

## TELE-ECHOCARDIOGRAPHY BETWEEN ITALY AND BALKAN AREA

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### BACKGROUND

A project (PIS-SRCE) has been started for promoting international medical cooperation in the Balkan area according to the Stabilization and Association Process, the European Union's policy framework for the Western Balkan countries. Information and communication technology is presently mature to set up a telemedicine network breaking down geographical barriers and providing specialized medical care virtually anywhere in the world. Videoconferencing equipment is commercially available to transmit securely over Internet echocardiography or other modality images in addition to standard audio/video signals. Real-time transmission capability is crucial for allowing specialists to drive remotely proper echo scanning of cardiac structures in patient or foetus with suspected congenital heart disease.

### METHODS

Commercial videoconference equipment (Aethra Vega X5 IP) was used to relay information between the two centres, one in Italy, at G.Pasquinucci Heart Hospital (GPH) in Massa, and the other in Bosnia and Herzegovina, at Clinical Centre in Banja Luka, using Internet connection with upload transfer rate of 512 kbits/s and image frequency of 25 frames per second. Sequences of medical echo images are transmitted from remote to consulting centre connecting the echocardiographic equipment by S-VHS video output to the videoconference equipment. On-line teleconsultation is thus achieved by this approach while DICOM records, ready at the end of scanning procedure, can be forwarded for further off-line analysis and processing. Live teleconferencing is achieved by built-in cameras with remote control and audio input/output. Data encryption capability allows to guarantee patient confidentiality. Using same videoconference equipment it is also possible to view remotely cardiac interventional or surgery operations. Medical informatics staff at GPH verified the technical feasibility of telemedicine services over Internet visiting the pediatric clinical centre in Banja Luka.

### RESULTS

The transmitted sources from Banja Luka alternated between the echographic video output (GE VIVID I) and the signal from a S-VHS tape reader, with continuous audio transmission. 512 kbits/s transmission bandwidth, divided into 64 kbps for audio and 448 kbits/s for video channels, allowed real-time reproduction of echocardiography images received from Banja Luka maintaining diagnostic quality according to the cardiologist's evaluation. The system has been approved by local administrators and physicians.

### CONCLUSIONS

Teleconsultation and telediagnosis with Balkan area is conveniently feasible using Internet as communication network and current videoconferencing equipment for secure on-line transmission of sequences of echocardiographic images. Telemedicine services will provide remote consultation on complex or critical cases, prompt selection of patients prone to surgery, foetus telediagnosis in presence of congenital heart disease, teleconferencing through the network on medical problems, remote view of interventions.