

METHOD AND SYSTEM FOR MAINTAINING AND UPDATING COMPUTERIZED MEDICAL RECORDS

BACKGROUND AND SUMMARY OF THE INVENTION

A. Field of the Invention

The present invention relates generally to computerized medical information systems. More specifically, it relates to maintaining and updating computerized medical records.

The invention is based on a distributed database network architecture, in which a plurality of portable data carriers (PDCs) and point-of-service (POS) stations interact to maintain the currency of the medical records of a plurality of patients. Each PDC contains the medical record of an individual patient. Each POS station contains a system for generating and propagating medical data specific to that medical care site.

The PDCs and POS stations contain independent, but interrelated, databases; and a major function of the presently described invention is to keep the information in these databases current.

In addition to serving as one of the database repositories in this network, each PDC also serves as a communication link between the POS stations. Each patient carries their own medical record from one station to another on their own PDC.

Furthermore, the invention utilizes object-oriented tools and structures that include: (1) dynamic objects called "update objects" and (2) data processing "rule sets" which are stored throughout the above described network, working together, these update objects and rule sets establish, route, organize, store and update the medical information of a plurality of patients.

B. Description of Related Art

The healthcare industry has long recognized the need for a computerized medical information system that can maintain a comprehensive and current record of each patient's medical status over space and time.

Although keeping such information in computerized databases might seem simple, providing efficient and cost-effective access to those databases and keeping all data in the databases current, are daunting tasks due to some technical inefficiencies in traditional distributed database systems, and due to the size and mobility of patient populations.

Whereas, it has been possible to successfully implement traditional centralized on-line computer information systems for geographically limited populations, such as within hospitals, it has not been possible to simply scale-up these systems to accommodate larger, more disperse patient populations in the outpatient setting.

The complex, wide-spread interactions of medical outpatient care require a wide area network architecture. However, available distributed database networks exhibit significant shortcomings when they are applied to electronic data interchange applications that entail complex independent transactions at numerous disparate point-of-service locations.

The major problems that make traditional network models unsuitable for many point-of-service applications, such as outpatient medical care, are: (1) inefficient access to needed data, (2) difficulty in maintaining data currency throughout the system and (3) cost.

From the data access standpoint, traditional transaction-oriented networks define a master data file which must be

coordinated and updated at one main site and then must be made available, in whole or in part, to peripheral dependent locations.

In order to have access to current data, these traditional systems must be continuously available on-line; and as the complexity of the transaction-based application increases, overload and bottleneck problems ensue; and the communication channels become more complicated and costly. Furthermore, the integrity of the whole network continuously and precariously depends on the reliability of these physical communication channels.

To date, accessing a central file, at some point, is the only networking solution that allows for the coordination of data updates that have been generated at geographically distinct locations. And unfortunately, all of these network systems experience overload, bottleneck, service interruption or coordination delay problems, because of their need to update and then redistribute, data from a masterfile.

Outpatient medical transactions are so diverse, as well as being so geographically and temporally complex, that the anticipated problems of data access, data currency and cost of the traditional centralized systems, become prohibitive. These are the primary reasons that, currently, there are no successful, broad-based computerized outpatient medical record systems.

SUMMARY OF THE INVENTION

The present invention takes a different approach. It does not depend on the presence of a central database, or a single masterfile. It is a new type of distributed database network system in which medical data items are automatically propagated from their sites of origin to several different memory storage sites, independently and selectively. The memory sites exist in: (1) portable data carriers (PDC), (2) medical point-of-service (POS) stations and (3) administrative services systems.

Although the presently described system is applicable to inpatient medical care, it is most advantageous in the outpatient setting.

In the presently preferred embodiment, the PDC is a microprocessor integrated circuit chip card, commonly known as a smart card. This card serves as a data storage device on which patients carry a copy of their own medical record.

Each card can carry a significant amount of medical data. In the present embodiment, this includes, but is not restricted to: diagnoses, surgeries, obstetrical data, status of therapeutic treatments, diagnostic test results, current and past medications, allergies, diet, durable medical equipment, blood type, advanced directives, immunizations, birth data, social history, family history, physician office visits, hospitalizations and emergency room visits. In addition, the card carries physician orders, such as medication prescriptions, laboratory or X-ray tests, referrals to consultant physicians, surgical procedures and the like. All of this data is directly transported between the POS stations of the system on the PDCs.

The POS stations are computer systems positioned at locations where patients receive medical care, such as physician offices, pharmacies, laboratories, radiology units, hospitals, diagnostic and treatment centers, emergency treatment sites and urgent care centers. Each of the POS stations may be custom-configured to that provider's specific medical application.

For example, a physician office POS station may, among other functions, generate new diagnoses and physician