Secure Collaborative Telemedicine Applications
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Background
The Concurrent Engineering Research Center (CERC) at West Virginia University is developing and deploying applications for secure collaborative telemedicine in rural hospitals, clinics, and homes in West Virginia to evaluate its impact on the delivery of healthcare. These applications illustrate the utility of collaborative telemedicine technologies to improve the delivery of healthcare to patients by intensive care, mid-level and home care providers. This research project is sponsored by the National Library of Medicine.

System Description
The telemedicine applications are based on the Secure Collaborative Telemedicine Architecture which employs an open systems approach, combining our software with vendor-supported, standards-compliant components and technologies. We have implemented a set of telemedicine systems, distributed services and applications to support three telemedicine scenarios.

Using on-site demonstration, prerecorded material and real-time collaboration with healthcare providers at pilot site clinics and hospitals, we plan to demonstrate the utility and merits of such telemedicine applications operating over public networks. We will also report on the interim assessments of these applications.

We shall demonstrate how our telemedicine applications enable healthcare professionals to:
• authenticate themselves via smartcards and public key cryptography;
• review patient charts at remote healthcare sites;
• examine patient vital signs;
• access a smartcard containing a patient's emergency health information;
• as well as collaborate with peers via e-mail and teleconferences.

We have developed smartcard applications based on G-7 interoperability standards for portable emergency medical information for patients as well as tools for administering and deploying them in clinical networks. Our healthcare professional smartcards enable access to information in patient smartcards and support authentication for utilizing remote healthcare resources and services. Our remote monitoring application enables authenticated healthcare providers to securely view patient remote vital signs.

We have implemented a set of middleware services based on CORBA (Common Object Request Broker Architecture) to integrate distributed healthcare components and systems. Transformers and filters enable secure communications and role-based access to middleware services. Our system administration tools enable management of user roles and review of audit trails. Vendor supplied applications include transcription facilities to support Web-based review, signoff and distribution of transcribed reports and a diagnosis decision support system for midlevel providers.

Utility
These telemedicine applications will illustrate that healthcare practitioners can collaborate with other healthcare providers over public networks to access patient records, view patient vital signs and confer with their patients. Such applications could enable healthcare organizations to improve the delivery of healthcare to their patients without compromising the integrity and confidentiality of patient identifiable information.