Title: HEALTH MONITORING SYSTEM

Abstract: A system for monitoring the health of an individual comprising a remote monitor which can monitor at least one health parameter of a patient, and means for transmitting data related to the monitored parameter to a central monitoring unit where the data is stored. The central monitoring unit comprises an application server hosting an application which provides access to the data. Multiple users may connect to the application server to access the data.
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Health Monitoring System

This invention relates to a remote health monitoring system, of the type in which data about a patient in one location is transmitted to another site for analysis. The invention is primarily concerned with humans, although it could be adapted for use with animals.

As the cost for hospitalisation of patients increases, and the ratio of old people in the total population rapidly increases, there is a need for improved methods for monitoring the health of individuals. There is a need for improved monitoring methods for health parameters of individuals with no identified diseases related to the health parameters of interest. For example a healthy individual may be monitored with the aim of identifying early signs of disease observable in special situations, such as blood pressure monitoring during working or stressful situations. There could be regular monitoring of individuals exposed to an increased risk of disease based on the results of genetic screening. There is also a need for improved methods for monitoring individuals with various symptoms of diagnosed diseases, for example to follow up drug treatment, postoperative patients or patients with a medical history of acute myocardial infarction. There is also a need for individual monitoring within sports medicine and/or other extreme performance situations or occupations. It is also desirable for there to be more efficient surveillance and eventual treatment of chronically ill persons through avoidance of unnecessary visits to a specialist for check-ups, with the associated costs for both individuals and society, patient inconvenience, and increased workload for the specialist.

Several methods have been suggested to monitor the health of individuals. These methods include various so-
called "telemedicine" methods. For example, WO 99/44494 discloses a system in which a patient carries a monitor which records physiological data. Cellular communications technology is used to transmit data to a central health monitoring station. The patient may speak to a clinician at the health monitoring station, who can advise the patient what to do or can send emergency medical assistance personnel.

Although there are various proposals for telemedicine medical systems for monitoring health of individuals, there is a medical need for a new method that is simple, efficient and safe. Known methods have various drawbacks such as high complexity, high cost, low efficiency, lack of versatility and limited safety.

Viewed from one aspect, the present invention provides a system for monitoring the health of an individual, comprising a remote monitor which can monitor at least one health parameter of a patient, and means for transmitting data related to the monitored parameter to a central monitoring unit where the data is stored, characterised in that the central monitoring unit comprises an application server hosting an application which provides access to the data, and in that multiple users may connect to the application server to access the data.

By storing the data centrally and by providing access to the data by means of an application running on an application server, the system provides considerable versatility. Users such as general medical practitioners, medical specialists, emergency medical personnel and even patients can all connect to the application server to review the data or other related material such as medical notes, a specialist diagnosis and so forth. The users do not need to have specialist hardware or software themselves in order to access the data. A conventional PC running a web browser such as Microsoft's Internet Explorer (TM) can be used to
connect to the application server, and the data and other related material can be displayed as web pages. The system could operate over a private network but preferably there is access through the Internet, making it extremely simple for new users to be added. All that is needed is a link to the site, and suitable authorisation. In view of the sensitivity of information, such as patient details, that will be stored on the system, security is an important issue. As a minimum a user will need to log in using a login name and password, and will generally have restricted permissions so that access to areas of the system is controlled. A patient may have access only to his own records, a treating doctor may have only access to the records of his own patients and so forth. Other more secure forms of authentication could be used, such as providing users with an electronic device which produces varying authorisation codes in accordance with an algorithm which is also matched on the central system. A user must enter the authorisation code generated by the device within a certain period, before the code changes.

The system can be made accessible using mobile technology, such as by means of Internet enabled mobile phones or other communication devices, personal digital assistants, dedicated hardware and so on. Routes of communication include radio waves, for example as used by mobile telephone networks, signals transmitted along analogue telephone wires or digital networks using ISDN or broadband access, specialised dedicated networks, the Internet and so forth. Short range communication, such as between a monitoring device and a communications module, could be by means of "Bluetooth" technology, wireless LAN technology, inductive coupling or any other available system. However it is preferable that at least long range communications are secure. Various forms of commercially available encryption may be used to encrypt data being communicated, just as commercially available
systems may be used to protect stored data and control access to the data.

In a preferred embodiment, there is utilised a combination of a sophisticated electronic communication system and a medical doctor directly responsible for the patient. It will be appreciated that the expression "patient" does not imply that the individual is suffering from a medical complaint. As discussed above, monitoring may be conducted for various purposes, even on healthy individuals.

In a practical implementation there may be provided a detector for monitoring one or more parameter from the individual. This communicates with a system for transmitting signals from the monitoring detector through a communication system to the central monitoring unit, which makes the information available to an expert for analysing the monitored physiological parameters. The expert will communicate the results from the monitoring unit to a medical doctor or others directly responsible for treatment of the patient.

Optionally, the recorded physiological data can be made available to a patient so that the individual can directly monitor the physiological data. The central monitoring unit may host smart software which can assist a patient. For example, the smart software may monitor symptoms of asthma in a patient and, without contacting a human specialist, advise the patient on whether to increase or reduce the amount of medication taken.

Optionally, a geographical location-system such as a GPS system carried by the individual might be included. This could be used to direct emergency medical personnel.

In one embodiment, an operation centre is included. This operation centre can provide the combined functions of a nurse or junior medical staff, and a technical support person, controlling the system, starting and stopping recording of medical data, and ensuring that
the system works according to the specifications. Medically qualified staff at the centre, able to carry out the functions of a nurse or junior medical staff, could make initial assessments and advise the patient before a full assessment is made by an expert. That expert could be a human specialist or smart software hosted by the system.

In one embodiment, the individual may be placed in direct contact with the specialist, but the most preferred system is one in which there is a central unit accessible by both the patient and the specialist as well as by the treating doctor, a nurse, technical support personnel and so forth.

A detector used in the system can be any detector able to monitor physiological parameters (status as well as potential changes) relevant for disease. Suitable detectors are detectors able to monitor cardiovascular parameters, parameters relevant for pulmonary diseases, parameters relevant for endocrine and metabolic diseases and parameters relevant for gastrointestinal diseases. One group of detectors that may be of particular interest are those for detection of heart function parameters, such as electrical activity in the heart (ECG), blood pressure, \( pO_2 \), and pulse rate. Other groups of interest include detectors for lung function parameters (PEF measurements), detectors for detection of glucose concentration in blood, detectors for ultraviolet rays, detector for pollen, dust or other asthma triggering elements, and detectors for other pollution that may trigger asthma or other diseases. A detector may monitor the progress of a pregnancy and the health of an unborn child. Another area of use is in the field of monitoring sleeping babies so as to avoid the cot death syndrome. The progress of treatment with medication, such as follow up medication, can be monitored.

Transmitting signals from the monitoring detector
to the central unit can be accomplished using any communicating technology available. The most preferred embodiments will use various wireless telecommunication systems, for example using the same cellular technology as in various mobile phone systems. The mobile phone system can be any phone system available, including mobile digital technology such as GSM, UMTS, NMT, D-AMPS, CDMA and other systems available. The systems might operate over different frequencies; for example 800\1900 or 1800\1900 MHz. Some preferred embodiments of the present invention use an integrated communication system between the detector and a telecommunication system. Another possibility is to use "blue tooth technology", wireless LAN or similar technology to achieve communication between the detector and a communication module which would transmit the information through a suitable telecommunications system.

In general the monitor may be part of an integrated device, which includes the electronics necessary to achieve communication, or may be separate from the communications device. Thus, a completely integrated mobile device could be worn by a user, monitoring data and transmitting it to the central monitoring unit directly using e.g. cellular telephone technology. Alternatively, the monitoring device could communicate with a local communications unit, such as a dedicated unit or a personal computer, which then transmits data to the central monitoring unit. The monitoring device may store data, and then be connected to a local communications unit at intervals for the data to be transmitted. This could be achieved using Bluetooth technology, infra red coupling, wireless LAN technology, inductive coupling, a cable connection, or for example by plugging the monitoring device into a socket provided by the communications unit. If measurements are only required at certain times, a fixed installation could be
provided which does the monitoring when the patient is attached to it at appropriate intervals. Again, there could be integrated communications, or for example a port for connection of a communications system such as a mobile or conventional telephone network, ISDN or broadband network and so forth.

In the preferred embodiments, the central unit will make the information available to all individuals including experts and medical doctors who have authorised access to the data. The central unit will treat the data up to certain levels using general or smart application software. The recorded information can also serve as documentation for payers or disease treatment refund authorities, such as public health authorities or health insurance companies. The central unit preferably also has systems for monitoring usage and billing customers. Normally, customers would be treating doctors who may subscribe to the system or have access to it on a "pay as you go" basis.

Sophisticated communications technologies such as local or wide area networks, the Internet or similar global and multi geographic virtual arrangements are preferred systems for use of the present invention.

The physiological data can be collected automatically from the individual and transmitted to the central system or it can be collected when triggered by the individual or by the central system, or by the detector itself. An expert might receive information through any communications channel, for example through alerts from the system itself, through dial-up access, e-mail, or any regulatory setup.

The monitoring device may perform more functions than just monitoring parameters. It could incorporate systems for treating the patient. For example, there could be a drug delivery system which delivers doses of medication at appropriate intervals. This could be separate from the monitoring but is preferably
interactive. Thus, the data collected by the monitoring device would be transmitted to the central monitoring unit where it would be analysed and the medication requirements calculated either by smart software or a human such as a specialist, a treating doctor or in some cases a nurse or junior medical staff. The medication requirements will then be transmitted to the monitoring device, and this could be done by transferring a programme to be followed for delivering the medication or by sending commands at the required times for administration of the medication.

The monitoring device could be associated with a heart pacemaker or a defibrillator, whether an external device or an implanted ICD. The central monitoring unit could host smart software or use a human specialist to calculate a new programme for a pacemaker or an ICD defibrillator, for example.

An expert, whether a human or smart software, might get all available data obtained from the individual using the system, or only get selected information such as information regarding physiological parameters only when the physiological parameters are outside a set of normal values.

In preferred embodiments the system uses an expert who is a medical doctor or another person with specialist training for analysing data from the individual. Most preferred, the expert is a medical doctor with more experience and knowledge about the physiological parameter of interest than the medical doctor or others directly responsible for treatment of the patient.

The individual can be a human being, animal or other living organisms that have a need for individual and continuous surveillance and information transferral for an expert evaluation. The individual can be a human or animal with no identified disease related to the physiological parameter of interest, such as a normal
individual to be monitored for example with aim to identify early signs of disease observable in special situations, for example based on results of genetic screening. Another option is that the individual has some symptoms but no diseases related to these symptoms have been diagnosed. Still another option is that a human or animal has an identified disease related to the physiological parameter of interest. Thus, a patient may be monitored for example with the intention to follow up lifestyle, to monitor drug treatment or to check on postoperative conditions. One preferred implementation involves monitoring the health of high-risk individuals, i.e. individuals with an increased risk above normal of getting a disease with mortality. Such individuals can for example be patients with a medical history of acute myocardial infarction.

As regards a combined monitor and transmitting unit using wireless communication with the central monitoring unit, such a wireless unit should preferably not weigh above 3 kilograms, and more preferably weighs less than 1 kilogram, most preferably less than 0.7 kilogram. The unit must include a power system which is preferably chargeable and preferably has a capacity to give power to the system at least for 10 hours, preferably 24 hours and more preferably at least 36 hours. This combined unit could be carried in a pocket or worn on a belt or similar such as a hand strap or foot strap. It can be in the form of two or more units which might communicate through standard wires or through wireless communication systems. In addition, blue tooth technology, infrared technology, wireless LAN or other communication technologies might be integrated into the system.

A typical combined unit could be for example an ECG-system based on two or more electrodes integrated with a digital communication unit. Such ECG devices are known as such, but the system of the present invention makes it possible to secures reliable diagnosis, have
immediate action in emergency and possibly implement follow up therapy.

The preferred embodiments of the present invention provide a new method for monitoring health of individuals enabling faster, more precise and cheaper medical intervention. More specifically, there is provided a detector for monitoring one or more parameters from an individual, communicating with a system for transmission of signals from the monitoring detector through a communication system to a central unit. This central unit makes the information available for those who are allowed access, such as an expert for analysing the monitored physiological parameters. This expert will communicate the results to a medical doctor or others directly responsible for treatment of the patient.

The system is especially suited for monitoring cardiovascular parameters, parameters relevant for endocrine and metabolic diseases, respiratory diseases and parameters relevant for gastrointestinal diseases.

The invention does not only extend to the complete system, but also to the central monitoring unit as such. Thus, viewed from another aspect there is provided data processing means for use as part of a central monitoring unit in a system as described above, the data processing means being configured to receive and store data from the remote monitor, and being configured as an application server hosting at least one application permitting users access to the data. Another aspect of the invention provides computer software which when run on data processing means will configure the data processing means as an application server as described above. Software may be provided as signals transmitted from a remote site, for example over the Internet or an intranet, or be provided on physical media such as CD-ROM. The software may be provided in an executable form, or encrypted and / or compressed, or as an installation
set that will create the necessary software to configure
the data processing means.

An important aspect of one preferred system is that
the operation of the monitoring device can be controlled
from an application running at the central monitoring
unit.

Thus, viewed from another aspect of the invention
there is provided a system for monitoring the health of
an individual, comprising a remote monitor which can
monitor at least one health parameter of a patient, and
means for transmitting data related to the monitored
parameter to a central monitoring unit where the data is
stored, characterised in that the central monitoring
unit hosts an application which can communicate with the
monitoring device to control operation of the monitoring
device.

As noted above, the monitoring device may be
controlled not only in respect of monitoring functions
but also in respect of treatment functions such as drug
delivery or the operation of a heart pacemaker or
defibrillator.

The data processing means could operate under any
suitable platform such as NT or Unix.

It will be appreciated that references to an
"application server" are to a server in a logical sense
rather than to a particular item of hardware in a
particular site. Applications and data may be divided
over a number of computers, at a number of sites which
can be in a number of geographical locations.

An embodiment of the invention will now be
described by way of example and with reference to the
accompanying drawings in which:

Figure 1 is a schematic overview of the system;
Figure 2 is a flow chart of one scenario using the
system;
Figure 3 is a flow chart of another scenario; and
Figure 4 is a flow chart of another scenario.
As shown in Figure 1, the system comprises a central application server 1. It will be appreciated that in practice the various functions of this server could be carried out by a number of connected physical units. The application server 1 is enabled to receive connections from users in a number of ways, including over the Internet, via a mobile communications network, a local area network, a conventional telephone network, a wide area network and so forth as discussed earlier.

As illustrated a number of patient monitors 2, for example ECG monitors, monitor parameters of a patient and transmit data via a cellular communications network to the application server 1. Software for handling and organising the storage of the data is hosted by the application server 1. An operation centre console 3 can access the application server to view the data and other related information. The data is also accessible to specialist doctors using workstations 4, and to physicians using workstations 5. The users access one or more general or smart software applications running on the application server. 6 is a home PC of a patient, connected to the server 1 via the Internet 7.

In the following scenarios, the Treating Doctor is the person who requests a specialist analysis of data, and is consequently billed by the operators of the system. The treating doctor may in some cases be another type of qualified person. The Specialist is a doctor, employed by the organisation providing the system, doing specialist analysis of the data. It will be appreciated that, as discussed earlier, at least some analysis could be performed by smart software acting as a "virtual specialist". The Patient is the person from whom measurements are taken, but as explained this does not mean that the person or animal is suffering from any medical condition. In these scenarios "PCC" (standing for "Professional Customer Care"), is used to designate the central monitoring unit whose functions are handled
by employees of the organisation providing the system. This is the link between the customers and the organization, i.e. treating doctors who will be using the organisation's system for their patients. It is also the link for specialists, hospitals, patients or anybody else, and should be the customer's primary contact point with the organisation regarding requests, support and other matters. It will be appreciated that in respect of all three scenarios there will be security systems of the type discussed earlier as regards access and communications.

There are three main usage scenarios, which are described with reference to figures 2, 3 and 4.

In one example, the treating doctor is in possession of one or more specialised ECG monitoring devices. The treating doctor will mount the device on the patient, if he or she decides that an ECG is needed. The treating doctor will then decide on the type and time frame of measurement needed, and start a measurement. The specialists employed by the organisation will be cardiologists with expertise in analysing ECG data.

In a first scenario, the treating doctor is authorised to access the service and subscribes to a specialist service. The patient data input is done via terminal or via the PCC. If data input is via a terminal, the doctor creates the patient record with relevant information. A number of fields in the record are mandatory and must be filled out. If data input is via the PCC the patient data is given via phone, fax, E-mail or any other suitable route from the doctor to the PCC, which creates a patient record. The treating doctor will request a measurement of a specific type, over a fixed time frame. The PCC will, using the same GUI (Graphical User Interface), input patient data, the treating doctor's customer ID, assign a specialist, and assign repetitive evaluations in case of long-term measurements etc.
If measurement is started via a terminal the treating doctor uses the "start measurement" interface in the application, where a measurement is requested from a specific device, over a fixed period of time, through configuration manager software. If measurement is started via the PCC, the PCC representative uses a "start measurement" interface in the application where a measurement is requested from a specific device, over a fixed period of time, through the configuration manager.

In either case, a specialist is allocated for evaluation, and the specialist is notified. The specialist must accept the job within a certain time limit. If not a new specialist is allocated.

When starting measurement using the terminal, the application notifies the treating doctor that the measurement has been started correctly.

When starting measurement using, the PCC will verify operation of the monitoring device, through the configuration manager or other software, and will inform the treating doctor whether any adjustments are needed. Whilst performing measurements, the PCC continuously monitors that the measurements are OK, and that everything is normal. If something happens, the PCC needs to take action, for example by notifying the treating doctor or calling the patient. Thus preferably the PCC needs to be given the telephone number of the patient. If a measurement is scheduled for longer time periods, it should be possible to request specialist evaluation at intermediate points, e.g. every 24 hours.

The application may stop the measurement at a pre-defined time. If using a terminal, the treating doctor stops the measurement by using the application. If using the PCC the treating doctor calls the PCC which uses the application for stopping the measurement. Once measurement has been stopped, data is stored on the organisations data area and on the treating doctor's data area. The allocated specialist is notified, and an
evaluation is written and a report stored both on the organisation's area and on the treating doctor's area. The PCC checks that the specialist is notified and that the report is written. The treating doctor is notified via E-mail or by any other means such as fax, SMS or telephone that the report is available on treating doctor's data area.

In a second scenario as illustrated in Figure 3, the treating doctor is authorised access to the service but hires the organisation's specialist service on a case by case basis. In this case, the system is the same as in the first scenario but the treating doctor must notify the PCC if he wants a specialist provided by the organisation to evaluate the data. There are three options after the measurement is available, that status being notified to the treating doctor. The treating doctor can do his own analysis and prepare his own report which is stored on the treating doctor's own data area. If he has already instructed PCC that he wants to hire a specialist, the specialist is notified, an evaluation is prepared, the report is stored on the organisation's data area and on the treating doctor's data area and the treating doctor is notified. The treating doctor may decide only after notification that the data is available that a specialist is required. This is achieved by notifying PCC, which appoints a specialist. An evaluation is prepared, the report is stored on the organisation's data area and on the treating doctor's data area and the treating doctor is notified.

With reference to Figure 4, in the third scenario the treating doctor is not authorised to access the applications hosted by the application server but subscribes to the organisation's specialist service. The treating doctor has registered a patient, and has started the procedure for initiating an ECG measurement. Patient data input is done via the PCC. The patient data
is given to the PCC via telephone, fax, E-mail or other suitable means from the doctor to the PCC, which creates a patient record. The treating doctor will request a measurement of a specific type, over a fixed time frame.

The PCC will input patient data, treating doctor's customer ID, assign a specialist, and assign repetitive evaluations in case of long-term measurements etc.

Measurement is started via the PCC and the PCC representative uses the "start measurement" interface in the application where a measurement is requested from a specific device, over a fixed period of time, through the configuration manager.

The treating doctor decides he wants the organisation to evaluate the measurement. A specialist is allocated by the PCC for evaluation, and the specialist is notified. The specialist must accept the job within a certain time limit. If not a new specialist is allocated.

The PCC will verify operation of the monitoring device, through the configuration manager or other software, and inform the treating doctor whether any adjustments are needed. The PCC monitors that the measurements are OK, and that everything is normal, as before. The application stops the measurement at a predefined time, or the treating doctor calls the PCC which uses the application for stopping the measurement. As before, the specialist is notified, a report stored, and the treating doctor is notified. The report can be provided to the treating doctor by access over the Internet, or in an e-mail or fax, or by any other suitable means.
Claims:

1. A system for monitoring the health of an individual comprising
   a remote monitor which can monitor at least one
   health parameter of a patient, and
   means for transmitting data related to said
   monitored parameter to a central monitoring unit where
   the data is stored, characterised in that said central
   monitoring unit comprises an application server hosting
   an application which provides access to the data, and in
   that multiple users may connect to the application
   server to access the data.

2. A system as claimed in claim 1, wherein operation
   of said remote monitor can be controlled by said central
   monitoring unit.

3. A system as claimed in claim 2, wherein said
   central monitoring unit controls the rate at which said
   remote monitor takes measurements.

4. A system as claimed in claim 2 or 3, wherein said
   central monitoring unit instructs the remote monitor to
   apply a treatment.

5. A system as claimed in claim 2, 3 or 4, wherein
   said central monitoring unit instructs said remote
   monitor to communicate information to the patient.

6. A system as claimed in claim 5, wherein said
   central monitoring unit instructs said remote monitor to
   inform the patient to increase or decrease an amount of
   medication being taken.

7. A system as claimed in any preceding claim, further
   comprising a geographical location-system so that said
remote monitor may send the location of the patient to emergency medical personnel.

8. A system as claimed in claim 7, wherein said information sent to the emergency medical personnel is sent via said central monitoring unit.

9. A system as claimed in any preceding claim, wherein said remote monitor measures physiological parameters and changes thereof.

10. A system as claimed in any preceding claim, wherein said central monitoring unit treats data up to a certain level using general or smart application software, and above said level refers data to an expert.

11. A system as claimed in claim 10, wherein said expert is a computer program.

12. A system as claimed in any preceding claim, further comprising means for monitoring usage of the services by individual customers and billing said customers according to their usage.

13. A system as claimed in any preceding claim, wherein said remote monitor is capable of administering treatment to a patient.

14. A system as claimed in claim 13, wherein said treatment comprises a drug delivery system which delivers doses of medication at appropriate intervals.

15. A system as claimed in claim 13 or 14, wherein said treatment is interactive with said monitored parameters.

16. A system as claimed in claim 14 or 15, wherein said remote monitor transmits data to said central monitoring
unit,
said central monitoring unit calculates a required dosage of medication and transmits said dosage to said remote monitor, and
said remote monitor delivers said dosage of medication.

17. A system as claimed in any preceding claim, wherein users who may access the data can include patients.

18. A system for monitoring the health of an individual comprising
   a remote monitor which can monitor at least one health parameter of a patient, and
   means for transmitting data related to said monitored parameter to a central monitoring unit where the data is stored, characterised in that the central monitoring unit hosts an application which can communicate with the remote monitor to control operation of the remote monitor.

19. A system as claimed in claim 18, wherein said central monitoring unit controls the rate at which said remote monitor takes measurements.

20. A system as claimed in claim 18 or 19, wherein said central monitoring unit instructs said remote monitor to apply a treatment.

21. A system as claimed in claim 18,19 or 20, wherein said central monitoring unit instructs said remote monitor to communicate information to the patient.

22. A system as claimed in claim 21, wherein said central monitoring unit instructs said remote monitor to inform the patient to increase or decrease an amount of medication being taken.
23. Data processing apparatus configured to communicate with a remote monitor which can monitor at least one health parameter of a patient, wherein said data processing apparatus is configured to receive and store data and comprises means for receiving data related to said monitored parameter from said remote monitor and wherein said data processing apparatus hosts an application, said application providing multiple users access to data stored on said data processing apparatus.

24. Data processing apparatus as claimed in claim 23, further comprising means for transmitting data to said remote monitor, whereby operation of said remote monitor can be controlled by said data processing apparatus.

25. Data processing apparatus as claimed in claim 24, wherein said data processing apparatus controls the rate at which said remote monitor takes measurements.

26. Data processing apparatus as claimed in claim 24 or 25, wherein said data processing apparatus instructs said remote monitor to apply a treatment.

27. Data processing apparatus as claimed in claim 26, wherein said data processing apparatus analyses data received from said remote monitor, calculates a dosage of medication required by the patient, and instructs said remote monitor to apply said dosage of medication.

28. Data processing apparatus as claimed in any of claims 24 to 27, wherein said data processing apparatus instructs said remote monitor to communicate information to the patient.

29. Data processing apparatus as claimed in claim 28, wherein said data processing apparatus instructs said
remote monitor to inform the patient to increase or decrease an amount of medication being taken.

30. Data processing apparatus as claimed in any of claims 23 to 29, wherein said data processing apparatus is capable of receiving information from a geographical location-system and forwarding that information to emergency medical personnel in order to locate a patient.

31. Data processing apparatus as claimed in any of claims 23 to 30, wherein said data processing apparatus treats data up to a certain level using general or smart application software, and above said level refers data to an expert.

32. Data processing apparatus as claimed in claim 31, wherein said expert is a computer program.

33. Data processing apparatus as claimed in any of claims 23 to 32, further comprising means for monitoring usage of the services by individual customers and billing said customers according to their usage.

34. Data processing apparatus as claimed in any of claims 23 to 33, wherein users who may access the data can include patients.

35. Data processing apparatus configured to communicate with a remote monitor which can monitor at least one health parameter of a patient, wherein said data processing means is configured to receive and store data and comprises means for receiving data related to said monitored parameter from said remote monitor and wherein said data processing apparatus hosts an application which can control operation of the remote monitor.
36. Data processing apparatus as claimed in claim 35, wherein said data processing apparatus controls the rate at which said remote monitor takes measurements.

37. Data processing apparatus as claimed in claim 35 or 36, wherein said data processing apparatus instructs said remote monitor to apply a treatment.

38. Data processing apparatus as claimed in claim 37, wherein said data processing apparatus analyses data received from said remote monitor, calculates a dosage of medication required by the patient, and instructs said remote monitor to apply said dosage of medication.

39. Data processing apparatus as claimed in any of claims 35 to 38, wherein said data processing apparatus instructs said remote monitor to communicate information to the patient.

40. Data processing apparatus as claimed in claim 39, wherein said data processing apparatus instructs said remote monitor to inform the patient to increase or decrease an amount of medication being taken.

41. Computer software for configuring data processing apparatus to operate in accordance with claims 23 to 34.

42. Computer software for configuring data processing apparatus to operate in accordance with claims 35 to 40.
FIGURE 1
1. Patient data

   **Patient data input via terminal.**
   **Patient data input via PCC.**

2. Start measurement

   **ECG measurement is started via terminal. Specialist is allocated and notified.**
   **ECG measurement is started via PCC. Specialist is allocated and notified.**

3. Start OK

   **Start measurement is OK -- notification via terminal. PCC is notified that automatic measurement is started.**
   **Start measurement is OK -- notification via PCC.**

   **PCC is monitoring that measurements are being done, and takes action when fault situations occur.**

4. Performing measurement

   **Performing measurement**

   **Stop measurement at predefined time or treating doctor decides new time via terminal.**
   **Stop measurement via PCC by calling PCC.**

5. Stop measurement

6. Measurement available

   **Specialist is notified, and measurement is available for specialist on Care4you data area. Evaluation is written and report is stored both on Care4you area and on treating doctor's area.**

7. Evaluation available

   **Treating doctor is notified via E-mail (or fax or SMS or phone) that report is available on treating doctor's data area.**
1. Patient data

- Patient data input via terminal.
- Patient data input via PCC.

2. Start measurement

- ECG measurement is started via terminal. Specialist is allocated and notified if wanted.
- ECG measurement is started via PCC. Specialist is allocated and notified if wanted.

3. Start OK

- Start measurement is OK – notification via terminal. PCC is notified that automatic measurement is started
- Start measurement is OK – notification via PCC.

4. Performing measurement

- Performing measurement.

5. Stop measurement

- Stop measurement at predefined time or treating doctor decides new time via terminal.
- Stop measurement via PCC by calling PCC.

6. Measurement available

Measurement is available for specialist on Care4you data area, and measurement is available for treating doctor on his data area. Treating doctor is notified via E-mail (or fax or SMS or phone) that measurement is available on treating doctor’s data area.

7. Evaluation

- Treating doctor decides now that he wants a specialist to evaluate. This is done by calling or e-mailing PCC who allocates specialist. Evaluation is written and report is stored both on Care4you area and on treating doctor’s area.
- Treating doctor has decided when he initiated the measurements, that specialist shall evaluate. In this case the specialist is notified, evaluation is written and report is stored both on Care4you area and on treating doctors area.
1. Patient data

   Patient data input via PCC.

2. Start measurement

   ECG measurement is started via PCC. Specialist is allocated and notified if wanted.

3. Start OK

   Start measurement is OK – notification via PCC.

   - PCC is has a full log over all active measurements, so that action may be taken if necessary.

4. Performing measurement

   Performing measurement.

   - PCC is monitoring that measurements are being done, and takes action when fault situations occur.

5. Stop measurement

   - Stop measurement at predefined time.

   - Stop measurement via PCC by calling PCC.

6. Measurement available

   Specialist is notified, and measurement is available for specialist on Care4you data area. Evaluation is written and report is stored both on Care4you area and on treating doctor's area.

7. Evaluation available

   Treating doctor is notified via E-mail (or fax or SMS or phone) that report is available. The report is sent via fax or ordinary mail. The report is also stored on the treating doctors data area.