

Medical expertise available wherever emergencies occur

Emergency personnel often lack the trauma expertise necessary to treat victims of severe accidents or other emergencies. Some victims die because they do not reach hospital emergency rooms fast enough. But now a system for remote treatment could help improve survival rates.



The IST-funded [DICOEMS](#) project has developed a wireless technology platform enabling doctors in hospital emergency rooms to remotely manage treatment of accident and other emergency victims. With specially equipped handheld computers or smart phones, paramedics and other emergency personnel first on the scene can send images and critical patient information, including vital data such as pulse, respiration, and ECG, to specialists at hospital emergency departments. Doctors can monitor the patient's condition via streaming video from the ambulance, make a diagnosis and provide detailed medical procedures for paramedics to follow.

"DICOEMS could significantly improve survival rates for victims of accidents or other medical emergencies by reducing the chance of inappropriate treatment," says Matteo Colombo, a technical specialist at Synergia 2000, the Milan-based project coordinator. "The system will improve decision support, diagnosis and risk management in critical situations occurring far from hospital emergency rooms," says Colombo.

Better use of patient data

With seven partners from five European countries, the 30-month project, which ended 30 June, also sought to improve use of patient data. "We found out that there was a big gap in how medical information from an emergency was stored, so emergency-intervention data was not followed up on properly and not available to other health-care providers. This is especially a problem if the patient has a recurring condition," says Colombo.

DICOEMS employs a Grid network management system to efficiently integrate geographically dispersed and often heterogeneous databases, according to the project. In an emergency, DICOEMS could allow identification of patients and access to their recent medical history, before the ambulance reaches the hospital. The system's multi-channel environment could also enable a patient's personal physician to remotely participate in his or her treatment.

With DICOEMS's global positioning system, central emergency systems can check an ambulance's position and tell the driver the fastest, most efficient route to the emergency site, and then from the site to the hospital. Central switchboard operators will have access to a specialised database allowing them to direct ambulances to the hospital best equipped to treat the patient's condition.

An important component of the system is a text-search tool for matching patient clinical data with the most appropriate hospital and doctors for his or her problems. "In Monza Emergency Center ([using the free, single emergency telephone number,] 118), we tested this function with a database of cardiovascular terminology. This way, emergency switchboard operators can type in key words describing a cardiological emergency, and the system returns the most suitable hospitals for the patient's condition, also noting their availability," says Colombo.

The biggest snag that DICOEMS encountered was in its efforts to develop and refine a portable polymerase chain reaction device to analyse patients' blood for DNA, to match against a large database. This would make it possible to identify an unconscious patient and access his or her medical history.

"Unfortunately, the European Union does not yet have a legal framework allowing collection of an extensive DNA database from the general public. That lack made this goal unworkable. This turned out to be the project's biggest obstacle," says Colombo.



Colombo adds that, "One possible way we could bridge the problem is to focus on smaller groups, such as firemen or policemen, which could have their own DNA databases. Privacy concerns might be less of an issue, because the organisation would manage its own database, which could be used for identifying injured or dead policemen or firemen, for example."

Two major pilot projects

DICOEMS has conducted two major pilot projects. The main Italian emergency services tested the remote emergency system, and the UK partner, Guy's and St. Thomas Hospital NHS Trust, tested the data integration and transfer capacity. "We hope to arrange an agreement allowing Guy's and St. Thomas Hospital to serve as the bridge between the DICOEMS Italian organisation and the UK's entire NHS system," says Colombo.

The DICOEMS system is scheduled to go into use by Italian ambulance centres by year's end, following approval by local authorities. "In Italy, there is already a strong willingness by ambulance associations to use the new system," says Colombo. "We have also received positive feedback from the European Commission," says Colombo.

The next step is to find partners to exploit the new technology. "In Eastern Europe, since there are no computer-assisted programs like this, DICOEMS could be sold as a whole system. Similar, though less advanced, systems already exist in Western Europe, so these countries could implement modules. DICOEMS is very flexible," concludes Colombo.

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