

## Case study: Is there a doctor in the mouse?

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Telemedicine has come of age in rural America, where it is being used to provide specialist intensive care that would otherwise be costly and difficult to obtain, writes Geoff Nairn.

Few specialist physicians want to practice in rural areas and workers there often have reduced or no insurance cover, which makes it a less attractive market for private healthcare.

Studies show that more than 50,000 lives could be saved each year in the US if intensive care unit (ICU) patients were provided with the right specialist care. They would also suffer fewer complications, which would reduce the average length of stay and hence, the size of their medical bills.

Unfortunately, there is a severe shortage of these specialist physicians, called intensivists, which is particularly acute in rural areas

Frank Sample, chief executive of Philips Visicu, a telemedicine provider, says: "It is clear that there are just not enough to go around."

The shortage of intensivists means the ICUs of rural hospitals usually seek to stabilise critically ill patients before transferring them to the nearest big city hospital. But this can put the patient's health at risk and imposes an additional financial and emotional burden on the patient and family.

A growing number of providers have therefore created telemedicine facilities to monitor patients remotely in local hospital ICUs.

Philips Visicu is one of the leading suppliers of this type of telemedicine and its eICU product is used by more than 200 hospitals across the US. The company was acquired by electronics giant Philips last year.

One of its customers is the Avera group, which operates in South Dakota and neighbouring states. From an operations centre at the Avera McKennan hospital in Sioux Falls, a small team of intensivists and critical care nurses constantly monitor patient health at nine Avera sites, using computers and high-resolution cameras.

While on-site nursing staff in the local-hospital ICUs take care of the patient's immediate needs and administer drugs, specialist staff in the eICU analyse the patient data. They are looking for the trends and subtle changes in a patient's condition that provide early warning signs of deterioration.

Visicu's proprietary software uses artificial intelligence principles and the accumulated knowledge of 50 experts in ICU medicine to classify patients as green, yellow, or red, with the red patients being those that need watching most.

If the intensivist wants to check on a patient, the cameras can zoom in and read an intravenous drip bag or study the reaction of a patient's eyes to a light flash.

To respect privacy, the cameras do not store any images and are only activated when needed.

Mr Sample says the system is not designed to replace face-to-face contact or usurp the authority of the attending physician. "It provides another set of eyes and means the ICU staff do not need to call out the attending physician in the middle of the night," he says.

To encourage providers to invest in remote ICU monitoring, the US Department of Agriculture offers grants. But even without the subsidy, the business case for this type of telemedicine is easily made, according to Avera.

The group calculates that the eICU technology has cut the average stay in the ICU by 23 per cent and, more importantly, cut mortality rates in ICUs by at least 25 per cent.

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