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(54) **INTERACTIVE SYSTEM FOR PATIENT ACCESS TO ELECTRONIC MEDICAL RECORDS**

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(52) **U.S. Cl.**
USPC **705/3**

(58) **Field of Classification Search** 705/2, 3
See application file for complete search history.

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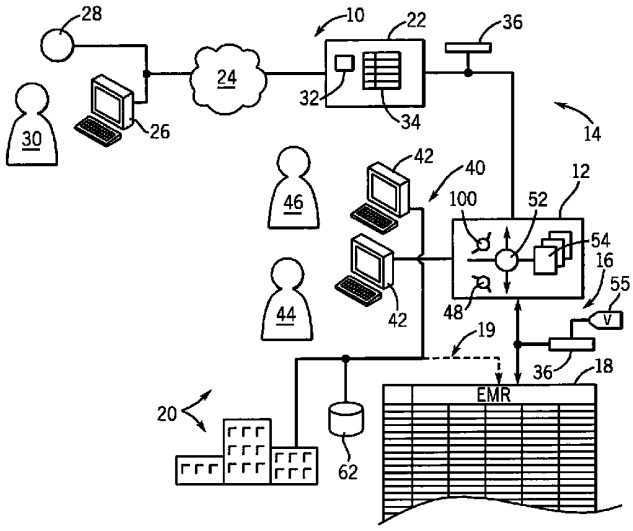
(57) **ABSTRACT**

A programmable rules-based interface between a patient and an electronic medical record EMR allows controlled patient access to the EMR allowing increased patient participation in the healthcare process.

37 Claims, 2 Drawing Sheets



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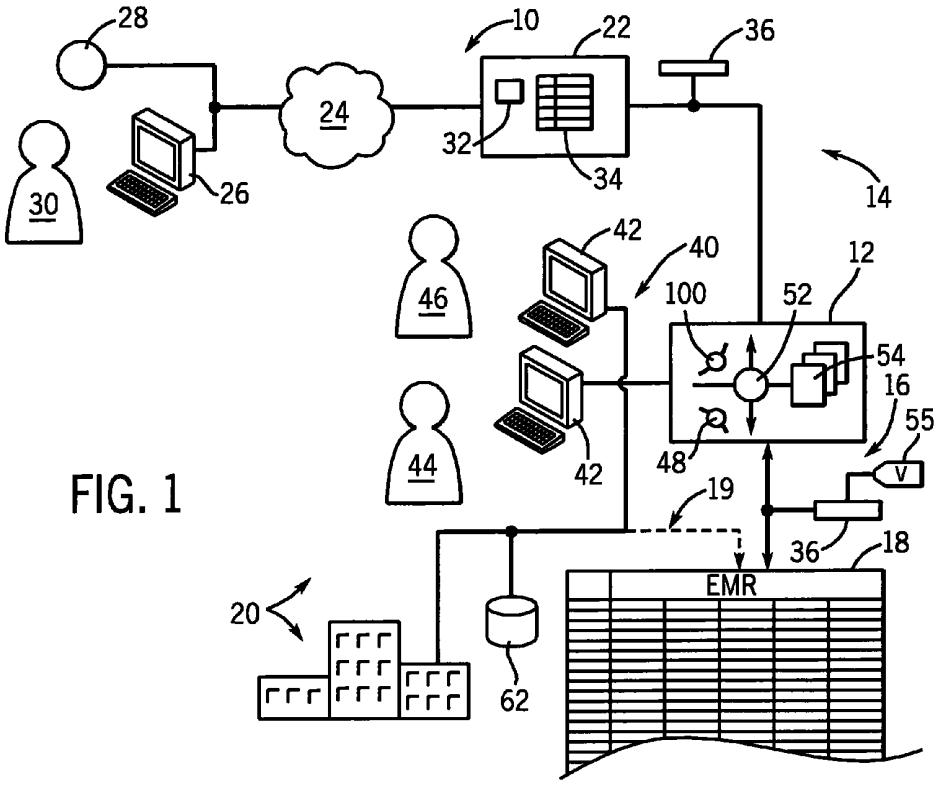
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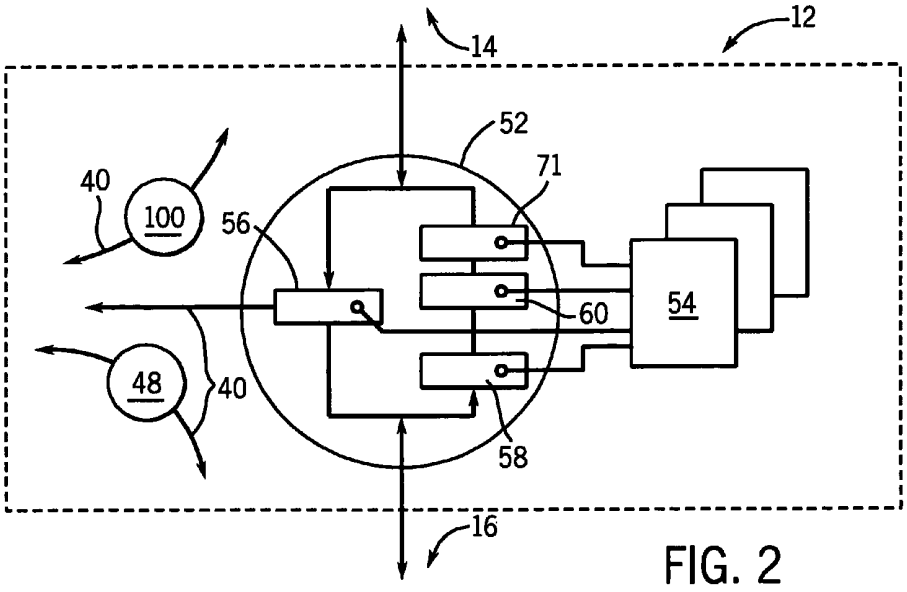
FIG. 1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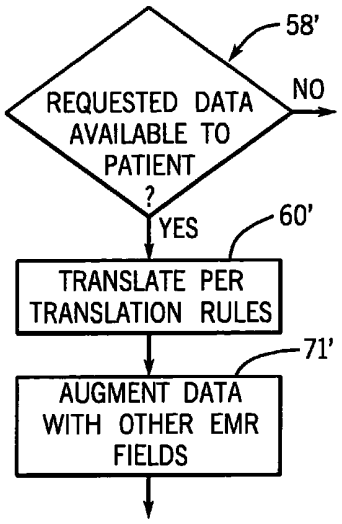

FIG. 3

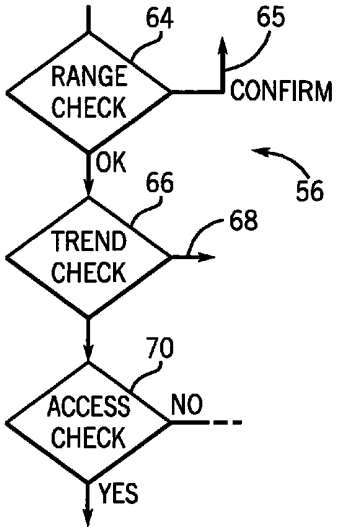

FIG. 4

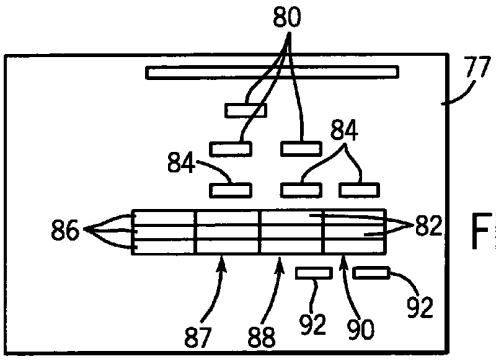

FIG. 5

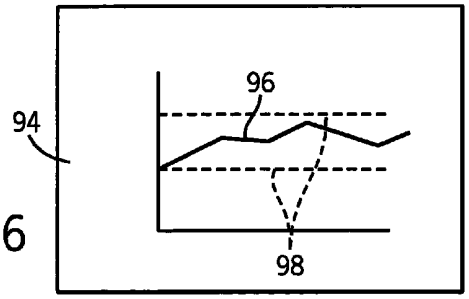

FIG. 6

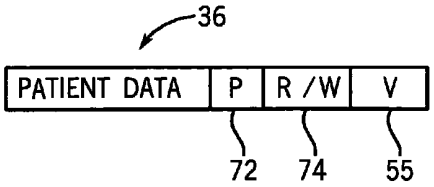

FIG. 7

INTERACTIVE SYSTEM FOR PATIENT ACCESS TO ELECTRONIC MEDICAL RECORDS

CROSS-REFERENCE TO RELATED APPLICATIONS

Statement Regarding Federally Sponsored Research or Development

The present invention relates to electronic medical record (EMR) systems and in particular to an EMR system allowing access to and entry of data by a patient.

Enlisting patients as active participants in their own healthcare can increase patient satisfaction and the quality of the healthcare experience while decreasing the cost of providing that care.

A number of healthcare organizations and other enterprises have used the Internet to provide basic information to patients allow the scheduling of appointments, and to provide interactive healthcare calculators and the like which allow patient-sourced data to be input and certain information to be returned. While these services allow more patient involvement in the healthcare process, the information provided by and to the patient is held separate from the centralized electronic medical record (EMR) that provides a cohesive repository of medical information for doctors and other healthcare providers.

This isolation of the patient from the EMR is done for good reason. Preventing patients from entering data into the EMR preserves the validity of the EMR data so that it may be relied upon by other healthcare professionals. Patients often unfamiliar with the data they are collecting are likely more prone to make significant mistakes in that data entry than a healthcare provider.

Further, the data in the EMR, intended for healthcare professionals, is often unintelligible by patients and some aspects of the data could be confusing or unnecessarily alarming to a layperson. The act of a healthcare professional entering medical information is often the juncture at which the data is reviewed or considered by the healthcare professional in detecting possible problems. Entry of data by patients eliminates this important juncture. Finally, issues of medical privacy make it desirable to limit to the extent possible, broad access to the electronic medical record. Medical privacy laws prohibit medical data from being made available to the parties not authorized by the patient and some medical data from being made available to the patient except in the presence of a qualified healthcare professional.

This need to separate the patient from the integrating features of the EMR limits the ability to which the patient may significantly contribute to his or her healthcare.

BRIEF SUMMARY OF THE INVENTION

The present invention provides practical access by a patient to the information in his or her EMR, significantly improving communication between a patient and their healthcare organization. Critical to the invention is a set of administrator programmable rules based on data from the EMR that control this access, limiting access to certain data, interpreting the data for the patient as necessary, and marking data from the patient so as to indicate its accuracy and level of review. Access to the EMR data allows improved information to be provided to the patient by processing patient-sourced data according to information stored in the EMR to provide data range checking and trend analyses. The invention communicates with a healthcare provider so that patient-sourced data can be reviewed and health issues brought to the attention of the healthcare provider much as if the healthcare provider entered the data his or herself. This invention may allow direct patient/physician communication using secured messaging.

Specifically, the present invention in one embodiment provides an access program for an electronic medical record (EMR) system executing a stored program to receive patient-sourced medical data about a patient from the patient, process the patient-sourced medical data according to medical data about the patient held in the EMR, and return information based on the processed patient-sourced data to the patient.

It is thus one object of at least one embodiment of the invention to tap into the centralized EMR to allow improved communication of medical information to the patient, as well as from the patient to the provider. Unlike systems that provide the patient access to specialized patient-only databases, the present invention provides nearly unlimited flexibility in utilizing the full EMR used by healthcare providers as a comprehensive source of patient information.

The processing of the patient-sourced data may use historical data about the patient held in the EMR.

It is therefore one object of at least one embodiment of the invention to take advantage of time-linked data held in the EMR and to integrate patient-sourced data gathering with data gathering or validation by healthcare professionals.

The processing of the patient-sourced data provides data to the patient indicating a healthy range for the patient-sourced data based on medical data about the patient held in the EMR. Alternatively, or in addition, the processing of the patient-sourced medical data may include a testing step that checks the data for entry errors based on knowledge about the patient held in the EMR.

It is an object of at least one embodiment of the invention to provide sophisticated context for data provided to the patient based on the full EMR.

The access program may notify a healthcare professional of detected errors to permit review of the patient-sourced data. This notification may link the healthcare professional directly to the relevant patient-sourced data.

It is an object of at least one embodiment of the invention to promote patient involvement in medical data collection without jeopardizing the reliability of EMR data that may be relied upon by health care professionals.

The access program may include a web server and the patient-sourced data may be received over the Internet from a web browser. The patient-sourced data may be authenticated, for example, by means of a password or other authentication system.

It is thus another object of at least one embodiment of the invention to remove the barriers to patient participation in his or her healthcare delivery without jeopardizing patient privacy.

The access program may receive a patient request for access to medical data about the patient from the EMR and determine a permission level for the patient with respect to access of the data using administrator programmable rules receiving as an argument the type of data or the value of the data. Access of the data by the patient is allowed only if the patient has permission according to the programmable rules.

It is thus one object of at least one embodiment of the invention to provide flexible rules controlling access by a patient to his or her EMR.

The administrator programmable rules may change a permission of patient-sourced data written to the EMR to read-only permission after a predetermined period of time.

It is thus one object of at least one embodiment of the invention to limit the ability of a patient to revise data entered by the patient after a predetermined period of time and thus to preserve the function of the EMR as a historical record for justifying medical care decisions.

The access program may receive a patient request for medical data about the patient from the EMR and translate the data received from the EMR in response to the request from terminology appropriate to the medical profession to terminology appropriate to a layperson.

It is thus one object of at least one embodiment of the invention to allow a layperson access to and understanding of the EMR while allowing use of the EMR to convey precisely stated medical information between medical professionals.

The access program may receive patient-sourced medical data and associate that data with a tag distinguishing the patient-sourced data from data entered by a healthcare professional before entry of the tagged patient-sourced data into a central patient record system.

It is thus one object of at least one embodiment of the invention to provide an indication of patient-sourced data to healthcare professionals to preserve the integrity of the EMR data.

The access program for an electronic medical record may receive patient-sourced medical data and analyze the received data in light of other data stored in the EMR to determine a trend over time indicating a possible medical issue and notify a healthcare professional if a medical issue is indicated.

It is thus another object of at least one embodiment of the invention to introduce the physician into the chain of data entry between patient and EMR to preserve traditional physician oversight.

These particular objects and advantages may apply to only some embodiments falling within the claims and thus do not define the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a simplified block diagram of an access program for an EMR providing an Internet communication channel;

FIG. **2** is a detailed block diagram of the access program of FIG. **1** showing filters and routers moderating information flow according to user programmable rules;

FIG. **3** is a flow chart showing the steps of data flow from the EMR to the patient;

FIG. **4** is a flow chart similar to that of FIG. **3** showing the steps of data from the patient to the EMR;

FIG. **5** is an example screen of an Internet browser displayed to the patient of FIG. **1** for the entry and editing of data;

FIG. **6** is a screen similar to that of FIG. **5** showing an example representation of data provided to the patient; and

FIG. **7** is a logical diagram of patient-sourced data entered into the electronic medical record showing additional fields used for validation and control.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. **1**, a computerized access system **10** per the present invention may include an interface module **12** standing between a patient communication channel **14** and an EMR communication channel **16**, the latter communicating with an electronic medical record (EMR) database **18**. Generally the interface module **12** is a program that may be physically located on an independent computer or run on a computer shared with another function such as the EMR database **18**.

Generally, the EMR database **18** includes a complete medical history of many patients collected from a variety of healthcare sources **20** including physicians and other healthcare professionals such members of the staff at hospitals, clinics, and laboratories communicating on standard EMR network **19**. As will be understood to those of ordinary skill in the art, the EMR database **18** includes biographical information about the patient describing the patient, including but not limited to the patient's age, gender, height and weight, and medical history information including the patient's medical conditions, previous medical procedures, medications, and laboratory test results. The EMR database **18** may be centrally accessed by many different healthcare sources **20** and thus serves as a path of intercommunication among many individuals working together to deliver healthcare.

The EMR database **18** is depicted as a single logical flat file for simplicity but may be configured in any of a variety of well known database formats including relational database structure, object database structures and the like. The data of the EMR database **18**, like all medical records, is protected under federal law to ensure that sensitive data of this record is not released in a way that would violate a patient's privacy rights. EMR databases may be obtained from a variety of commercial sources including Epic Systems Corporation, the assignee of the present invention, which sells an EMR database under the trade name of "Chronicles" used with the "EpicCare" and "Epicenter" electronic medical record software.

The patient communication channel **14** may join the interface module **12** to a web server **22** providing a secure socket layer connection to the Internet **24**. The Internet **24** may in turn connect a number of patient terminals **26** (only one shown for clarity) implementing a browser and/or a communication port to a home monitoring system **28**, either or both used by a patient **30**.

The monitoring system **28** may be any of a number of different healthcare appliances, for example, a blood glucose monitor or a home dialysis system or other automated home healthcare providing a machine that can support Internet or other electronic data communication. Generally, the connection to the Internet **24** allows a means for the patient **30** to enter patient-sourced medical data into the computerized access system **10**, the patient-sourced medical data being either machine-generated data from home monitoring system **28** or patient-collected data manually input by a patient into terminal **26**. Patient sourced data will typically include without limitation selections from: patient's weight, blood glucose, blood pressure, pain level, previous health conditions, heart rate, temperature, last menstrual period, medications, and dialysis status.

The web server **22** includes a number of active web pages **32**, some of which will be described below, allowing the patient and/or monitoring system **28** to transmit and receive data securely to and from the web server **22**. Incorporated into these web pages **32**, for example as a CGI script, is a program for authentication of the patient's access to the web pages **32**. The authentication control program makes use of a log-in identifier/password validation table **34** both shown as logically held on the web server **22** but in the preferred embodiment stored and executed remotely. The login identifier/password validation table **34** holds one or more patient specific tokens (for example, log-in identifiers and passwords but possibly including instead or in addition biometric data and the like) that ensure access to possibly sensitive medical data is not freely available to unknown parties. The patient **30** may also allow access to his or her medical records by a proxy or patient's representative also stored as links in the log-in pass-

word/password validation table **34** which gives each proxy a unique token. Generally, the term "patient" as used herein should be considered to include the patient and/or the patient's proxies. One important proxy, of a parent for children, may be initiated as a reminder based on knowledge about childbirth from the EMR.

The patient **30** must enter the login identifier and password upon every new Internet communication session. The log-in identifier and password are not stored in cookie form on the patient terminal **26** such as might make anyone with access to the patient terminal **26** able to view or enter data on behalf of the patient **30**. The monitoring system **28**, however, may include a different internally encoded login identifier unique to that monitoring system **28** for the same purpose.

The table **34** may also include provisions allowing several different login identifiers and passwords to be associated with the same patient so that proxy access may be had by a patient's representative.

Data received by the web server **22** from the patient **30** is marked with a patient identification number and forwarded along the patient communication channel **14** as a patient identified message **36** possibly containing a request or patient sourced data to the interface module **12**. Similar messages **36** may be received by the web server **22** along the patient communication channel **14** from the interface module and forwarded to the patient **30**. Generally the messages **36** will be formatted to act as queries or responses to queries of or from the EMR database **18**.

Referring still to FIG. **1**, the interface module **12** may also connect to a provider communication channel **40** possibly using all or a portion of standard EMR network **19** allowing communication with healthcare sources **20** via terminals **42** associated, for example, with a primary care physician **44** and a system administrator **46**. The physician **44** or administrator **46** may have access to the EMR database **18** directly per normal conventions to add, modify, read, or delete data, or through the interface module **12** as will be described using a viewer/editor **48**.

Access through the interface module **12** by the physician **44** also provides limited access to the patient **30**. In this respect, some patient-sourced data in messages **36** sent by the patient **30** can be routed to a physician **44** and messages from the physician **44** may be routed to the patient **30** in the form of secure communications. Such secure communications may also be initiated by the patient **30** as will be described further below.

Referring now to FIGS. **1** and **2**, the interface module **12** employs a set of administrator programmable rules **54** to control the flow of data between the patient **30** and the EMR database **18** principally through rule engine **52**. The administrator programmable rules **54** may be entered, modified, or deleted by the system administrator **46** for particular circumstances using a conventional editor program of a type well known in the art. Generally the rules are simple logical constructions describing test conditions and actions based on those test conditions as will be understood from the following discussion. The administrator in this case is considered to be an authorized individual other than the patient associated with a healthcare organization.

Generally, rule engine **52** includes a data entry filter **56** receiving data from the patient communication channel **14** and passing it to the EMR communication channel **16** and data reply filter **58** and translation program **60** and report generator **71** receiving data from the EMR communication channel **16** and passing it to the patient communication channel **14**. Each of these filters and tables **56**, **58**, **60**, and **71** applies administrator programmable rules **54** by accepting as rule arguments, the particular patient identified in a message **36** and one or more fields of the EMR database **18** being accessed for reading or writing and/or the data of those fields. User generated rules **54** can thus limit, modify or augment the data contained in messages **36** according to the type and value of data in the messages **36** and according to related data in the EMR database **18**. In one example, the administrator programmable rules **54** provide the patient **30** with a controlled environment in which to view or modify records or the EMR database **18**. In another example, data provided to the patient **30** may be subject to sophisticated processing, for example, trend analysis based on other data in the EMR database **18**.

Referring specifically to FIGS. **2** and **3**, the data reply filter **58** reviews data from the EMR database **18** in response to a message **36** carrying information from the EMR database **18**. At this step indicated by process block **58'**, the data reply filter **58** invested with administrator programmable rules **54** determines whether the requested data is to be available to the patient (or proxy-user) based on the data field or the data values themselves. The administrator programmable rules **54** may partition data of the EMR database **18** into data that may be viewed or not viewed by the patient **30**. For example, nursing or progress notes may be blocked from being viewed by the patient generally regardless of their content. Alternatively or in addition, some fields of the EMR database **18** may be blocked depending on the content of the field. For example, the patient may be prohibited from viewing particular diagnoses or may have general ability to view lab tests except if the results of the test indicate that in-person consultation is to be preferred, for example, if a lab tests indicates an abnormal pap smear or HIV test. Certain data may be blocked simply to avoid clutter in the report (e.g., dates outside a certain date range) or to avoid needless distress to the patient (e.g., the patient may not wish to see they had breast cancer every time they review their problem list). The particular fields and values are determined flexible by the user programmable rules **54** and may be changed on a patient-by-patient basis. Further, data may be made generally available to patients, but an option may be given to the provider to block the data from patient access.

If permission is granted for the data to be received by the patient **30**, the response message **36** containing the data proceeds to a translation program **60** which provides a set of patient-friendly words and phrases that may be substituted for words and phrases within the response message **36** to improve the intelligibility of the reply message to a layperson. The rules in this case simply effect a search and replace operation of a type well understood in the art as indicated by process block **60'**. For example, a medical term such as "esophageal reflux" might be translated to "chronic heartburn" for a lay user by means of a series of search and replace type operations in the rules **54** or by selecting a different interpretation text for standard medical codes.

Data from the translation program **60** may be received by the report generator **71** which calls on other data from the EMR database **18** to augment the requested data of the message **36** or to put the requested data in context as indicated by process block **71'**. For example, the report generator may prepare a chart comparing requested test results for the patient **30** to an ideal range based on patient-sourced data held in the EMR database **18** such as patient age, gender or other medical conditions. Alternatively, the report generator **71** may provide previously stored data to produce a time series putting the data in context. The report generator **71** may also provide the patient **30** with general patient information keyed to or tailored to the patient **30** based on the patient records, for example, general patient information about exercise geared to

the patient's age or diet. This general patient information may be contained in a non-patient record file **62** as shown in FIG. **1** and provided by a third party vendor. This general patient information can also be triggered by the trend checker **66** which may help identify possible medical issues. The general patient information can include preprepared background information about the medical issue and clinical options for treatment.

Importantly, the report generator **71** may make use of data from the EMR database **18** not directly available to the patient. For example, a patient may be blocked from certain data related to the patient's mental health, but this information can be used to provide the patient with relevant content from the non-patient record file **62** including articles on dealing with stress or about counseling services. The report generator **71** may produce reminders, for example, for a pap smear, based on hidden data about sexual history. A report, for example, may show data about weight gain and cholesterol levels to encourage progress on these fronts, while hiding a diagnosis about obesity which might make the patient feel defeated.

Referring again to FIGS. **2** and **4**, patient medical data coming from the patient **30** (patient-sourced data) is received by data entry filter **56** where it is first processed to determine that the patient-sourced data provided by the patient **30** objectively matches the particular range expected from that data per process block **64**. Such patient-sourced data may include, for example, a patient's weight, blood glucose, blood pressure, and dialysis information for a dialysis machine. For example, a blood pressure entry by the patient may be checked against theoretically possible blood pressure entry values. If the value entered by the patient **30** does not fit within an expected range, a "request to confirm" message is sent as indicated by arrow **65**. In response, the patient **30** may check and reenter that data. Alternatively, or in addition the range checking may flag the data for review by the physician **44** later who is also provided with a direct link to the data so that it may be easily examined and/or corrected. The patient-sourced data may be entered in response to a reminder message sent to the patient according to a stored reminder program as part of the computerized access system **10**.

The range checking process block **64** may also request and receive from data in the EMR database **18**, for example, data indicating recent similar data provided by the patient **30** to which the current data may be compared, or known medications taken by the patient **30** that might modify the range. Thus, the range checking may be invested with knowledge about the patient from the EMR database **18** including data that is not directly accessible to the patient.

If the patient **30** confirms the patient-sourced data or if the patient-sourced data passes the range checker **64**, a data trend is checked per process block **66** which evaluates the data in light of other known data in the EMR database **18**, for example, previous entries of data by the patient **30** and known medical conditions of the patient **30**. Typically, trend checking will evaluate given patient-sourced data by extrapolating from previous data or other data in the EMR database **18**. If the trend or simply an abnormal individual reading indicates a problem such as might require review by a healthcare professional, a message indicated by arrow **68** is provided to a physician **44** alerting them as to this trend which the healthcare professional might otherwise have noticed only by entering the data his or herself. The patient may be notified to seek an appointment and may be connected to a scheduling system or office.

Abnormal conditions detected by the trend checker can in addition notify the patient to call an emergency number or a provider on-call for immediate response, for example, significant change in blood pressure or heart rate as informed by data in the EMR database **18**. Importantly, the trend checking can be informed by information about the patient obtained from the EMR database **18** as described by a rule **54**. For example, a patient who has had congestive heart failure might be subject to a trend rule that is sensitive to a lower level of weight gain than is a person without such a condition. Likewise, a different trend rule might be used for a patient who has taken a medication (as indicated in the EMR database **18**) that sometimes raises blood pressure or where a slight blood pressure rise signals a possible problem associated with the drug.

After the patient-sourced data has passed through the trend checking, process block **70** confirms that the patient-sourced data may be entered into the patient record of the EMR database **18**. This access checker **70** is a logical construct and in fact normally implemented by activation of one or more web pages **32** allowing for particular data entry by the patient. A significant amount of the data of the EMR database **18** accessible to the patient will be read-only and in general, only a small subset of data will allow for data entry by the patient **30**.

Referring now to FIG. **7**, all patient-sourced data of message **36** entered into the EMR database **18** carries with it a patient-source tag **72** indicating that it is patient originated data. This patient-source tag **72** is always kept with the patient-sourced data to preserve the integrity of the EMR database **18**. Nevertheless, the patient-sourced data is available freely to other users of the EMR database **18** to integrate the patient-sourced data with the healthcare system. The patient-sourced data of message **36** may also include a second read/write field **74** indicating whether the patient may continue to edit the data or whether it has become read-only data with respect to the patient. This read/write field may be carried with the data or may be enrolled in an administrator programmable rule **54** of the rule engine **52** and prevents delayed modification of data by the patient preserving data integrity. Normally data that may be written to (or modified) by the patient **30** is converted to read-only status after a predetermined period of time selected by an administrator **46**. Finally, the patient-sourced data of message **36** may also include a validation tag **55** which may be provided optionally for data that has been validated by a healthcare professional indicating that it has additional reliability. This validation tag **55** may be attached by the physician **44** or administrator **46** using the viewer/editor **48** to review data from the patient after it has been enrolled in the EMR database **18** or as prompted by a message generated by rule engine **52**. Importantly, the physician **44** does not need to recopy or re-enter the data, but may simply validate existing data.

Data within the EMR database **18** can be viewed in a number of ways based on these tags. Only validated data can be viewed or only invalidated, patient-sourced data may be viewed. Alternatively both types of data may be commingled with or without the tags being identified. In a third display method, the screen can be separated into a field reserved for each type of tagged data.

The patient-sourced data may be formatted by the web server **22** or the interface module to properly query the EMR database **18**, in this case query referring both to operations of a standard query language including those that read, write, sort and search for data.

Referring now to FIGS. **1** and **5**, the entry of patient-sourced data by the patient **30** or the request and review of data from the EMR database **18** is facilitated by a data entry screen **77** generated by the browser on the patient terminal **26** from data provided by the web server **22**. The data entry

screen **77**, for example, may provide data entry boxes **80** allowing the patient to designate data fields from the EMR database **18** for review or data for entry into particular fields of the EMR database **18** and data display fields **82** in which data from the EMR database **18** may be displayed. Data collected over a period of time may be indicated in tabular form with rows **86** being data types and columns being dates and times of the data per date flags **84** so that a first column **87** may allow for current data entry by the patient whereas later columns **88** and **90** may show previously entered data by the patient. An edit flag **92** may indicate whether the data is still editable by the patient (per read/write field **74**) or whether it has reverted to a read only status. Triggers other than time, such as validation of the data or its range can be used in addition or instead based on programmable rules.

Alternatively, data may be reviewed on a data review screen **94** as shown in FIG. **6**. In this data review screen **94** shows a line plot **96** of previous data obtained from the EMR database **18** and normal bars **98** based on knowledge about the patient obtained from the patients EMR database **18**. The patient, for example, may also view other aspects of the EMR database **18**. For example, a history of prescriptions and their status or the results of previous office visits which may also be viewed by a proxy for example, a parent or guardian.

Referring again to FIG. **2**, the present invention, providing communication with the patient **30** over the Internet **24**, allows for secure communication between the patient **30** and physician **44** via a dedicated messaging server **100** contained within the interface module **12**. Incorporation of the messaging system into the present invention allows the physician to review messages in light of data read or viewed from the EMR communication channel **16**.

It is specifically intended that the present invention not be limited to the embodiments and illustrations contained herein, but include modified forms of those embodiments including portions of the embodiments and combinations of elements of different embodiments as come within the scope of the following claims.

We claim:

1. A computer-implemented electronic medical record (EMR) access control system configured to implement an access program stored on a computer-readable medium comprising:

a computer, which when controlled by the access control program, is configured to:

a) receive patient-sourced medical data about a patient from the patient at a computer system;

b) determine a patient specific range of physiology values based at least in part on the patient-sourced medical data;

c) generate a revised patient specific range of physiology values using the access program based on a computer-implemented electronic medical record system of a healthcare provider using a subset of the data in the electronic medical record of the healthcare provider, the subset being defined by the healthcare provider;

e) compare the revised patient specific range of physiology values to the patient-sourced medical data using the access program to generate an information report based on the medical record data in the electronic medical record of the healthcare provider; and

f) return the information report to the patient based on the comparison,

wherein the subset defined by a healthcare provider is defined to exclude patient access to information in the electronic medical record of the healthcare provider until the occurrence of a personal consultation between the patient, and the healthcare provider, the exclusion being indicated by data and programmable rules in the electronic medical record of the healthcare provider.

2. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein determining a patient specific range of physiology values uses historical data about the patient held in the electronic medical record of the healthcare provider.

3. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein determining a patient specific range of physiology values includes testing the data for entry errors based on knowledge about the patient held in the electronic medical record of the healthcare provider.

4. The computer-implemented electronic medical record (EMR) access control system of claim **3** wherein the patient is notified of the entry errors to permit re-entry of the patient-sourced medical data.

5. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein returning the information report includes providing output to the patient indicating a medical issue.

6. The computer-implemented electronic medical record (EMR) access control system of claim **5** wherein the computer provides the patient with prepared background information about the medical issue.

7. The computer-implemented electronic medical record (EMR) access control system of claim **5** wherein the computer provides the patient with clinical options for assisting in correcting the medical issue.

8. The computer-implemented electronic medical record (EMR) access control system of claim **5** wherein the patient is prompted to seek healthcare support.

9. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein a healthcare professional is notified of abnormal conditions indicated by the patient-sourced data to permit review of the patient-sourced data.

10. The computer-implemented electronic medical record (EMR) access control system of claim **9** wherein the healthcare professional is notified by a secure electronic message.

11. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein the patient-sourced data is selected from the group consisting of: patient's weight, blood glucose, blood pressure, pain level, previous health conditions, heart rate, temperature, last menstrual period, and dialysis status.

12. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein the patient-sourced data from the patient is authenticated by a patient specific token.

13. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein the electronic medical record of the healthcare provider holds medical data provided by different healthcare professionals for multiple patients.

14. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein the access control program includes a web server and the patient-sourced data is received over the Internet from a web browser.

15. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein the patient-sourced data is entered into the electronic medical record of the healthcare provider.

16. The computer-implemented electronic medical record (EMR) access control system of claim **15** wherein the patient-sourced data is further presented to a healthcare professional

for validation prior to being entered into the electronic medical record of the healthcare provider.

17. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein patient-sourced data is selected from a source consisting of: machine-generated data from home healthcare appliances and patient-collected data manually input by a patient.

18. The computer-implemented electronic medical record (EMR) access control system of claim **1** wherein the subset defined by a healthcare provider is defined to exclude patient access to information pertaining to at least one medical condition identified by the programmable rules as being known to cause distress to the patient.

19. A computer-implemented electronic medical record (EMR) access control system configured to implement an access program stored on a computer-readable medium comprising:

a computer, which when controlled by the access control program, is configured to:

a) receive a request to upload patient-sourced medical data to an EMR access control system, the request including the patient-sourced medical data about a patient from the patient;

b) store the patient-sourced medical data in an EMR in a patient-sourced data section of the EMR;

c) modify the patient-sourced medical data using the access program based on a subset of patient information stored in a healthcare provider section of the EMR, the healthcare provider section consisting of information entered by a healthcare provider, wherein the patient has only restricted access to the data in the healthcare provider section to preserve the validity of the healthcare provider section data, the subset being defined by the healthcare provider;

d) enter the modified information into the healthcare provider section; and

e) return an information report to the patient based on the modified patient-sourced data,

wherein the subset defined by a healthcare provider is defined to exclude patient access to information in the healthcare provider section until the occurrence of a personal consultation between the patient and the healthcare provider, the exclusion being indicated by data and programmable rules in the electronic medical record of the healthcare provider.

20. The computer-implemented electronic medical record (EMR) access control system of claim **19** wherein modification of the patient-sourced medical data uses historical data about the patient held in the healthcare provider section.

21. The computer-implemented electronic medical record (EMR) access control system of claim **19** further including processing the patient-sourced data to provide data to the patient indicating a patient specific range of physiology values for the patient-sourced data based on medical data about the patient held in the healthcare provider section.

22. The computer-implemented electronic medical record (EMR) access control system of claim **19** further including testing the data for entry errors based on knowledge about the patient held in the healthcare provider section.

23. The computer-implemented electronic medical record (EMR) access control system of claim **22** wherein the patient is notified of the entry errors to permit re-entry of the patient-sourced medical data.

24. The computer-implemented electronic medical record (EMR) access control system of claim **19** wherein the processing of the patient-sourced data provides output to the patient indicating a medical issue.

25. The computer-implemented electronic medical record (EMR) access control system of claim **24** wherein the system provides the patient with prepared background information about the medical issue.

26. The computer-implemented electronic medical record (EMR) access control system of claim **24** wherein the access program provides the patient with clinical options for assisting in correcting the medical issue.

27. The computer-implemented electronic medical record (EMR) access control system of claim **24** wherein the patient is prompted to seek healthcare support.

28. The computer-implemented electronic medical record (EMR) access control system of claim **19** wherein a healthcare professional is notified of abnormal conditions indicated by the patient-sourced data to permit review of the patient-sourced data.

29. The computer-implemented electronic medical record (EMR) access control system of claim **28** wherein the healthcare professional is notified by a secure electronic message.

30. The computer-implemented electronic medical record (EMR) access control system of claim **19** wherein the patient-sourced data is selected from the group consisting of: patient's weight, blood glucose, blood pressure, pain level, previous health conditions, heart rate, temperature, last menstrual period, and dialysis status.

31. The computer-implemented electronic medical record (EMR) access control system, of claim **19** wherein the patient-sourced data from the patient is authenticated by a patient specific token.

32. The computer-implemented electronic medical record (EMR) access control system of claim **19** wherein the healthcare provider section holds medical data provided by different healthcare professionals for multiple patients.

33. The computer-implemented electronic medical record (EMR) access control system of claim **19** wherein the access program includes a web server and the patient-sourced data is received over the Internet from a web browser.

34. The computer-implemented electronic medical record (EMR) access control system of claim **19** wherein the patient-sourced data is entered into the healthcare provider section.

35. The computer-implemented electronic medical record (EMR) access control system of claim **34** wherein the patient-sourced data is further presented to a healthcare professional for validation prior to being entered into the healthcare provider section.

36. The computer-implemented electronic medical record (EMR) access control system of claim **19** wherein patient-sourced data is selected from a source consisting of machine-generated data from home healthcare appliances and patient-collected data manually input by a patient.

37. The computer-implemented electronic medical record (EMR) access control system of claim **19** wherein the subset defined by a healthcare provider is defined to exclude patient access to information pertaining to at least one medical condition identified by the programmable rules as being known to cause distress to the patient.

* * * * *

专利名称(译)	用于患者访问电子病历的交互式系统		
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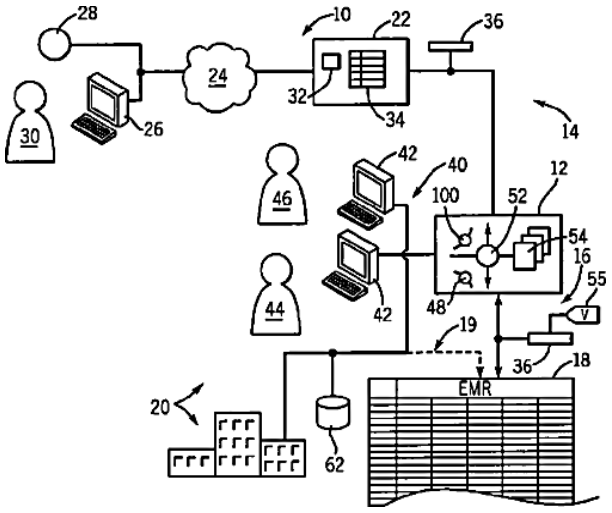
摘要(译)

患者和电子病历EMR之间的可编程的基于规则的界面允许受控患者访问EMR，从而允许患者更多地参与医疗保健过程。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