

Point-of-Care Testing in Australia

The Status, Practical Advantages, and Benefits of Community Resiliency

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Abstract: Point-of-care (POC) testing in community settings in Australia has rapidly evolved during the past decade. The development of large-scale national and statewide community-based POC testing programs have delivered evidence-based outcomes highlighting the analytical quality, the clinical effectiveness, and (where appropriate) the cultural effectiveness of POC testing. The use of community-based POC testing, particularly in geographically isolated Australian communities, has practical advantages for the patient, the health professional performing POC testing, the treating practitioner, and the community overall. Both patients and device operators have reported statistically significant improvements in satisfaction levels with pathology service delivery following the introduction of POC testing for chronic and acute diseases. Point-of-care testing can assist in improving patient outcomes as a result of the treating practitioner taking immediate action on the POC test result. Point-of-care testing fosters and builds a strong sense of community engagement by ensuring that the patient is the central focus of the pathology service being delivered and by empowering the health service to have greater ownership and control of the way its pathology service and resultant health information is managed. As POC testing is implemented, progressive knowledge transfer and capacity building are critical to ensure the community is empowered with the resources to manage and sustain the program in the long term. Building community capacity to undertake quality-ensured POC testing for routine patient care has flow-on benefits in terms of resilience, preparedness, and response in disaster scenarios.

Key Words: point-of-care testing, stakeholder satisfaction, engagement, capacity, sustainability, resilience, disaster

(*Point of Care* 2013;12: 41–45)

STATUS OF POINT-OF-CARE TESTING IN AUSTRALIA

Point-of-care (POC) testing in community settings has come of age in Australia, particularly over the past decade, because of the significant technological and analytical advances in device and reagent manufacture, an increasing array of new tests and test profiles, and the development of large-scale national and statewide community-based programs that have delivered evidence-based clinical, operational, and strategic benefits to the community.^{1,2} Some of these models are briefly summarized.

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Support was also received from the Australian Government Department of Health and Ageing which funds the Quality Assurance for Aboriginal and Torres Strait Islander Medical Services Program.

The author's unit receives research support from Siemens Healthcare Diagnostics.

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ISSN: 1533-029X

The national Quality Assurance for Aboriginal and Torres Strait Islander Medical Services Program (QAAMS) is the largest and longest-standing POC testing program in Australia. QAAMS now supports the quality-ensured conduct of POC testing for hemoglobin A_{1c} and urine albumin-creatinine ratio to assist diabetes management in more than 160 Aboriginal and Torres Strait Islander medical services across Australia. QAAMS has been funded continuously by the Australian government since its inception in 1999 and is managed by the Community Point-of-Care Services unit at Flinders University in partnership with the Royal College of Pathologists of Australasia's Quality Assurance Programs Pty Ltd.^{3–5} A recent government-commissioned independent review of QAAMS concluded that “All sources of evidence suggest that the QAAMS Program is meeting best practice standards in the areas of indigenous health care, diabetes management, and point-of-care testing [and] QAAMS is one of the few programs to successfully navigate the cultural complexities and potential pitfalls of chronic disease management in indigenous communities.”⁶

Separate statewide i-STAT networks now operate in Queensland and the Northern Territory. The Queensland network is managed by Pathology Queensland and has devices located in more than 140 rural and remote locations in Queensland where there are no laboratories and a further 32 hospitals with on-site laboratories.^{7,8} The Northern Territory network is managed through a partnership between the Community Point-of-Care Services unit at Flinders University and the Northern Territory Department of Health and operates in 33 remote health centers in some of the most isolated areas of Australia.⁹

In South Australia, the Integrated Cardiovascular Clinical Network SA (iCCnet SA) provides an integrated solution to ensure that patients presenting to rural and remote hospitals in South Australia receive access to appropriate cardiac care. As part of this comprehensive service, troponin POC testing is embedded into an agreed clinical pathway for patients presenting with chest pain/acute coronary syndrome.¹⁰

From 2005 to 2007, the Australian Government commissioned a comprehensive study of POC testing in general practices in Australia (which was formally named the Point-of-Care Testing in General Practice Trial). The clustered randomized controlled trial involved 53 general practices and 4968 patients with chronic conditions including diabetes, hyperlipidemia, or coagulation disorders.^{11–13} The lead organizations responsible for delivering the trial were the University of Adelaide's Discipline of General Practice, the Community Point-of-Care Services unit at Flinders University, and the Royal College of Pathologists of Australasia's Quality Assurance Programs Pty Ltd.

Each of these Australian POC testing models has been conducted under quality-ensured frameworks that have delivered evidence-based outcomes highlighting the analytical quality, the clinical effectiveness, and (where appropriate) the cultural effectiveness of POC testing.^{4,5,10,12}

However, several major challenges for POC testing in Australia remain.² Currently, there are no national standards or



FIGURE 1. The general location of aboriginal and Torres Strait Islander medical services in the QAAMS Program. Eighty percent of the Australian population live within 50 km of the sea. More than 75% of the Australian landmass is classed as remote, including all of the interior of Australia, which is very isolated geographically.

guidelines for the conduct of POC testing in Australia. A set of interim standards was developed for use in the Point-of-Care Testing in General Practice Trial by a subcommittee of the Australian Government Department of Health and Ageing's Quality Use of Pathology Committee.¹⁴ These standards also provided a framework for the development of an accreditation program used for general practices conducting POC testing in the trial.¹⁵ The second major issue for POC testing in Australia is that most POC tests, notably those in the general practice arena, are not currently eligible for the rebates under the government's Medical Benefits Scheme (Medicare), and therefore the cost of POC testing is borne by the practice or the patient.

PRACTICAL ADVANTAGES AND BENEFITS OF POC TESTING

The growth of community-based POC testing in Australia has undoubtedly benefited from several factors: first, the movement toward "patient-centered" health care delivery; second, the care of patients with chronic diseases has increasingly devolved from the hospital to the community; third, the vastness of the Australian continent and the geographic isolation of many rural and remote communities have inhibited the ability of laboratory services to deliver pathology results in a timely manner, and this has facilitated the need and requirement for POC testing (Figs. 1 and 2). The most remote health service in the QAAMS Program is 1500 km from the nearest capital city in one direction and 1000 km from the nearest town in the opposite direction. Clearly, the scale of distance in a country such as Australia precludes laboratory testing from being effective in many instances.

The use of community-based POC testing, particularly in geographically isolated Australian communities, has practical advantages for the patient, the health professional performing POC testing, the treating practitioner, and the community overall.

Patient

For the patient, the immediacy of the POC test result provides a convenient and timely service, negating the need for a return visit to obtain his/her pathology results. Only a small

volume of blood or urine (generally <100 μ L) is required to perform most POC testing, and therefore sample collection is far less stressful than having a venipuncture, for example. There is also a sense of ownership of the sample, which, for indigenous patients, is a culturally sensitive issue and a significant practical advantage of POC testing. The patient can observe his/her own sample being loaded onto the POC device and see the result displayed on the screen of the device when the test is completed. In both the QAAMS and POC Testing in General Practice Trial, patient surveys have concluded that patients view POC testing as motivational in terms of better managing their own condition and strengthening their relationship with the doctor.^{4,16}

POC Testing Operator

Health professionals conducting community-based POC testing in Australia are generally nurses or aboriginal health workers (indigenous Australians who live and work in their communities and who have a qualification in primary health care) but may also include diabetes educators, nutritionists, pharmacists, and other allied and administrative personnel. In the community models developed by the author's unit, POC testing device operators (whether indigenous and nonindigenous) have described their enjoyment and satisfaction in having the responsibility for performing POC testing in their communities. The success of our indigenous POC testing programs has unquestionably resulted from ensuring that the aboriginal health worker has a pivotal role as the POC testing operator; aboriginal health workers provide a crucial communication bridge between management staff, the community, and the nonindigenous health staff and, in our experience, are a very committed, passionate, and hardworking group of health professionals. In the QAAMS Program in particular, aboriginal health workers have become highly proficient at performing routine POC testing within their services and can achieve standards of analytical quality at least equivalent to the laboratory.⁵

Both patients and device operators have reported statistically significant improvements in satisfaction levels with pathology service delivery following the introduction of POC testing for chronic and acute diseases (Table 1).

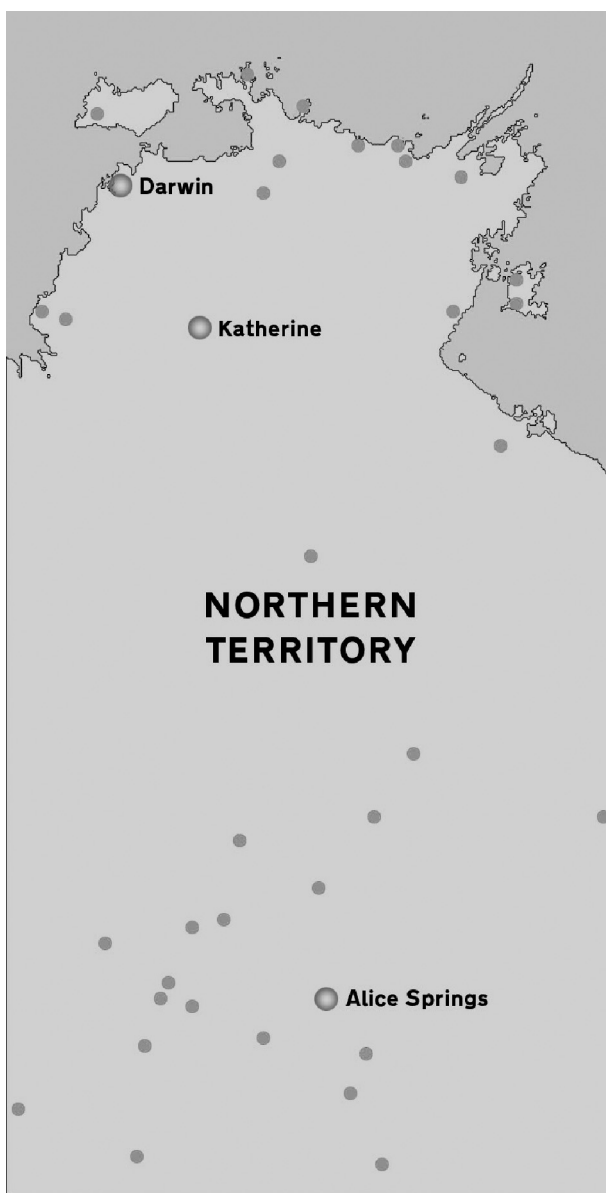


FIGURE 2. General location of remote health centers participating in the Northern Territory POC Testing Program. As shown by the map, the majority of health centers are geographically isolated from the 3 main towns in the territory, namely, Darwin, Katherine, and Alice Springs.

TABLE 1. Comparison of Satisfaction of Stakeholders (POC Testing Device Operators and Patients) Before and After the Introduction of POC Testing in the Northern Territory (NT) POC Testing Program,⁹ the QAAMS Program,⁴ and the Diabetes Management Along the Mallee Track Program¹⁸

Program	Stakeholder	Test	Satisfaction	% Unsatisfied	% Unsure	% Satisfied	n	P
NT POC Testing	Operators	Electrolytes	Before POC testing	34	13	54	39	<0.001
			After POC testing	0	4	96		
QAAMS	Operators	HbA _{1c} , UACR	Before POC testing	30	28	42	57	0.271
			After POC testing	4	7	90		
	Patients	HbA _{1c} , UACR	Before POC testing	11	28	61	159	0.007
			After POC testing	3	6	91		
Mallee Track	Patients	HbA _{1c} , UACR, lipids	Before POC testing	29	19	51	36	0.001
			After POC testing	9	6	85		

TABLE 2. Examples of Clinical Outcome Benefits From Accessing POC Testing in Rural and Remote Australian Communities

Clinical Outcome	Measure	POC Test	Example of Community Program Where Benefits Were Observed
Chronic disease	Improved glycemic control	HbA _{1c}	QAAMS Diabetes Management Along the Mallee Track Point-of-Care Testing in General Practice Trial
	Stabilization of renal function	Creatinine and eGFR	NT POC Testing Program
	Early identification of renal disease risk	Urine ACR	Umoona Kidney Project ^{19,20}
	Stabilization of patients on warfarin therapy	INR	NT POC Testing Program
Acute disease	Early risk stratification for acute coronary syndrome	Troponin T or I	iCCnet SA NT POC Testing Program
	Rapid stabilization of septic shock	Potassium	NT POC Testing Program
	Reduction in cardiovascular disease mortality	Troponin T and associated cardiac care tests	iCCnet SA

ACR indicates albumin creatinine tissue; eGFR, estimated glomerular filtration rate; INR, international normalized ratio.

Treating Practitioner

For the treating practitioner, POC testing provides rapid results that can be used to enhance clinical decision making at the time of consultation for the management of both acute and chronic conditions. Point-of-care testing can maximize the health outcome benefit to the patients as a result of the treating practitioner taking immediate action on the POC testing result. Examples of clinical outcome measures that have been used to assess the effectiveness of POC testing in community-based Australian settings are summarized in Table 2. For indigenous diabetes patients, observed improvements in glycemic control are important in reducing the risk of complications of diabetes, in particular stemming the progression toward end-stage renal disease which has placed a massive burden on the Australian health care system in the past 2 decades. In remote Northern Territory communities, the ability to make an informed on-site clinical decision on acutely ill patients as to whether they could be stabilized in situ or required a medical evacuation to a tertiary hospital has been crucial in improving both clinical and operational outcomes. Ruling out the need for a single medical retrieval results in cost savings of up to US \$15,000, depending on the mode of evacuation.

Community Engagement

Point-of-care testing fosters and builds a strong sense of community engagement by ensuring that the patient is the central focus of the pathology service being delivered and by empowering the community health service to have greater ownership and control of the way his/her pathology service and resultant health information is managed.

When POC testing is being established within a new community, it is imperative that the POC coordinator takes time to engage and listen to the community and their thoughts and aspirations. Time and patience are required to define and explain the clinical, operational, and economic benefits (and limitations) of introducing POC testing into the community setting. For indigenous POC testing models in particular, community engagement is crucial to the acceptance and ultimate success of the program.

Because of their portability, POC devices can be taken into the community and linked with community events such as health promotion activities, chronic disease awareness, and health screen-

ing days. Through access to on-site POC testing for chronic conditions, notably diabetes and coagulation disorders, patients can remain in their communities for treatment and management and are not dislocated from their family members. For indigenous patients, separation from family to attend treatment clinics in large cities or towns can create significant social and emotional problems, and therefore having POC testing locally available helps build community resilience.

It is imperative to ensure there will be an element of progressive knowledge transfer and capacity building, so that, as a POC testing program is implemented, the community is empowered with the resources to manage and sustain the program in the long term. With all of the models developed by our unit, this involves systematically embedding a functional clinical governance structure for the organization and accountability of POC testing, a tailored continuing program for training and competency assessment of device operators, implementation of sustainable quality management practices fit for purpose and relevant and appropriate for the device(s) being used, and documentation of policies and procedures in flexible formats, depending on the clinical, cultural, and geographic settings where community-based POC testing is practiced.

Toward Building a Sustainable and Resilient Workforce Capacity

The ultimate aim of progressive knowledge transfer is to build a sustainable and resilient community workforce that has the capacity to undertake routine quality-ensured POC testing for its intended clinical purpose, whether it is for acute care, chronic care, or both. In the QAAMS Program for example, 1014 aboriginal health workers and nurses have been trained in the practice of POC testing for diabetes management since 2003, whereas in the Northern Territory training has been provided for 357 remote-area nurses as POC testing operators for both acute and chronic clinical needs since mid-2008. However, it should be noted that disproportionately high rates of health professional staff turnover remain the biggest single factor affecting efficient health service delivery (including POC testing) in remote Australian communities. In 2 separate studies, 53% of nurse POC testing operators who left their general practice during the Australian Government's Point-of-Care Testing in

General Practice Trial were from remote locations, whereas 33% of nurse operators in the Northern Territory POC Testing Program left their remote health service during the first year of operation of this program.^{9,17}

In the QAAMS Program, an indigenous leaders team, comprising an aboriginal health worker from each state and Territory of Australia who has demonstrated outstanding leadership and commitment to POC testing, has also been established to work at the national governance level of the program on cultural safety and advocacy for POC testing.

The building of a resilient POC testing workforce has additional advantages for the community during periods of escalated activity or need, such as the untimely impact of a natural or manmade disaster where major disruption to normal health care practices may occur and where it may be necessary to use “crisis standards of care.” The ability to mobilize a local workforce that (i) is familiar with and trained in the principles and practice of POC testing, (ii) has the ability to adapt their skills and undertake “just in time” training for different POC testing applications needed in a disaster scenario, and (iii) can show leadership in the time of crisis is a major advantage in both the first-line response and recovery phase of a disaster event.

CONCLUSIONS

There is a sound evidence base that community-based POC testing in Australia has enhanced service delivery, assisted in improving patient outcomes (in both chronic and acute disease contexts), and facilitated community engagement (particularly in indigenous communities). Across much of the vast Australian landmass, there are now many communities that are utilizing POC testing for specific clinical needs and have built significant workforce capacity for conducting POC testing. Nonetheless, it is acknowledged that, in remote communities in particular, staff retention rates are a constant problem that can erode efforts to maintain POC testing workforce capability, whereas the current lack of Medicare rebates for most POC tests is likely to impede its uptake in some primary care settings, notably general practice. Building community capacity to undertake quality-ensured POC testing for routine patient care has flow-on benefits in terms of preparedness and response in disaster scenarios.

ACKNOWLEDGMENTS

The author thanks the Pathology Section of the Australian Government's Department of Health and Ageing for its long-term commitment and funding support of the QAAMS Program.

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