

Integration Issues in Patient Mobility

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One new tendency brought by telemedicine is the service moving compared to doctor moving, patient moving and information moving in the history of medical practice. By “moving service”, patients will be provided with all necessary cares through one set of terminals or one service provider regardless where patients stay. Moving those services, which are usually obtained in a clinic/hospital, to patient’s home requires technological help, e.g. communication channels between the patient and the clinic to transfer essential data of patient’s conditions e.g. in terms of risk factor for cardiac patients using web available instruments like ECG (electronic cardiograms). The current technology, e.g. PDAs (personal digital assistants), wireless devices, means of telecommunication, embedded services, data warehouses etc., provides a solid base for building up a mobile patient infrastructure.

By patient mobility, therefore, it means (a) the ability for a patient to access (tele)medical services at different terminals, on the basis of a unique identifier; the id can be either biometric (e.g., fingerprint), or based on security on electronic cards or certificates (e.g. SIM card) *and* the capability of the network to provide those services in compliance with the patient's service profile.

According to our survey conducted by searching published papers from MEDLINE between 1996-2000, we divide integration issues into five categories from a social perspective, a technical perspective, a patient’s perspective, a medical institutional perspective, and an economical perspective. Our research is based on technical perspective considering the others as well. Major problems to build up mobile patient integrated services from the technical perspective include:

- No clear definition for integration.
- Different existing data formats and big number of legacy systems.
- Lack of the common standard for the data exchange.
- Information overload and a systematic approach not there yet.
- Lack of the research for medical intelligence systems.

The integration could be considered as:

- *(Medical) Knowledge integration.* Medical information provision to different user groups must be knowledge-intensive service like evidence-based medicine.
- *Service integration.* Implementation of integrated services to patients from different systems.
- *Skill integration.* Skills demanded may have to be expanded to achieve a common understanding of the problem. Remote diagnosis and expert diagnosis will help health care workers learn skills from other experienced practitioners.
- *Device integration,* a combination of traditional medical devices and net-based monitoring devices for distant patients.

- *Network integration.* The services would allow to retrieve and transfer information traversing boundaries between local and regional, even international networks.
- *Patient information integration.* Information about a patient has to be integrated from different locations into a virtual patient record and viewed on-line through a unified interface.
- *Transaction integration.* All transactions around one patient's visit to the clinic/hospital, e.g. insurance and billing would be performed automatically.

The future services will be a collective package dedicated to individual patients' needs. The most important challenge is to integrate them together for the purpose of a mobile patient. Effective integration in a complex heterogeneous computing environment involves technical processes, standardization processes and people resources. Integrated services require a shift from a focus on systems within hospital environments to a patient oriented approach, a co-effort from general practice, hospitals, community services and patients.