

From the perspective of providers of telehealth, using a commercial DSL broadband network is substantially cheaper than using ISDN telephone lines and provides additional benefits:

a feasibility trial and cost-minimisation analysis in Australia

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Background

Telehealth services in many countries are based on integrated services digital network (ISDN) telephone lines.¹⁻³ For some services there may be no other option, for other services the development of digital subscriber line (DSL) broadband networks may provide a viable alternative. As DSL is always on service, rather than a service requiring the dialing of remote sites for connectivity to be established (e.g. ISDN), benefits may include improved site management and monitoring as well as cost savings. We trialed the use of a commercial DSL service as a replacement to a current ISDN service for one of our telehealth sites. Based on the results of this trial we completed a cost-minimisation analysis projecting costs across 10 remote sites.

Aim

To establish whether the use of a commercial DSL broadband network, as an alternative to ISDN telephone lines, is feasible, less costly and provides any other benefits or detriments.

Methods

A DSL enabled telephone line and DSL router were installed in our telehealth hub site and connected to a virtual private network (VPN) server and existing videoconferencing codec. ISDN equipment in a remote site was replaced with commercial DSL equipment. An ISDN router and three ISDN lines (384 kbs capacity) were replaced with a DSL router, DSL enabled telephone line (with 512/512 symmetric DSL service) and VPN server. We recorded information on the number of hours of videoconferencing and calculated costs over a 1-month period as part of the feasibility trial. These costs were extrapolated for use in a cost-minimisation analysis to compare the use of ISDN and DSL for 10 remote telehealth sites⁴⁻⁵ for a 12-month operating period (all costs reported in 2009 Australian dollars, as of July 1st 2009 AUD 1 = USD 0.81, EUR 0.57, GBP 0.49).⁶

Results

In the one month feasibility trial period 16 sessions were conducted (44 hours of videoconferencing in total). For the trial site a \$5,789 ISDN router was replaced with a \$125 DSL router and \$1,065 virtual private network (VPN) server. Based on the activity over the 1-month trial, \$484 in ISDN call costs were saved using the DSL service. Anecdotally users reported greatly improved videoconferencing picture quality. Additional benefits identified included reduced

Table 1

Summary of cost to provide ISDN based service versus DSL based service to the hub site and 10 remote sites

Item	Using ISDN (\$)	Using DSL (\$)	
Fixed costs†			
Remote site equipment costs			
Videoconferencing system	11,956	11,956	
UPS battery	7,943	7,943	
Wireless bridge			
Wireless access point	3,694	3,694	
Mobile trolley	3,074	3,074	
Router	21,258	459	
VPN server	-	3,911	
Hub site equipment costs			
Videoconferencing system	1,196	1,196	
Router	2,126	46	
VPN server	-	391	
Telecommunications costs			
Installation∞	11,682	1,375	
Fixed costs sub total	64,776	35,892	
Variable costs			
Telecommunications			
Line rental‡	22,857	17,820	
Call charges*	58,080	-	
Monitoring¥	2,008	0	
Variable costs sub total	82,945	17,820	
TOTAL	147,721	53,712	
Saving		94,009	

UPS = uninterruptible power source; VPN = virtual private network

† All fixed costs are reported as an equivalent annual cost (EAC) at a discount rate of 5% over 3-years

∞ Calculated as a one-off cost at \$1,062/ISDN site and \$125/DSL site for 11 sites (10 remote sites plus the hub site)

‡ ISDN rental at \$57.72/line/month/site for three lines/site over 12-months; DSL rental at \$135/month/site for 12-months

*ISDN call charges at \$11/hour/site called from the hub site for an assumed 44 hours/month over 12-months

¥ Using ISDN, monitoring requires an additional call to each remote site for overnight system testing

session management time (the DSL system did not require management of the ISDN router dialers for each call) and 24-hour/7-day a week monitoring capability (achieved by continually monitoring the VPN connection between the remote and hub site).

Extrapolating set-up and running costs for the same level of activity across the hub site and 10 remote sites over a 12-month period, the use of DSL would reduce fixed costs from \$64,776 to \$35,892 and variable costs from \$82,945 to \$17,820 resulting in an overall saving of \$94,009 (Table 1).

Conclusion

The set-up and running cost of telehealth are important factors in service management and decision making. With the current pricing of ISDN and DSL services in Queensland, the use of a commercial DSL broadband network, as an alternative to ISDN telephone lines, is feasible, less costly and provides additional benefits such as improved remote site monitoring and reduced call management time.

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