

Mobile Patient Health Record System

Field of the Invention

[0001] The present invention relates to a mobile health record system for patients. In particular, the present invention relates to a system that allows portability
5 of the patient's health records by allowing the patient to download to his/her mobile phone or allowing the patient to access the health records via an online portal.

Background

[0002] As there is an increasing awareness in public health, the health care industry has become one of the largest industries throughout the world. There are
10 various sectors available in the health care industry. One main group of the health care industry is the health care equipment and services, which comprises companies that provides health care, medical equipment and medical supplies, such as hospitals, medical professionals and nursing homes.

[0003] A health record, or medical record, is a written account of a patient's
15 examination and treatment, which includes the patient's medical history and care. For centuries, these health records have been recorded in hard copies by medical professional, which include the patient's diagnosis and prescribed medications.

[0004] It is prevalent that various private practitioners store their patient's health records in hard copies. Patients are unable to keep track or access to their health
20 records effortlessly. There have been cases where patients provide inaccurate

information on their medical history, which leads to future misdiagnosis from the health care provider. This undoubtedly caused additional costs incurred.

[0005] Newer generation of the health records are managed as electronic health records (EHR). Typically, it would require some specialized or customized software programs and database, such as Clinical Management System (CMS), to facilitate the daily operations. CMS are computer software products that help coordinate and integrate all the inherent activities involved in the management and running of a health care facility. A few examples available in the market today include Gloco Medical CMS, Crimson Logic, Clinic Assist and Medi2000 and etc. CMS helps private practitioners to organize their patient's health records, which includes the patient medical history, itemized bill, patient appointment management, diagnosis, prescribing & dispensing of medications and parameter data and charting. A few examples of parameter data and charting are Body Mass Index (BMI), blood pressure, HbA1c test and Fasting Blood Sugar (FBS) test.

[0006] It is getting more common that patients sourcing for medical assistances or seeking for alternative opinions from different medical practitioners/professionals. There are patients who travel across different countries or even continents in order to seek medical assistances. Therefore, it is important that the patients' health records can be accessed anytime and anywhere as they wish. However, it exists concerns on the authenticity of these EHR because there isn't a common authenticated ground for these EHR.

[0007] A web-based personal health information service provided by Google, better known as Google Health, allows users (or patients) to manually enter their

personal health records or merging their health records with partnered health services providers through web-browsers. However, it is important to note that this service is a purely user-controlled service and it is entirely voluntarily by the patient. Therefore, there is no guarantee on the authenticity and the accuracy of the data recorded in the Google Health. Further, this information is not verified for integrity and legality, and therefore, it is only suitable for personal used only.

Summary

[0008] In one aspect of the present invention, there is provided a mobile health records system for managing electronic health records of patients created by different medical professionals. The mobile health records system comprises a patient health record (PHR) server having a database for storing the health records and a clinical management system remotely located off the PHR server and accessible directly by at least one medical professional. The clinical management system is operable to communicate with the PHR server through a communication network to create new individual health records and retrieve the individual health records for updating. The individual records are accessible by the respective patients through their mobile communication device via the communication network; and the PHR server is adapted to prevent any changes made by the medical professionals and the respective patients to the individual health records stored thereon, such that the individual health records can be treated as admissible individual records.

[0009] In one embodiment, the clinical management system may be connected with the PHR server via a secured communication network.

[0010] In an alternative embodiment, the patients are accessible to the health records through mobile communication device. It is possible that the mobile communication device comprises a dedicated program adapted to access the PHR server to retrieve the individual health records. The individual health records may also be downloaded onto the mobile communication device for off-line view. The individual health records may also be downloaded onto the mobile communication device in XML or HTML format. Alternatively, the mobile communication device may access the PHR server and retrieve the individual health records through a portal reside at the PHR server.

10 **[0011]** In a further embodiment, the patients are prohibited from changing the information of the individual health records created by the medical practitioner.

[0012] Yet, the respective patients may be operable to access the PHR server through inputting a correct authentication code.

[0013] In a further embodiment, the PHR server may further comprise a newscaster operable to broadcast medical news to the patients. The PHR server broadcasts news to the respective patients depending on the patients' profiles recorded on the individual health record. The PHR server may also receive medical news or announcements from the medical practitioners through the respective clinical management systems.

20 Brief Description of the Drawings

[0014] This invention will be described by way of non-limiting embodiments of the present invention, with reference to the accompanying drawings, in which:

[0015] FIG. 1 is a block diagram illustrating the process flow of a mobile health record system in accordance with an embodiment of the present invention;

[0016] FIG. 2 is a sequence diagram of the mobile health record system as a patient visits a medical professional for treatment;

5 **[0017]** FIG. 3 is a sequence diagram of informative health news transmitted into the mobile health record system;

[0018] FIG. 4 is a sequence diagram of a method that allows the patient to access his/her own health records or informative health news through the mobile communication device;

10 **[0019]** FIG. 5 is a sequence diagram of a method that allows the patient to access his/her own health records or informative health news through the mobile communication device in a MPHR portal;

[0020] FIG. 6 is a sequence diagram of a method that allows the patient to access his/her own health records or informative health news through a dedicated
15 program; and

[0021] FIG. 7 is a flow diagram of the patient logging into the MPHR server.

Detailed Description

[0022] The following descriptions of a number of specific and alternative embodiments are provided to understand the inventive features of the present invention.

20 It shall be apparent to one skilled in the art, however that this invention may be practiced without such specific details. Some of the details may not be described in

length so as to not obscure the invention. For ease of reference, common reference numerals will be used throughout the figures when referring to same or similar features common to the figures.

[0023] It is widely recognized that medical records are important references to medical practitioners to provide a continuity of care to the patients. But these medical records are not available from one practitioner to another under the current practice, i.e. the information is not shared. In fact, sharing of these medical records is not a common practice, especially for those medical records that are still being kept in papers form.

[0024] Modern medical centers and groups of clinical alliances have been adapting systems to keep these medical records electronically. These records, however, are kept as proprietary information and these medical records are under the control of the respective medical practitioner, or medical groups. Therefore, from the patients' point of view, it may be hassle for the patients to obtain their updated individual medical records, when it is needed.

[0025] Accordingly, the present system and method facilitate a centralized mobile patient health record system for providing mobile medical records. The mobile medical records are transmitted by respective licensed medical practitioners through their respective clinical software via web services to the centralized mobile patient health record system for the patients. The respective clinical software may include any general clinical software package available on the market, or any proprietary/in-house software adapting by the respective practitioners. It is desired that these medical records, once transmitted to the mobile patient health record system, shall be tempered-proof on the system to ensure the integrity and legality. Preferably, only approved

clinical software can send medical records to the central mobile health record system. In view of that, the mobile patient health record system shall be adapted to protect the medical records from any amendments. It is also desired that the mobile patient health records system be developed as a trusted source of medical records, which is
5 recognized and usable medically and legally.

[0026] The respective medical record stored on the centralized mobile patient health record management system, on the other hand, is also accessible by the individual patient remotely for viewing and sharing. The individual patients shall not be giving any right to modified, edit any substantive information in the respective
10 medical record though. The patients can obtain these updated and compiled medical records anytime, anywhere with any suitable portable device. In one proposed embodiment, the medical records can be downloaded to a portable device by the patients and be carried along with the patients. The portable device include mobile phone, personal data assistant (PDA) or the like that can process the downloaded record
15 thereon directly. Further, the patients are given further option to access their respective medical record online through any suitable mobile communication device through a communication network, i.e. Internet.

[0027] Briefly, there is provided a mobile health records system for managing electronic health records of patients that can be created by respective medical
20 professionals. The mobile health records system has a patient health record (PHR) server having a database for storing the health records; and a clinical management system remotely located off the PHR server for creating the individual health records. The PHR server is accessible directly by at least one medical professional operable to communicate with the PHR server through a communication network to create new

individual health records and retrieves the individual health records for updating. The individual records are accessible by the respective patients through their mobile communication device via the communication network; and the PHR server is adapted to prevent any changes made by the medical professionals and the respective patients to the individual health records stored thereon, such that the individual health records can be treated as admissible individual records.

[0028] FIG. 1 is a schematic block diagram illustrating a mobile health record system **100** in accordance with an embodiment of the present invention. The mobile health record system **100** comprises a Mobile Patient Health Record (MPHR) server **101** having a MPHR portal **107** and a database **102**. The mobile health record system **100** allows the patient **103** to retrieve personal health records **105**, recorded by one or more medical professionals **104** created through a clinical management system (CMS) **106**. The medical professionals **104** include medical doctors, who are generally licensed to provide medical services. The health records **105** keyed into the CMS **106** are transmitted into the database **102** of the MPHR server **101**. The database **102** may be a Microsoft SQL-based database. The patient **103** may access the health record **105** via the Internet MPHR portal **107** or a personal mobile communication device **108**. The mobile communication device **108** allows the patients **103** to remotely access their own health records **105** through the MPHR server **101**. The mobile communication device **108** may connect to the system **100** via any mobile communication network, such as 3G networks. In an alternative embodiment, the health records **105** may be retrieved by downloading the information via the mobile phone application or the like. The health records **105** may be a mobile device readable file, such as XML, HTML files, retrieved (or downloaded) and stored on the mobile communication device, which

allow offline usage. Alternatively, the mobile health record system **100** may allow the patient **103** to view the health records **105** as web contents. Suitably, the retrieved individual health records **105** are being formatted and presented in a suitable layout viewable through the mobile communication device **108** or the MPHR portal **107**. As
 5 the health records **105** are ultimately stored and centralized into the database **102** that is accessible to through any suitable communication networks (i.e. Internet), the health record **105** retrieved by the individual patient **103** is always the most updated record even the records were supplied by different medical professionals **104**.

[0029] The mobile health record system **100** also serves as a medical
 10 information broadcast system that allows the medical professionals **104**, medical health agencies **110** and pharmaceutical companies **111** to broadcast informative health news **113** to the selected patients **103** via the MPHR server **101**. Typically, the informative health news **113** will be sent to a MPHR administrator **116** for reviewing and subsequently inputting into the MPHR server **101**. The MPHR administrator **116** may
 15 profile the patients **103** based on their particulars and records that have been stored in the MPHR server **101**. The particulars include age, sex, area of residence and the respective medical history etc. Through the profiling, the informative health news **113** may be sent to the appropriate patients **103**. The patients **103** may also subscribe to the informative health news **113** voluntarily.

20 **[0030]** The to and fro transmissions of the MPHR server **101** is also protected via a firewall **112**. Accessibility to the MPHR server **101** due to confidentiality issues of the patient's **103** health record **105** will be described in further details below.

[0031] Still referring to FIG. 1, the patient **103** is any person who receives medical attention, care or treatment from the medical professionals **104**. The medical professionals **104** are qualified and licensed personnel who delivers proper health care in a systematic way professionally to any individuals in need of health care services. In
5 the present invention, the individuals in need are better known as the patient **103**.

[0032] FIG. 2 illustrates a sequence diagram **200** of the mobile health record system **100** as a patient **103** visits a medical professional **104** for treatment in one embodiment of the present invention. A step **201** shows the process that takes place as the patient **103** visits the medical professional **104**. At step **202**, the medical
10 professional **104** utilizes the CMS **106** to retrieve the updated health records **105** from the MPHR server **101**. The CMS **106** is a localized-system adapted to manage the health records **105** in conjunction with the MPHR server **101**. The medical professional **104** may retrieve, organize, search and update the medical health records **105** through the CMS **106**. The health records **105** include the patient information,
15 patient medical history and patient drug allergies. The health records **105** also include parameter data and charting that has been tested by the medical professional **104** and has been updated into the MPHR server **101**.

[0033] At step **203**, the medical professional **104** is required to pass through the firewall **112** in order to access the MPHR server **101** at step **204**. At step **205**, the
20 MPHR server **101** accesses the database **102** to retrieve the requested health records **105** at step **206**. The retrieved health record **105** is exported into the MPHR server **101** at step **207**. At step **208**, the health record **105** passes through the firewall **112** and transmits to the CMS **106** at step **209**. Accordingly, the medical professional **104** may

review the updated health record **105** at step **210** before carrying out diagnosis on the patient **103**.

[0034] Still referring to FIG. 2, the medical professional **104** diagnoses the patient **103** at step **211**. During the visit, the medical professional **104** records the
5 diagnosis and treatment result on the CMS **106** at step **212**. Similarly, the updated health record **105** passes through the firewall **112** at step **213** before it is transmitted to the MPHR server **101** at step **214**. At step **215**, the medical records **105** are updated and stored in the database **102**.

[0035] As the patient **103** is able to visit and seek alternative opinions from
10 different medical professionals **104**, the patient **103** is able to present the past health records **105** to the new medical professional **104**, even when the medical professional **104** is not able to access the MPHR server **101**. It is important to note that the patient **103** can access the most updated version of the personal health record **105** whenever he/she visits any of the medical professional **104** mentioned above in the same
15 schematic way illustrated in FIG. 2.

[0036] FIG. 3 is a sequence diagram **300** of the informative health news **113** transmitted into the mobile health record system **100** in accordance with another embodiment of the present invention. The medical health agencies **110** or the pharmaceutical companies **111** send the new informative health news **113** to the MPHR
20 administrator **116** for broadcasting at step **301**. The new informative health news **113**, upon approved by the MPHR administrator **116**, is sent through the firewall **112** at step **302** to the MPHR server **101** at step **303**. At step **304**, the new informative health news **113** is stored and maintained in the database **102**.

[0037] Similarly, the medical professional **104** may also have informative health news **113** that needs to be transmitted to the patients through the MPHR server **101**. At step **305**, the new informative health news **113** are forwarded to the MPHR administrator **116** for broadcasting. The new informative health news **113**, upon
 5 approved by the MPHR administrator **116**, is sent through the firewall **112** at step **306** to the MPHR server **101** at step **307**. At step **308**, the new informative health news **113** is stored and maintained in the database **102**.

[0038] The informative health news **113** transmitted into the MPHR server **101** may be information or messages that are health related and useful to the patients **103**.
 10 The MPHR server **101** is able to selectively transmit the informative health news **113** to the relevant patients **103**. This is through the patient's **103** past medical history or particulars as recorded from the health records **105** stored in the database **102**. These informative health news **113** or messages maybe sent to the patient **103** via Short Message Service (SMS). All the informative health news **113** are also posted on the
 15 MPHR portal **107** for online retrieval by the patients **103**. The methods that describe how a patient **103** retrieves or receives this information health news **113** are further elaborated in FIG. 4 and FIG. 5.

[0039] FIG. 4 is a sequence diagram **400** of a method that allows the patient **103** to access the health records **105** or informative health news **113** through the
 20 personal mobile communication device **108** upon request in accordance with one embodiment of the present invention. At step **401**, the patient **103** uses the mobile communication device **108** to request for the health records **105** and/or informative health news **113** at step **401**. The request passes through the telecommunication provider **109** at step **402**, and then the firewall **112** at step **403** before reaching the

MPHR server **101** at step **404**. Once the request is verified to be valid, the MPHR server **101** retrieves the relevant information through the database **102** at step **405**. Once the health records **105** are retrieved at step **406**, they are transmitted to the MPHR server **101** at step **407**. At the same step **407**, the informative health news **113** that may
 5 be of interest to the patient **103** is also transmitted into the MPHR server **101**. The health record **105** or informative health news **113** passes through the firewall **112** from the MPHR server **102** at step **408**. At step **409**, the health records **105** or informative health news **113** are sent to the telecommunications provider **109** for subsequently forwarding to the mobile communication device **108** at step **410**. The
 10 telecommunications provider **109** may send the medical record **105** and/or the informative health news **113** in form of XML or as any webpage format to the patient's **103** mobile communication device **108**. At step **411**, the patient **103** may utilize the medical record **105** and/or informative health news **113** as desired.

[0040] FIG. 5 is a sequence diagram **500** of a method that allows the patient
 15 **103** to access his/her own health records **105** or informative health news **113** through the mobile communication device **108** through the MPHR portal **107** in accordance with one embodiment of the present invention. The MPHR portal **107** is an online portal that allows the patient **103** to access his/her health records **105** or informative health news **113**. At step **501**, the patient **103** uses the mobile communication device
 20 **108** to connect to the telecommunications provider **109** at step **502**. Once the connection is established, the patient's **103** request to access the MPHR portal **107** is verified for authenticity through the firewall **112** at step **503** and the patient **103** is allowed to access the MPHR portal **107** at step **504**. The MPHR portal **107** searches for the requested information on the database **102** at step **505**, and once the requested

health record **105** or informative health news **113** is found at step **506**, the health records **105** and informative health news **113** is loaded onto the MPHR portal **107** at step **507**. The health record **105** and the informative health news **113** are then transmitted through the firewall **112** at step **508** and through the patient's **103** telecommunications provider **109** at step **509**, for onward forwarding to the patient's **103** mobile communication device **108** at step **510**. Accordingly, the patient **103** may view the health record **105** and the informative health news **113** directly on the mobile communication device **108** at step **511**. Optionally, the patient **103** may export these information, wholly or selectively, from the MPHR portal **107** to the mobile communication device **108**.

[0041] In the above embodiment, the patients **103** access their individual health records **105** and the informative health news **113** through the mobile communication device **108**, which can typically be a mobile phone. For the purpose the present invention, it is understood that the patients **103** may access the information via any devices capable of communicating with the communication network, i.e. Internet. Such devices may include a personal computer, a personal data assistant, or the like.

[0042] As the patient **103** is accessing to his/her own MPHR portal **107**, the filtered and/or subscribed informative health news **113** will also be shown to the patient **103** accordingly.

[0043] FIG. 6 is a sequence diagram **600** of a method that allows the patient **103** to access his/her own health record **105** through a dedicated program **117** deployed on the mobile communication device **108** of the patient **103** in accordance with an alternative embodiment of the present invention. At step **601**, the patient **103** executes

the dedicated program **117** to access the MPHR server **101**. The request to access the MPHR server **101** will first pass through the firewall **112** for authentication at step **602** and then accessed at step **603**. Once the authentication is successful, the MPHR server **101** requests for the individual health record **105** from the database **102** at step **604**.

5 The database **102** searches for updated health records **105** at the step **605**. The individual health record **105** is feed into the MPHR server **101** at step **606** as it is retrieved. The MPHR server **101** may process the individual health record **105** into an appropriate format for transmitting through the firewall **112** at step **607**. The appropriate format can be any device readable format available to the mobile

10 communication device **108**. Thereafter, the individual health record **105** is downloaded onto the mobile communication device **108** of the patient **103** at step **608**. The patient **103** may then view the individual health record **105** directly on the mobile communication device **108**, even when the mobile communication device **108** is not connected to the communication network.

15 **[0044]** FIG. 7 is a flow diagram **700** of the patient **103** logging into the MPHR server **101** in accordance with yet another embodiment of the present invention. Similarly, the patient **103** is able to log into the MPHR server **101** via the mobile communication device **108** through the dedicated program **117** or the MPHR portal **107**. Each patient **103** is assigned a unique code number **114** for accessing the MPHR

20 server **101**. The unique code number **114** can be specifically assigned to the patient **103**, or selected by the patient **103**. The unique code number **114** may include a user name and a password. When logging into the MPHR server **101** at step **701**, the unique code number **114** is inputted into the MPHR server **101** at step **702**. At step **703**, the unique code number **114** entered is checked if it is valid or invalid. If the unique code

number **114** entered by the patient **103** is valid, the patient **103** is able to access the MPHR server at step **704**. If the unique code number **114** is invalid or false, the patient **103** returns to the step **702** that requires the patient **103** to enter the unique code number **114** again. This process continues till the patient **103** enters the correct unique
5 code number **114** into the MPHR server **101**.

[0045] The mobile health record system **100** also allows the medical professionals **104**, the medical health agencies **110** and the pharmaceutical companies **111** to send out relevant informative health news **113** to the patient **103**. The MPHR server **101** is able to selectively choose the patient **103** based on the patient's **103**
10 health history and information from the health record **105**. The informative health news **113** sent to the MPHR server **101** may also include news to inform the patient **103** about available health screenings or promotional packages.

[0046] In another embodiment of the present invention, the medical records in the electronic form may further include digital certificate/signature.

15 [0047] The above description illustrates various embodiments of the present invention along with examples of how aspects of the present invention may be implemented. While specific embodiments have been described and illustrated it is understood that many changes, modifications, variations and combinations thereof could be made to the present invention without departing from the scope of the present
20 invention. The above examples, embodiments, instructions semantics, and drawings should not be deemed to be the only embodiments, and are presented to illustrate the flexibility and advantages of the present invention as defined by the following claims.

Claims

1. A mobile health records system for managing electronic health records of patients created by different medical professionals, the mobile health records system comprising:

5 a patient health record (PHR) server having a database for storing the health records; and

a clinical management system remotely located off the PHR server and accessible directly by at least one medical professional, the clinical management system is operable to communicate with the PHR server through a communication network to create new individual health records and retrieve the individual health records for updating,

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wherein the individual records are accessible by the respective patients through their mobile communication device via the communication network; and the PHR server is adapted to prevent any changes made by the medical professionals and the respective patients to the individual health records stored thereon, such that the individual health records can be treated as admissible individual records.

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2. The mobile health records system according to claim 1, wherein the clinical management system is connected with the PHR server via a secured communication network.
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3. The mobile health records system according to claim 1, wherein the patients are accessible to the health records through mobile communication device.
4. The mobile health records system according to claim 3, wherein the
5 mobile communication device comprises a dedicated program adapted to access the PHR server to retrieve the individual health records.
5. The mobile health records system according to claim 4, wherein the individual health records are downloaded onto the mobile communication device for off-line view.
- 10 6. The mobile health records system according to claim 5, wherein the individual health records are downloaded onto the mobile communication device in XML or HTML format.
7. The mobile health record system according to claim 3, wherein the mobile communication device accesses the PHR server and retrieves the
15 individual health records through a portal resides at the PHR server.
8. The mobile health records system according to claim 1, wherein the patients are prohibited from changing the information of the individual health records created by the medical practitioner.
9. The mobile health records system according to claim 1, wherein the
20 respective patients are operable to access the PHR server through inputting a correct authentication code.

10. The mobile health records system according to claim 1, wherein the PHR server further comprises a newscaster operable to broadcast medical news to the patients.

11. The mobile health records system according to claim 10, wherein the
5 PHR server broadcasts news to the respective patients depending on the patients' profiles recorded on the individual health record.

12. The mobile health records system according to claim 10, wherein the PHR server operable to receive medical news or announcements from the medical practitioners through the respective clinical management systems.