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(54) **HYPERTENSION PREVENTION APP AND WEB BASED TOOLS**

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(57) **ABSTRACT**

A computer system and method is disclosed as a support structure for patients with hypertension or prehypertension to encourage life style changes leading to dietary control, increase exercise and blood pressure control. The method includes automated messages and responses delivered in real time to encourage appropriate actions by the patient. A diary feature is provided for user input of various relevant parameters, such as foods consumed, exercise activities, body weight, blood pressure, and heart rate. The computer system and method may be implemented on a mobile computing device, such as a smart phone or wearable, a conventional personal computer, or a web service. Most functions will be provided on the mobile device, but some housekeeping and data visualization functions may be limited to the personal computer or web service implementations.

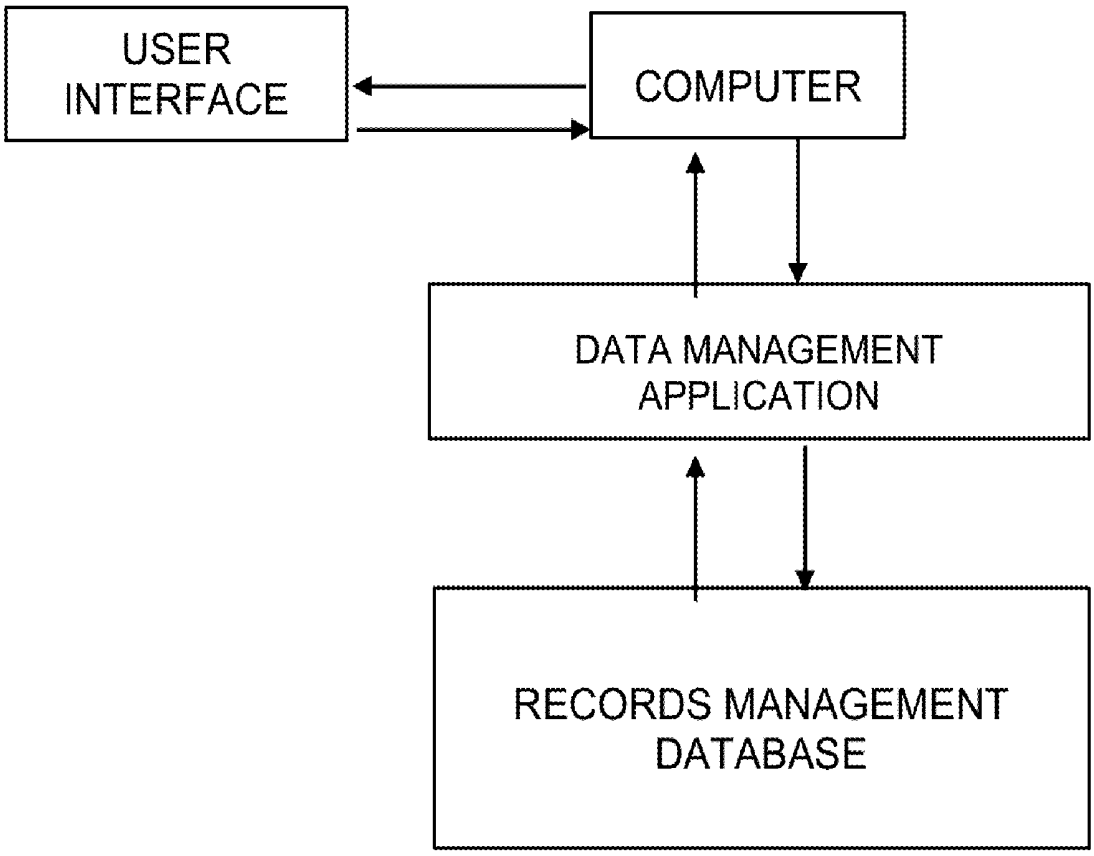


FIG. 1

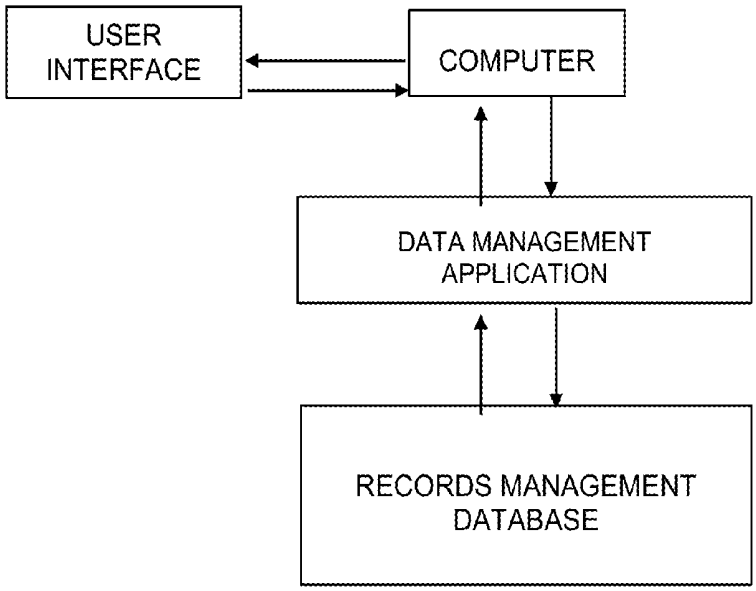


FIG. 2

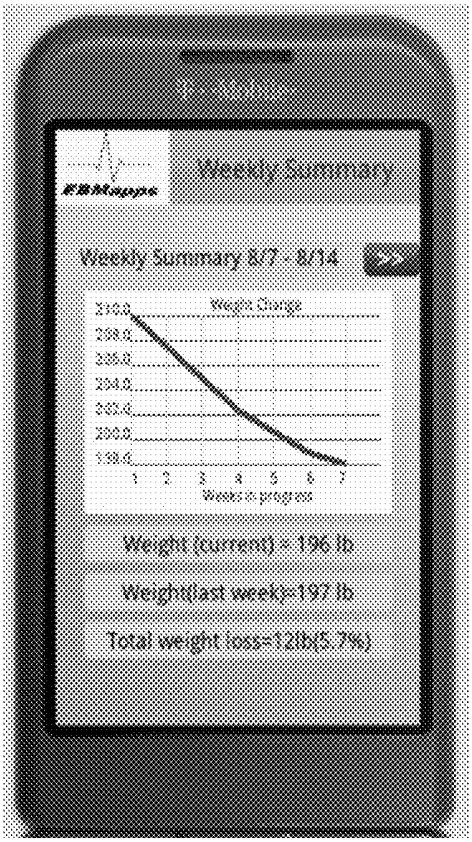


FIG. 3

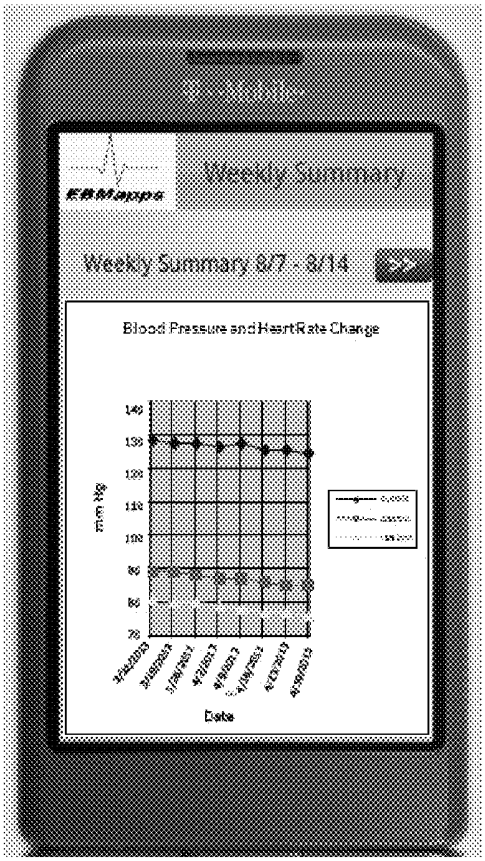


FIG. 4

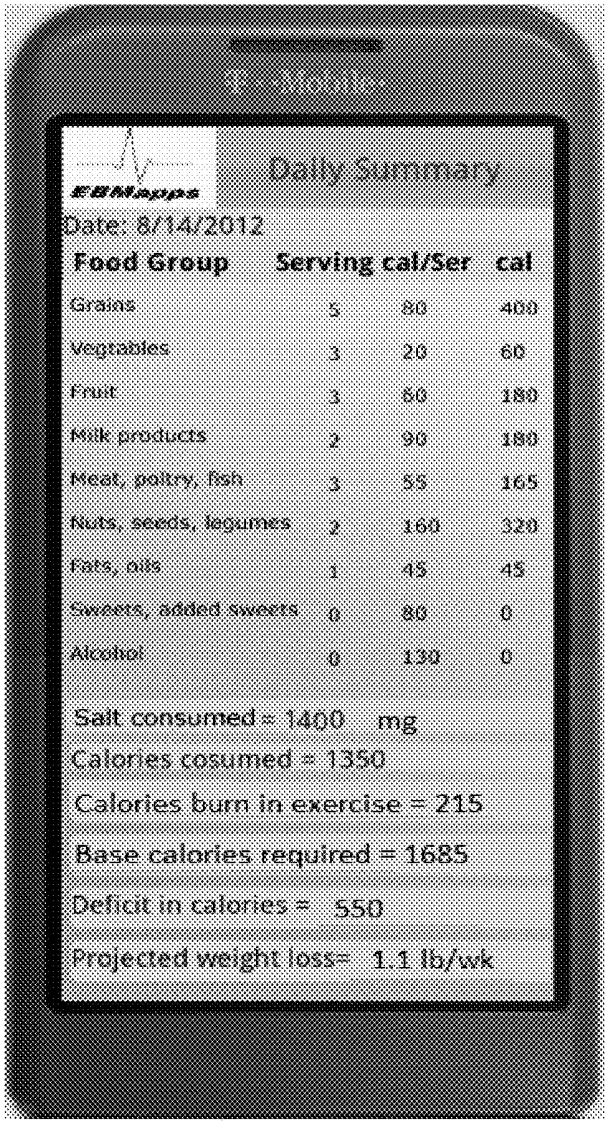

Daily Summary
Date: 8/14/2012
Food Group Serving cal/Ser cal
Grains 5 80 400
Vegtables 3 20 60
Fruit 3 60 180
Milk products 2 90 180
Meat, poltry, fish 3 55 165
Nuts, seeds, legumes 2 160 320
Fats, oils 1 45 45
Sweets, added sweets 0 80 0
Alcohol 0 130 0
Salt consumed = 1400 mg
Calories cosumed = 1350
Calories burn in exercise = 215
Base calories required = 1685
Deficit in calories = 550
Projected weight loss= 1.1 lb/wk

FIG. 5

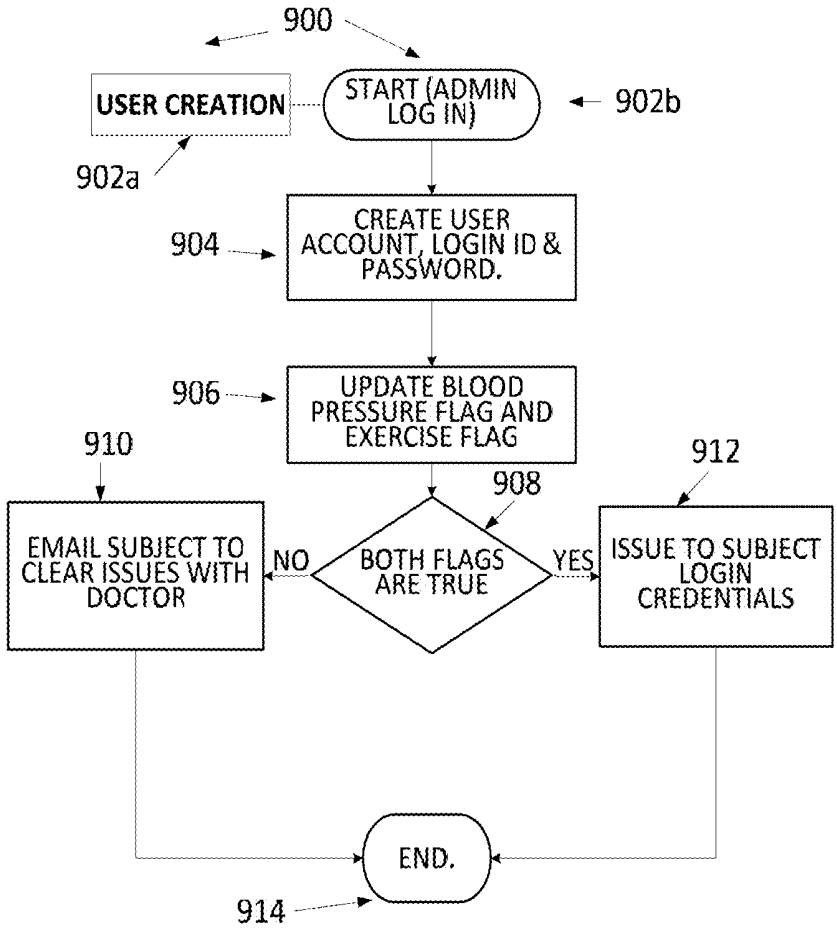

900
USER CREATION
START (ADMIN LOG IN)
902b
902a
CREATE USER ACCOUNT, LOGIN ID & PASSWORD.
904
UPDATE BLOOD PRESSURE FLAG AND EXERCISE FLAG
906
910
912
908
EMAIL SUBJECT TO CLEAR ISSUES WITH DOCTOR
NO
BOTH FLAGS ARE TRUE
YES
ISSUE TO SUBJECT LOGIN CREDENTIALS
END.
914

FIG. 6

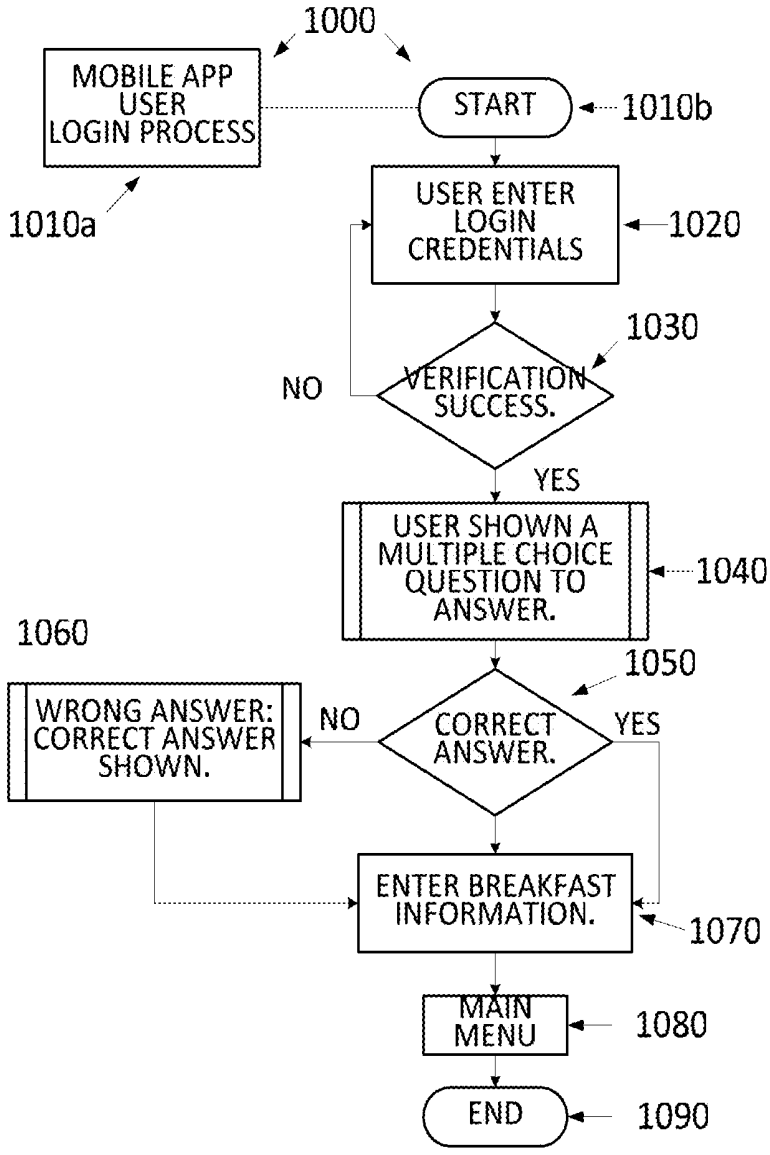

1000
MOBILE APP USER LOGIN PROCESS
1010a
START
1010b
USER ENTER LOGIN CREDENTIALS
1020
1030
VERIFICATION SUCCESS.
NO
YES
USER SHOWN A MULTIPLE CHOICE QUESTION TO ANSWER.
1040
1060
1050
WRONG ANSWER: CORRECT ANSWER SHOWN.
NO
CORRECT ANSWER.
YES
ENTER BREAKFAST INFORMATION.
1070
MAIN MENU
1080
END
1090

FIG. 7

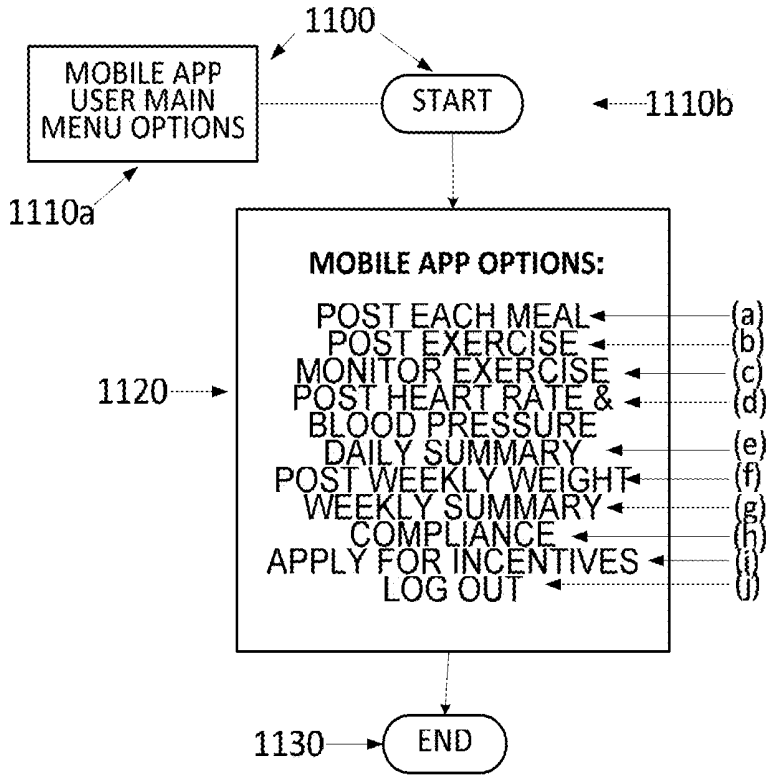

1100
MOBILE APP USER MAIN MENU OPTIONS
START
1110b
1110a
MOBILE APP OPTIONS:
POST EACH MEAL (a)
POST EXERCISE (b)
MONITOR EXERCISE (c)
POST HEART RATE & BLOOD PRESSURE (d)
DAILY SUMMARY (e)
POST WEEKLY WEIGHT (f)
WEEKLY SUMMARY (g)
COMPLIANCE (h)
APPLY FOR INCENTIVES (i)
LOG OUT (j)
1120
1130
END

FIG. 8

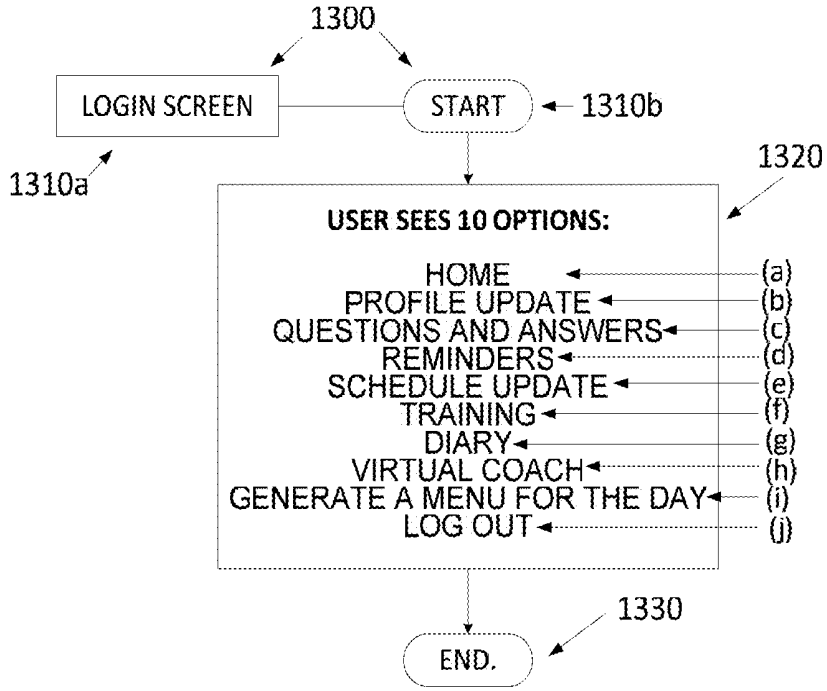

1300
LOGIN SCREEN
START
1310b
1310a
1320
USER SEES 10 OPTIONS:
HOME (a)
PROFILE UPDATE (b)
QUESTIONS AND ANSWERS (c)
REMINDERS (d)
SCHEDULE UPDATE (e)
TRAINING (f)
DIARY (g)
VIRTUAL COACH (h)
GENERATE A MENU FOR THE DAY (i)
LOG OUT (j)
1330
END.

FIG. 9

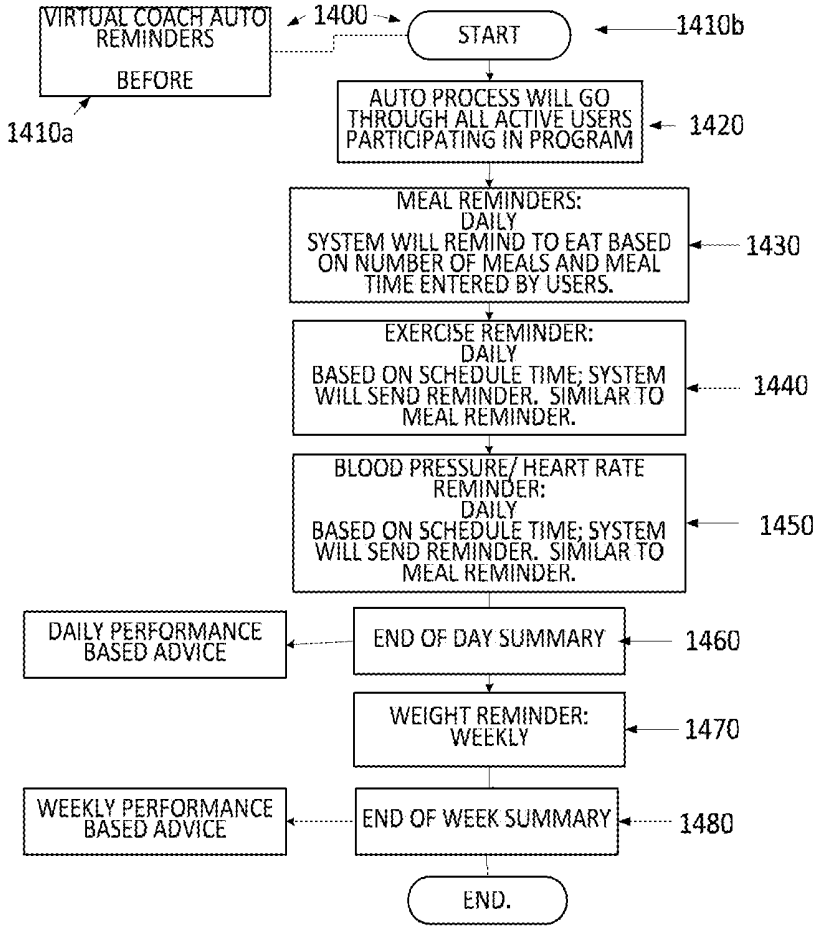

VIRTUAL COACH AUTO REMINDERS
BEFORE
1410a
1400
START
1410b
AUTO PROCESS WILL GO THROUGH ALL ACTIVE USERS PARTICIPATING IN PROGRAM
1420
MEAL REMINDERS: DAILY SYSTEM WILL REMIND TO EAT BASED ON NUMBER OF MEALS AND MEAL TIME ENTERED BY USERS.
1430
EXERCISE REMINDER: DAILY BASED ON SCHEDULE TIME; SYSTEM WILL SEND REMINDER. SIMILAR TO MEAL REMINDER.
1440
BLOOD PRESSURE/ HEART RATE REMINDER: DAILY BASED ON SCHEDULE TIME; SYSTEM WILL SEND REMINDER. SIMILAR TO MEAL REMINDER.
1450
DAILY PERFORMANCE BASED ADVICE
END OF DAY SUMMARY
1460
WEIGHT REMINDER: WEEKLY
1470
WEEKLY PERFORMANCE BASED ADVICE
END OF WEEK SUMMARY
1480
END.

FIG. 10

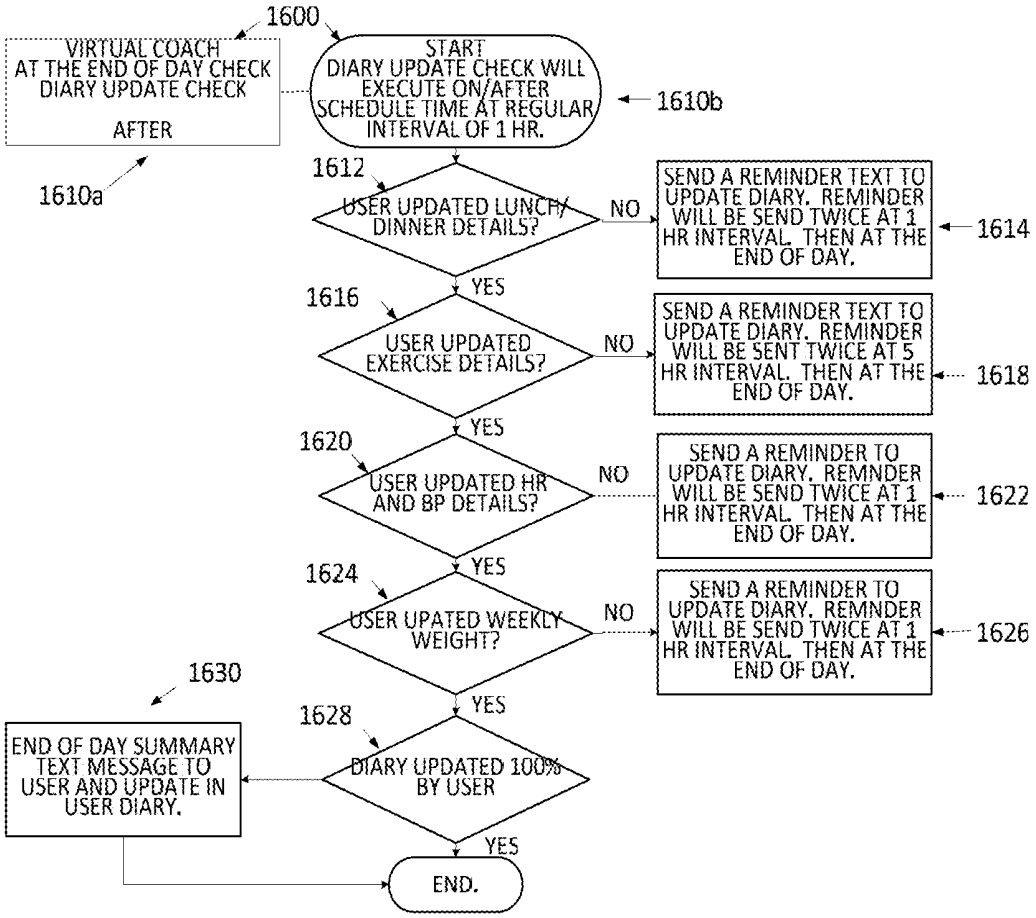

1600
VIRTUAL COACH AT THE END OF DAY CHECK DIARY UPDATE CHECK AFTER
1610a
START DIARY UPDATE CHECK WILL EXECUTE ON/AFTER SCHEDULE TIME AT REGULAR INTERVAL OF 1 HR.
1610b
1612
USER UPDATED LUNCH/ DINNER DETAILS?
NO
SEND A REMINDER TEXT TO UPDATE DIARY. REMINDER WILL BE SEND TWICE AT 1 HR INTERVAL. THEN AT THE END OF DAY.
1614
YES
1616
USER UPDATED EXERCISE DETAILS?
NO
SEND A REMINDER TEXT TO UPDATE DIARY. REMINDER WILL BE SENT TWICE AT 5 HR INTERVAL. THEN AT THE END OF DAY.
1618
YES
1620
USER UPDATED HR AND BP DETAILS?
NO
SEND A REMINDER TO UPDATE DIARY. REMNDER WILL BE SEND TWICE AT 1 HR INTERVAL. THEN AT THE END OF DAY.
1622
YES
1624
USER UPATED WEEKLY WEIGHT?
NO
SEND A REMINDER TO UPDATE DIARY. REMNDER WILL BE SEND TWICE AT 1 HR INTERVAL. THEN AT THE END OF DAY.
1626
YES
1630
1628
END OF DAY SUMMARY TEXT MESSAGE TO USER AND UPDATE IN USER DIARY.
DIARY UPDATED 100% BY USER
YES
END.

FIG. 11

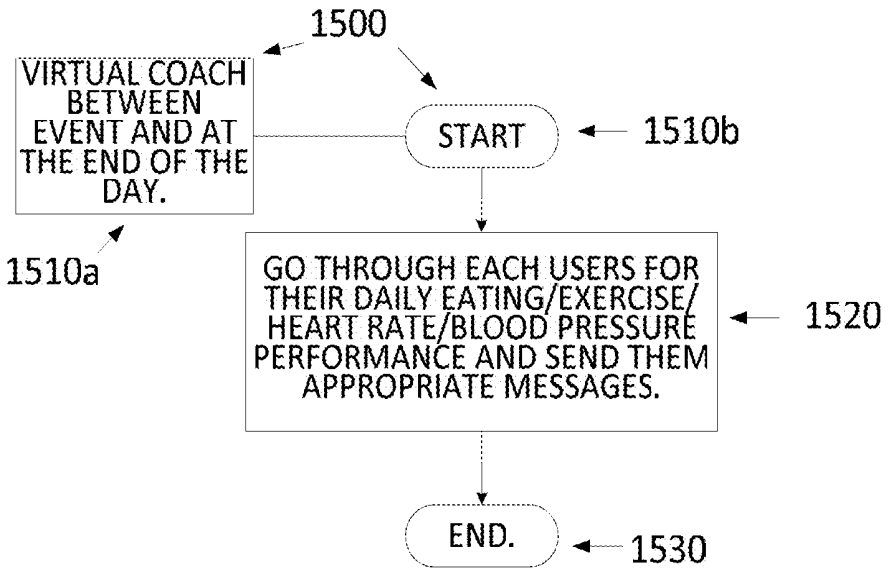

1500
VIRTUAL COACH BETWEEN EVENT AND AT THE END OF THE DAY.
1510a
START
1510b
GO THROUGH EACH USERS FOR THEIR DAILY EATING/EXERCISE/ HEART RATE/BLOOD PRESSURE PERFORMANCE AND SEND THEM APPROPRIATE MESSAGES.
1520
END.
1530

FIG. 12

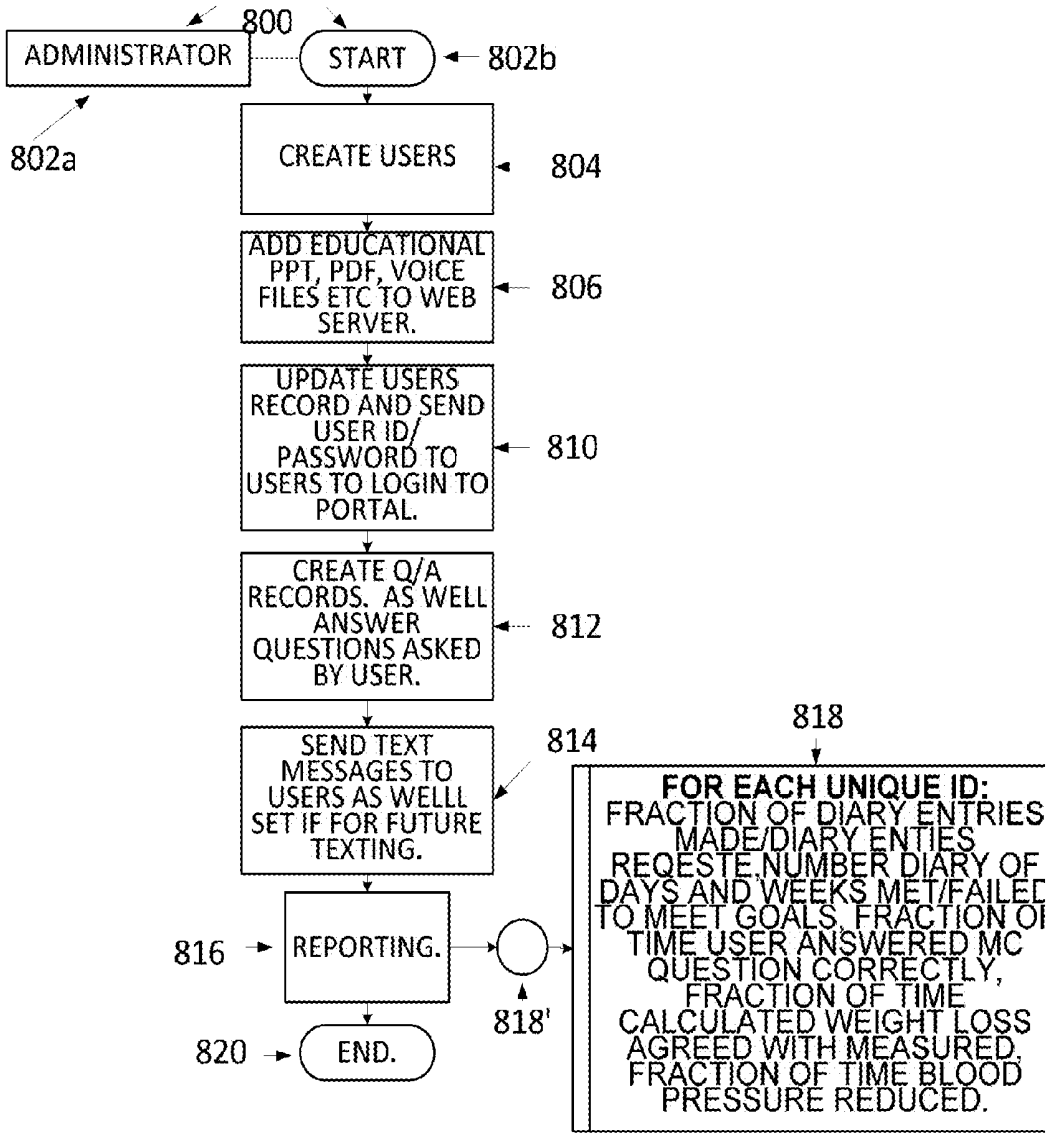

800
ADMINISTRATOR
START
802b
802a
CREATE USERS
804
ADD EDUCATIONAL PPT, PDF, VOICE FILES ETC TO WEB SERVER.
806
UPDATE USERS RECORD AND SEND USER ID/ PASSWORD TO USERS TO LOGIN TO PORTAL.
810
CREATE Q/A RECORDS. AS WELL ANSWER QUESTIONS ASKED BY USER.
812
SEND TEXT MESSAGES TO USERS AS WELLL SET IF FOR FUTURE TEXTING.
814
818
FOR EACH UNIQUE ID: FRACTION OF DIARY ENTRIES MADE/DIARY ENTIES REQESTE,NUMBER DIARY OF DAYS AND WEEKS MET/FAILED TO MEET GOALS, FRACTION OI TIME USER ANSWERED MC QUESTION CORRECTLY, FRACTION OF TIME CALCULATED WEIGHT LOSS AGREED WITH MEASURED. FRACTION OF TIME BLOOD PRESSURE REDUCED.
816
REPORTING.
818'
820
END.

FIG. 13

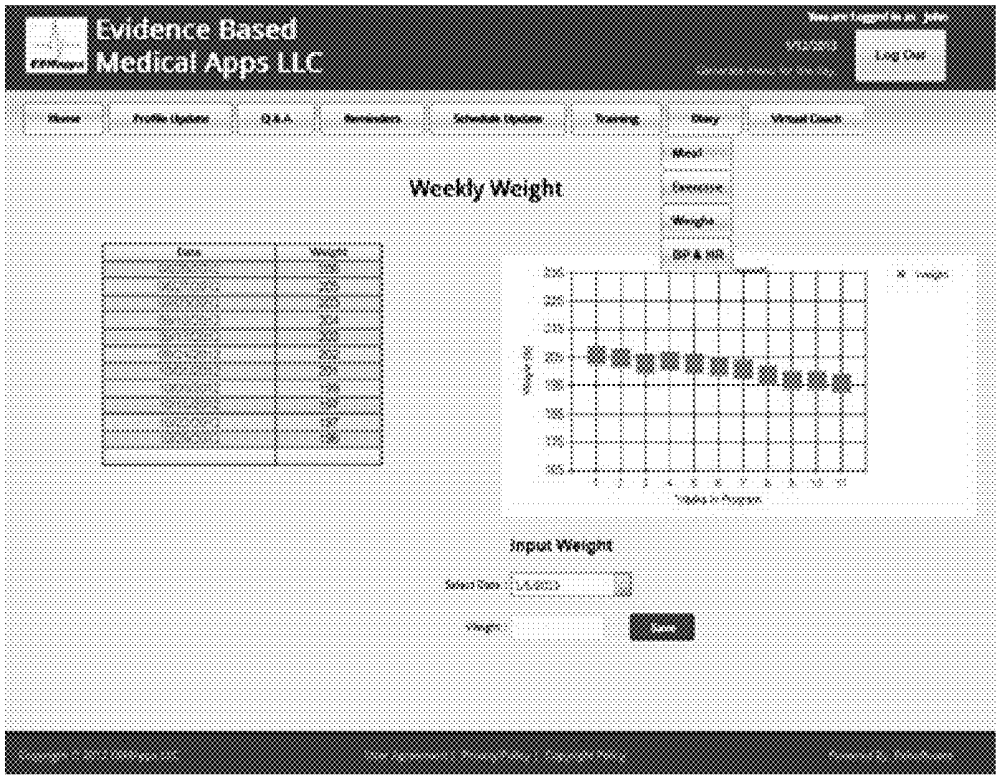
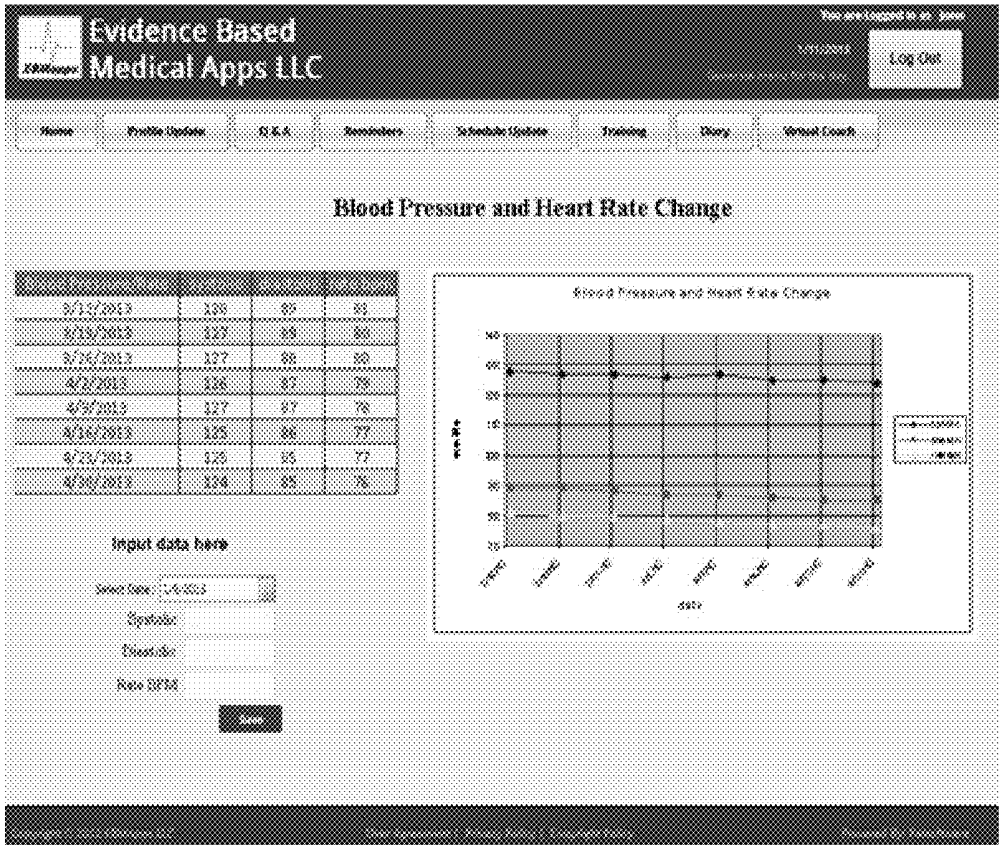

Evidence Based
Medical Apps LLC
Log Out
Weekly Weight
Input Weight

FIG. 14


Evidence Based
Medical Apps LLC
Log Out
Blood Pressure and Heart Rate Change
Input data here

HYPERTENSION PREVENTION APP AND WEB BASED TOOLS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. Patent Application No. 62/055,918, filed Sep. 26, 2014, the entire contents of which are incorporated by reference.

FIELD OF THE INVENTION

[0002] This invention pertains to the area of software for the management of medical conditions, in particular, for the prevention and reduction of high blood pressure.

BACKGROUND OF THE INVENTION

[0003] Hypertension is the primary cause of death of approximately 348,000 Americans each year. Approximately 76 million Americans, or 34% of the adult population, have hypertension and an additional 30 million have prehypertension. Hypertension or high blood pressure makes the heart work harder and the increased pressure can damage vessels and organs.

[0004] The risks from hypertension increase with age. Hypertension is more common in men, is more common in blacks and runs in families. Hypertension can result from inactivity, from using tobacco or alcohol, from too much salt, or from too little potassium or vitamin D in the diet. Hypertension can also result from stress. Hypertension is linked to high cholesterol, diabetes, and kidney disease.

[0005] Blood pressure is measured in millimeters of mercury (mm Hg). Systolic pressure is the higher number and represents the pressure while your heart is beating. Diastolic pressure is the lower number and represents the pressure while your heart is filling with blood. Normal blood pressure is 120/80 or less. High blood pressure is 140/90 or greater. Blood pressure between normal and high blood pressure (120-139)/(80-89) is termed prehypertension. People with prehypertension often become hypertensive within four years.

[0006] Hypertension makes the heart work harder resulting in damage to vessels and organ tissue. This increases their risk for ischemic heart disease (poor heart blood flow), stroke (damage to the brain), peripheral vascular disease (poor blood flow to the limbs), aneurysms (a balloon-like vascular structure that can burst), atherosclerosis (narrowing arteries), pulmonary embolism (blocks of vessels in the lung), cognitive impairment (brain damage) and chronic kidney disease.

[0007] Many life style changes have been identified that decrease blood pressure. The NIH Dietary Approach to Stop Hypertension (DASH) diet effectively reduces blood pressure by 11.4 mm Hg (systolic) and 5.5 mm Hg (diastolic). A DASH diet coupled with weight management and exercise reduces blood pressure by an average of 16.1 mm Hg (systolic) and 9.9 mm Hg (diastolic). Aerobic exercise alone also lowers blood pressure by 4 mm Hg (systolic) compared to controls. Changing to a low-sodium diet also reduces systolic pressure by 4.6 mm Hg. Reduced alcohol consumption lowers systolic pressure by 3.6 mm Hg and diastolic pressure by 1.8 mm Hg. Increased potassium reduces systolic blood pressure by 1.8 mm Hg and diastolic pressure by 1.0 mm Hg.

[0008] Many electronic tools are available on the web and as products that are geared toward weight loss, dietary control and/or exercise motivation. It is important to note that these tools, as a group, have failed. The number of hypertensives has rocketed due to poor eating and under activity to include 34% of all American adults, according to NIH data.

SUMMARY OF THE INVENTION

[0009] A data-enabled apparatus and method is provided to assist persons with pre-hypertension or hypertension make life-style choices designed to reduce high blood pressure. The apparatus may be implemented on a handheld computer such as a smartphone or tablet, or it may be implemented on a laptop or desktop computer, or it may be implemented through a website.

[0010] The apparatus and method includes a software application, hereinafter termed a "Hypertension Prevention Module" (HPM) consisting of a computer application, running on computers such as Mac, Windows, iOS, Android, or as a web service. Coupled to the HPM is a "Records Management Database" (RMDB) that stores data entered by the user. The RMDB may also include pre-loaded data such as demographic and standardized medical data.

[0011] The HPM is programmed to interact with users in real time and process historical data entered by the user along with pre-loaded medical data to encourage proper eating, sufficient exercise, weight loss, reduced sodium consumption, increased consumption of potassium containing foods, and reduction of alcohol consumption. The apparatus and method is designed to be used by prehypertensive users to reduce their blood pressure normal values.

[0012] The HPM can be used as a method that routinely interacts with users over the course of a day. In various embodiments of the method, the following interactions may be employed:

[0013] Users may be asked questions that quiz their knowledge of lifestyle choices that affect blood pressure.

[0014] Users may be asked questions about their food choices at meal times.

[0015] Users may be asked about relevant medical data such as body weight and blood pressure.

[0016] Users may be given suggestions about what and when to eat.

[0017] Users may be given suggestions about their exercise.

[0018] Key components of the HPM may include:

[0019] A user interface provided in a mobile app, a laptop or desktop computer, or a website.

[0020] An educational component for an induction period of the first six weeks of the program using multiple choice questions.

[0021] A user database having data entry and review component (also termed herein a "diary") that allows users to enter data such as medical data, food choices, and exercise that also allows users to track and review their progress.

[0022] A "Virtual Coach" component that displays intelligent messages and reminders to users in real time based on their data entry. For example, the Virtual Coach may remind the user to eat at a certain time, to eat certain foods, to exercise, or to record their medical data such as body weight and blood pressure. In addition, the Virtual Coach may provide daily and weekly summaries of the users' progress.

[0023] A mobile app that provides the educational, data entry, and Virtual Coach components, and provides mes-

sages and reminders to users in real time to instruct or encourage users to make desired choices likely to reduce hypertension.

[0024] A smart phone step counter that allows exercise analysis and automatic entry of exercise in the user diary.

[0025] Web based tools for use on Windows or Mac computers that allow virtually all features provided by the smart phone but includes additional features such as educational power points, questions and answers, reminders, schedule change and can generate an appropriate menu.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] FIG. **1** is an overview of the parts of the HPM

[0027] FIG. **2** is an embodiment of a weekly summary shown on a smartphone.

[0028] FIG. **3** is a different embodiment of a weekly summary shown on a smartphone.

[0029] FIG. **4** is an embodiment of a daily summary shown on a smartphone.

[0030] FIG. **5** is flow chart of a user creation procedure.

[0031] FIG. **6** is flow chart of a user login procedure.

[0032] FIG. **7** is a flow chart of an embodiment of mobile app options.

[0033] FIG. **8** is a flow chart of an embodiment of web app or desktop app options.

[0034] FIG. **9** is a flow chart of an embodiment of Virtual Coach activities.

[0035] FIG. **10** is a flow chart of an embodiment of Virtual Coach activities at the end of the day.

[0036] FIG. **11** is a flow chart of an alternative embodiment of Virtual Coach activities at the end of the day.

[0037] FIG. **12** is a flow chart of an embodiment of Administrator options.

[0038] FIG. **13** is an embodiment of a weekly summary screen on a web app.

[0039] FIG. **14** is an alternative embodiment of a weekly summary screen web app, showing tabular and graphical blood pressure and heart rate data.

DETAILED DESCRIPTION

Hypertension Prevention Module Overview

[0040] As used herein, the term "computer" refers to any device having a microprocessor capable of running the software of the invention. The term may refer, for example, to a handheld device such as a smartphone or tablet computer, which may be termed a "mobile computer," or a notebook. laptop computer, or desktop computer, which collectively may be termed a "personal computer." In some embodiments, remote computers, of any design or configuration, may be employed. The terms "patient" and "user" are used interchangeably, unless the context indicates that a distinction is being made.

[0041] In an embodiment, the present invention provides a computer system for use by a user with hypertension or prehypertension, comprising a computer, a user interface operating on the computer, a records management database stored in a non-volatile electronic medium and operatively coupled to the computer, and a data management application running on the computer and coupled to the computer, and a display screen and keyboard for text input on the user interface; wherein the records management database comprises data relevant to hypertension, and the user enters relevant data into the records management database via the user interface; wherein the data management application is programmed to process data in the records management database and deliver pre-programmed messages to the user in real time; and wherein the data in the records management database comprises data relevant to hypertension and the messages and questions instruct or assist the user in real time to make lifestyle choices intended to reduce hypertension.

[0042] In another embodiment of the present invention, a computer-implemented method for reducing blood pressure in a patient with hypertension or prehypertension is provided, including providing a computer application having a user interface, wherein the computer application stores data in one or more databases in computer memory, providing a records management database stored in a non-volatile electronic medium operatively coupled to the computer, providing a data management application coupled to the user interface and running on a computer receiving patient data into one or more of the databases, wherein the data comprises medical parameters relevant to hypertension, querying the patient via the user interface on a routine basis regarding lifestyle factors that affect blood pressure, and receiving responses in real time from the patient that are stored in one or more of the databases, and providing automated suggestions on a routine basis and in real time to the patient on lifestyle choices, that if followed by the patient, are expected to reduce blood pressure in the patient.

[0043] In another embodiment of the present invention, a computer-implemented method is provided which uses a computer application running on a computer having a user interface, wherein the computer application stores data in one or more databases in non-volatile computer memory. The method receives patient data and stores the received data in a database, wherein the data comprises medical parameters from the patient relevant to hypertension. The method queries the patient via the user interface on a routine basis regarding lifestyle factors that affect blood pressure, and receives responses in real time from the patient, and storing the received responses in real time in a database. The method may further provide automated suggestions on a routine basis and in real time to the patient on lifestyle choices, that if followed by the patient, are expected to reduce blood pressure in the patient. The querying and providing responses are preferably performed on a routine basis, more preferably on a regular schedule. In preferred embodiments the application prompts the user on a regular schedule to enter patient data via the user interface. In alternative embodiments the application receives data automatically from sensors that are in communication with the computer.

[0044] Referring to FIG. **1**, a flow chart of an embodiment of the overall apparatus is illustrated. A user interface is provided, that typically will include a display screen and an input method such as an attached keyboard, which may be physical or a virtual keyboard displayed on a touch screen. The display screen may be, for example, a window in a computer application operating on a desktop or laptop computer, a smartphone screen, a tablet computer screen, or a web browser window.

[0045] The user interface may be controlled by a computer operatively linked to a Data Management Application (DMA), an application specially adapted for the instant purposes. The DMA may be a programmed application that runs on the computer, developed, for example, in C++, Ruby on

Rails®, or Python™. In an embodiment, the DMA may be running on a remote server that accesses the computer through the internet or some other communication means.

[0046] In an embodiment, a Records Management Database (RMDB) is connected to the DMA. The RMDB is a database application designed to store data entered by the user, and preloaded data, such as demographic and standardized medical data, necessary for DMA activities.

[0047] Collectively, the entire apparatus comprising (in this embodiment) a user interface, computer, DMA, and RMDB, is termed the "Hypertension Prevention Module" (HPM).

[0048] In an embodiment, the DMA may communicate with other resources, such as servers connected to medical professionals, insurance companies, employers, personal trainers, and billing services. Typically, such communication will be wirelessly in the case of handheld devices, or through the internet in the case of desktop and laptop computers running the HPM. Wireless connectivity (e.g. via Wi-Fi) with a router which provides Internet communication is also contemplated for any type of device.

[0049] In an embodiment, the HPM may be implemented on several computer platforms, and users can employ any one of the platforms or a combination thereof. For example, the HPM may be implemented on a mobile platform, such as an iOS® or Android™ smartphone, a wearable computer (such as a smart watch or other jewelry), or a tablet computer. As used in this disclosure, the term "mobile app" refers to such a use.

[0050] The HPM may also be implemented on a desktop or laptop-type computer such as on computers running the Windows® or Macintosh® operating systems. Desktop or laptop-type computers are also referred to herein as "personal computers." As used in this disclosure, the term "desktop app" refers to the HPM implemented on a desktop or laptop computer. The HPM may also be implemented on a website. As used in this disclosure, the term "website" refers to such a use.

[0051] In addition to the HPM, a user website may be provided, that will contain most or all of the tools in the users personal HPM, and the user will communicate with the HPM through the internet. The website may have additional tools not in the HPM. The website also may be configured to gather data, either personally identifiable or anonymized, for example for data aggregation purposes.

[0052] Data stored by mobile apps, desktop apps, and/or websites may be synchronized so as to permit a patient to run the RMDB and DMA on more than one platform. In other embodiments, the RMDB may run on a single platform while the DMA is run on multiple platforms.

[0053] In various embodiments, the HPM may be provided as a public service that anyone can enroll in through a public registration system. In other embodiments, the HPM may be provided as a closed system accessible only to members of a group, such as employees of a particular employer or health insurance members for a particular health insurance plan. For such groups, the HPM may be a medical benefit. In either embodiment, administrative supervision and/or clinical supervision (clinical coordinator) may be provided. For example, administrators or clinical coordinators may supervise the participation and progress of HPM participants (users).

[0054] For example, a clinical coordinator may contact a user who appears to have stopped using the system, for example, if a user hasn't entered data in several days. This can be an important leg of a motivational component of the HPM. The clinical coordinator can provide encouragement or help users deal with personal problems preventing them from fully participating in the program. Clinical coordinator may also manually flag unusual behavior (of the computer or users) for follow up. Clinical coordinators may also be notified automatically, or may manually flag, users who appear to be deteriorating on the program. For example a user whose blood pressure or blood sugar level increases steadily may need additional intervention beyond what the HPM can provide.

Initiation Overview

[0055] New users of the HPM may be required to go through an initial registration step, including entering personal particulars and optionally billing information that will be stored in the RMDB.

[0056] Some of the information that may be required as part of the registration process includes:

[0057] Name and address, and other relevant identifying information, for example medical insurance number.

[0058] Credit card or other payment information (optional)

[0059] Sex

[0060] Date of birth

[0061] Initial blood pressure

[0062] Initial body weight

[0063] Initial height

[0064] Attesting that their physician has approved them for moderate stress exercise

[0065] Type of smart phone (or other mobile device)

[0066] Have a dietary target (as calculated below) of 1200 calories or more

[0067] Have a PC that has internet access and printing capabilities

[0068] Some general criteria that are envisioned are that each participant has a body mass index (BMI) over 27, that each participant be over 21, that any participant is not currently on medication to treat high blood pressure.

[0069] In addition, users may be required to provide the following information to initialize the module:

[0070] Times during the day that the Virtual Coach will remind them to eat well

[0071] times during the day for exercise and types of exercise or sports

[0072] times during the day the user will desire reminders to measure and record blood pressure and heart rate.

Educational Tools

[0073] Some educational material for users is shown in the attachment. At user log-on the first time, the user may be directed to review the educational material before using other tools. The electronic educational material is composed of several sections:

[0074] Basic information about hypertension

[0075] Behavior modification

[0076] Controlling your diet

[0077] Exercise

[0078] Weight loss

[0079] Description of the module

[0080] Using your educational tools: smart phone

Website Tools

[0081] In an embodiment, educational components may be available as separate selectable training modules on a website accessible to users of the system. For example, components covering Diet and Exercise, Using Web Tools and Using Smart Phone Tools may be available on the website.

[0082] While all tools are provided at the website, they may not be convenient for the user to employ in real time. To expect the user to log in to the website to enter diary information or to review their progress on a daily summary may be unrealistic. By contrast, advice from the Virtual Coach will ideally be provided in real time for optimum effectiveness. To address these issues, diary entries (adding data to the RMDB) and Virtual Coach messages can also be added or received through the user's smart phone or mobile device. In a preferred embodiment, the mobile app is designed to minimize the time required for diary input. An additional tool that may be provided on a mobile app is a step counter that provides full analysis of walking/jogging exercise including, distance traveled, speed (in mph) and calories burned.

Operational Embodiments

[0083] In an embodiment, the HPM includes a "Virtual Coach," which is an automated system driven by the DMA module of the HPM that automatically interprets and analyzes user activities based on rules pre-programmed into the HPM. For example, if the user enters food items that may be inappropriate, the Virtual Coach may send a message to the user recommending an alternative food choice. The Virtual Coach may also send reminders at specific times of the day, such as at times when exercise or eating is recommended. Such reminders may be via SMS text or as pop-up reminders on mobile devices. The Virtual Coach may send reminders for users to measure the blood pressure or body weight and enter it into their diary.

[0084] In an embodiment, the Virtual Coach may also ask the user about compliance with medications, including sending reminders to take medication when appropriate, and/or following up to confirm that that the user took the correct medication. The Virtual Coach may coordinate with a medical practitioner on this aspect, to adjust dosages or times when the user is reminded to take their medication.

[0085] In other embodiments of the Virtual Coach, a multiple choice question may be presented to users, for example early in the morning. The Virtual Coach may send a text message at each meal and snack reminding the user to eat appropriately and enter the foods eaten and salt consumed into their diary. For example, a Virtual Coach text message may be: "It is time for breakfast. Remember to eat healthy! Would you like to enter your meal into your diary? Don't forget to enter salt consumed." The user may also receive a text message reminding them to exercise and to record their exercise in their diary. The Virtual Coach may provide the participant with a daily summary of their progress at the end of the day as well as a performance based notification encouraging them for the following day. Finally, the user may receive reminders to measure and record their body weight, their blood pressure and heart rate each week. Users may receive a weekly progress summary as well as a performance based encouragement notification for the coming week. The actual time the notifications are delivered are selectable by the user. These times can be modified by the user, for example, at the website.

[0086] In an embodiment, after the initiation process is completed, there is a preliminary phase to the program, in which each morning for the first six weeks just prior to breakfast, a multiple choice question will be sent to each user. In a preferred embodiment, the question will be sent via a mobile app, since most people are preparing for their day prior to breakfast and likely not sitting down at a desktop computer.

[0087] These multiple choice questions may do two things: (1) they may condition the user to think about controlling their eating and planning for exercise that day and (2) they may help reinforce the educational components of this program.

[0088] A sample multiple choice question may be:

[0089] Question: What is the best way to prevent hypertension?

[0090] A. A diet rich in fruits and vegetables

[0091] B. A low salt high potassium diet

[0092] C. Lose weight

[0093] D. All of the above

[0094] When the user selects the correct answer (here, the correct answer is "D"), the Virtual Coach will confirm that it is correct. When a user selects the wrong answer, the Virtual Coach will tell the user that the answer is wrong and provide the correct answer. The Virtual Coach will next ask the user to enter their breakfast foods into the diary.

[0095] Users may log in to use their electronic diary with the mobile application at any time. After logging on, users will be presented with a main menu of options for the HPM. In an embodiment, users may have options to enter dietary, exercise, weight, blood pressure or heart rate data into the HPM. They may also choose to monitor their exercise or look at performance summaries such as their daily or weekly summary.

Mobile App Options

[0096] Various options are presented to the user on the mobile app that can be initiated by the user. An embodiment of a list of options is shown in FIG. **7**.

[0097] In an embodiment, a "Post Each Meal" menu item on the main menu returns a set of button for meals to choose from, for example, breakfast, lunch, midafternoon snack, etc. After selecting the appropriate meal, the user will be able to enter foods eaten for that meal. If the user is responding to a text reminder to eat, this step may be omitted—the user may be taken directly to the meal input screen allowing them to enter servings for various food items. This screen lists all food groups. The user inserts a number to record the number of servings of each group. This is a very efficient method of recording foods consumed into a dietetic diary. An additional screen may also be presented listing common sources of dietary salt. The user can select the number of servings that were consumed at that particular meal. Upon submitting this data, salt intake will be approximated and stored in the user diary.

[0098] Another main menu item may be to enter exercise details. In an embodiment, various exercise activities may be presented, for example playing golf, walking, bicycling, playing tennis, etc. The user checks the type of exercise, enters the minutes of exercise completed and submits it.

[0099] In an embodiment, the HPM mobile app may include a step counter that that measures how many steps taken during running or jogging, when a smart phone or wearable is carried during these activities. Access to the step counter may be provided from the exercise option on the

mobile app. The HPM mobile app may also include a timer, allowing users to press a button at the start of an activity and at the end. When the user selects stop exercise or it stops due to inactivity, a screen may appear showing distance walked, exercise time, average speed and calories burned. This information can be positive feedback to the user, and is automatically saved in the user's diary.

[0100] Other main menu items may be to enter body weight, blood pressure, and heart rate. The user may also be reminded to do these tasks at the times they have selected at in advance. Blood pressure and heart rate may optionally be acquired directly from wearable monitoring devices that are in communication with the computer.

[0101] When the user enters their weight to start a new week, a weekly summary may appear as shown in FIG. **2**. This summary as shown compares user weight to the past week and provides a graph of weight over a several week period. It also provides total weight loss in pounds and as a percent of the user's initial body mass. The user target typically will be a weight loss of at least 3% over a 3 month period. This screen may also display an overview of user's overall performance in regard to controlling blood pressure. This screen (FIG. **3**) graphically compares user blood pressure and heart rate to those over the past weeks. In this way improved blood pressure can be visually appreciated. This summary may also display minutes of exercise for the week compared to the user's target, calories consumed in exercise for the week, and average salt consumed for the week compared to the user's target.

[0102] Another option that may be provided are daily and weekly summaries of clinical targets, which include blood pressure and body weight, dietary entries, and exercise entries.

[0103] Another option that may be provided on the mobile app are for incentives. In this embodiment, health care plans can provide incentives to encourage use of the HPM. For example, users may receive gifts or discounts on purchases for participation in the HPM, and for meeting clinical targets, such as weight loss or blood pressure reduction, or for meeting dietary targets to reduce fat and sodium intake, increase potassium intake, or to log a regular program of moderate stress exercise.

[0104] If weight and/or blood pressure targets are met, the user may consent to the release of diary data (for the Diary Compliance, Weight Compliance, Blood Pressure (BP) Compliance) to an incentive program. In addition, a medical release may be emailed to the user to take to his/her physician to complete in order to validate weight loss and blood pressure reduction.

[0105] In addition to the user selectable menu items, the Virtual Coach may provide automated messages to the user at various times each day. For example, a text message from the Virtual Coach may be provided that encourages the user for the coming week based on their progress. In another embodiment, a user may be discouraged that their exercise isn't impacting their weight significantly. After all, 1200 calories typically burned for the week through exercise is only 0.3 lb lost. But exercise has other medical benefits. For example, users can be reminded that exercise significantly reduces blood pressure.

[0106] In various embodiments, the Virtual Coach may include notifications for a daily multiple choice question, a reminder to eat healthy at each meal, a reminder that it is time to exercise and a reminder that it's time to measure blood pressure and heart rate. In addition, the user may be asked to input diary dietary inputs, salt consumption input, exercise input and blood pressure/heart rate data. The Virtual Coach may send a daily summary and a performance based text of encouragement for the next day. Finally, on a weekly basis the user may be reminded to input their weight and after that input a weekly summary and performance based advice/encouragement for the next week is provided. While this may appear to be a cumbersome quantity of messages for the user (this could be as many as 136 tasks/interaction per week), the efficiency of the app is intended to make these interactions palatable for the user. The mobile app has been carefully designed and requires minimum effort to comply with requests for diary information. The tool constantly reminds and encourages but does not interfere with the users daily activities.

[0107] As described above, the Virtual Coach has many roles that are facilitated through the mobile app. In various embodiments, the Virtual Coach reminds users to eat well, exercise properly, and record their foods consumed, salt consumed, exercises completed, their weight and their blood pressure in the users diary. When data is not entered into the diary, the Virtual Coach may send several reminders.

[0108] The Virtual Coach may also provide daily (FIG. **4**) and weekly summaries (FIGS. **2** and **3**), which are also selectable items on the main menu of the mobile app. The daily summary compares target food consumption with actual for the day. It also calculates the calories consumed and compares this to the calories used (base plus burned by exercise) to calculate the projected weekly weight loss or gain based on the days caloric consumption and expenditure. In addition, the sodium consumed is estimated and compared to the target value to show how well the user is complying with the program.

[0109] In an embodiment, the Virtual Coach may offer performance-based advice following a summary that will inform the user yet also be supportive. For example, if the user generally meets their food consumption target, the Virtual Coach will congratulate them on a great day. For minor excesses in one or two food categories or slightly exceeding the sodium intake target, the Virtual Coach may tell the user they had a good day and remind them to watch their food consumption relative to their targets. Should consumption result in a calculated weight gain, the Virtual Coach may remind the user that tomorrow is a new day and that they should focus on meeting their dietary targets. Whenever excess servings of fats are indicated, the Virtual Coach may remind the user that fats can increase blood fat level and so should be avoided. If thirty or more minutes of exercise is completed, the Virtual Coach may again congratulate them for a successful day. If exercise is completed but falls short of target, the Virtual Coach may encourage the user to have a better day tomorrow. If no exercise has been completed, the Virtual Coach may remind the user that tomorrow is a new day and they should focus on meeting their exercise target.

[0110] The weekly summary compares the users weight and blood pressure to the prior week. In addition the summary provides a plot of the users weight, blood pressure and heart rate for several past weeks while in the program. The summary also provides the total weight loss while in the study in pounds (lbs) and as a percent of total initial weight. The weekly summary also provides the total exercise minutes for the week compared to the target and the total calories burned through exercise for the week. Finally, the users blood pres-

sure will be compared to determine if the user is still hypertensive or if blood pressure has returned to normal.

[0111] In an embodiment, the Virtual Coach will offer constructive performance based advice following each weekly summary depending on how well the user met their exercise and weight loss targets. Weight loss is a sensitive target with many variables in the near term. With diet and exercise as encouraged here, the long term trend should be towards lower body weight. It is important not to discourage a user that has a week of two where the actual weight does not meet expectations. Should the user lose a pound or more and meet their exercise target, they will be congratulated by the Virtual Coach. If weight loss is minimal but the exercise target is met or almost met, the Virtual Coach will encourage the user by telling them that sometimes weight loss is not closely correlated to exercise. Users that do not meet their weight loss or exercise goals will be reminded that exercise can be an important factor in reducing blood pressure and contributes to weight loss. To users that show no progress in weight loss over a few weeks but appear to meet dietary and exercise targets, the Virtual Coach may suggest that the user review the educational presentation regarding serving sizes or other remedial measures.

[0112] Health care savings can provide incentives to encourage use of the HPM. The HPM supports users in a process to lose weight, reduce fat and sodium intake, increase potassium intake, and follow a regular program of moderate stress exercise. Web and mobile tools may be designed to deliver information and receive data entered by the user. The HPM may also provide a summary of performance and offers performance based advice on a regular (daily and weekly) basis. To assist in the general goals of the HPM, a variety of monitors can be used to track user compliance and performance for the HPM. The monitors may include:

[0113] Did the user complete educational training?

[0114] What fraction of days did the user answer a multiple choice question?

[0115] How frequently was the multiple choice question answered correctly?

[0116] How frequently did the user input dietary information into their diary?

[0117] How frequently did the user input dietary sodium information into their diary?

[0118] How frequently did the user input exercise information into their diary?

[0119] How frequently did the user input blood pressure information into their diary?

[0120] How frequently did the user input weight information into their diary?

[0121] How frequently did the user's recorded dietary information meet target values?

[0122] How frequently did the user's recorded dietary sodium information meet target values?

[0123] How frequently did the user's recorded exercise information meet target values?

[0124] How frequently did the user's recorded blood pressure information meet target values?

[0125] How frequently did the user's recorded weight meet that calculated based on dietary and exercise information?

[0126] Validated weight compliance (comparison of entered weight loss compared to weight loss obtained from the user's physician)

[0127] Validated blood pressure reduced to normal (user's physician certification that user blood pressure is in the normal range)

[0128] In an embodiment, the HPM can be used with a wellness program, for example from a health insurance provider or employer, that provides incentives to diary compliance, weight compliance, blood pressure (BP) compliance, validated weight loss and validated blood pressure reduction. From diary inputs these data can be easily tracked and made available to the user. The user is always able to see their compliance with important module monitors and track their progress.

[0129] In any such incentive program, it is envisioned that users must consent to have their personal information transmitted to the program. Thus, in an embodiment, the user may be asked to consent to the release of diary data (for the diary compliance, weight compliance, blood pressure (BP) Compliance) to the wellness program. In addition, a medical release may be sent to the user to take to his/her physician to complete and return to validate weight loss and blood pressure reduction.

Web Based Tools

[0130] In addition to the mobile app (diary and Virtual Coach), in an embodiment, a website may be provided giving users access to web-based tools through a standard internet browser. These tools may include most of those found in the mobile app, for example, a meal diary, salt consumption diary, exercise diary, weight diary, blood pressure/heart rate diary, daily summary and weekly summary. These tools will allow users to enter diary data and receive reminders and messages through the website as an alternative, or in addition to, the mobile app. In addition, the website may provide additional tools for user profile update, questions and answers, study reminders, user schedule update, dynamic training, generate a dietary menu, detailed account information, and a method to opt out of the study. Details of the web based tools are provided below.

[0131] For example, questions and answers may be made available to the user to help them understand hypertension and the process that they are following to prevent it. At a "question and answer" screen, the user may search a hypertension-related database of frequently asked questions. If a user has a question not in the database, a messaging system may be provided allowing the user to ask a clinical coordinator the question. The clinical coordinator may optionally add such new questions, and the answer, to the question and answer database.

[0132] Another website feature may be a reminder screen that notifies users of missing diary information, such as a missing meal or missing exercise data.

[0133] Another website feature may be a "schedule update" screen, where the user can change their meal time or exercise text reminders. This feature provides adaptability in the system.

[0134] Another website feature may be a "Training" option, where the user can view content, for example, a Power Point-type slide presentation, optionally with audio, on topics such Diet and Exercise, Using Web Tools, or Using Mobile App Tools. An example of educational material that might be presented in the Training option is shown in the attachment.

[0135] Another website feature may be a Diary option that allows a review and input of meals, sodium (salt), exercise, weight blood pressure and heart rate. This tool provides a

flexible option for users to add to omitted entries, review previous entries, and change previous entries. This window also provides daily food targets and historical food data.

[0136] For example, the Diary option may have a screen for the sodium (salt) diary. This screen may list many common high salt dietary items. Users can input the number of servings of any of these items at each meal. An estimated salt intake is calculated based on a base salt intake (800 mg/day) plus the salt consumed in any of these items selected. The daily target may be adjusted but is typically less than 1500 mg/day.

[0137] The Diary option may also have an exercise diary screen, allowing users to enter and edit exercise data. Exercise may be entered by the user each day for each exercise type (for example, walking, cycling, or swimming). A summary of the user's most recently entered exercise is also posted in a table and graph format as shown.

[0138] The Diary option may also have a screen showing body weight (FIG. **13**), showing the users weight they have entered each week. An option may be provided on this page to enter body weight, as an alternative to the mobile app. Historical weight data may be given in tabular and graphical formats as illustrated in FIG. **13**. This graphic depiction of weight (ideally trending downward in most cases) is expected to make a large impact on users in terms of understanding progress and their weight loss goal, and as a motivational tool. Users may modify their exercise list at the schedule update screen.

[0139] The Diary option may also have a screen showing blood pressure and heart rate data entered by users on a daily or weekly basis (FIG. **14**). An option may be provided on this page for users to enter their blood pressure and heart rate each week, as an alternative to using the mobile app. Historical blood pressure and heart rate data may be displayed in the tabular and graphical formats as shown in FIG. **14**. A graphic depiction of blood pressure (ideally trending downward in most cases) can make a large impact on the user in terms of understanding progress and their blood pressure goal, and as a motivational tool.

[0140] Various summaries of relevant data may be provided under the diary tab. For example, FIGS. **13** and **14** show summaries of body weight and blood pressure presented in tabular and graphical formats. Options may be provided to show various time ranges for summary data, for example, over periods of days, weeks, or months.

[0141] A Virtual Coach option may be provided, that includes various drop down menus that may show daily and weekly summaries of parameters and projections provided by the HPM. For example, the daily summary may show an overview of calories consumed, calories used, projected weight loss, minutes of exercise, sodium intake and blood pressure for each day of the most recent week. The user may also be able to review historical daily summary data. Similarly, a weekly summary may be provided, showing an overview of calories consumed, calories used, projected weight loss, minutes of exercise, sodium intake and blood pressure for recent weeks. The daily and weekly summaries may include graphical display options, allowing a user to view, for example, their blood pressure over the past eight weeks in a graphical view. This can be a powerful tool to help users understand their progress. This can also be a strong motivational tool, showing that the various lifestyle choices and changes recommended by the HPM and Virtual Coach result in desired body changes such as lower body weight and lower blood pressure.

[0142] A "Menu of the Day" option on the main webpage menu may also be provided, giving users a suggested menu for meals and snacks for that day. These generated meal plans may help users get started on planning to eat right and are expected to be an important leg of the overall program. In an embodiment, these meal menus may be created by a random combination of different sets of breakfast, morning snack, lunch, afternoon snack, dinner and evening snacks. Each daily menu includes the number of servings for each meal and is designed to meet the nutritional targets for that user, such as total calories, protein, sodium, etc. Many additional features can be added to the menu including creation of shopping list and shopping carts to satisfy the foods on the menu.

Calculators

[0143] In an embodiment, a number of calculators may be provided on the website and in the mobile and computer applications. Inputs for these calculations may come from the questionnaire and the user diary. Example calculations may include:

[0144] Body Mass Index (BMI)

[0145] Inputs: weight (lb) and height (inches)

$$BMI=[weight/(height^2)]\times 703$$

Distance Walked and Speed:

[0146] Inputs: gender, steps taken (cell phone step counter), walking time (cell phone step counter in minutes)

[0147] Stride factor=0.413 for females and 0.415 for males

Distance walked (miles)={[stride factor×height (inches)/12]×steps taken}/5,280

Speed (mph)=[distance walked (miles)/walking time (min)]/60

[0148] Calories Burned in Walking:

[0149] Inputs: weight (lb), miles walked (computed above)

Calories burned=weight×miles walked×0.3

Calories Consumed:

[0150] Inputs: servings of grain, vegetables, fruit, milk, meat, nuts, fats and sweets (from user diary)

Calories consumed=grain servings×80+vegetable servings×25+fruit servings×180+milk servings×90+meat servings×55+nut servings×125+fat servings×45+sweet servings×80.

[0151] Calories Required Per Day:

[0152] Inputs from questionnaire: age, weight, height, gender and activity level (1-4)

[0153] correction for gender is add 5 for males and subtract 161 for females

[0154] correction for activity level is multiply by 1 for sedentary, multiply by 1.2 for low

[0155] activity, multiply by 1.27 for active and multiply by 1.45 for very active.

Calories required per day=[9.9×weight (kg)+2.25× height (cm)+4.92×age in years+gender correction]×activity correction

Projected Weight Loss Per Week: (from One Day's Data)

[0156] Inputs from calculators: calories required per day, calories burned, calories consumed

Projected weight loss=7×(calories required+calories burned−calories consumed)/3500

User Security

[0157] Authentication or proper qualification and/or identification of users may be assured by a secure user login method. All data collected from users and transmitted over computer networks may be stored and transmitted in encrypted formats compliant with HIPAA standards.

App Flow Charts

[0158] Various flow charts illustrating an embodiment of the operational features of the inventions are shown in FIGS. **5** to **12**.

[0159] FIG. **5** is a flow chart of a user creation procedure. Users are prompted to create a log in ID and password at step **904**. In this example, users are required to enter initial blood pressure and exercise data at step **906**. Step **906** also sets flags if the data is sufficient for participation in the study. The flags are evaluated in step **908**. For example, a severely obese patient may require additional supervision, so step **908** would initiate contact with the users physician. If the user meets the parameters for the program, they will be issued login credentials and can begin using the HPM.

[0160] FIG. **6** shows a typical user login procedure. After verification success step **1030**, the user may be presented with a multiple choice question providing a simple thought provoking and educational component.

[0161] FIG. **7** is a flow chart of main menu options for the mobile app. FIG. **8** is a log in screen for the desktop or web app, showing menu items that might be used in the HPM.

[0162] FIG. **9** is a flow chart of typical activities of the Virtual Coach. In many cases, the beginning (step **1400***b*) may be initiated automatically such as with an automated reminder at a certain time of day (step **1410***a*). Various activities that the Virtual Coach might use are shown in steps **1430**, **1440**, and **1450**.

[0163] FIG. **10** illustrates Virtual Coach activities at the end of the day, such as shortly before bedtime. The Virtual Coach will review expected user inputs, such as food entries (step **1612**) and exercise details (step **1616**), and send the user a reminder (steps **1614** and **1618** respectively) if the data entry is absent or appears to be mistaken or inaccurate. For example, a user who enters ten servings of broccoli for dinner may be presumed to have made an error, so the Virtual Coach may ask for confirmation or correction.

[0164] FIG. **11** shows the Virtual Coach review of data at the end of the day, such as shortly before bedtime, and sends users appropriate messages.

[0165] FIG. **12** is a flow chart of administrator actions that may be provided in some embodiments of the HPM. These may be actions by clinical administrators or computer administrators. For example, user records may be updated by the administrator (step **810**) if a user is having computer trouble.

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[0172] 7. Your Guide to Lowering Your Blood Pressure With DASH http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf

Attachment

Hypertension Prevention Module: Diet and Exercise

Hypertension – High Blood Pressure

- Hypertension is the primary cause of death of approximately 348,000 Americans each year
- Approximately 76 million Americans, or 34% of the adult population, have hypertension and an additional 50 million have prehypertension.
- Hypertension or high blood pressure makes the heart work harder and the increased pressure can damage vessels and organs.

Who Gets Hypertension?

- The risk of Hypertension
  - increases as you get older
  - is more common in men
  - is more common in blacks
  - runs in families
  - results from inactivity
  - results from using tobacco and alcohol
  - can be caused by too much salt
  - can be caused by too little potassium or vitamin D
  - can result from stress
  - is linked to high cholesterol, diabetes and kidney disease

By the Numbers

- Blood pressure is measured in millimeters of mercury (mm Hg)
  - Systolic is the higher number and represents the pressure while your heart is beating
  - Diastolic is the lower number and represents the pressure while your heart is filling with blood
- Normal blood pressure is 120/80 or less
- High blood pressure is 140/90 or greater
- Blood pressure between (120-139)/(80-89) is prehypertension

Prehypertension

- People with prehypertension often become hypertensive within 4 years
- Hypertension makes your hear work harder resulting in damage to vessels and organ tissue
- This increases their risk for
  - Ischemic heart disease (poor heart blood flow)
  - Stroke (damage to the brain)
  - Peripheral vascular disease (poor blood flow to the limbs)
  - Aneurysms (a balloon-like vascular structure that can burst)
  - Atherosclerosis (narrowing arteries)
  - pulmonary embolism (blocks of vessels in the lung)
  - cognitive impairment (brain damage)
  - chronic kidney disease

How Can I Lower My Blood Pressure?

- The NIH Dietary Approach to Stop Hypertension (DASH) diet effectively reduces blood pressure by 11.4 (systolic) and 5.5 mm Hg (diastolic).
- A DASH diet coupled with weight management and exercise reduces blood pressure by an average of 16.1 mm Hg (systolic) and 9.0 mm Hg (diastolic)
- Aerobic exercise alone also lowers blood pressure by 4 mm Hg (systolic) compared to controls.

How Can I Lower My Blood Pressure (con't)?

- Changing to a low-sodium diet also reduces systolic pressure by 4.6 mm Hg.
- Reduced alcohol consumption lowers systolic pressure by 3.6 mm Hg and diastolic pressure by 1.8 mm Hg.
- Increased potassium reduce systolic blood pressure by 1.8 mm Hg and diastolic pressure by 1.0 mm Hg.

The Purpose of This Module

- The purpose of this module is to use electronic based tools to help convert prehypertensives back to normal.
- These tools include:
  - web-based training
  - smartphone based training assessment
  - smartphone based diary
  - smartphone based reminders
  - Smart phone based virtual coach that provides updates of progress and performance based advice.

Behavior Modification

Behavior Modification

- The strategy is to provide prehypertensives with knowledge, strategies and tools that will help them comply with the controlled diet and exercise required for modest weight loss and control their blood pressure.
- National Institutes of Health (NIH) studies that combine diet, exercise and behavior modification produced significant weight losses in a 4 – 12 month period

Successful Behavioral Control

- Set realistic goals
- Monitor your progress
- Cognitive restructuring or changing how you think
- Stimulus control
- Social support
- Provide rewards
- Relapse prevention

Set Realistic Goals

- In this module very modest goals are made:
  - Eat a well balanced low fat, low salt diet, be physically active and loose a modest amount of weight.
- In this study the weight loss target is a modest 3% of your weight in three months which should not be difficult to reach:
  - If you weigh 150 lbs, you need to loose about 4.5 lb
  - If you weigh 200 lbs, you need to loose only 6 lbs
  - If you weigh 300 lbs, you need to loose only 9 lbs

Self Monitoring

- In this module, you will have an electronic diary.
- You will be able to conveniently track what you eat, the exercises you complete, the weight you loose and your blood pressure.
- You will be able to compare your eating and exercise relative to target levels each day as well as the daily change in your blood pressure.
- You'll be encouraged by the progress shown in your diary!

Cognitive Restructuring

- You may have unfounded feelings that this program will not provide the weight loss required for blood sugar control.
- In this module, you will be given an educational foundation so that you will understand the dietary and exercise requirements for modest weight loss and blood pressure control.
- You will see that there is no magic to weight loss and blood pressure control, just simple eating and exercise rules to follow.

Stimulus Control

- Often parties or holidays are a stimulus for binge eating of fatty and salty foods.
- It is important to celebrate!
- It is also important to not to loose sight of your long term goals of blood pressure control through dietary control, weight loss and exercise.

Social Support

- In this module, you will be provided a virtual coach that will provide your social support.
- This coach will remind you of everything you need to do to be successful in eating healthy, exercising, loosing weight and reducing your blood pressure.
- The virtual coach will also provide advice and encouragement!
- Finally, you can also ask questions and get answers.

Relapse Prevention

- Everyone has set backs.
- You can have a day or week of failure in using this module.
- Such setbacks are minor, however, if taken in the context of a three month commitment to this Study.
- It is important to be able to start again after a small set back. It isn't the end of the world.

Provide Rewards

- You should provide yourself rewards for doing well in with this module: a trip to the movies (hold the buttery popcorn and candy!), a new article of clothing etc.
- There is also strong possibility of a great reward through using this module.
- You can exercise and eat well and feel years younger and more vigorous with your blood pressure under control.
- Alternatively you do not follow this module and probably be forced to take medications to treat high blood pressure and maybe feel miserable!

Prepare for Success

- Replace items in your pantry with substitutes that meet your new eating requirements.
- Replace items in your refrigerator with substitutes that meet your new eating requirements.
- This is a good time to get everyone in the family involve -- have them eat healthy too.
- Shop carefully!

Stock the Pantry With Low Salt/Low Fat Supplies

- Whole-grain breads
- Whole-grain pasta
- Brown rice
- Whole-wheat pancake mix and tortillas
- Sugar/salt free whole grain snack bars
- Canola and extra-virgin olive oil and cooking sprays
- Legumes: pinto, kidney, black beans packed in water
- Fruit: bananas, raisins and canned fruit packed in water
- Unsalted pretzels
- Microwave popcorn bags with no salt or flavoring
- Plain crackers
- Unsalted nuts
- Potatoes

ock the Refrigerator With Low Salt/Low Fat Supplies

- Reduced-sugar jams, jellies, pancake syrups
- Fresh fruits
- Fresh vegetables
- Low-fat salad dressings
- Skim/Low-fat milk
- Low-fat cheese and cottage cheese
- Margarine
- Fresh lean proteins: skinless poultry, lean beef and pork, lean (95%) ground beef and fish

A Key to Breaking Poor Eating Habits

- A key to this program is to eat well: whole grains, vegetables, fruits, lean meats and fish.
- Once poor food choices like sweets, a salty snack and food high in saturated fats are purchased and in your home, the battle is lost.
- You need to shop carefully and smart. Always read the label.
- You should never food shop when you are hungry!

Pitfalls of Rapid Weight Loss

- Rapid weight loss over a few weeks can be dangerous and temporary.
  - It is so difficult that most people fail.
  - It can lead to gall stones, kidney failure, stroke and even heart failure.
  - It leads to loss fat and muscle.
  - Since there has been no long term lifestyle change, people go back to their old routine and gain the weight back. This gain is fat and the muscle lost is not recovered.

Module Goals

- The goal of this module is to delay or prevent high blood pressure by reducing your blood pressure back to normal.
- This will be accomplished by eating a diet low in saturated fats and salt, being physically active and by loosing a little weight through wise food choices.
- The target is to loose approximately 3% of your body weight which is only 5-10 lb in 3 months.
- These are healthy, manageable lifestyle changes and most people can easily do it! We hope you can use these lifestyle changes for a lifetime!

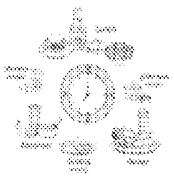
EBMapps

Controlling Your Diet

EBMapps

Control What You Eat

- A useful way to reduce your hunger is to eat more frequently.
- If you eat when you are not "starved," you are better able to control what you eat.
- When you are "starved," you binge eat and are out of control.
- You are better off eating 5-6 small controlled meals each day rather than 3 jumbo "out of control" meals each day!

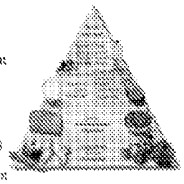


http://diabetes.niddk.nih.gov/dm/pubs/eating_activities.aspx#planmeal

EBMapps

Hypertension Food Pyramid

- The National Institutes of Health has developed a hypertension food pyramid. This is sometimes called the DASH (Dietary Approaches to Stop Hypertension) diet.
- The goal is to eat more from the groups at the bottom of the pyramid, and less from the groups at the top.
  - mainly fruits and vegetables
  - plenty grains or complex carbohydrates
  - some low fat milk and lean meats and fish
  - nuts and legumes, and a small amount unsaturated fats
  - few sweets



NIH DASH diet

EBMapps

Exercise Caution

- The DASH eating plan has more daily servings of fruits, vegetables, and whole grain foods than you may be used to eating.
- Because the plan is high in fiber, it can cause bloating and diarrhea in some.
- To avoid these problems, gradually increase your intake of fruit, vegetables, and whole grain foods.

http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/how_make_dash.html

EBMapps

DASH Food Groups

http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/how_make_dash.html

EBMapps

Grains – Complex Carbohydrates

- You body needs sugar (glucose) – it is a basic source of energy.
- Complex carbohydrates result in the slow release of sugar (glucose) into your blood, so you feel full of energy.
- Simple sugar (sweets) provide a quick spike of sugar in your blood which should be avoided.
- Complex carbohydrates and whole grains slowly release glucose and are high in fiber and vitamins
  - Fiber aids digestion
  - Fiber makes you feel full

http://diabetes.niddk.nih.gov/dm/pubs/eating_activities.aspx#exercises

Complex Carbohydrates - Grains

- Grains are complex carbohydrates and are major sources of energy and fiber
- Examples of grains include:
  - Whole wheat bread and rolls
  - whole wheat pasta
  - English muffin
  - pita bread
  - Bagel
  - cereals
  - grits
  - Oatmeal
  - brown rice
  - unsalted pretzels
  - popcorn

http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/how_make_dash.html

Grain Serving Sizes

- Examples of one serving of grains/complex carbohydrates include:
  - one slice whole wheat bread
  - one small roll
  - A half cup cooked cereal
  - 3/4 cup dry cereal flakes
  - one six inch tortilla
  - 1/3 cup rice

Whole Grains

- Buy whole grain breads and cereals, they:
  - provide more vitamins and minerals.
  - provide fiber that aids in digestion and make you feel fuller
- White grains (starches) are not as healthy.
  - If practical, reduce the following: white bread, white rice and white pasta.

Healthy Ways to Eat Grains

- Eat fewer fried and high-fat grains such as tortilla chips.
- Try pretzels, fat-free popcorn, baked tortilla chips or low-fat muffins.
- Use mustard instead of mayonnaise on a sandwich.
- Use low-fat or fat-free substitutes such as low-fat mayonnaise or light margarine on bread, rolls, or toast.
- Eat unsweetened cereals with fat-free (skim) or low-fat (1%) milk.

Vegetables

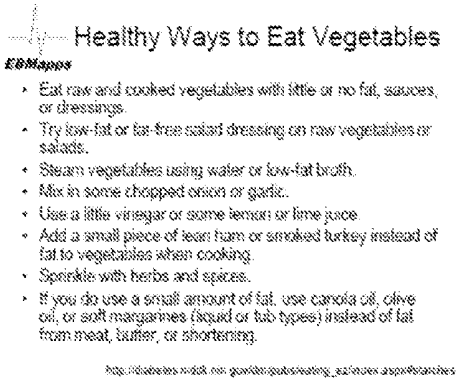
Vegetables are rich sources of potassium, magnesium, and fiber.

- Examples include
  - broccoli
  - carrots
  - collards
  - green beans
  - green peas
  - kale
  - lima beans
  - Potatoes
  - Spinach
  - Squash
  - sweet potatoes
  - tomatoes

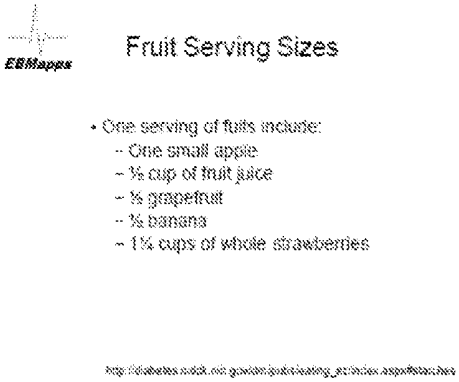
http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/how_make_dash.html

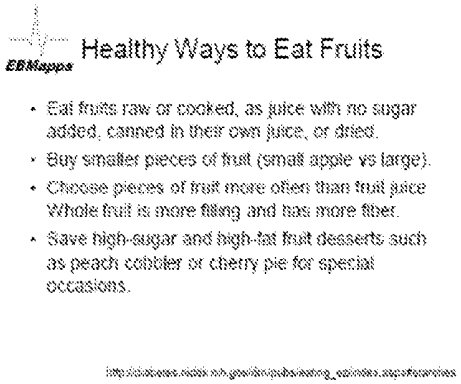
Vegetables Serving Sizes

- One serving of vegetable include:
  - one half cup of cooked carrots or green beans
  - one cup of raw greens (salad)
  - A half cup of vegetable juice


Healthy Ways to Eat Vegetables
EBMapps
• Eat raw and cooked vegetables with little or no fat, sauces, or dressings.
• Try low-fat or fat-free salad dressing on raw vegetables or salads.
• Steam vegetables using water or low-fat broth.
• Mix in some chopped onion or garlic.
• Use a little vinegar or some lemon or lime juice.
• Add a small piece of lean ham or smoked turkey instead of fat to vegetables when cooking.
• Sprinkle with herbs and spices.
• If you do use a small amount of fat, use canola oil, olive oil, or soft margarines (liquid or tub types) instead of fat from meat, butter, or shortening.


Fruit
EBMapps
• Fruits are high in potassium and provide carbohydrate, vitamins, minerals, and fiber.
Fruits include:
– Apples
– Apricots
– Bananas
– Dates
– Grapes
– Oranges
– grapefruit
– Mangoes
– Melons
– Peaches
– Pineapples
– Raisins
– Strawberries
– tangerines


Fruit Serving Sizes
EBMapps
• One serving of fruits include:
– One small apple
– ½ cup of fruit juice
– ½ grapefruit
– ½ banana
– 1¼ cups of whole strawberries


Healthy Ways to Eat Fruits
EBMapps
• Eat fruits raw or cooked, as juice with no sugar added, canned in their own juice, or dried.
• Buy smaller pieces of fruit (small apple vs large).
• Choose pieces of fruit more often than fruit juice. Whole fruit is more filling and has more fiber.
• Save high-sugar and high-fat fruit desserts such as peach cobbler or cherry pie for special occasions.


Low Fat Milk Products
EBMapps
• Milk provides carbohydrate, protein, calcium, vitamins, and minerals.
• Examples include:
– milk
– yogurt


Low Fat Milk Product Serving Sizes
EBMapps
•One serving of Low Fat Milk products include:
– 1 cup fat-free or low fat yogurt
– 1 cup fat-free (skim) or low fat (1%) milk

Healthy Ways to Eat Dairy

- Drink fat-free (skim) or low-fat (1%) milk.
- Eat low-fat or fat-free fruit yogurt sweetened with a low-calorie sweetener.
- Use low-fat plain yogurt as a substitute for sour cream.

http://diabetes.niddk.nih.gov/dm/pubs/eating_well/index.aspx#starches

Meats

- Animal fat is source of unsaturated fats which increase blood fat and so should be avoided.
- Lean meat, poultry and fish on the otherhand are rich sources of protein and magnesium
- Examples include lean
  - meats
  - poultry
  - fish

http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/how_make_dash.html

Meat Serving Sizes

- Lean meat, poultry, fish serving size is in ounces.
- Three ounces of meat is approximate the size of the palm of the hand.

http://diabetes.niddk.nih.gov/dm/pubs/eating_well/index.aspx#starches

Healthy Ways to Eat Meats

- Buy cuts of beef, pork, ham, and lamb that have only a little fat on them. Trim off the extra fat.
- Eat chicken or turkey without the skin.
- Avoid frying. Cook meat and meat substitutes in low-fat ways: broil, grill, stir-fry, roast or steam.
- To add more flavor, use vinegars, lemon juice, soy sauce, salsa, ketchup, barbecue sauce, herbs, and spices.
- Limit the amount of butter, and fried foods you eat. They are high in fat.
- Check food labels. Choose salt free or low-fat/fat-free cheese.

http://diabetes.niddk.nih.gov/dm/pubs/eating_well/index.aspx#starches

Nuts, Seeds and Legumes

- Nuts, seeds, and legumes are rich sources of energy, magnesium, protein, and fiber
- Examples include
  - Almonds
  - Hazelnuts
  - mixed nuts
  - Peanuts
  - Walnuts
  - sunflower seeds
  - peanut butter
  - kidney beans
  - lentils
  - split peas

http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/how_make_dash.html

Nut, Seed, Legume Serving Sizes

- The serving size for nuts, seed and legumes is one oz.
- One oz is the amount held in a single hand full.

http://diabetes.niddk.nih.gov/dm/pubs/eating_well/index.aspx#starches

Healthy Ways to Eat Nuts, Seeds and Legume

- Legumes include: fava, adzuki, kidney beans, chickpeas, black-eyed peas, pint beans, lentels, soy and lima beans which are often eaten cooked or dried.
- legumes should NOT be given to children less than 18 months of age because they do not have sufficient stomach enzymes to digest the legumes.
- Many nuts and seeds are eaten raw or after roasting.
- No salt should be added to nuts or seeds

Fats and Sweets

- Limit the amount of fats and sweets you eat because they are not as nutritious as other foods
- Some fats contain unsaturated fats, trans fats, and cholesterol that increase your risk of heart disease.
  - Animal fat is rich in unsaturated fats and so should be avoided
  - Dairy fat is also rich in unsaturated fats so it too should be avoided
- Fats produce twice the calories for the same mass as carbohydrates and protein.
- Limiting saturated fats and sweets foods will help you lose weight and keep your blood fats under control, reducing blood pressure.

Fats and Sweets

- Examples of fats include
  - Soft margarine
  - vegetable oil (such as canola, corn, olive, or safflower)
  - low-fat mayonnaise
  - light salad dressing
- Examples of sweets include
  - fruit-flavored gelatin
  - fruit punch
  - hard candy
  - jelly
  - maple syrup
  - sorbet and ices
  - sugar

Fats and Sweets Serving Sizes

- One serving of sweets include:
  - a 3 inch cookie
  - a plain small donut
  - a table spoon of maple syrup.
- One serving of fats
  - a teaspoon of oil
  - a strip of bacon
  - a tabel spoon of regular salad dressing
  - a tabel spoon of reduced fat mayonnaise

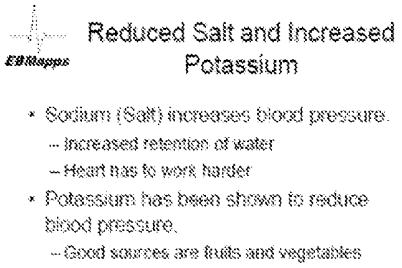
How Can I Satisfy My Sweet Tooth?

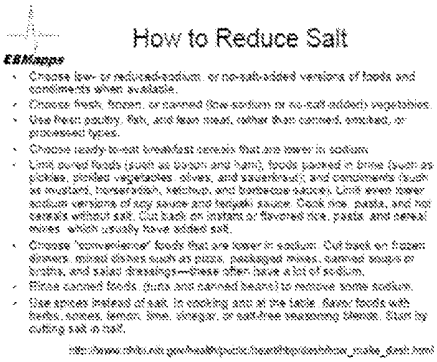
- You should avoid sweets. They are empty calories.
- Try having sugar-free popsicles, diet soda, fat-free ice cream or frozen yogurt, or sugar-free hot cocoa mix.
- Share desserts in restaurants.
- Order small or child-size servings of ice cream or frozen yogurt.
- Divide homemade desserts into small servings and wrap each individually. Freeze extra servings.
- Remember, fat-free and low-sugar foods still have calories.

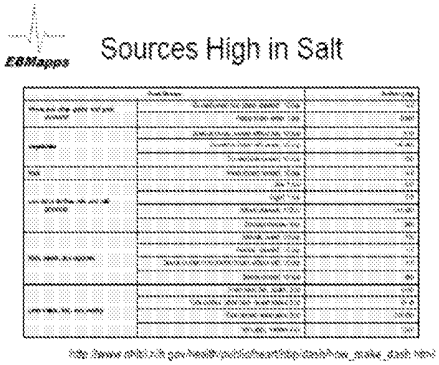
What About Fats and Oils?

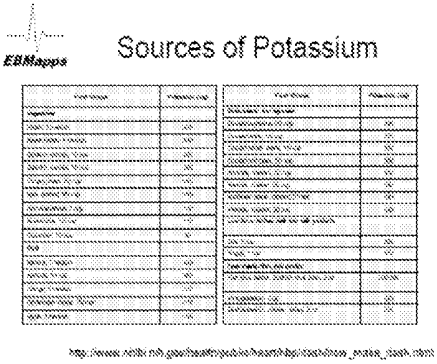
- Fats and oils have the highest number of calories for the same mass
- Saturated fat found in animal and dairy fat
  - Increases LDL and VLDL (bad cholesterol)
  - associated with atherosclerosis and heart diseases
- Unsaturated fat is found in vegetable oils and fish
  - Increases HDL (good cholesterol) and decreases LDL
- Try to minimize saturated fats but eating some unsaturated fats will help control bad cholesterol.

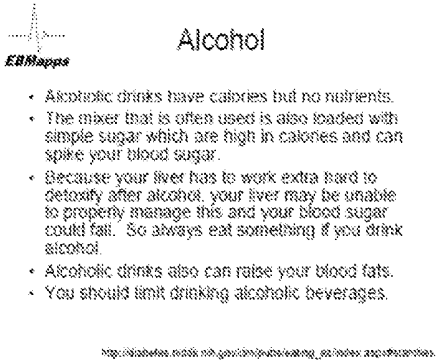

Common Foods
EBMapps
Remember: all food groups are in servings except meat, they are in oz!
Slice low fat pizza = 2 starch (dough) + 1 vegetable (sauce) + 1 meat substitute (low fat cheese)
Chili (cup) = 2 vegetable (sauce + beans) + 1 meat + 2 starch (if over a cup of rice)
Tuna salad sandwich = 2 starch (bread) + 2 meat (tuna) + 2 fat (only 1 fat if low fat mayo)
Chicken potpie = 1 starch (shell) + 1 meat (chicken) + 1 vegetable + 2 fat (gravy)
Pork fried rice (cup) = 1 starch + 1 meat + 2 fat
Macaroni and cheese (cup) = 2 starch (whole grain pasta) + 1 meat substitute (low fat cheese)
Taco = 1 starch (6" shell) + 1 meat (lean ground beef) + 1 vegetable
Spaghetti and 1 meatball = 2 starch (cup whole grain spaghetti) + 2 vegetables (sauce) + 2 meat (2 oz lean ground beef plus egg)

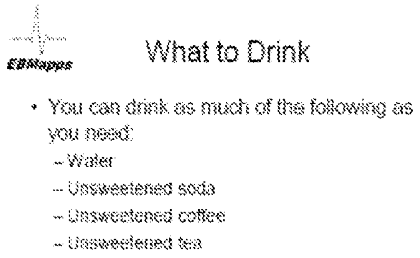

Reduced Salt and Increased Potassium
EBMapps
Sodium (Salt) increases blood pressure.
– Increased retention of water
– Heart has to work harder
Potassium has been shown to reduce blood pressure.
– Good sources are fruits and vegetables

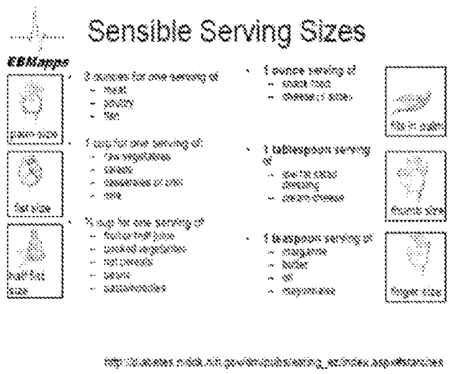

How to Reduce Salt
EBMapps
Choose low- or reduced-sodium or no-salt-added versions of foods and condiments when available.
Choose fresh, frozen, or canned (low-sodium or no-salt-added) vegetables.
Use fresh poultry, fish, and lean meat, rather than canned, smoked, or processed types.
Choose ready-to-eat breakfast cereals that are lower in sodium.
Limit cured foods (such as bacon and ham), foods packed in brine (such as pickles, pickled vegetables, olives, and sauerkraut), and condiments (such as mustard, horseradish, ketchup, and barbecue sauce). Limit even lower-sodium versions of soy sauce and teriyaki sauce. Cook rice, pasta, and hot cereals without salt. Cut back on instant or flavored rice, pasta, and cereal mixes, which usually have added salt.
Choose "convenience" foods that are lower in sodium. Cut back on frozen dinners, mixed dishes such as pizza, packaged mixes, canned soups or broths, and salad dressings—these often have a lot of sodium.
Rinse canned foods (tuna and canned beans) to remove some sodium.
Use spices instead of salt. In cooking and at the table, flavor foods with herbs, spices, lemon, lime, vinegar, or salt-free seasoning blends. Start by cutting salt in half.

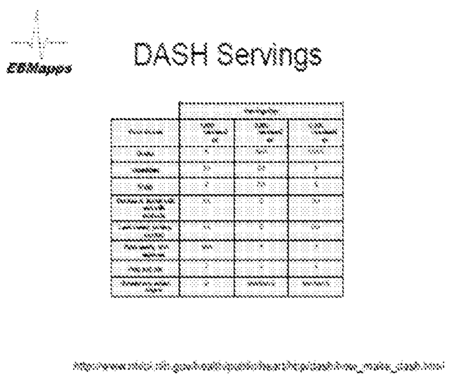

Sources High in Salt
EBMapps


Sources of Potassium
EBMapps


Alcohol
EBMapps
Alcoholic drinks have calories but no nutrients.
The mixer that is often used is also loaded with simple sugar which are high in calories and can spike your blood sugar.
Because your liver has to work extra hard to detoxify after alcohol, your liver may be unable to properly manage this and your blood sugar could fall. So always eat something if you drink alcohol.
Alcoholic drinks also can raise your blood fats.
You should limit drinking alcoholic beverages.


EBMapps
What to Drink
• You can drink as much of the following as you need:
– Water
– Unsweetened soda
– Unsweetened coffee
– Unsweetened tea


EBMapps
Sensible Serving Sizes
• 3 ounces for one serving of
– meat
– poultry
– fish
palm size
• 1 cup for one serving of:
– raw vegetables
– salads
– casseroles or chili
fist size
• ½ cup for one serving of:
– fruit or fruit juice
– cooked vegetables
– hot cereals
– beans
– pasta/noodles
half fist size
• 1 ounce serving of
• 1 tablespoon serving of
– low fat salad dressing
– cream cheese
thumb size
• 1 teaspoon serving of
– margarine
– butter
– oil
– mayonnaise
finger size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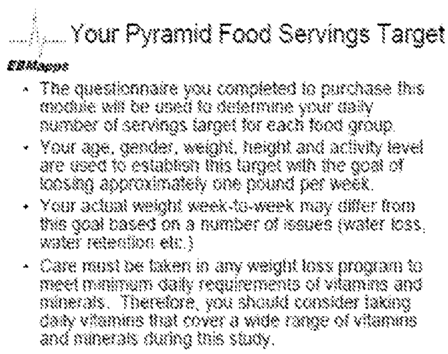
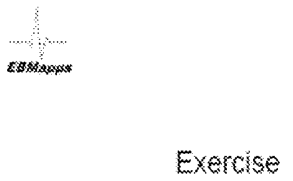
DASH Servings


EBMapps
Your Pyramid Food Servings Target
• The questionnaire you completed to purchase this module will be used to determine your daily number of servings target for each food group.
• Your age, gender, weight, height and activity level are used to establish this target with the goal of loosing approximately one pound per week.
• Your actual weight week-to-week may differ from this goal based on a number of issues (water loss, water retention etc.)
• Care must be taken in any weight loss program to meet minimum daily requirements of vitamins and minerals. Therefore, you should consider taking daily vitamins that cover a wide range of vitamins and minerals during this study.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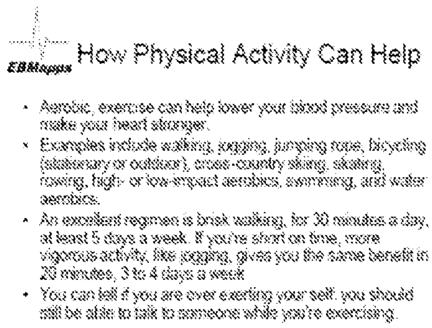
Exercise


EBMapps
How Physical Activity Can Help
• Aerobic, exercise can help lower your blood pressure and make your heart stronger.
• Examples include walking, jogging, jumping rope, bicycling (stationary or outdoor), cross-country skiing, skating, rowing, high- or low-impact aerobics, swimming, and water aerobics.
• An excellent regimen is brisk walking, for 30 minutes a day, at least 5 days a week. If you're short on time, more vigorous activity, like jogging, gives you the same benefit in 20 minutes, 3 to 4 days a week.
• You can tell if you are over exerting your self: you should still be able to talk to someone while you're exercising.

Physical Activity

- Before you start:
  - Talk with your doctor about what types of exercise are safe for you.
  - Always start a new exercise program slowly.
  - Always warm up before exercising and cool down after.

Physical Activity

- Start your exercise programs slowly and gradually increase your endurance.
  - Initially, a 15 minute walk may be your limit.
  - Slowly work up to longer and faster walks.
  - A good target is a brisk 30 minute walk, 5 days each week.
  - Other exercises may include: swimming, dancing or golf.

Physical Activity Basics

- Warm up and stretch for 5 to 10 minutes before you exercise.
- Cool down for several minutes after you exercise.
- For example, walk slowly at first, stretch, and then walk faster. Finish up by walking slowly again.
- Find an exercise buddy. Many people find they are more likely to do something active if a friend joins them.

Heart Rate

- You should monitor your heart rate during exercise.
- An important rate is your maximum heart rate
  - It is found by subtracting your age from 220 beats per minute.
  - If you are 60 years old, your maximum heart rate is 220 – 60 = 160 beats per minute.
- A good target heart rate while your exercising is 0.65 of your maximum.
  - For the 60 year old, the maximum rate is 220-60 = 160 so a good target is 160 x .65 = 104 beats per minute.
  - At this rate you should still be able to talk while exercising!

Weight Loss

Weight Loss in This Study

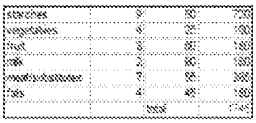
- The key to weight loss is diet and exercise.
- Crash diets are not healthy and generally don't hold up over the long term.
- The weight loss provided in this module is not magic. It is healthy, common sense and it is sustainable.
- Hopefully, the eating and exercise habits you develop using this module will last a lifetime and provide you a healthy, high blood pressure free future.

How Does Weight Loss Work?

- It is all about calories consumed and calories used.
- To loose weight, you need to use more calories than you consume.
- A 5 ft 10 in, 200 lb, 60 year old, low activity male uses 2,050 calories per day. If he also meets the exercise requirements of this program this increases to about 2,275 calories used per day.
- To loose 1lb in a week this male must burn 3,500 calories more than he consumes.
- This works out to 3,500/7 = 500 less calories per day, so he needs to consume 2,275 – 500 = 1,775 calories per day.

How Does Weight Loss Work?

- Based on a target of 1,775 calories each day, his target for pyramid food groups becomes:



- If he meets his target, he will succeed in loosing approximately 1 lb per week and meet his 3% body mass reduction in 6 weeks!

This Module

The Purpose of This Module

- The purpose of this module is to see if electronic educational tools including a mobile phone based diary and virtual coach can prevent or delay the onset of hypertension.
- This educational program, mobile diary and virtual coach can help subjects reduce their blood pressure by:
  - controlling their diet
  - exercising regularly
  - loosing a little weight
- These lifestyle modifications may significantly reduce your blood pressure to normal within three months

The Electronic Diary

- The mobile app based diary will allow you to document the type and quantities of food you eat while using this module
- The diary will also allow you to document exercise that you complete while using this module.
- Finally, the diary will allow you to document your weight, heart rate and blood pressure each week while you are using this module.

The Virtual Coach

- Your mobile app based virtual coach provides reminders and asks for information using you mobile notification system.
- The virtual coach:
  - asks a multiple choice question each day about the educational components of the program
  - reminds you to eat properly at every meal.
  - reminds you to record the types and quantities of food (including salt) consumed at each meal.
  - reminds you to exercise.
  - reminds you to record the types and minutes of exercise each day.
  - reminds you to document your weight, heart rate and blood pressure weekly.
- The virtual coach will give you encouragement and document your progress each day through a "daily summary" and each week through a "weekly summary".

Will This Work?

- The key question is: "Why will this help me keep my blood pressure on target?"
- A key to the success of this module is the education you receive about behavior control, proper eating and exercise. You will know what foods to eat and what foods to avoid. You will also know what level of physical activity will benefit your blood pressure.
- Published studies show that a diary system improves control of eating habits.
- Published studies also show that reminders to exercise improve the chances of exercise.
- All these things should help you eat properly, loose a little weight, be more physically active and reduce your blood pressure.

Using This Module Will Require Effort

- The diary needs to be filled out at every meal or snack and will take a few minutes each time on your smart phone.
- The virtual coach will text you several times each day reminding you to eat properly, to fill out your diary and to exercise.
- Each week you will need to record your weight, your blood pressure and your heart rate.
- These are all extra activities and therefore inconvenient.
- The possible benefit, however, is important – the control of your blood pressure!

EBMapps

Using your Educational Tools:
Web Based Tools

Web Based Tool Use

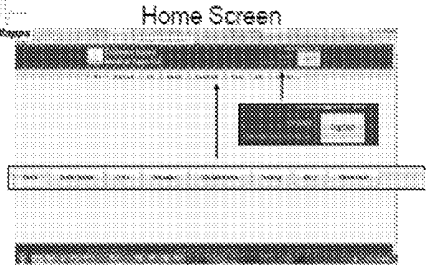
EBMapps

- You may use all your educational tools by logging into the module website and selecting tools that you wish to use.
- Several features are available using the web that are not found on the smart phone app including: educational tools, questions and answers, update your profile, review reminders and modify your schedule from the virtual coach to name a few.
- You may also review all your historical data of foods consumed, exercise completed, weight loss, past daily summaries and past weekly summaries.
- Input of old missing data is also easily facilitated on the web site.

Web Log In

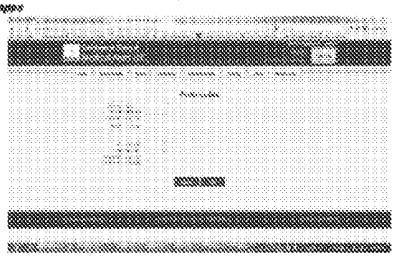
- Log into the module web site by simply typing in your e-mail address as the username and your password.

Home Screen



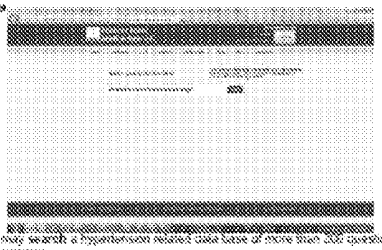
- The Home Screen has not buttons or tabs for:
  - Home, Profile Update, Q & A s, Reminders, Schedule Update, Training, Diary and Virtual Coach.
- You may also generate a dietary menu for the day or you may Log Out of the system.

Profile Update Screen

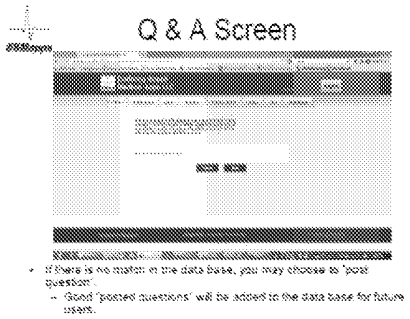


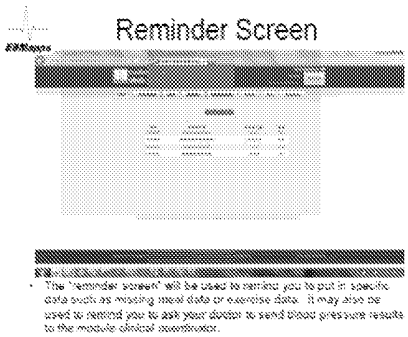
- At the Profile Update screen, you can update contact information: nickname, email address, cell phone number, home address and land line number as shown.

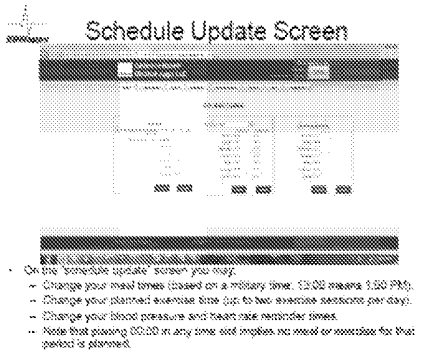
Q & A Screen

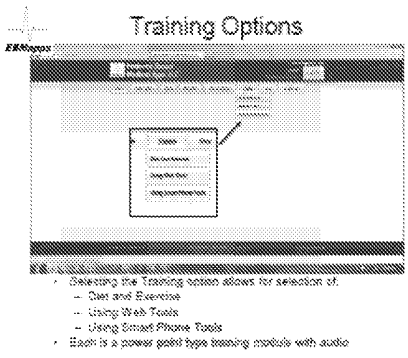


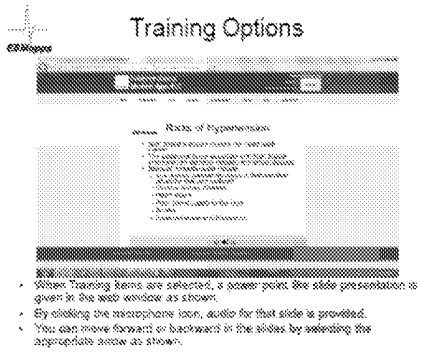
- You may search a hypertension related data base of more than 300 questions and answers.
  - This is done by simply typing your question in the space provided and selecting "search"
  - If there is a match in the data base, an answer will be immediately provided.
  - If there is no match in the data base you may choose to "post" the question as describe on the next slide.

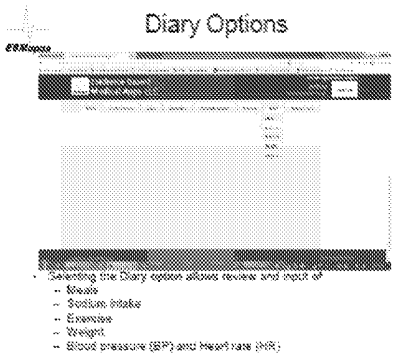

Q & A Screen
If there is no match in the data base, you may choose to "post question"
"Good "posted questions" will be added to the data base for future users.


Reminder Screen
The "reminder screen" will be used to remind you to put in specific data such as missing meal data or exercise data. It may also be used to remind you to ask your doctor to send blood pressure results to the module clinical coordinator.

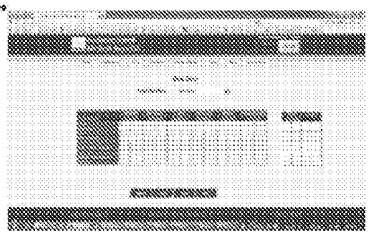

Schedule Update Screen
On the "schedule update" screen you may:
Change your meal times (based on a military time. (13:00 means 1:00 PM).
Change your planned exercise time (up to two exercise sessions per day).
Change your blood pressure and heart rate reminder times.
Note that placing 00:00 in any time slot implies no meal or exercise for that period is planned.


Training Options
Selecting the Training option allows for selection of:
Diet and Exercise
Using Web Tools
Using Smart Phone Tools
Each is a power point type training module with audio


Training Options
When Training items are selected, a power point like slide presentation is given in the web window as shown.
By clicking the microphone icon, audio for that slide is provided.
You can move forward or backward in the slides by selecting the appropriate arrow as shown.

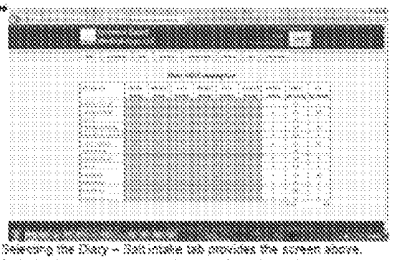

Diary Options
Selecting the Diary option allows review and input of
Meals
Sodium Intake
Exercise
Weight
Blood pressure (BP) and Heart rate (HR)

Diary – Meals



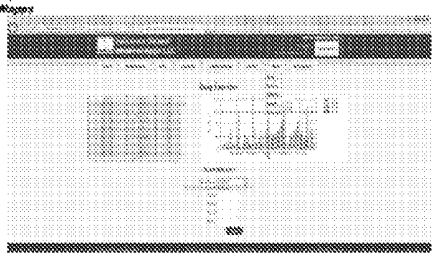
- Selecting the Diary - Meals tab provides the screen above.
- Foods consumed at each meal may be input for each day.
- The most accurate results will be provided if you input your meal data at each meal!
- Your daily food targets and most recent input food data are also provided for your review.

Diary – Salt Intake



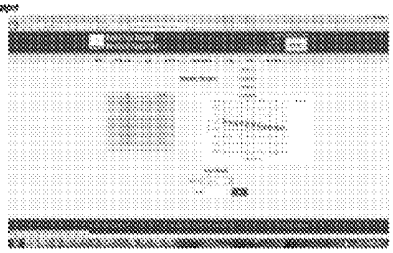
- Selecting the Diary – Salt intake tab provides the screen above.
- Salty foods eaten at each meal may be input for each day.
- The most accurate results will be provided if you input your meal data at each meal!
- You should try to keep salt to less than 1500 mg each day.

Diary – Exercise



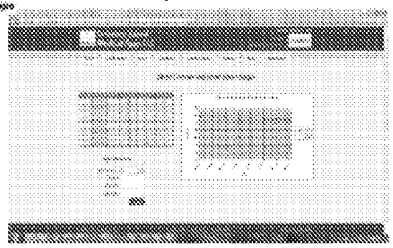
- Selecting the Diary - Exercise tab provides the screen above.
- Exercise is entered each day for each exercise type.
- A summary of your most recently entered exercise is also posted in a table and graph format as shown above.

Diary - Weight



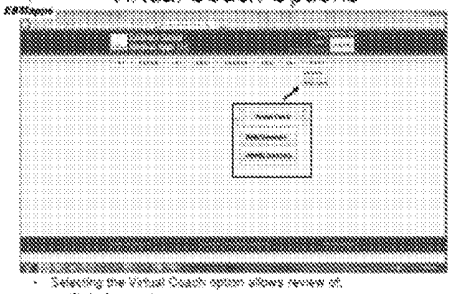
- Selecting the Diary – Weight tab provides the screen above.
- Weight is entered each week. Be sure to record your weight at the same time of day.
- Previously entered weight data is given in table and graph formats as shown above.

Diary - BP & HR



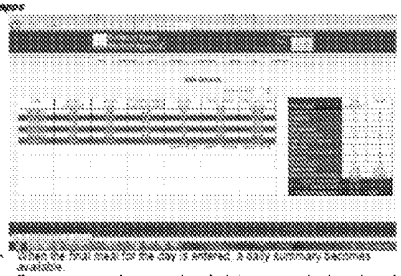
- Selecting the Diary – BP & HR (blood pressure and heart rate) tab provides the screen above.
- BP & HR is entered each week. Be sure to record your BP & HR at the same time of day.
- Previously entered weight data is given in table and graph formats as shown above.

Virtual Coach Options



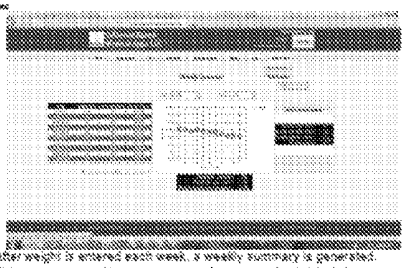
- Selecting the Virtual Coach option allows review of:
  - ~ Daily Summaries
  - ~ Weekly Summaries

Daily Dietary Summary



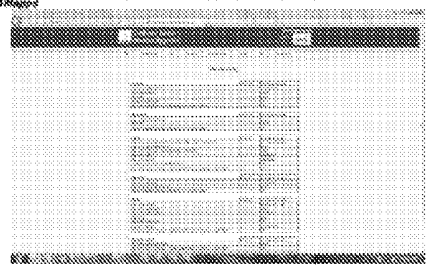
- When the final meal for the day is entered, a daily summary becomes available.
- The summary provides an overview of calories consumed, calories burned, estimated weight loss at that rate for the week, minutes of exercise and blood pressure.
- Historical daily summaries may also be reviewed to appreciate changes

Weekly Summary



- After weight is entered each week, a weekly summary is generated.
- This summary provides an overview of your exercise totals (minutes) each week, your weight and your blood pressure.
- This data is provided in a table and your weight is displayed graphically to appreciate your weight loss.
- Historical data is also available for review.

Generate a Menu



- By selecting the menu of the day (adjacent to Log Out), you can generate a menu! A sample is given above.

EBMapps

Using your Educational Tools: Smart Phone

Web and Smart Phone Use

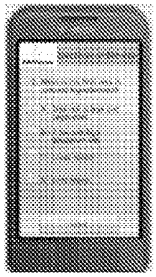
- You may use your module tools by logging into the module website and selecting tools that you wish to use.
- Alternatively, you can use certain tools directly through your smart phone
- At each reminder from the virtual coach, you may choose to directly input foods eaten, exercise completed and weight into your smart phone. This way you avoid having to find a computer every time you want to use your diary!

Smart Phone Use

- Your virtual coach will send you text messages asking module questions, reminding you to eat well and record foods consumed, to exercise and to track you weight.
- Your virtual coach will also provide you a summary each day and each week that tells you how you are doing.
- At each reminder from your virtual coach, you may choose to directly input foods eaten, exercise completed and weight into your smart phone. This way you avoid having to find a computer every time you want to use your diary!
- Alternatively, you can log in using your smart phone or you can wait to input you food, exercise and weight data after logging in to our web site using you PC.

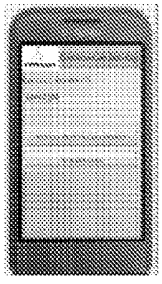
Smart Phone Use: Daily Multiple Choice Question

- For the first six weeks of the module, you will receive a multiple choice question from the virtual coach on your smart phone just prior to the breakfast reminder.
- This helps assure that you learn the educational components of the module.
- A simple sample is shown on the right.



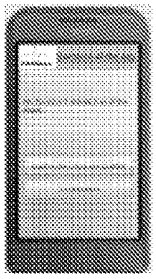
Answer It Correctly

- When you select the correct answer, the virtual coach will confirm that it is correct.
- The system will next ask you to put in your breakfast foods.



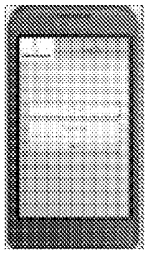
When Wrong

- When you select the wrong answer, the virtual coach will tell you what the correct answer is.
- The system will next ask you to put in your breakfast foods.



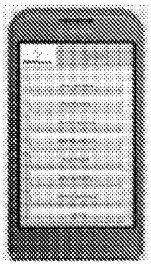
Log Into Your Educational Tools

- You may log in to use your electronic diary with your cell phone whenever you'd like.
- When you select the EBMapps icon on your phone, you'll get to the log in screen shown on the right.
- Login is your e-mail address.
- Your Password you selected when you purchased this module



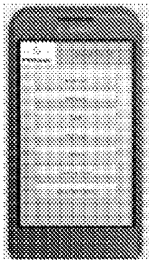
Enter Data Into Your Diary

- After you log on, you will see icons to post information into your diary as shown on the right.
- As shown you may post dietary, exercise, weight or blood pressure data.
- You may also choose to monitor your exercise or look at performance summaries.



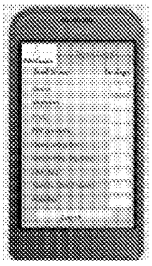
Post Each Meal

- If you select the "Post Each Meal" icon, you will get a list of meals to choose as shown on the right
- Simply select the appropriate meal.
- If you are responding to a text reminder to eat, you won't need to take this step



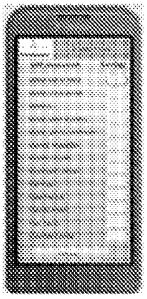
Enter Food Servings

- After you select the meal you'd like to input, you will see this screen listing the food groups.
- Simply record the number of servings of each food group.
- Remember meat/meat substitutes are in oz!
- After you input your number of servings, simply submit it.



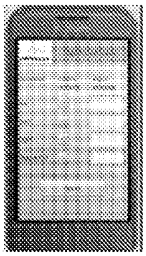
Enter High Salt Food Servings

- After submit the foods you've eaten, you will see this screen listing high salt food groups.
- Simply record the number of servings of each food group
- After you input your number of servings, simply submit it and your salt intake will be compiled for that meal.



Post Exercise Details

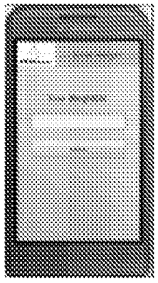
- When you select "post exercise details," you will see the screen on the right.
- Simply check the type of exercise and enter the minutes of exercise completed.
- When complete simply submit it.



Post Weight

EBMapps

- When you select "post weight," you will see the screen on the right.
- Simply enter your weight. You should always weight yourself at the same time of day.
- When weight is entered simply submit it.



Post Weight

EBMapps

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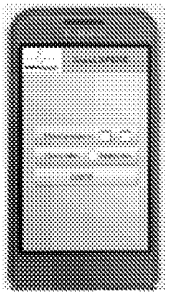
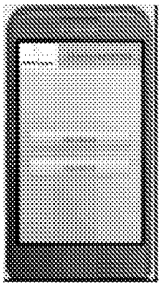
- When weight is entered simply submit it.



Monitor Exercise

EBMapps

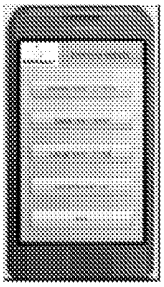
- The EBMapps application includes a step counter that is accessible through "monitor exercise".
- When you select "monitor exercise," the screen to the right will appear.
- Simply select "start exercise," put your cell phone in your pocket and walk or jog!
- When you are done select "stop exercise". If the counter senses you stop for a period of time, it will automatically stop.
- Use this option instead of manually inputting exercises minutes.



Monitor Exercise

EBMapps

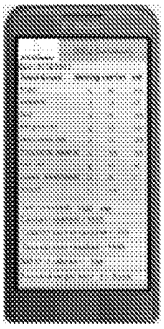
- When you select stop exercise, the screen to the right will appear.
- The monitor provides: distance walked, exercise time, average speed and calories burned!
- This is automatically saved in your diary.
- Log out after reviewing this information.



Daily Summary

EBMapps

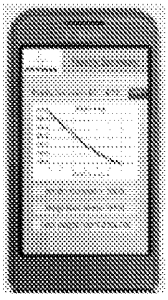
- When you input your last meal of the day, the screen to the right will be displayed.
- This provides a summary of what you ate over the day.
- The summary also provides you an overview of your calories consumed and used, as well as projected weekly weight loss based on that day.



Weekly Summary-1

EBMapps

- When you input your weight to start a new week, your weekly summary will appear (right).
- It compares your weight to the past week and provides a graph of your weight over a several week period.
- It also provides total weight loss in pounds and as a percent of your initial body mass. Your target is a weight loss of at least 7%!
- Selecting the blue arrow at the top takes you to additional weekly summary information.



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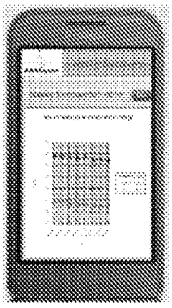
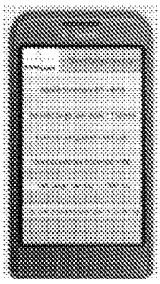


Weekly Summary-2

EBMapps

- The second page of your weekly summary will pop up (right).
- It provides a summary of how the exercise phase of your program went for the week.
- It provides exercise minutes completed compared to your target. It also computes calories burned for the week through exercise.
- You may feel that exercise doesn't impact your weight much. 700 calories is only 0.2 lb. It is pimportant to realize that exercise strongly reduces blood pressure. IT IS AN ESSENTIAL COMPONENT!



1. A computer system for use by a user with hypertension or pre-hypertension, comprising

a. a computer;

b. a user interface operating on the computer, the user interface having a display screen and keyboard for text input;

c. a records management database stored in a non-volatile electronic medium operatively coupled to the computer;

d. a data management application coupled to the user interface and running on the computer;

wherein the records management database comprises data relevant to hypertension, and the user enters relevant data into the records management database via the user interface;

wherein the data management application is programmed to process data in the records management database and deliver pre-programmed messages to the patient in real time; and

wherein the messages and questions instruct or assist the user in real time to make lifestyle choices intended to reduce hypertension.

2. The system of claim **1**, wherein the data relevant to hypertension comprises medical data about the patient, selected from blood pressure measurements, heart rate measurements, body weight measurements, body dimension measurements, exercise quantity, potassium intake, and salt intake, and combinations thereof.

3. The system of claim **1**, wherein the data relevant to hypertension comprises dietary information of foods consumed by the user.

4. The system of claim **1**, wherein the user interface operates on a platform selected from a website, a smartphone, a tablet computer, a desktop or laptop computer, and a wearable computer.

5. A computer-implemented method for reducing blood pressure in a patient with hypertension or prehypertension comprising

a. providing a computer application having a user interface, wherein the computer application stores data in one or more databases in computer memory;

b. providing a records management database stored in a non-volatile electronic medium operatively coupled to the computer;

c. providing a data management application coupled to the user interface and running on a computer;

d. receiving patient data into one or more of the databases, wherein the data comprises medical parameters relevant to hypertension;

e. querying the patient via the user interface on a routine basis regarding lifestyle factors that affect blood pressure, and receiving responses in real time from the patient that are stored in one or more of the databases; and

f. providing automated suggestions on a routine basis and in real time to the patient on lifestyle choices, that if followed by the patient, are expected to reduce blood pressure in the patient.

6. The method of claim **5**, wherein the computer application is an application running on a mobile device, a desktop or laptop-type computer, or a website.

7. The method of claim **5**, wherein the queries via the user interface on a routine basis are provided to the patient at least three times per day.

8. The method of claim **5**, wherein the queries via the user interface on a routine basis are provided to the patient at least five times per day.

9. The method of claim **5**, wherein the automated suggestions provided on a routine basis are provided at least three times per day.

10. The method of claim **5**, wherein the automated suggestions provided on a routine basis are provided at least five times per day.

11. The method of claim **5**, further comprising providing a summary of the patient's historic medical data for review by the patient.

12. The summary of claim **11**, wherein the historic medical data comprises body weight and/or blood pressure data.

13. The method of claim **5**, wherein a clinical supervisor monitors the progress of the patient.

14. The method of claim **5**, further comprising querying the records management database to obtain a question relating to hypertension, wherein the question presented is based on data entered by the patient into the records management database.

15. The method of claim **5**, further comprising presenting summary data to the patient at regular intervals, wherein the data relates to factors related to hypertension, and optionally include data entered by the patient into the RMDB.

16. The method of claim **5**, wherein a set of multiple-choice questions is presented periodically to the patient via the user interface, wherein the questions are directed to lifestyle choices that affect hypertension, and wherein the patient is prompted to answer each multiple-choice question, and the answers are stored in the records management database.

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摘要(译)

公开了一种计算机系统和方法，作为患有高血压或高血压前期患者的支持结构，以促进生活方式的改变，从而导致饮食控制，增加运动和血压控制。该方法包括实时传递的自动消息和响应，以鼓励患者采取适当的行动。提供日记特征用于各种相关参数的用户输入，例如食物消耗，锻炼活动，体重，血压和心率。计算机系统和方法可以在移动计算设备上实现，例如智能电话或可穿戴设备，传统的个人计算机或网络服务。大多数功能将在移动设备上提供，但是一些内务和数据可视化功能可能限于个人计算机或web服务实现。