

Economic evaluation of an outreach allied health service: how do you measure 'bangs for the buck'?

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INTRODUCTION

The delivery of health services in rural and remote areas is a more costly exercise based on recognised units of output (ie occasions of service), when compared to delivering services in provincial and metropolitan areas. This is because in rural and remote areas there are low population densities that do not support the employment of full-time medical and allied health professionals, requiring health professionals to work in an outreach model of service delivery with the concomitant costs of transport and accommodation. In addition to this is the clinical time lost during travel from the service base to the communities. An alternative model of service delivery is the transport of clients to regional or metropolitan centres for health care. Whilst this is often viewed as a more efficient use of the health professionals' time, it does not provide the urban-based health professional with any context to the living conditions and community infrastructure that the client has available. Travel by rural and remote people to urban areas for health services is burdensome to the client as often they must meet the cost or part cost of their travel, and face the social dislocation of being away from the family, as well as the loss of income for the time away. Furthermore, there is evidence that people in rural and remote areas do not access health services or delay in accessing services because of the social dislocation and financial burden.^{1,2}

This paper describes an allied health service providing outreach services to remote communities in north-west Queensland, operating within a primary health care framework. The paper draws on several components of the evaluation of the first stage of this service (initial 3 years), and demonstrates that the usual measure of the effectiveness of a health service ie occasions of service, has limitations in the primary health care setting, particularly when the service is seeking to reach Aboriginal and Torres Strait Islander people, and that other factors must be considered when measuring 'bangs for the buck'.

Description of the Outreach Service

The North West Queensland Allied Health Service (NWQAHS) was developed in response to identified gaps in access to allied health services in north-west Queensland. The NWQAHS is auspiced and managed by North and West Queensland Primary Health Care (formerly the Northern Qld Rural Division of General Practice), and is funded through the Australian Government's Regional Health Strategy.

The planning process identified several key requirements of an outreach model to meet the needs of the target communities. These were:

- provision of regular and reliable allied health services delivered in a culturally sensitive and appropriate manner, operating in the paradigm of Primary Health Care,

- successful recruitment and retention of appropriately skilled and experienced allied health professionals,
- community participation in health service planning, implementation and monitoring
- capacity building within communities through health promotion, training of local workers, and development of ‘therapy assistants’ within the communities to provide and/or monitor ongoing treatment between allied health professional visits, and
- successful integration of the NWQAHS with other service providers.

The NWQAHS delivers services using a hub and spoke model with Allied Health Professionals based in Mt Isa. The philosophy of primary health care underpins the service delivery model. The disciplines provided include physiotherapy, podiatry, dietetics, occupational therapy, speech pathology and psychology.

The total population of the 12 target communities is 16 081, with a population density ranging from 0.03 to 0.55 per km². The region is described as three distinct precincts (Table 1). The population of the region is predominantly young, with 40% of the Indigenous population under 14 years of age. Between 40% and 50% of the total population of the region (Indigenous and non-Indigenous) were between 15 and 49 years of age. Six per cent of the population was 65 years and older.

Table 1 Composition of the three precincts serviced by the NWQAHS

Precinct	Population	Structure	Indigenous (%)
Gulf	6575	3 Local government areas 5 Communities	58
Inland	9248	4 Local government areas 5 Communities	14
Mt Isa [†]	22 739	1 Local government area 2 Communities	13

[†] Because Mt Isa city has a population in excess of 5000 people it was not eligible for service delivery under the Commonwealth Regional Health Strategy. The target community within this precinct has a population of 258 of which 46% are Indigenous.

The model was developed in response to the context in which communities wished to see services delivered, as well as addressing obstacles to the recruitment and retention of allied health professionals in rural and remote practice. The key features of the model include:

- allied health professionals (AHPs) travelling in functional teams
- development of a 6 month calendar of service delivery in conjunction with other visiting services to avoid clashes with other services in the communities
- each community visited on a 6 weekly basis, but AHPs spending 2–3 days in the community (dependent on population), in order to undertake direct one to one service provision as well as develop primary health care activities
- a centralised booking number for referrals
- development of therapy assistants in each community to support follow-up care between allied health visits, and develop skills of local people
- use of videoconferencing to support the therapy assistants, clients and carers
- case conferencing with local health professionals at each visit

- transport by charter aircraft to the Gulf and Highway precincts to minimise clinical time lost to travel, and enable service provision during the wet season.

NWQPHC was funded to develop and manage the NWQAHS in July 2001, and service delivery commenced in May 2002, ramping up to full operation by July 2002. The formative evaluation of the service commenced in July 2002, and the economic evaluation of the NWQAHS was undertaken as a component of the broader evaluation.³

ECONOMIC EVALUATION

The economic evaluation was structured in three parts:

- 1 Partial evaluation to identify costs of providing the services and describe outcomes
- 2 Cost-benefit analysis – comparison of input costs against output benefits
- 3 Cost-effectiveness analysis comparing the costs of providing outreach allied health services with those of another provider, and an alternative model where all services are based in a regional centre (Mt Isa or Townsville), and clients and carers/parents are transported to the regional centre and then back to their community.

The initial contract period for the NWQAHS was 3 years. The economic evaluation focused on the middle year of funding (2002–03) by which time the service had ramped up to full operational function.

Stage 1: partial evaluation

The partial evaluation analysed the cost of providing the outreach service and allocated the costs to:

- staffing costs inclusive of wages, superannuation, workers compensation for clinical, management, and administrative staff supporting the outreach service
- outreach costs inclusive of air charters, airfares, motor vehicle costs, accommodation and living away from home allowance
- office costs representing the costs of maintaining the infrastructure of the service at the base in Mt Isa.

In 2002–03 staffing costs were \$898 822 representing approximately 50% of all expenses, outreach costs were \$346 550, and office costs were \$268 885.

In 2002–03, 9.5 allied health professionals, arranged in three functional teams:

- undertook 140 separate community visits to 12 communities
- travelled 196 000 km by air and road (not yet by water!)
- spent 944 days and 598 nights in the 12 target communities
- cost an average of \$167 000 per full-time equivalent allied health professional, ranging from \$158 000 for Speech Pathology to \$176 000 for Podiatry, Dietetics and Physiotherapy
- provided face-to-face services at an average cost of \$672 per service, ranging from \$332 per service for Physiotherapy to \$1010 per service for Speech Pathology (Table 2)

- provided care in 12 communities costing from \$17 000 per annum to service McKinlay (where only some of the disciplines were provided, and transport was with the RFDs), to \$240 000 per annum to service Doomadgee and Mornington Island (communities receiving the full compliment of allied health disciplines, and transport was by air charter)
- provided communities with reliable and quality allied health professional services at an average annual per capita cost of \$119, ranging from \$40 per capita in Cloncurry to \$712 per capita in Burketown (Table 3).

Table 2 Estimated cost of delivery of direct client services by NWOAHS for 2002–03, by discipline

Discipline	Total costs (\$)	Total occasions of service	Average cost per occasion of service (\$)
Occupational therapy	402 981	538	749
Psychology	336 652	349	965
Speech pathology	316 059	312	1 013
Physiotherapy	175 528	529	332
Dietetics	175 528	312	563
Podiatry	175 528	319	550
Total	1 582 257	2 354	672

Table 3 Estimated cost of delivery of direct client services by NWOAHS for 2002–03, by community – standardised for population

Community	Total costs (\$)	Estimated population	Average cost of providing service per head of population (\$)
Normanton	124 006	1 603	77
Karumba	69 822	615	114
Doomadgee	239 512	1 581	151
Mornington Island	239 512	1 174	204
Burketown	167 267	235	712
Hughenden	215 089	2 408	89
Richmond	154 883	939	165
Julia Creek	72 173	596	121
McKinlay	17 278	90	192
Cloncurry	141 358	3 521	40
Dajarra	70 678	235	301
Camooweal	70 678	315	224
Total	1 582 257	13 312	119

Stage 2: cost–benefit analysis (or what are the bangs?)

Cost–benefit analysis compares programs in terms of the benefit that interventions achieve using a common unit of measurement, usually cost. In a full cost–benefit analysis all outcomes such as days of disability, or prevention of premature death are quantified in dollar terms. It was beyond the scope of this evaluation to undertake this, however, the benefits have been described in the usual measures of service effectiveness which include:

- occasions of service ie number of clients seen
- reach of the service – who is using the service within a community?
- outcomes at an individual and community level.

Primary health care is more than occasions of service

The philosophy of primary health care defined in the United Nations Declaration of Alma Ata⁴ is based on a holistic understanding and recognition of the multiple determinants of health, equity in health care, community participation and control over health services, with the focus on health promotion and disease prevention, and use of accessible and affordable technology and provision of services based on best practice. Primary health care operates across the continuum of health education, health promotion, early intervention, primary prevention, treatment, secondary prevention and chronic disease management. Historically, allied health professionals operate in the latter part of this continuum⁵. In outreach service delivery the emphasis must be placed on the earlier part of the continuum because services are provided periodically with the need for development of self and community development in the management of health issues.

Given the relatively short time period the service was operating at the time of this evaluation, measures of client outcome had not been developed. However, it was possible to document the impact of the service at a community and individual level through qualitative methods using key informant interviews and focus groups with resident health professionals, health workers, teachers, local government officers, community service providers and the community panel.

Occasions of service

The initial analysis showed that in 2002–03 the 9.5 FTE allied health professionals provided 2354 occasions of service to 1128 clients from 1405 referrals received.

Reach of the service

An analysis of referrals for the 12 month study period was used as a proxy measure for reach of the service into a community, as well as a proxy for determining access to the service by Indigenous people within a community. Overall, about 10.5% of the population in the target communities were referred to the service and 8% of the Indigenous population (Table 4). The upper half of Table 4 (shaded), are communities with higher Indigenous populations. It can be seen that in most of these communities the allied health professionals achieved a similar reach into the community as it had with the non-Indigenous population group.

Allied health activity

Allied health professionals collected time use data to capture information on the range of activities they undertook that was associated with client care and delivery of a service within a primary health care paradigm. The allied health professionals used a set of Activity Definitions based on the National Allied Health Casemix Committee Health Activity Hierarchy⁶ structure further defined by the Domiciliary Allied Health and Rehabilitation Team (Brisbane, Qld), and the Darling Downs Rural Allied Health Team (Toowoomba, Qld).

Table 4 Analysis of referrals received by community

Community	Number of referrals	Estimated population	% population referred	Number of Indigenous referrals	Estimated Indigenous population	% Indigenous population referred
Burketown	103	235	43.8%	35	94	37.2%
Camooweal	23	315	7.3%	10	145	6.9%
Cloncurry	172	3 521	4.9%	31	880	3.5%
Dajarra	20	235	8.5%	14	195	7.2%
Doomadgee	154	1 431	10.8%	103	1 231	8.4%
Gregory	12	150	8.0%	1	123	0.8%
Mornington	195	1 174	16.6%	107	1 115	9.6%
Normanton	81	1 603	5.1%	47	866	5.4%
Karumba	40	600	6.7%	8	30	26.7%
McKinlay	14	100	14.0%	1	10	10.0%
Hughenden	322	2 600	12.4%	45	260	17.3%
Julia Creek	62	600	10.3%	2	36	5.6%
Richmond	221	939	23.5%	5	103	4.8%
Total	1 419	13 503	10.5%	409	5 064	8.1%

The definitions reflected:

- individual client attributable activities (IPA), including direct client consultation, case conference, telephone contact with the client, documentation, co-worker training to support a client, consultation with other professionals regarding the client
- non-individual client attributable (NIPA), including client scheduling and preparation for trips, consultation with other health care professionals worker not specific to an individual client, case conferencing when discussing a number of clients, travel time, health promotion/group activities, resource preparation, service liaison and community development
- clinical services management including administration, professional development, mentoring, quality management activities, staff management, community liaison, management
- teaching and training
- research.

In the period 2002–03 the allied health teams conducted approximately 30 health promotion or health education programs across the target communities. These included:

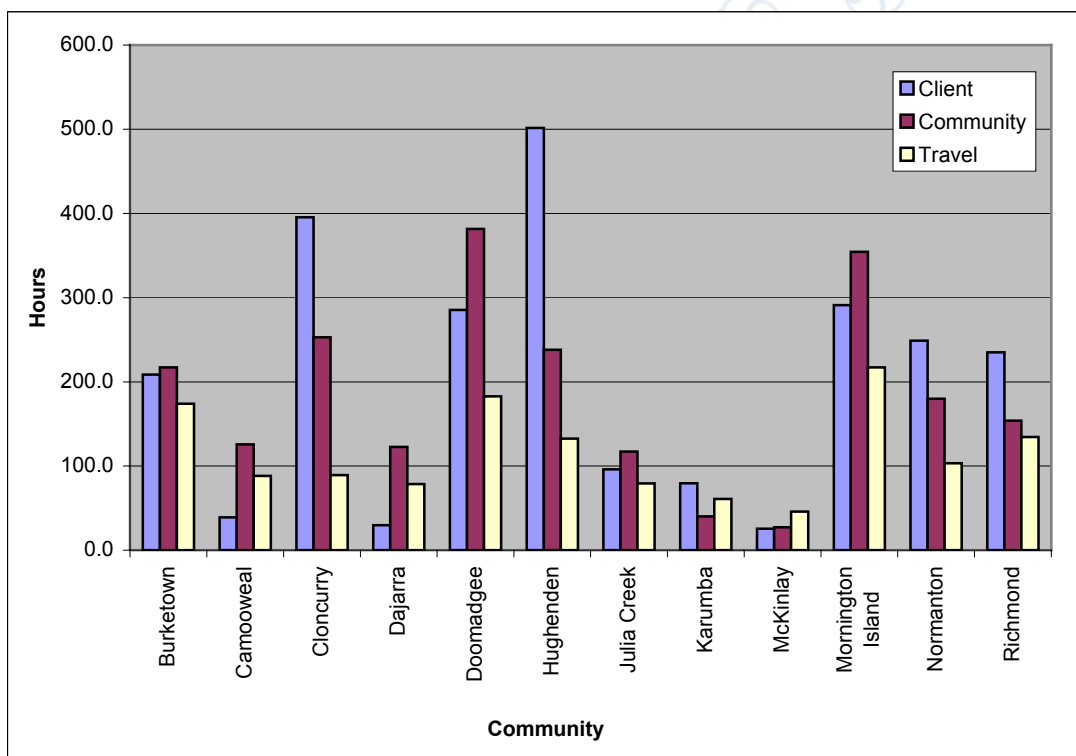
- education of local service providers on subjects as diverse as manual handling, foetal alcohol syndrome, Diabetes education, swallowing in nursing homes
- implementation of “Brain Gym” programs in four schools
- linkage with the Tropical Public Health Unit in the “Activate – Ate” program
- assessment of pensioner units for safety
- assistance with an aged care facility in preparation for accreditation

- participation in the “Healthy Ears” program to prevent otitis media in children in Indigenous communities
- ante-natal classes
- small group work with at-risk children for literacy
- design and improving schools’ tuck shop menus
- start up and encouragement of community fit-ball class
- pedometer program in Richmond
- falls prevention program in three communities.

Pattern of service delivery

Analysis of time use data logged by the allied health professionals, demonstrated that the pattern of service delivery by the allied health professionals differed across communities. In communities where there was a higher proportion of non-Indigenous people such as Hughenden, Richmond and Cloncurry, the allied health professionals spent more time working on an individual client basis. In comparison in the communities where there was a higher Indigenous population (Dajarra, Camooweal, Doomadgee and Mornington Island) service delivery focused more toward community and group activities (Figure 1).

Figure 1 Total community attributable time 2002–03



However, even within a community the pattern of service delivery differed across disciplines. As an example in Mornington Island the physiotherapist, speech pathologist and occupational therapist spent more time working with individual clients, whereas the dietitian, psychologist and podiatrist worked to a greater extent at a community level (Figure 2). The flexibility of the

service model to adapt to the community is reflected when comparing the pattern of service between Figure 2 (Mornington Island) and Figure 3 (Hughenden), where the non-Indigenous community is more used to one to one client consultation.

Figure 2 Mornington Island – community attributable time 2002–03

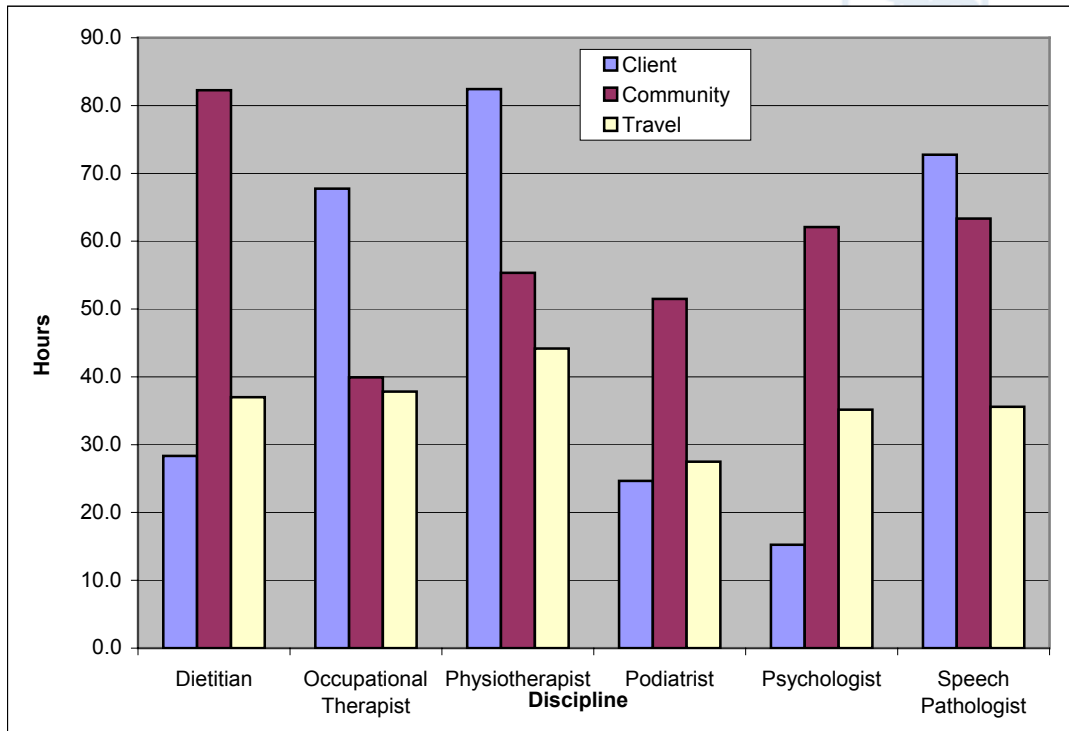
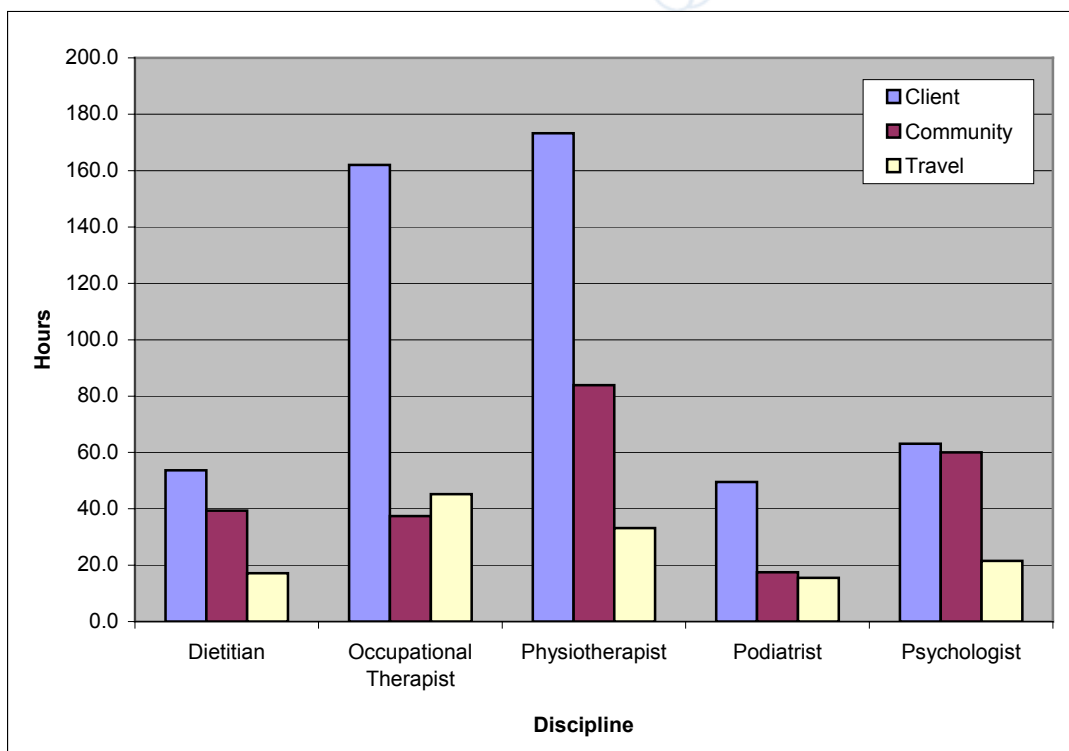


Figure 3 Hughenden – community attributable time 2002–03



Impact of the service

Qualitative data gathered through interviews with resident doctors, Directors of Nursing, community nurses, Aboriginal Health Workers, teachers, aged care providers and child care workers identified the impact of the service at an individual, family and community level. The impact can be categorised into:

- **Improved client care** – client and referrer surveys and anecdotal feedback consistently supported high levels of satisfaction with both the delivery of services and the results generated by the teams
- **Improved client outcomes** – reflected in enabling aged people and children with disabilities to be cared for in their community, clients increasing their independence, improved management of diabetic clients, early discharge from hospital to home and from regional hospitals back to the communities
- **Support of other health workers** – providing clinical reviews and developing management plans for clients under the care of hospitals, community health, HACC and aged care hostels, and assisting staff initiate and monitor these plans; inservice training and skills development particularly with Aboriginal Health Workers, aged care workers and child care workers
- **Improving the viability and value adding to other services** – including the geographical re-distribution of outreach allied health services between NWQAHS and the local Health District enabling regular visits to specified communities; supporting special needs and learning development teachers in schools by providing screening, assessment and management plans for children where Education Qld did not have capacity to provide; debriefing for local service providers and emergency services workers; peer support to remote health professionals
- **Capacity building within communities** – including assisting schools and child care facilities to become accredited for special needs children, assisting aged care facilities in application for increased beds and levels of care, assisting shire councils and health corporations develop health management plans for their constituencies

Stage 3: Cost-effectiveness analysis

Cost-effectiveness analysis compared the cost of providing outreach services by NWQAHS with:

- another outreach service provider
- alternative model where all services are based in Mt Isa or Townsville with transport of clients and carers from and back to their community.

Another provider

Within North West Qld there are two other providers of outreach allied health services. The evaluators were able to source data from one of these providers to undertake a cost comparison. The second agency provided three allied health disciplines to children predominantly in Mt Isa (71% of services) but also in Cloncurry, Julia Creek and Richmond. Although the range of disciplines provided, clients targeted and communities serviced was substantially smaller than the NWQAHS (including no services to the Gulf communities and

no air travel), the estimated cost of delivering services was only marginally lower than the NWQAHS figure of \$672, at \$537 per service overall and \$595 per service for outreach clients.

Centralised allied health services

In this model all allied health services are provided at the Mt Isa Base Hospital (or The Townsville Hospital) and all clients in the outreach communities are transported to Mt Isa (or Townsville). The model assumed that no additional facilities would be required but that some additional staff and considerable client transport costs would be incurred.

The model compared the cost of providing such a 'centralised' allied health service model to all of the clients serviced by the NWQAHS in 2002–03 in comparison to the cost of providing the NWQAHS in that year.

In the 2002–03 financial year it was estimated that the NWQAHS performed 1988 face-to-face outreach client services or occasions of service at a total cost of about \$1.58 million. The number of outreach consultations performed by each discipline and in each community was documented and used to estimate the additional workload generated at the outpatients department of Mt Isa Base Hospital and Townsville Hospital, and the additional allied health and administrative staff that would be required to process these additional clients.

It was assumed that all clients aged less than 16 years and over 75 years would require an escort. It was further assumed that 50% of clients aged 56 to 75 years and 25% of the remainder would also require escorts for travel (and accommodation). Overall this provides a factor of 1.52 persons travelling for each client seen. Accommodation costs were based on basic motel costs in Mt Isa of \$70 per night twin share (Table 5).

Table 5 Estimated costs of transport, accommodation for clients residing in target communities and requiring allied health services

Community	No. persons transported	Cost of transport (\$)		Cost of accommodation (\$)		Total cost of transport and accommodation (\$)
		Cost per person	Total cost	Cost per person ⁱ	Total cost	
Normanton	196	600	117 600	100	19 600	137 200
Karumba	82	600	49 200	100	8 200	57 400
Doomadgee	357	600	214 200	100	35 700	249 900
Mornington Is	445	600	267 000	100	44 500	311 500
Burketown	242	600	145 200	100	24 200	169 400
Hughenden	648	96	62 208	65	42 120	104 328
Richmond	448	108	48 384	50	22 400	70 784
Julia Creek	128	80	10 240	0	0	10 240
McKinlay	30	30	900	0	0	900
Cloncurry	366	30	10 980	0	0	10 980
Dajarra	33	74	2 442	0	0	2 442
Camooweal	49	74	3 626	0	0	3 626
Total	3 024	3 492	931 980	365	196 720	1 128 700

ⁱ Estimated at \$70 for Mt Isa and \$100 for Townsville, shared between the 1.52 persons travelling for each one client seen = estimated \$50 cost per traveller for Mt Isa and \$65 cost per traveller for Townsville.

Comparison of outreach and centralised models

The total cost of the estimable elements of providing a centralised regional service for the clients actually serviced by the NWQAHS, for the year 2002–03, would have been in the order of \$1.25 million, including transport costs and additional staff hours (Tables 5 and 6). It was assumed that the additional administrative and infrastructure costs would be minimal to cater for the additional 1988 clients across the two regional sites.

Table 6 Estimated costs of providing additional allied health services at base to meet demand of transported clients

Discipline	No. clients	Average Time/Client (hrs)			Total additional time (hrs)	Hourly cost of AHP (\$) ⁱⁱ	Total cost (\$)
		Face to face	Follow up	Total			
OT	447	1.25	0.75	2.00	894	\$47.00	42 018
Psychology	346	1.00	0.50	1.50	519	\$47.00	24 393
Speech Pathology	268	1.00	0.50	1.50	402	\$47.00	18 894
Physiotherapy	488	0.50	0.25	0.75	366	\$47.00	17 202
Dietetics	227	0.50	0.25	0.75	170	\$47.00	7 990
Podiatry	211	0.50	0.25	0.75	158	\$47.00	7 426
Total	1 988				2 509		117 923

The difference between the outreach and the centralised models, was \$330 000 per year. Therefore \$330 000 can be regarded as the cost of all the additional services and products of the NWQAHS above and beyond the simple delivery of allied health care to the individual. These included:

- providing allied health professional services in the client’s community and therefore saving them the hardship of travelling to Mt Isa or Townsville
- avoiding the dislocation for the client and the community, that can occur when clients are transported away from their community for medical interventions, especially for Indigenous clients
- providing a broad range of Primary Health Care Services in the communities, including health education, support of other health care workers and others in education and child care
- providing care to clients in their homes and facilitating extended home based care in the community and reducing the loss of ‘elders’ from the community for health reasons
- community development such as expansion of aged care facilities, HACC services and the capacity of schools and child care facilities to care for special needs children
- clients accessing care within an appropriate timeframe where there is increased likelihood that they would not do so or would delay treatment if they had to travel
- promoting the allied health care disciplines within remote communities and increasing the likelihood of remote students enrolling in health related tertiary education and ultimately providing such disciplines in remote communities

ⁱⁱ Based on average PO3 salary plus remote area packaging (accommodation, relocation etc), assuming 210 working days per year (after leave and public holidays) and 7.6 hours per working day.

- improved co-ordination and continuity of care with local workers

There are a number of benefits that are more subtle and difficult to measure but can reasonably be expected to have accrued from the above activities and need to be identified:

- improved sense of *individual and community well-being*, from the knowledge that the services provided by NWQAHS are available, whether or not the individual will ever need those services themselves. This factor reaches to the heart of Primary Health Care with the promotion of *wellness* being seen as important if not more important than reduction in *illness*
- increased *capacity to recruit further health professionals*, including GPs to the region by providing a critical mass of health care providers
- increasing the profile of rural and remote allied health practice by disseminating their experiences and *promoting* the positives of working in *remote communities* – ultimately increasing the likelihood of recruiting quality and appropriate allied health staff to the region (and other remote regions).

Marginal analysis

Marginal analysis indicates that the cost of providing an additional service by an individual discipline in an individual community is low because the transport and supporting infrastructure is already in place. Furthermore, this analysis was undertaken in the first full year of operation of the service, and recent anecdotal reports have shown that utilisation of allied health services increases as communities become more trusting and aware of the service, particularly in the remote Aboriginal communities.

The most important marginal cost reduction is that for the roll out of health care initiatives. Should a new initiative be developed in hearing health, aged care, dietary modification, or diabetes management – there are now the allied health professionals in place in these remote communities to co-ordinate the local delivery of these program, and increase the penetration of population health initiatives to a section of the community in which population health initiatives have previously made little impression.

CONCLUSION

This paper has demonstrated that the cost of setting up a stand alone service and providing outreach services in remote communities is about 20% more costly than transporting clients to a centralised facility. However, if an existing service provider such as a District Health Service sought to re-orient its service delivery model, the additional costs would be less than 20% because much of the infrastructure “at base” would already be in place.

There are significant advantages to communities and individuals in having services provided locally. The key advantages relate to:

- facilitating access to services by rural and remote people who may not use allied health services if they were required to travel to regional centres, particularly elderly people, Aboriginal and Torres Strait Islander people, and people in lower socio-economic groupings
- delivering services within a primary health care framework to promote primary prevention, early identification and early intervention

- training and skills development of the local workforce both within and external to the health sector
- capacity building within communities through assisting current providers and community based services to develop local infrastructure and services.

Assessment and measurement of these advantages to clients and communities cannot be determined using current data collection processes that largely focus on occasions of service or episodes of care. Therefore, if funders continue to try to evaluate primary health care services using workload measures they are only assessing a single component of a primary health care service. Clearly, the NWQAHS and its model of service delivery demonstrated that there are many components to be considered when determining bangs for the buck. What is now required is the development and implementation of data sets that capture the impact of primary health care services, and can measure that tricky thing that could be called individual and community “wellness”.

PRESENTER

Kristine Battye has worked in health service planning, health systems analysis, project development and evaluation since 1994. Kristine started in this career with the advent of the Divisions of General Practice, and worked with the NSW Central West Division, the Townsville Division, and was Executive Officer of the North Qld Rural Division of General Practice from 1997 to 2000. Kristine started her own consultancy in early 2001. Her main areas of work have been in regional health service planning, project evaluations and rural workforce development. Kristine’s qualifications include a Bachelor of Applied Science, PhD and MBA.

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