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(54) HEALTHCARE MANAGEMENT SYSTEM USING PATIENT PROFILE DATA

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(57) **ABSTRACT**

The present disclosure is directed to a system and method which gathers information from all of a person's healthcare providers and abstracts from that information the data necessary for a healthcare provider to render informed medical decisions. In one embodiment, information necessary to process proper payment to a provider (re: reimbursement to the insured patent) is used to develop a holistic view of the medical condition pertaining to the patient. Since this information comes from a myriad of providers, including physicians, surgeons, nursing care, druggists, testing labs, mental health counselors, dentists, oral surgeons, etc., the holistic view that is developed is comprehensive. In one embodiment, the system and method could set parameters on critical data such that if that data is outside the set parameters, alerts can be sent to the appropriate caregivers and/or patients.

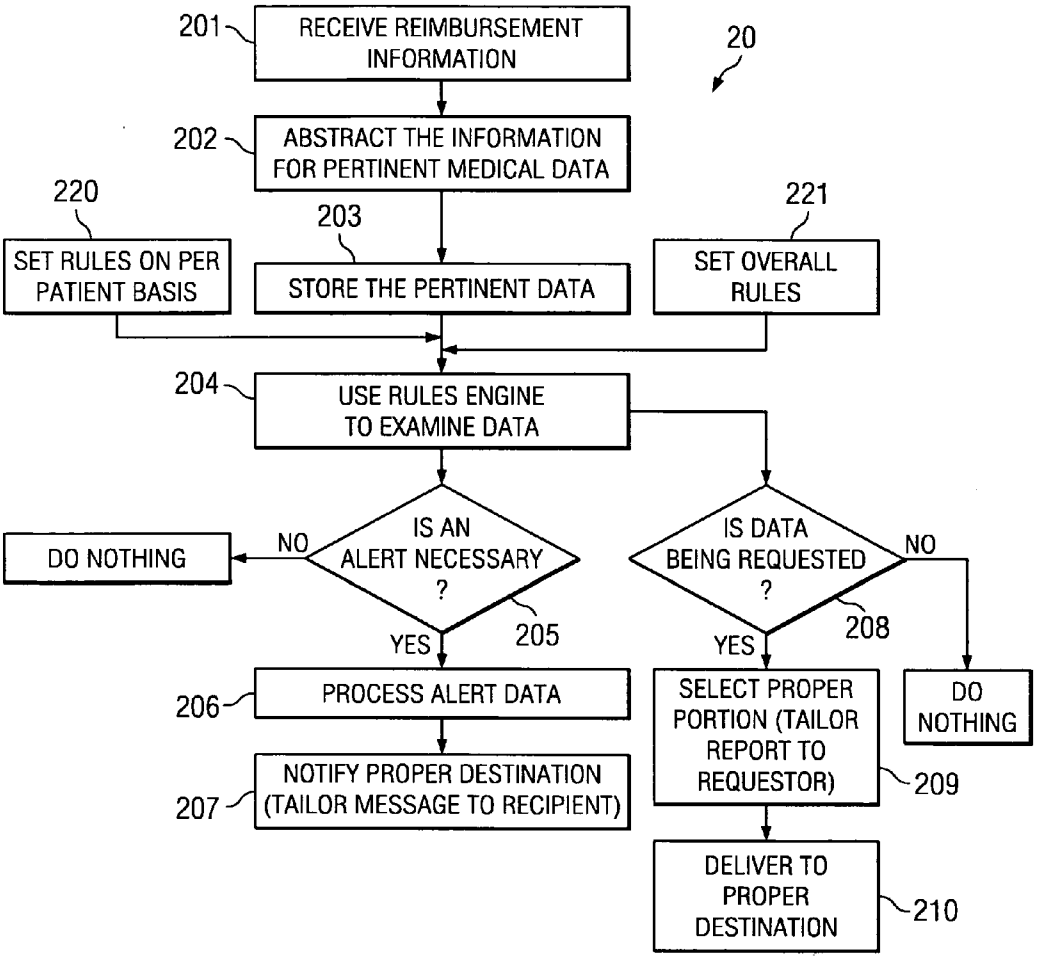


FIG. 1

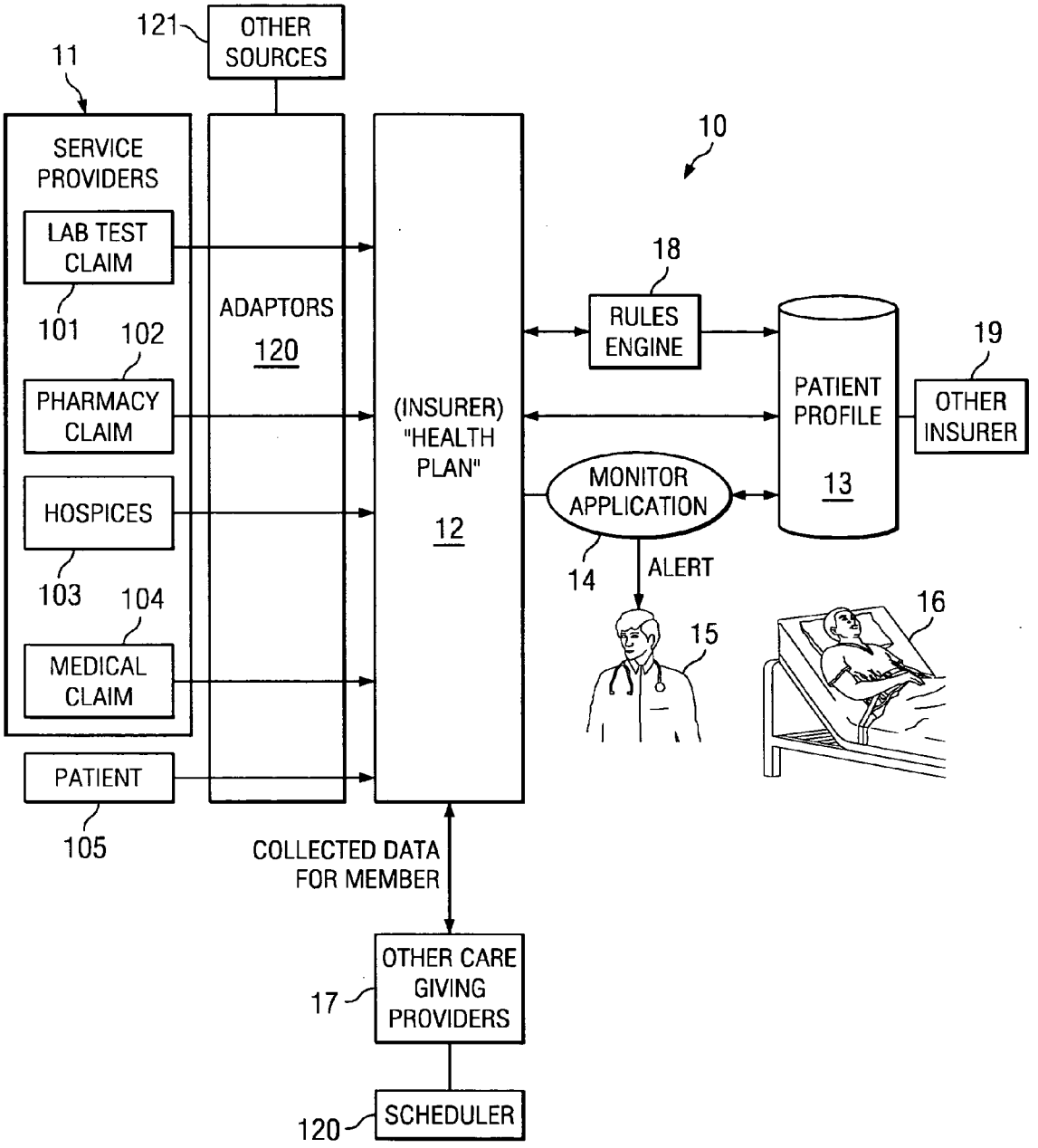
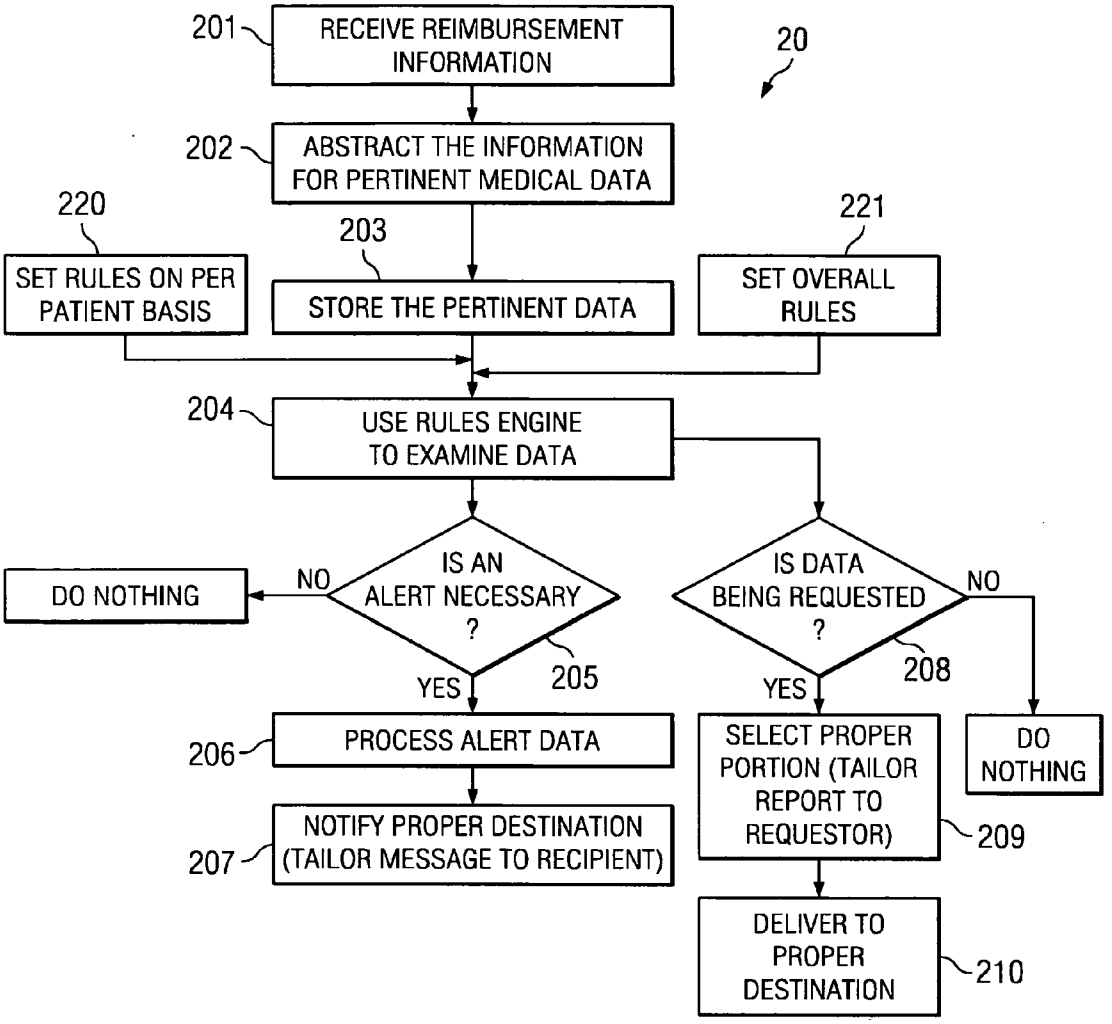

121
OTHER SOURCES
11
SERVICE PROVIDERS
LAB TEST CLAIM
101
102
PHARMACY CLAIM
HOSPICES
103
104
MEDICAL CLAIM
PATIENT
105
ADAPTORS
120
(INSURER) "HEALTH PLAN"
12
10
18
RULES ENGINE
PATIENT PROFILE
13
19
OTHER INSURER
MONITOR APPLICATION
14
ALERT
15
16
COLLECTED DATA FOR MEMBER
OTHER CARE GIVING PROVIDERS
17
SCHEDULER
120

FIG. 2


201
RECEIVE REIMBURSEMENT INFORMATION
20
202
ABSTRACT THE INFORMATION FOR PERTINENT MEDICAL DATA
220
SET RULES ON PER PATIENT BASIS
203
STORE THE PERTINENT DATA
221
SET OVERALL RULES
204
USE RULES ENGINE TO EXAMINE DATA
DO NOTHING
NO
IS AN ALERT NECESSARY ?
205
YES
IS DATA BEING REQUESTED ?
208
NO
YES
206
PROCESS ALERT DATA
207
NOTIFY PROPER DESTINATION (TAILOR MESSAGE TO RECIPIENT)
SELECT PROPER PORTION (TAILOR REPORT TO REQUESTOR)
209
DO NOTHING
DELIVER TO PROPER DESTINATION
210

HEALTHCARE MANAGEMENT SYSTEM USING PATIENT PROFILE DATA

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is related to concurrently filed, co-pending, and commonly assigned U.S. patent application Ser. No. _____, [Attorney Docket No. 66729/P021US/10409827], entitled "SYSTEM AND METHOD FOR SELECTING HEALTHCARE MANAGEMENT", the disclosure of which is hereby incorporated herein by reference.

TECHNICAL FIELD

[0002] This invention is related to medical systems and more particularly to systems and methods for providing medical alerts based on consolidation of a patient's medical information.

BACKGROUND OF THE INVENTION

[0003] Healthcare providers, such as physicians, druggists, nurses, and even the patient him or her self have only a limited view of health-related information pertaining to that patient which is necessary to make properly informed decisions. One limitation is the unavailability of the full range of data needed at a given time to make a fully informed medical decision. Another limitation is the inability to track data between different providers or between different visits to the same provider. For discussion, a visit is any contact with anyone in the chain of healthcare provision, including payors, claims processors, laboratories or pharmacists.

[0004] By way of example, assume a person visits a doctor with a particular problem. The doctor (assuming it's the patients regular doctor) will know about chronic illnesses, such as diabetes, etc. of that patient. But what the doctor does not know is whether the patient has filled the last Rx and if he/she has, taken the medicine regularly. The healthcare provider may or may not know what other healthcare providers may have prescribed, and may or may not have lab test results ordered by other providers. Thus, when treatment is rendered it is done so without access to a wide body of knowledge pertaining to the patient.

[0005] Another problem with the scenario discussed above is that when the provider does make a decision on treatment, he/she then tells the patient to go off and do something and to call if there is a problem. Unless the patient calls with a problem, the provider does not have any insight into what is happening to the patient. This is not a prudent way to manage a person's health and is particularly troublesome when the patient has a chronic illness.

BRIEF SUMMARY OF THE INVENTION

[0006] The present disclosure is directed to a system and method which gathers information from all of a person's healthcare providers and abstracts from that information the data necessary for a healthcare provider to render informed medical decisions. In one embodiment, information necessary to process proper payment to a provider (re: reimbursement to the insured patent) is used to develop a holistic view of the medical condition pertaining to the patient. Since this information comes from a myriad of providers, including physicians, surgeons, nurse case managers, druggists, testing labs, mental health counselors, dentists, oral surgeons, etc., the holistic view that is developed is comprehensive.

[0007] In one embodiment, the system and method could set parameters on critical data such that if that data is outside the set parameters, alerts can be sent to the appropriate caregivers and/or patients.

[0008] The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention will be described hereinafter which form the subject of the claims of the invention. It should be appreciated that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized that such equivalent constructions do not depart from the invention as set forth in the appended claims. The novel features which are believed to be characteristic of the invention, both as to its organization and method of operation, together with further objects and advantages will be better understood from the following description when considered in connection with the accompanying figures. It is to be expressly understood, however, that each of the figures is provided for the purpose of illustration and description only and is not intended as a definition of the limits of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] For a more complete understanding of the present invention, reference is now made to the following descriptions taken in conjunction with the accompanying drawing, in which:

[0010] **FIG. 1** is one embodiment of a system and method for consolidating medical information from a myriad of healthcare providers; and

[0011] **FIG. 2** is a flow chart of one embodiment of system operation.

DETAILED DESCRIPTION OF THE INVENTION

[0012] The forms which are filed (usually electronically) by healthcare providers for reimbursement from payors contain clinical data pertaining to the patient. In addition, health care plans use pharmacy benefit management companies (PBMs) to evaluate and pay pharmacy claims. This process of verification generates pharmacy data which then compliment the treatment and diagnostic data obtained from doctors. In addition, when a physician orders diagnostic tests, (laboratory, imagine, etc. tests), the test costs are billed for either by the ordering physician or by the providing physician, such as by a radiologist. The claim for payment also goes to the payor. In most situations the actual test results are available in electronic format and will also go the payor.

[0013] The system and method described herein takes advantage of the fact that all of this data funnels through a common point and can be used to provide a comprehensive holographic view of a patient's health. Thus, in the disclosed system and method, the health plan acts as the aggregator of

information pertaining to its members and that aggregated information is used to create a meaningful representation of the medical profile of the member.

[0014] Turning now to **FIG. 1**, system **10** shows one embodiment of a system and method for consolidating medical information from diverse sources, such as Service Provider **11**, to give a consolidated profile of a patient. Service provider **11** represents service providers which could encompass test lab **101**, pharmacies **102**, hospitals **103**, and physicians **104**. Claims from any provider are submitted to a patient's insurer **12**. Others, such as the user, user's family, or even unrelated systems such as, for example, a credit card profile system, shown as **121**. At least a portion of the information coming from these various diverse sources is stored in database **13**. While it is contemplated that the raw data be stored in database **13** it could be that only abstracted data (such as above or below limit data) is so stored. Also note that database. **13** could accept data from other insurers **19** which could occur, for example, if a patient were to have multiple insurers (husband and wife; private and government, etc).

[0015] Assuming patient **16** used provider **15** as a primary provider but also used other providers **17** (cardiologist, diabetic specialist, obstetrician/gynecologist), it could be appropriate for any one or more of these providers to set "rules" for the patient. These rules could pertain to filling and refilling a prescription, taking and sending certain monitored readings (sugar levels, air flow, etc.), limits on certain readings, etc. These rules are stored in rules engine **18** on a patient-by-patient basis and when a rule has been attained (i.e., a certain monitored fact is outside a limit), then monitor application **14** sends a message, (e-mails, telephone, fax, etc) to provider **15** (and possibly also to one or more other parties, including the patient).

[0016] Claims are submitted from various service providers, as well as the patient, and these claims may be formatted differently based on the reason for the data exchange. To handle such a situation, proper interfacing between systems is required and this is handled by adaptors, such as adapters **120**.

[0017] One example of how the system and method could work is where physician A has prescribed a particular medication for a patient and physician B, possibly because that patient failed to inform physician B of the medication he/she is taking, prescribed another medication that might be dangerous when mixed with the first medication or possibly negates the effects of the first medication. In such a situation, the system would generate an alert to the patient and, if desired, to both physicians A and B. The reason the alert can be delivered is because of the composite view of a patient's medical history as obtained from payment records. Since the system is based upon data coming to a payor for reimbursement, over-the-counter medicines or medicines that are not paid for by the provider will only get into the system if the patient (or someone acting for the patient) sends in the data.

[0018] Another example would be if a patient has asthma and is asked to measure his/her peak air flow daily and to call the physician if the readings go below a certain level. Frequently patients don't follow through with the instructions or are worried about calling ("bothering") the physician. Using this system a member could go online to record his/her peak flow every day. This on-line data is then sent to the system. A rule is set up in the system that says: if air flow falls below a certain level, or if there is a significant downward trend, issue an Alert Thus, even if the patient is not at the critical stage, alerts are sent and trouble can be averted. The physician cannot take phone calls from patients every day and calculate changes to air flow, but the provider could set the system to accept a patient's input and to call (alerts) when certain limits are met. In addition, patients can input symptoms, such as coughing, vomiting, chest pain, headaches, temperature, blood pressure, etc., and this data can be used to trigger an alert based either on a general group rule, or on parameters set individually for that patient.

[0019] Compliance by a patient is another major concern. For example, the provider asks a patient to take a medication, monitor peak air flow to lungs, check blood sugar, see a specialist, etc. In reality, the provider does not know whether the patient has complied or not. When the patient ends up in the emergency room because of failure to follow directions it is often too late for help. However, using the system and method described herein, the provider will be notified if certain values decrease or change or hit a certain level. Alerts will be generated if the values are missing, i.e., not put in for two or three consistent days, etc. Also, missing data could be that a prescription has not been filled (or refilled on time), thereby initiating an alert.

[0020] These are all examples of the power obtained when the medical history of a patient can be generated and continually monitored based upon an abstraction of data meant for another purpose, namely payment information.

[0021] **FIG. 2** shows one embodiment of system **20** where process **201** receives reimbursement information (a payment claim) from any one of a number of medical providers. This information contains within it enough information so that the third party payor can process the payment to determine how much will be reimbursed. This reimbursement can be sent directly to the provider or sometimes it is sent to the patient. Each such claim must contain with it enough information so that the payor can properly determine the procedure that was performed, and whether the patient is eligible for reimbursement and what the limits are. Often the provider sends minimal information that certain tests have been performed and does not send the actual test results. However, in some situations, the actual test scores are sent with the payment claim information. Pharmacies send in the prescription and sometimes also the diagnosis along with their claim information. In **FIG. 1** this information is shown coming from service providers **11** and goes directly to insurer **12** but the data could pass through adapters **120** designed such that the data from each provider is converted so that pertinent data can be removed, as desired, for storage in patient profile storage **13**.

[0022] In addition, process **201** will process data from a patient, such as from patient **105** (**FIG. 1**) This data could be test results that have been self-administered, such as blood sugar levels, peak flow levels, blood pressure, temperature, or any other measurable physiological (or environmental) parameter that is necessary for a medical diagnosis. In addition a patient can input symptomatic information, such as chest pain, coughing, vomiting, or any other type of occurrence such as blurry vision, or abdominal pain, all of which will be received by process **201** and processed to become part of the patient profile information stored in storage **13**.

[0023] Process **202**, either before the information is stored in patient profile **13** or thereafter, and with or without the help of adaptors **120**, creates an abstract of the information to determine certain information. For example, process **202** could look at various pieces of information and conclude that a patient is a diabetic. This would be concluded, for example, by looking at the medication the patient is taking, patient hospital visits, supplied lab test results, etc., and applying rules under control of rules engine **18** (**FIG. 1**) to conclude that this patient is in a group of diabetics. Other types of information could lead to an abstracting of a patient so that the patient is classified as a heart patient, a pregnant patient, etc. Each of these categories could then require the further abstracting of information to determine from symptoms provided by the patient when to send an alarm. The profile could be organized chronologically for all information, or chronologically for a particular test (such as MRIs) or could be organized in any manner desired. This profile could be made available to a provider or payor when desired and in the manner desired.

[0024] For example, if a patient is classified as having heart failure, then upon receiving information from a patient that the patient is having night time cough, the system would, based upon process **204**, determine that this patient (or his/her health care provider) needs be alerted.

[0025] The system is established such that an administrator, who could be a doctor, could establish parameters that would apply to all of the patients in the database. This information would apply to the whole population of patients falling within the rules for the group. Within each group each physician could establish specific parameters for his/her specific patients.

[0026] Process **203**, as discussed, stores the pertinent data either in patient profile storage **13** or in other storage and based upon rules established by rules engine **18**. Process **205** determines if an alert is necessary. If an alert should be sent, such an alert will be processed via process **206** to determine what type of an alert, who the alert should go to, and how, and will also determine what type of data should be supplied. Process **207** sends the alert to one or more providers, other third parties, or to the patient, as desired.

[0027] Process **208** determines if data is being requested by a physician. This could occur, for example, if a patient shows up in an emergency room of a hospital seeking emergency care. An attending doctor then might request the system to provide an abstract of conditions that would be critical to know how to render proper informed medical assistance. For example, if the patient is diabetic, or is known to be on a medication to thin the blood, the doctor will be so informed. Note that sending a surgeon who is about to perform an operation an entire medical history of the patient is not what is required. What is required at this point is specific characterizations of the patient so that the surgeon can take proper steps. Process **209** handles this task. For example, the surgeon need not know the exact sugar levels over the last six months for this patient, but rather the surgeon needs to know that this patient is a diabetic and is on certain types of medication. Process **209** determines the proper data or portion of the data or abstract of the data and tailors the report to the requester based upon the nature of the request. Process **210** then delivers the report and data to the proper destination. This delivery both from process **210** or process **207** can be, for example, via the Internet or a telephone call or any other type of message, whether wireless or wire line.

[0028] There can also be continuous interaction between the patient and the system so that the patient or provider can set up personalized interventions or recommendations based upon clinical parameters. Thus, a reminder to refill a prescription (or to visit the care giver or a specialist), can be sent to a patient when a prescription is not filled on time or when a suggested specialist has not been visited. Actual insurance reimbursement for future medical visits could, if desired, be dependant upon compliance. Notification to a patient may, for instance, be sent to a patient that he/she should not take both of the drugs prescribed (perhaps by different doctors) because one of the drugs has the ingredients of the other. Based on the severity of that situation (for example, two drugs prescribed which are contra-indicated for use with each other), it may be desired to send a message to the caregiver.

[0029] Messages could be delivered warning a patient of expected symptoms when certain medication, or combination of medications, are being taken. Also, post-operative suggestions can be sent to patients who have just had a certain procedure performed. In some situations preliminary diagnosis is possible based upon all of the information that is available. For example, assume a patient (or a provider) enters into the system, (either directly or abstracted from a claims form) a certain set of symptoms. Assume also that these symptoms suggest a disease known to be prevalent in a certain part of the world. The system then could examine the travel records (as obtained from credit card abstracts or airline records) and note to the provider (or to the patient) the fact that the symptoms may be related to the patient's recent trip to a certain country.

[0030] Note that any such message must be HIPPAA compliant and thus secure e-mail, personal telephone calls, may be necessary. Also note that the message can take any form, such as "Dear Patient, we do not see that you have reordered your XYZ medication. If there is a problem, please call us or please refill it now. Thanks, Your Doctor." If the prescription remains unfilled on day five, an alert would go to the doctor as an indication that perhaps the doctor needs to call the patient to see what is going on.

[0031] Rules could be, for example, entered into the database to the effect that all males over the age of 50 who have not had a PSA in the last year are identified. Based on such a rule, alerts would be sent to each identified patient and to each patient's provider For those patients who must be seen by a provider at periodic times, reminders can be sent and these reminders could, if desired, already have attached a scheduled provider visit. This could, for example, be accomplished using scheduler **120** (**FIG. 1**) which would be updated (or synchronized) by each provider's office in the same manner as synchronism occurs in PDA calendars.

[0032] While it would always be best to have a complete file, including x-rays, MRIs, lab tests, etc., accessible for a patient when any diagnosis is being made, this would be the exception and not the rule. A next best situation would be if a profile of the patient could be made available. That profile is then made up of data indicating certain important factors. For example, if a medical history of visits, drugs and tests indicates a patient is a diabetic then a provider may only be

told the patient is a diabetic and all of the hundreds of test results would not be sent. This abstract profile is, as discussed above, determined by looking at prescriptions, doctors visited and lab tests, as obtained from payment records. Note that simply giving a printout (electronic or otherwise) of all tests, provider visits, etc is overwhelming and not helpful, but providing the proper level of detailed information can be very helpful.

[0033] Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the invention as defined by the appended claims. Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, composition of matter, means, methods and steps described in the specification. As one will readily appreciate from the disclosure, processes, machines, manufacture, compositions of matter, means, methods, or steps, presently existing or later to be developed that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized. Accordingly, the appended claims are intended to include within their scope such processes, machines, manufacture, compositions of matter, means, methods, or steps.

What is claimed is:

1. A method for providing a holistic view of a patient's medical condition, said method comprising:

abstracting information coming to a payor from medical providers, said information pertaining to a particular patient and coming from diverse locations and from diverse disciplines;

storing said abstracted information over a period of time on a patient-by-patient basis; and

upon a triggering event providing at least pertinent portions of said stored information to a medical provider, said pertinent portions based upon the totality of the information provided to said payor pertaining to a particular patient.

2. The method of claim 1 wherein said trigger event is a medical provider inquiry.

3. The method of claim 2 wherein said provided pertinent portions are based upon the nature of said inquiry.

4. The method of claim 3 wherein said pertinent portions are contained in a message sent over the Internet.

5. The method of claim 1 wherein said trigger event is activation of a rule.

6. The method of claim 5 wherein said provided pertinent portions are based upon the nature of said rule activation.

7. The method of claim 6 wherein said pertinent portions are contained in a message transmitted over the Internet.

8. The method of claim 1 wherein said provided portion is a holistic view of said patient's medical condition.

9. The method of claim 8 wherein said portion is tailored to what is required at the time said pertinent portion is provided.

10. The method of claim 1 wherein said trigger event is activation of a rule, said rule established by at least one of the following: a health care provider, a system administrator, a patient.

11. The method of claim 10 wherein limits for at least some of said rules are established on a patient-by-patient basis by a health care provider.

12. The method of claim 10 wherein limits for a group of patients are established for a group of patients by said system administrator.

13. The method of claim 10 further comprising establishing rules for patients based on group parameters.

14. The method of claim 13 further comprising:

setting limits on a patient-by-patient basis for at least some of said group parameter rules.

15. The method of claim 10 further comprising:

sending a message to a patient upon activation of a rule pertaining to said patient.

16. The method of claim 1 further comprising:

storing, in association with said abstracted information, data arriving from individual patients, said data pertaining to testing results obtained by said patient.

17. A system for providing medical profiles to a patient, said system comprising:

means for obtaining data necessary to process payment to medical providers for a particular patient;

means for abstracting certain data from said obtained payment data;

means for creating a medical profile for a patient based upon said abstracted certain data; and

means based on a triggering event for sending at least said created medical profile to at least one of said patient's medical providers.

18. The system of claim 17 wherein said triggering event is rules-based.

19. The system of claim 18 further comprising:

means for allowing a patient's provider to establish certain of said rules for said patient.

20. The system of claim 18 further comprising:

means for allowing a patient to self-establish certain of said rules.

21. The system of claim 18 further comprising:

means for allowing a party other than said patient and said patient's medical provider to set rules for a defined group of patients.

22. The system of claim 18 further comprising:

means for sending a medical alert to a medical provider when a rule has been triggered.

23. The system of claim 18 further comprising:

means for sending a medical alert to said patient when a rule has been triggered

24. A system for providing medical profiles to a patient, said system comprising:

means for obtaining data necessary to process payment to a medical provider for a particular patient;

means for abstracting certain data from said obtained data;

means for creating a medical profile on a patient based upon said abstracted certain data; and

means based on a triggering event and on said created medical profile for sending an alert that a certain medical condition is outside a defined limit.

26. The system of claim **25** wherein said alert is sent to said patient.

26. The system of claim **25** wherein said alert is sent to said patient's provider(s).

27. The system of claim **25** further comprising:

means for establishing defined limits on a patient-by-patient basis.

28. A medical alerting system comprising:

a database for storing medical data on a patient-by-patient basis, said medical data pertaining to provider diagnosis, provider visits, patient prescriptions and patient lab results;

a rules engine for reviewing data stored in said database, on a patient-by-patient basis; and

a notification system for sending medical alerts under control of said rules engine when data pertaining to a particular patient falls within a rule defined for said particular patient.

29. The system of claim 28 further comprising:

an adaptor for populating said database based upon data sent to a payor for reimbursement purposes.

30. The system of claim 28 further comprising:

a communication device for sending a medical alert to a provider when a rule has been triggered.

31. The system of claim 28 further comprising:

a communication device for sending a medical alert to said patient when a rule has been triggered.

32. The system of claim 28 wherein said notification system is responsive to an inquiry from an authorized provider for sending at least one medical profile to said provider, said profile tailored to the needs of said requesting provider.

33. The system of claim 32 wherein said obtaining means comprises:

means for obtaining data from patient, said data pertaining to medical conditions of said patient.

34. The system of claim 28 wherein said notification system is operable for sending alerts under control of said rules engine when certain expected data is missing.

35. A method for providing medical alerting, said method comprising:

storing medical data on a patient-by-patient basis, said medical data pertaining to at least one of provider diagnosis, provider visits, patient prescriptions, patient lab results;

receiving from patients data pertaining to medical conditions pertaining to said patients;

reviewing stored data on a patient-by-patient basis, said review matching data received from a patient against stored data pertaining to said patient; and

said review results in information falling within at least one defined rule.

36. The method of claim 35 further comprising:

populating said database based upon data sent to a payor for reimbursement purposes.

37. The method of claim 35 further comprising:

sending a medical alert to a provider when said rule has been triggered.

38. The method of claim 35 further comprising:

sending a medical alert to said patient when said rule has been triggered.

39. The method of claim 35 wherein said rule is established for a plurality of patients on a non-specific patient basis.

40. The method of claim 35 wherein said rule is established specifically for certain of said patients.

* * * * *