharing of the data collection tool was very helpful, for several HAIs the data programme logic applied to the HAI definitions did not capture all HAI. We will continue to collaborate with our colleagues to improve the logic for HAI diagnosis in the data collection tool.

Future PPS projects should consider formal ethical review as the results of the PPS will inform national QI initiatives but may not be directly linked with the subsequent QI activity. Also, as it is likely that the results will be presented and published beyond the immediate environment in which they were collected, ethical review is required for these activities.

It will also be essential to determine the scope of EMR use as this will be helpful when determining the time required for the PPS. Access to EMR increased the efficiency of the process as it avoided the need for surveyors to be competing with clinical teams for access to patient records. It will reduce both the time required and staff resources for the PPS.

The capture of recent surgical history and medical device utilisation was challenging, and it will be essential to investigate other means of capturing this information. If patient management systems could accurately record this information, it could be uploaded with the CSV file.

Using the same team of surveyors, investing time in training and undertaking daily reviews of all suspected HAI cases resulted in high-quality data as evidenced by the high IRR.[1] This should remain the standard for future PPS. However, we under-estimated the resources required for data analysis both in real-time, when the PPS was in progress and upon completion. An expectation that a preliminary summary be provided for the exit meeting may have been unrealistic as it often delayed the timing of the exit meeting. This may have been one of the reasons why attendance at these meetings was variable. Alternative strategies for sharing preliminary data should be considered.

Conclusions

From an organisational perspective, the PPS for HAI achieved its goal of determining the overall burden of HAI in adult inpatients. It was well received and supported by senior leadership, quality and IPC teams. The data were reliable and will be used to inform QI initiatives to reduce HAI events. The processes followed during the planning and implementation of the HAI PPS can be used as a model to look at other areas of concern such as antimicrobial utilisation and specific disease-related issues, not just HAI.

This viewpoint summarises the key processes that need to be addressed by such surveillance activities. It provides a useful set of considerations for other healthcare provider groups wanting to understand the burden of disease in their local or national setting. At a national level, using the prevalence of disease to calculate the incidence and economic burden will allow better informed resource and funding decisions.

COMPETING INTERESTS
Nil.

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