



**Title** Evidence for the Benefits of Telecardiology Applications:  
A Systematic Review

**Agency** AHFMR, Alberta Heritage Foundation for Medical Research  
Health Technology Assessment Unit, Suite 1500, 10104-103 Avenue NW, Edmonton,  
Alberta T5J 4A7 Canada; Tel: +1 780 423 5727, Fax: +1 780 429 3509; [www.ahfmr.ab.ca](http://www.ahfmr.ab.ca)

**Reference** HTA 34, October 2004 (English). ISBN 1-894927-04-4 (print);  
ISBN 1-894927-05-2 (online): [www.ahfmr.ab.ca/programs.php](http://www.ahfmr.ab.ca/programs.php)

## Aim

To review the literature assessing telecardiology in 4 areas of application: pediatric care, hospital or clinic use for adults, emergency care, and home care.

## Conclusions and results

Forty-four studies met the selection criteria, and most (39 of 44) concluded that telecardiology had advantages over the alternative. However, the quality of over half of the studies was poor or poor to fair.

All but one of the studies on pediatric applications related to teletransmission of echocardiography data. Reported benefits included savings in time and cost through avoiding unnecessary referrals. Three studies were of fair quality, but the rest gave weaker evidence. Economic analyses in 6 studies were of low or very low quality.

In applications for adults, 6 of 10 studies on addressed transmission of echocardiography findings between cardiologists and primary care physicians. Benefits arose from avoiding unneeded referrals and identifying patients for urgent intervention. One study was judged to be fair, while the others had lower reliability. Two studies indicated benefits from using telecardiology in a prison and in a cardiac catheterization lab. Telemetry outside critical care units and in transmitting nuclear medicine results were deemed feasible, but the benefits were less clear.

In emergency care, 3 studies considered transmission of echocardiography data from ambulance to hospital, and found benefits from faster diagnosis and more rapid treatment. One of the studies was of good quality, while the others provided weaker evidence. A good quality study on dobutamine stress echocardiography showed benefits by avoiding unnecessary hospitalization. A fair-quality study indicated benefits from using a fax-based system for out-of-hours support.

In home care, 9 of 13 studies assessed telemonitoring of patients with heart failure. Benefits arose from reduced

hospital admissions, decreased hospital stay, and lower hospital costs. Four studies were RCTs of high quality; two were judged to be fair and three were poor to fair. One of the high-quality studies contained a fair to good economic analysis. Two high-quality studies showed that home-based rehabilitation was as effective as programs in institutions. One good and one poor quality study found gains in performance in monitoring arrhythmias.

## Recommendations

Despite the long history of telecardiology, most studies do not provide convincing evidence of benefit. Few recent studies of telecardiology have reported clinical or economic outcomes.

## Methods

Literature databases were searched for January 1992 to September 2003. Controlled studies and case series studies of at least 20 patients reporting clinical, economic, or administrative outcomes of telecardiology were selected. Study quality was assessed and rated as: *high* (high degree of confidence in the findings); *good* (some uncertainty about the findings); *fair* (some limitations); *poor to fair* (substantial limitations); or *poor* (unacceptable uncertainty). Studies including cost or economic data were judged against accepted criteria for economic analysis.

## Further research/reviews required

Most of the included studies were of poor or poor to fair quality and offer only preliminary indications of benefits and costs, requiring verification of the findings. Decision makers should note the need to follow up preliminary studies to obtain reliable outcome data for telecardiology applications.