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(54) **APPARATUS, SYSTEM, AND METHOD FOR MANAGING ADHERENCE TO A REGIMEN**

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CPC ***G06F 19/3418*** (2013.01); ***G06F 19/3456*** (2013.01); ***G06F 19/3487*** (2013.01)

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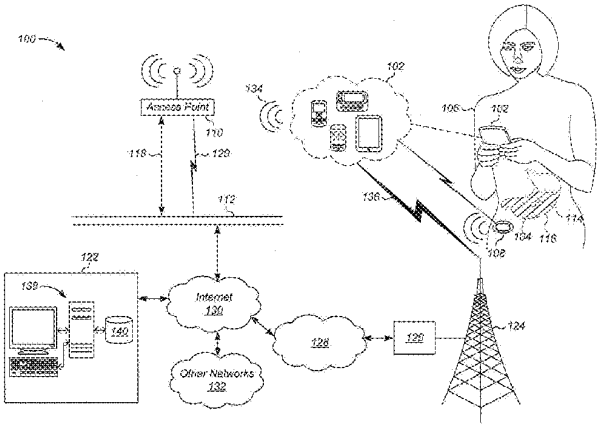
(57) **ABSTRACT**

A method of managing adherence to a regimen in a subscription based computer implemented healthcare information environment. The method includes receiving at a mobile device information from a receiver that a dose was ingested by a living subject. The mobile device comprises a processor, a memory and a display coupled to the processor. The method provides wirelessly communicating the information over a wireless network to a backend computer processing system and receiving from the computer at the backend processing system a personal information stream characterizing behavior of the living subject based on the received information over a predetermined period. An apparatus includes an adherence package including a foldable sheet, at least one of blister pack coupled to the foldable sheet, at least one ingestible device associated with a dose, and a perforation provided on the foldable sheet to enable removal of the at the least one blister pack.

28 Claims, 52 Drawing Sheets
(48 of 52 Drawing Sheet(s) Filed in Color)



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WO	WO2008097652	8/2008
WO	WO2008101107	8/2008
WO	WO2008112577	9/2008
WO	WO2008112578	9/2008
WO	WO2008120156	10/2008
WO	WO2008133394	11/2008
WO	WO2008134185	11/2008
WO	WO2008150633	12/2008
WO	WO2009001108	12/2008
WO	WO2009006615	1/2009
WO	WO2009029453	3/2009
WO	WO2009036334	3/2009
WO	WO2009051829	4/2009
WO	WO2009051830	4/2009
WO	WO2009063377	5/2009
WO	WO2009081348	7/2009
WO	WO2009111664	9/2009
WO	WO2009146082	12/2009
WO	WO2010000085	1/2010
WO	WO2010009100	1/2010
WO	WO2010011833	1/2010
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WO	WO2010057049	5/2010
WO	WO2010075115	7/2010
WO	WO2010080765	7/2010
WO	WO2010080843	7/2010
WO	WO2010107563	9/2010
WO	WO2010115194	10/2010
WO	WO2010132331	11/2010
WO	WO2010135516	11/2010
WO	WO2011068963	6/2011
WO	WO2011133799	10/2011
WO	WO2011159336	12/2011
WO	WO2011159337	12/2011
WO	WO2011159338	12/2011
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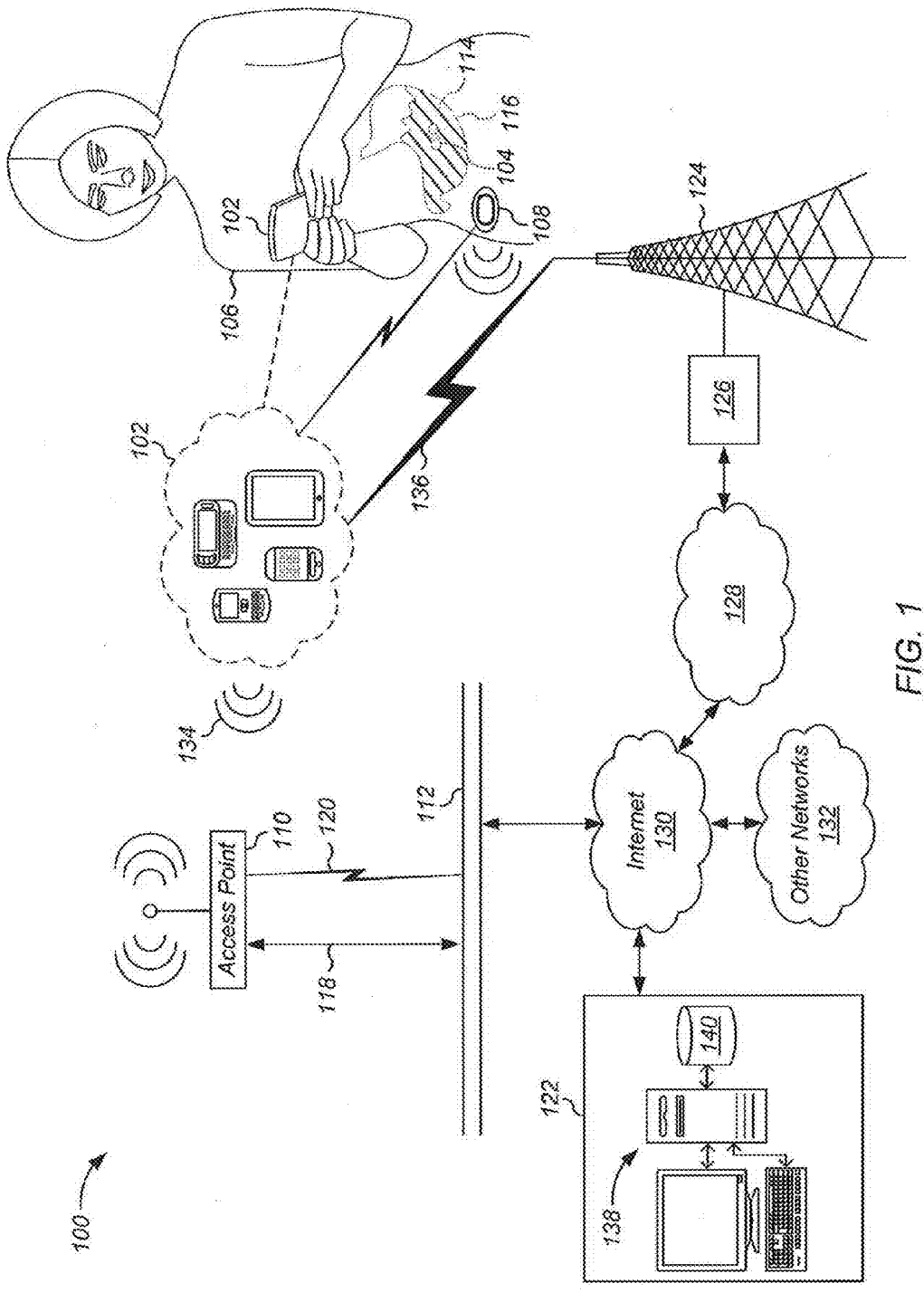

100
102
104
106
108
110
112
114
116
118
120
122
124
126
128
130
132
134
136
138
140
Access Point
Internet
Other Networks

FIG. 1

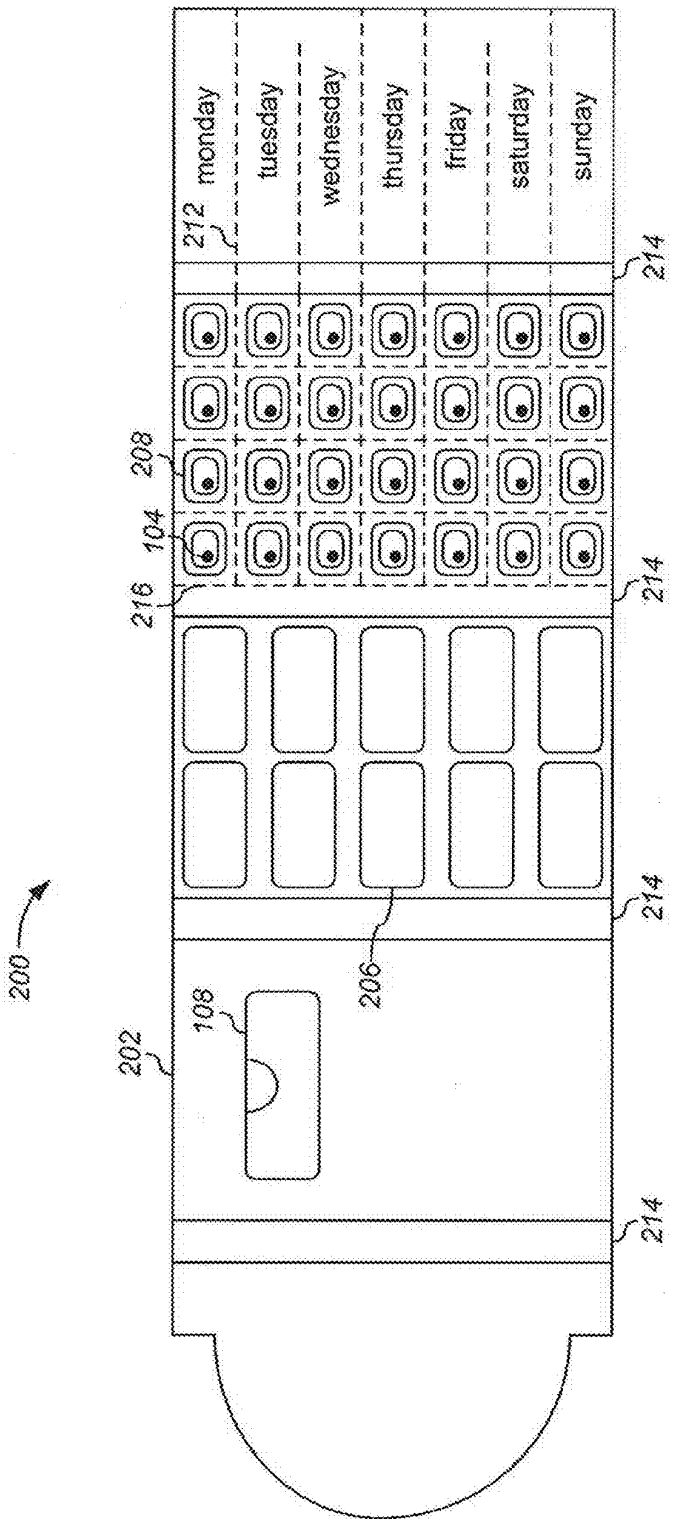

monday
tuesday
wednesday
thursday
friday
saturday
sunday
212
214
208
104
216
214
214
206
214
200
202
108

FIG. 2

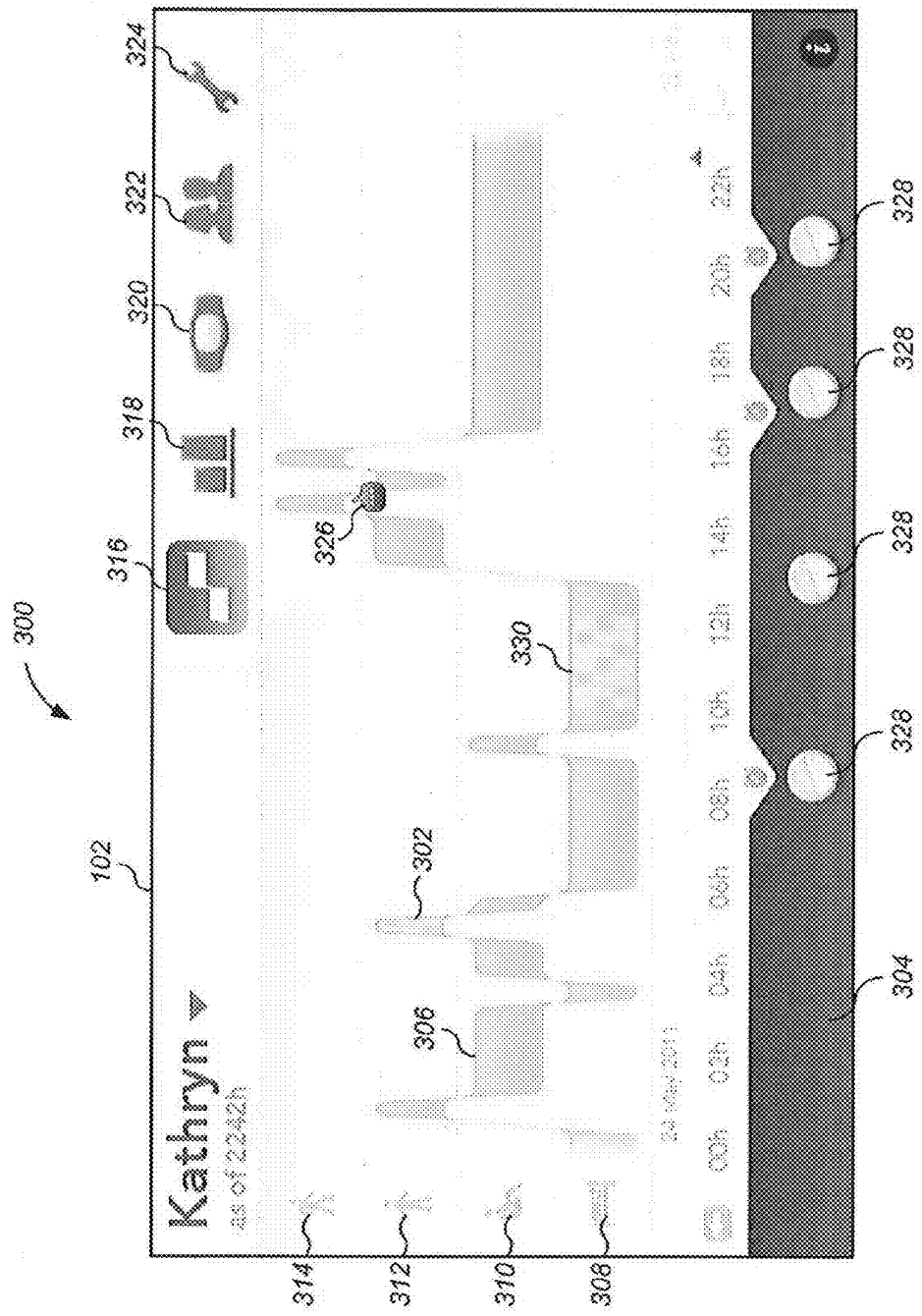

300
102
316
318
320
322
324
326
328
328
328
328
304
Kathryn
as of 2242h
302
306
330
314
312
310
308
00h
02h
04h
06h
10h
12h
14h
16h
18h
20h
22h

FIG. 3

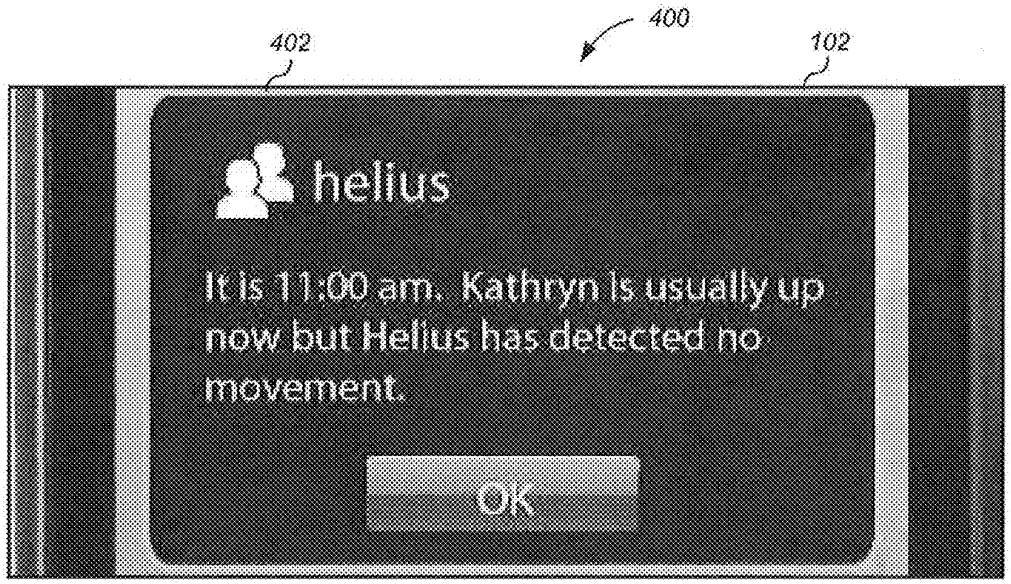

400
402
102
helius
It is 11:00 am. Kathryn is usually up now but Helius has detected no movement.
OK

FIG. 4

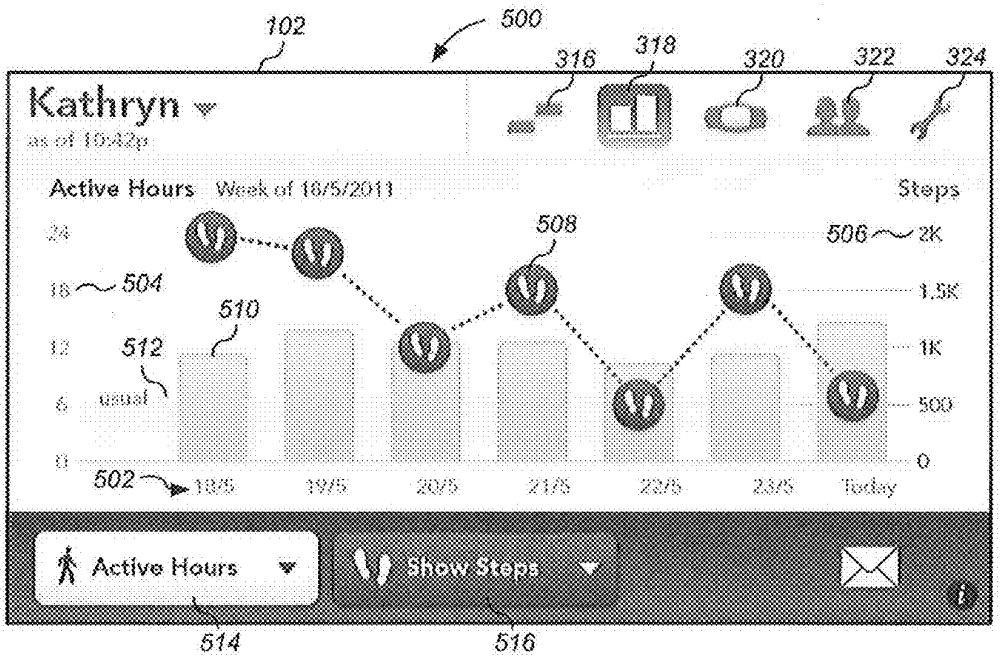

102
500
316
318
320
322
324
Kathryn
as of 10:42p
Active Hours
Week of 16/5/2011
Steps
24
18
504
12
6
usual
0
502
510
512
508
506
2K
1.5K
1K
500
0
18/5
19/5
20/5
21/5
22/5
23/5
Today
Active Hours
Show Steps
514
516

FIG. 5

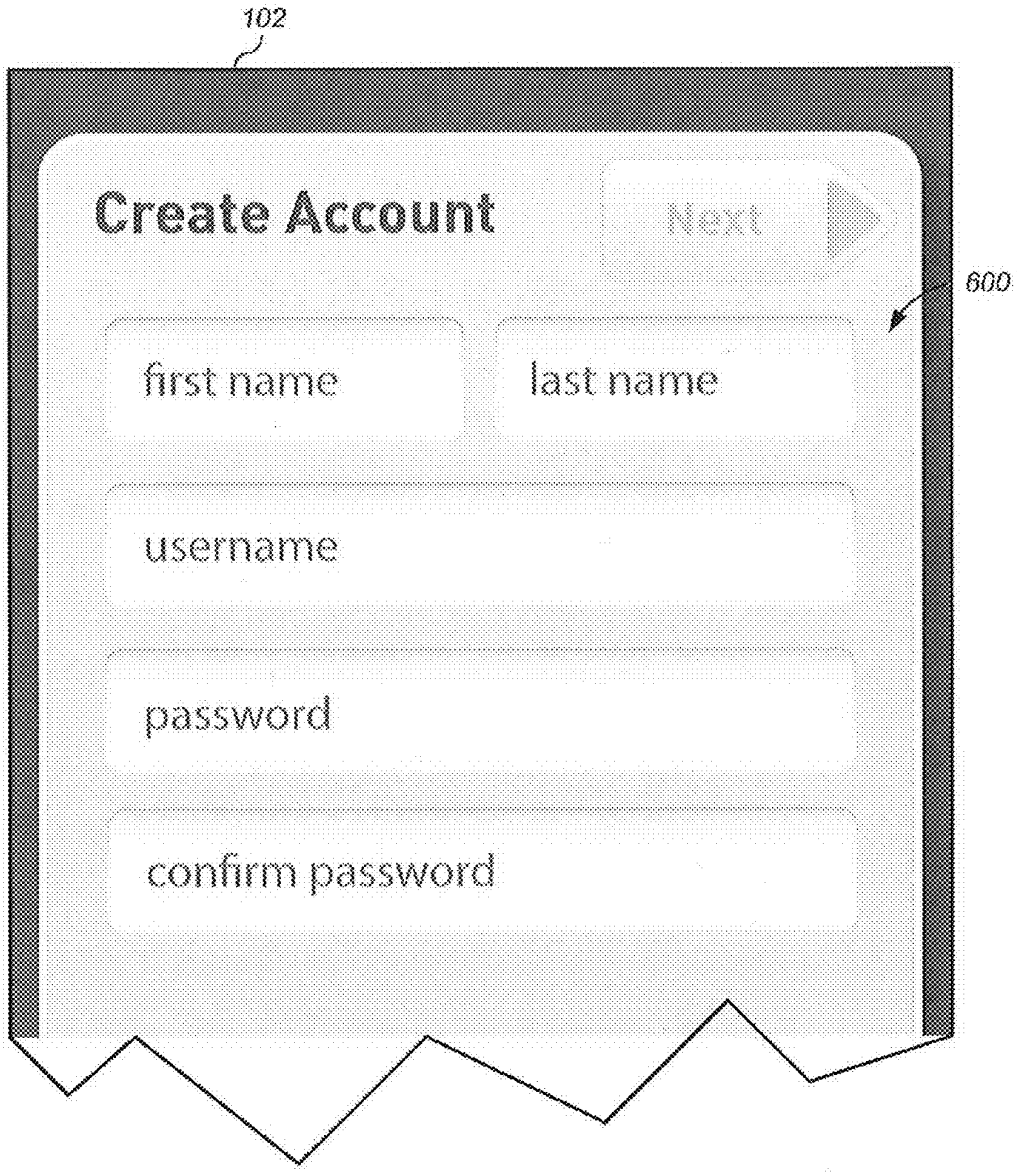

102
Create Account
Next
600
first name
last name
username
password
confirm password

FIG. 6

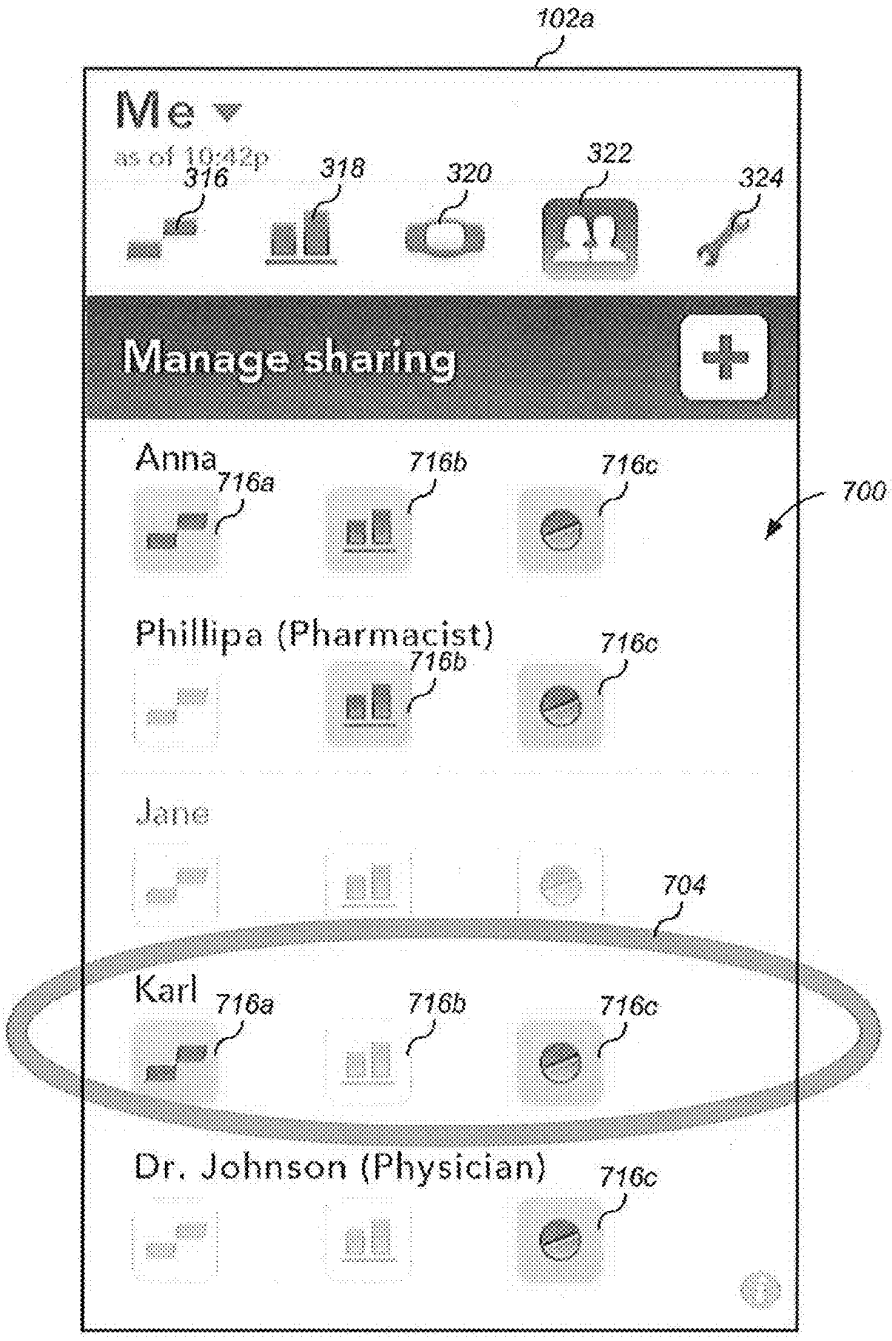

102a
Me
as of 10:42p
316
318
320
322
324
Manage sharing
Anna
716a
716b
716c
700
Phillipa (Pharmacist)
716b
716c
Jane
704
Karl
716a
716b
716c
Dr. Johnson (Physician)
716c

FIG. 7

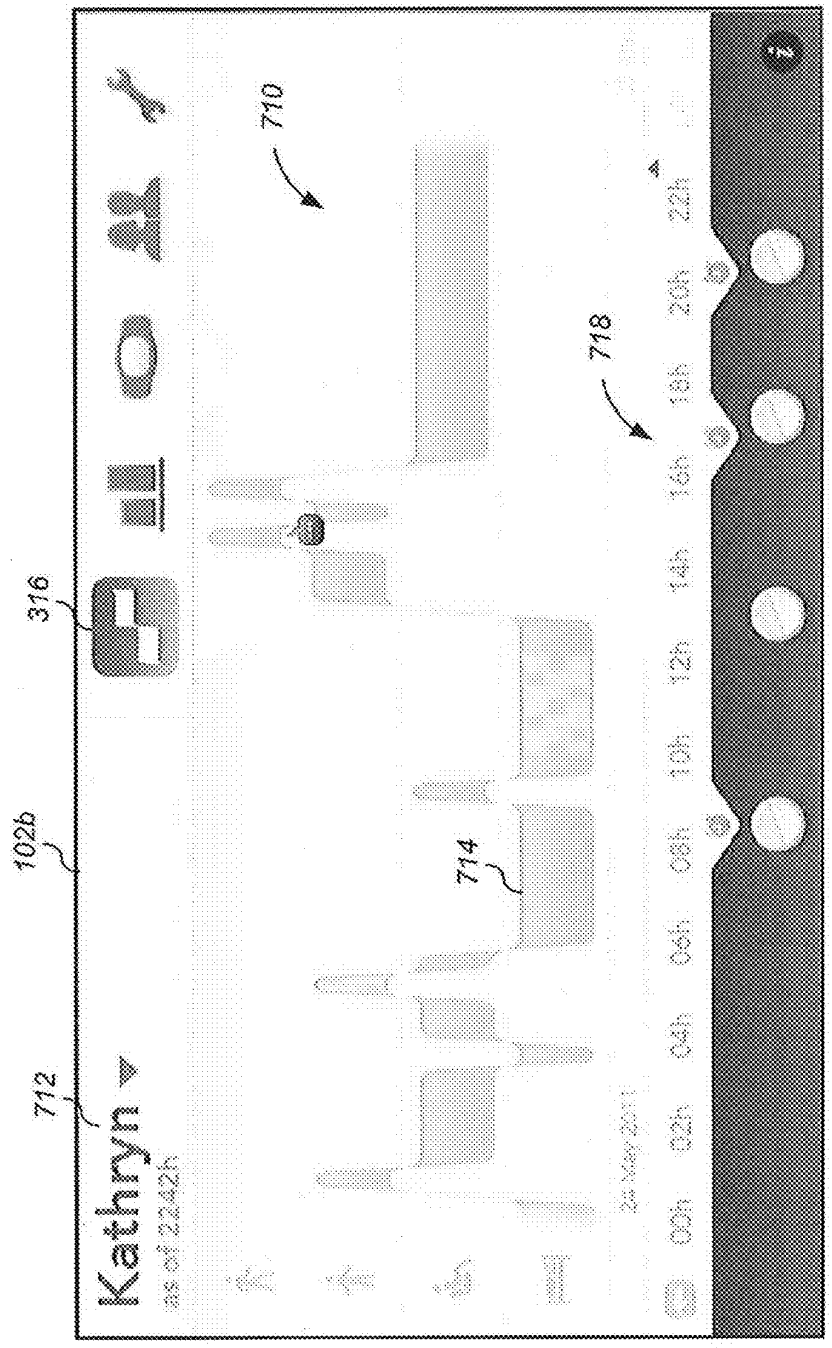

712
102b
316
710
714
718
Kathryn
as of 22:42h
00h
02h
04h
06h
08h
10h
12h
14h
16h
18h
20h
22h

FIG. 8

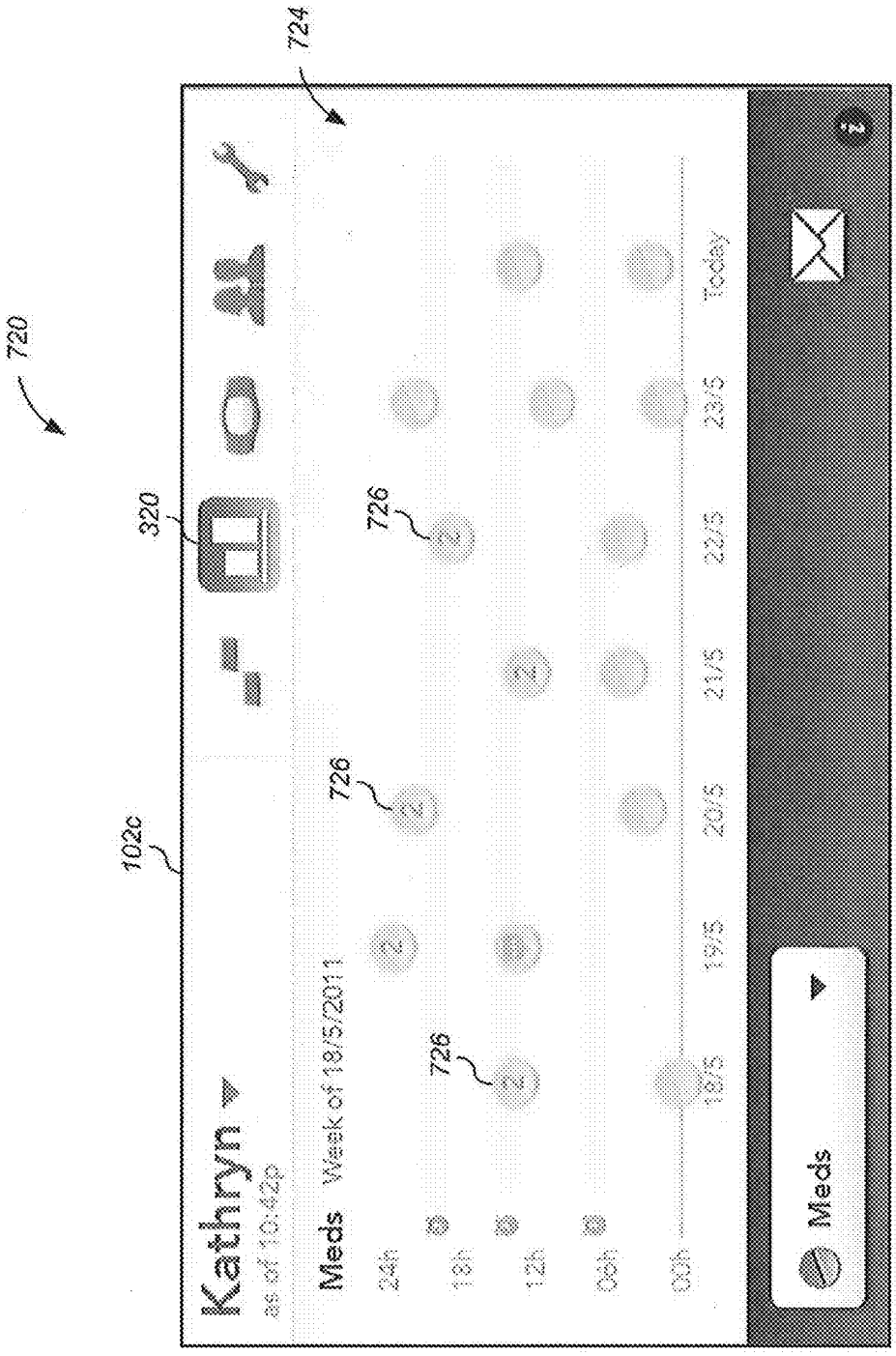

720
724
320
726
102c
Kathryn
as of 10:42p
Meds
Week of 18/5/2011
24h
18h
12h
6h
0h
18/5
19/5
20/5
21/5
22/5
23/5
Today
Meds

FIG. 9

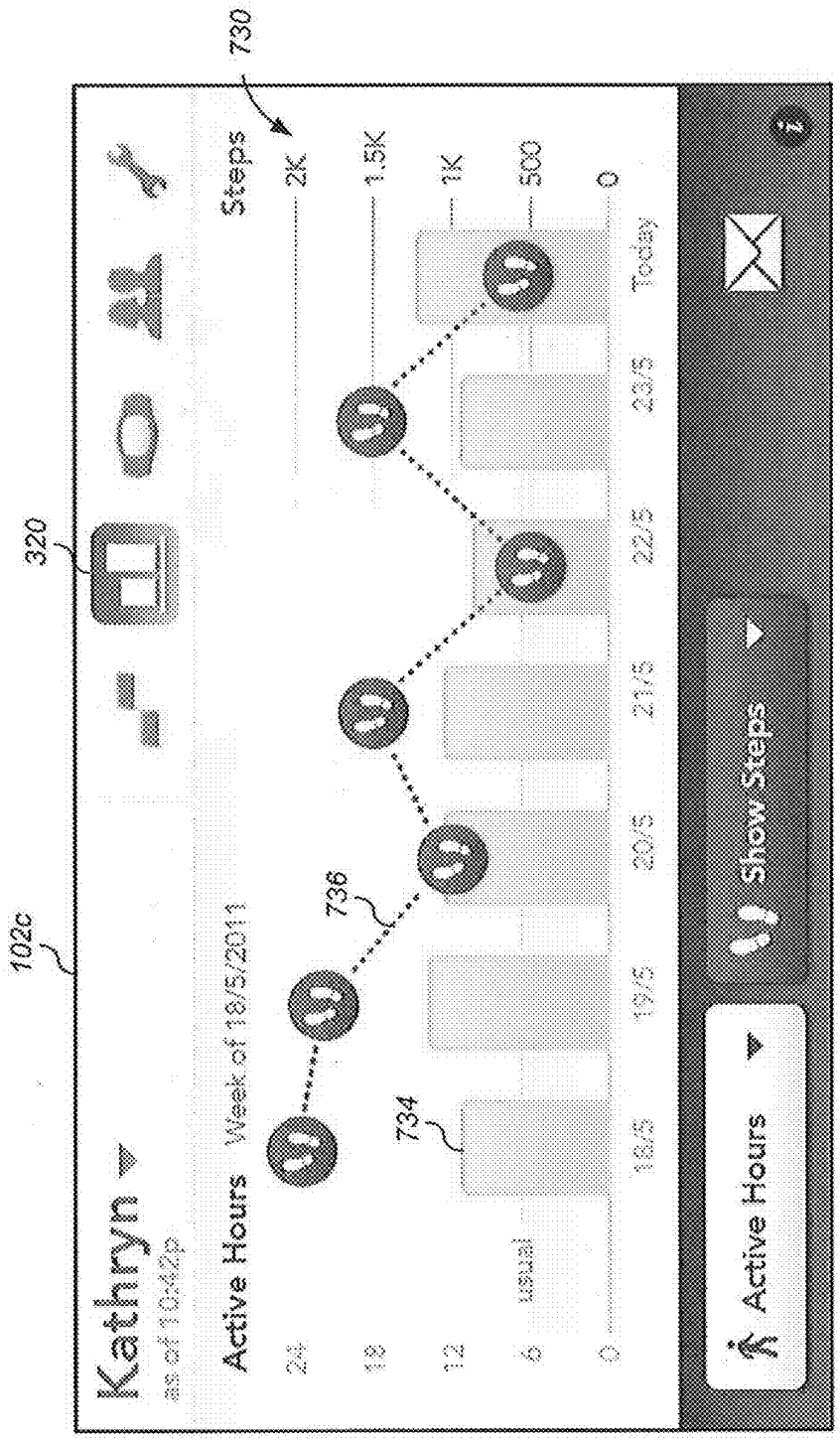

730
320
102c
Kathryn
as of 10:42p
Active Hours
Week of 18/5/2011
Steps
2K
1.5K
1K
500
0
24
18
12
6
0
usual
734
736
18/5
19/5
20/5
21/5
22/5
23/5
Today
Show Steps
Active Hours

FIG. 10

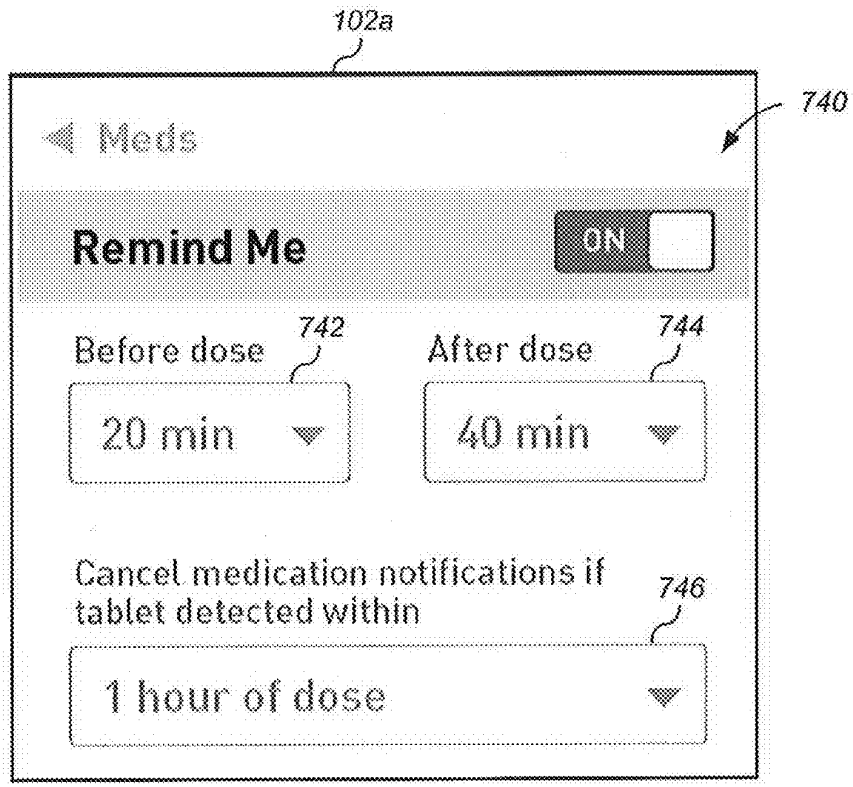

102a
740
Meds
Remind Me
ON
Before dose
742
20 min
After dose
744
40 min
Cancel medication notifications if tablet detected within
746
1 hour of dose

FIG. 11

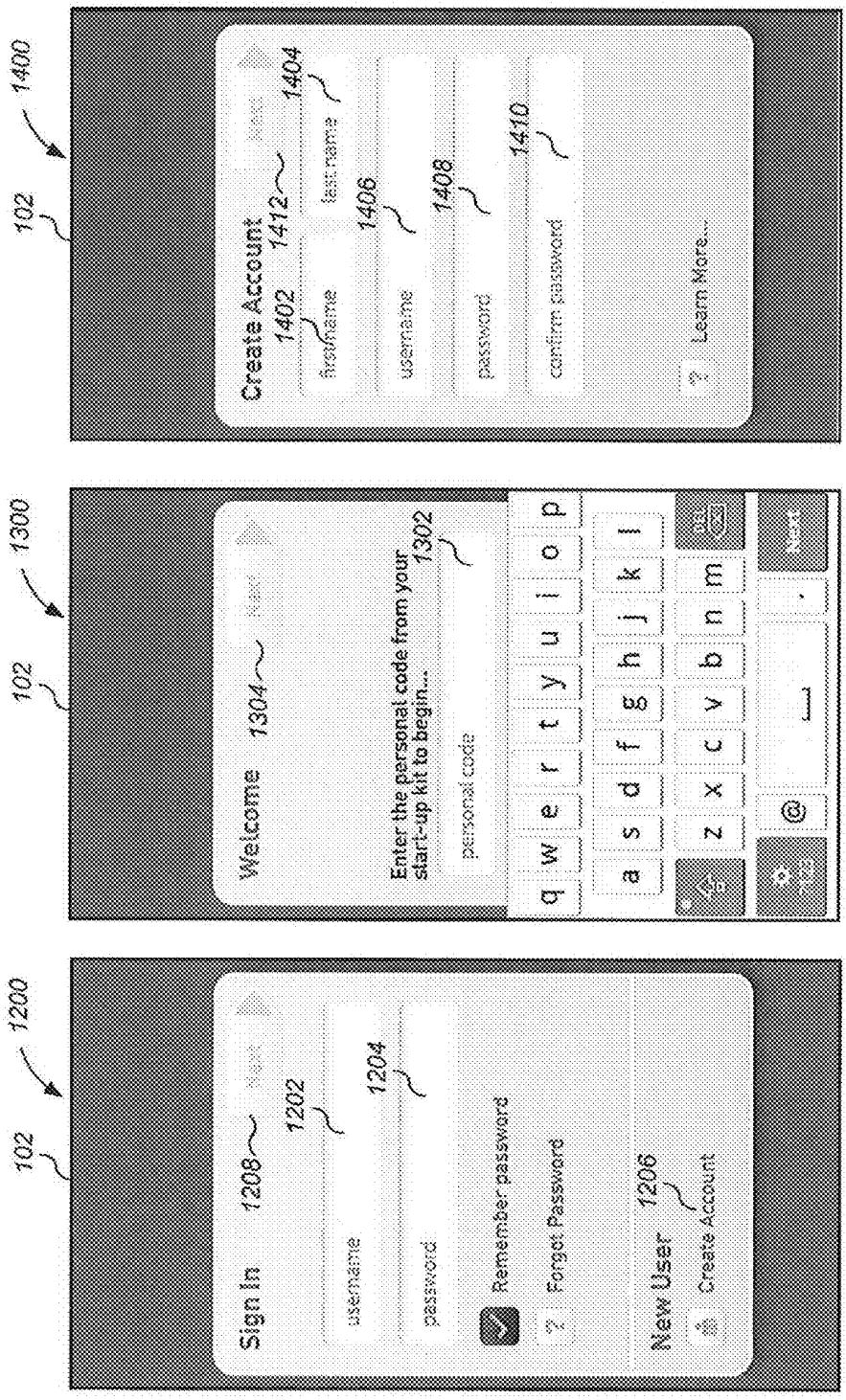


FIG. 12

FIG. 13

FIG. 14

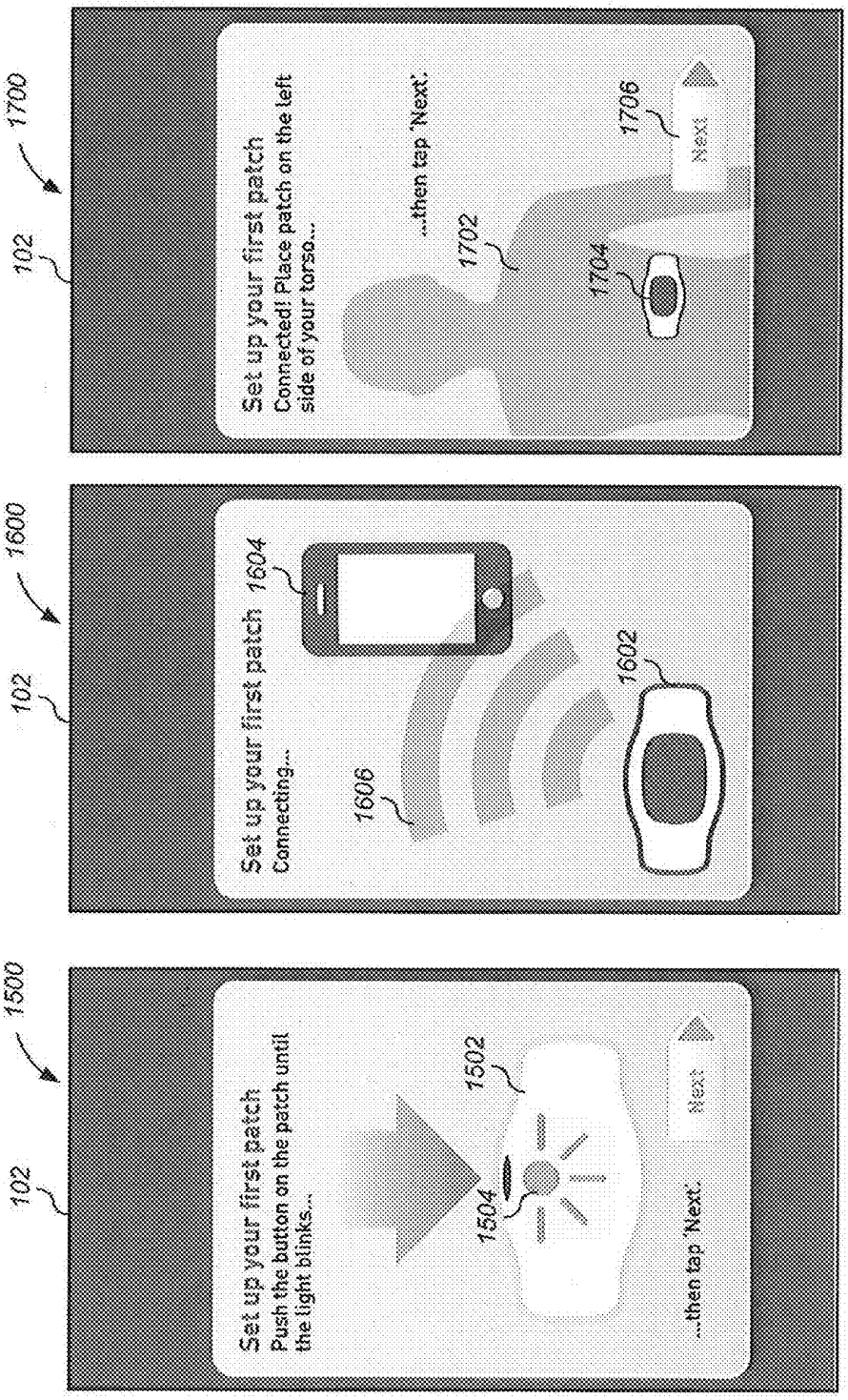


FIG. 15

FIG. 16

FIG. 17

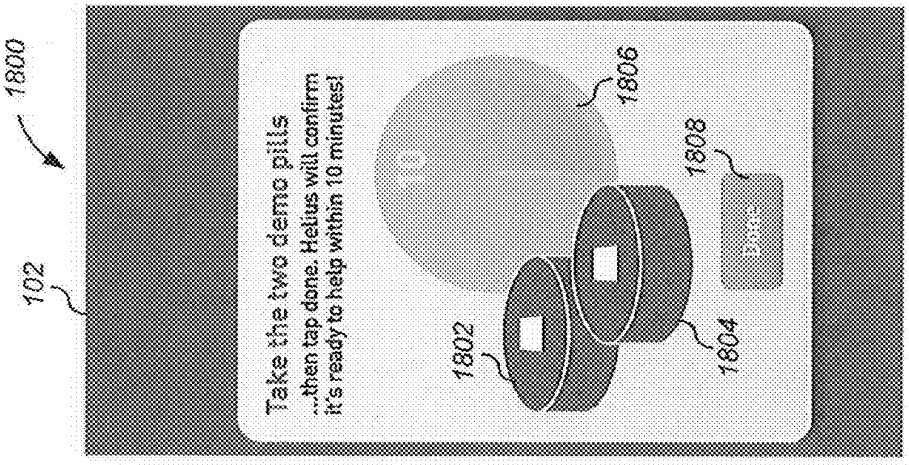


FIG. 18

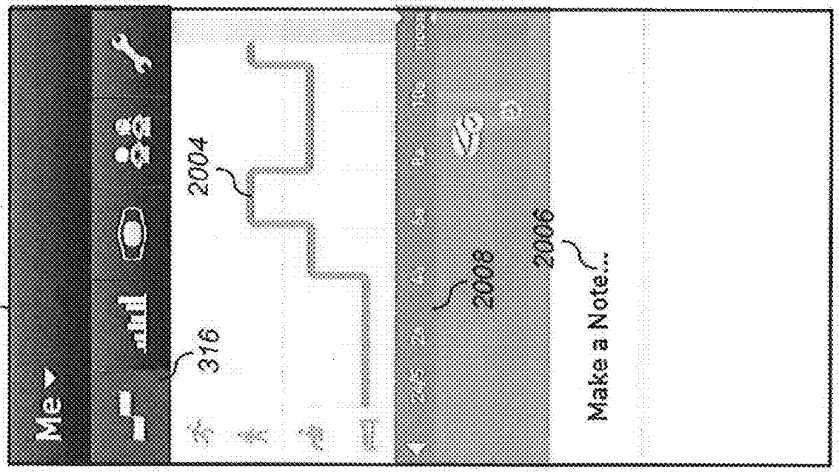


FIG. 20

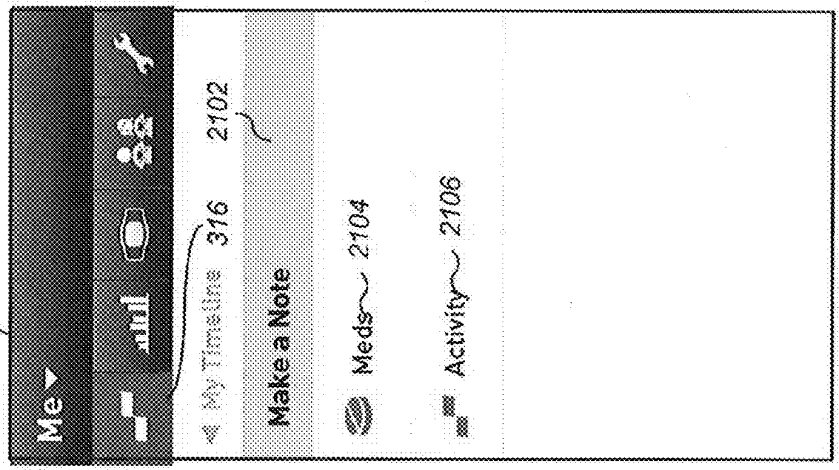


FIG. 21

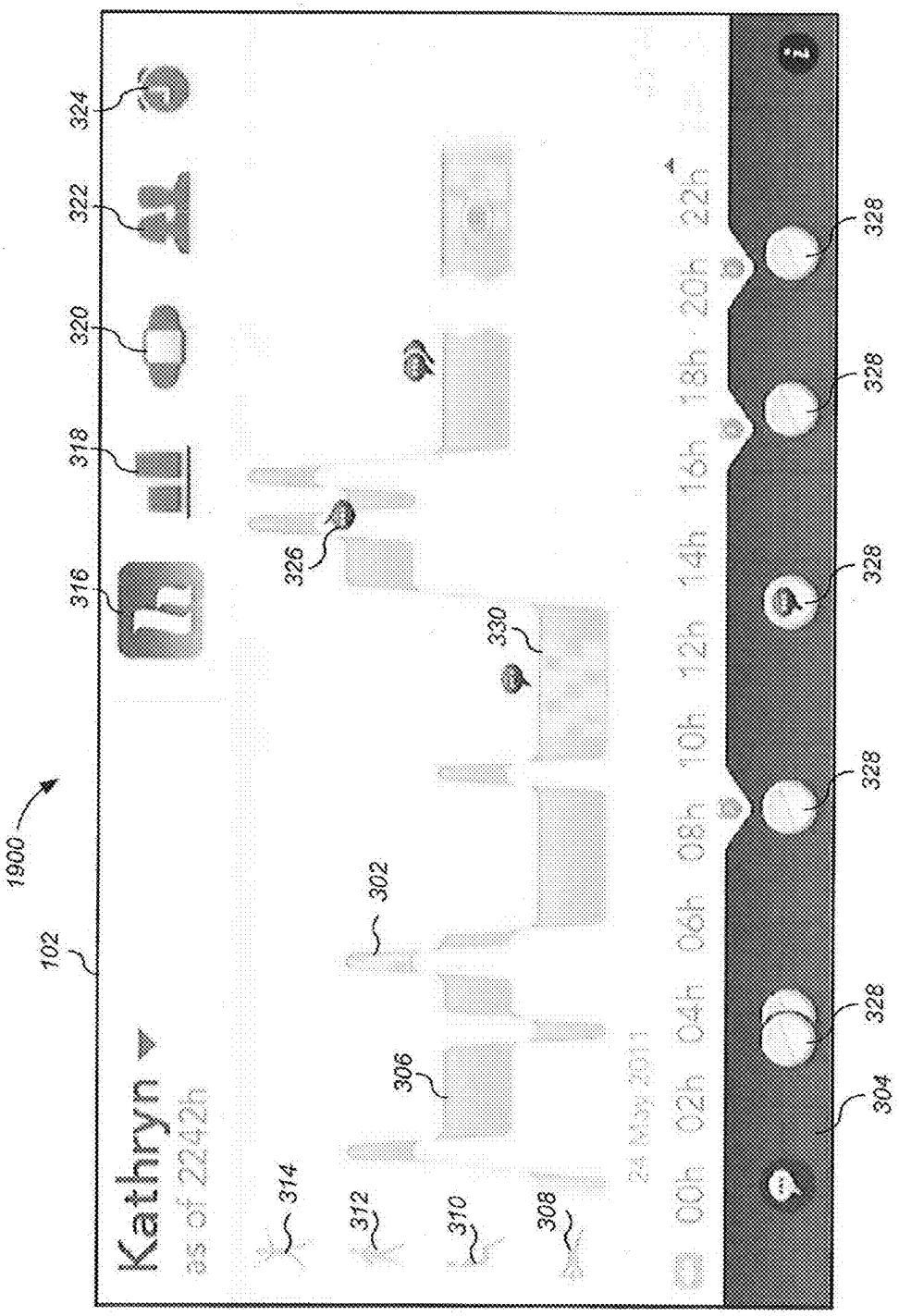

1900
102
Kathryn
as of 2242h
00h 02h 04h 06h 08h 10h 12h 14h 16h 18h 20h 22h
24 May 2011
302
304
306
308
310
312
314
316
318
320
322
324
326
328
330

FIG. 19

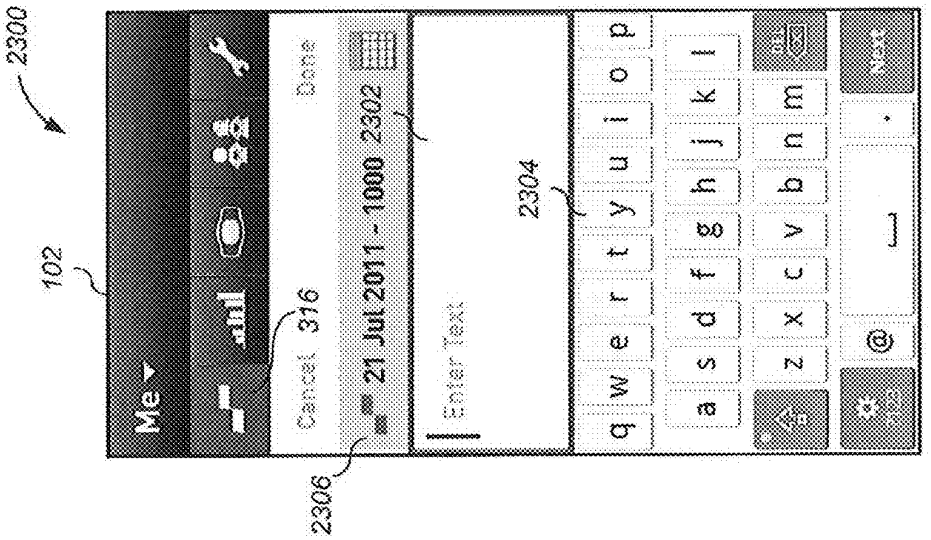

2300
102
Me
Cancel
316
Done
21 Jul 2011 - 1000
2302
2306
Enter Text
2304
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
@
.
Next

FIG. 23

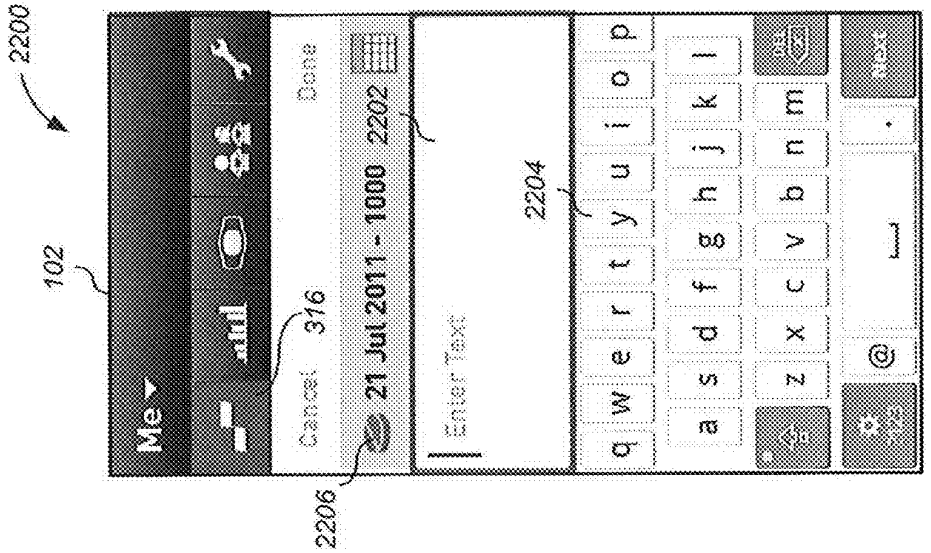

2200
102
Me
Cancel
316
Done
21 Jul 2011 - 1000
2202
2206
Enter Text
2204
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
@
.
Next

FIG. 22

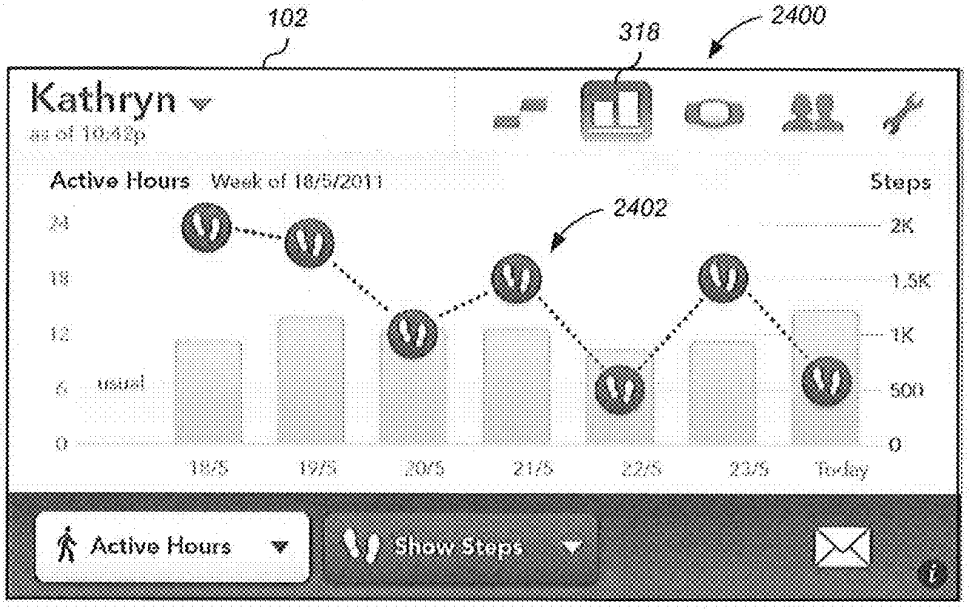

102
318
2400
Kathryn
as of 10:42p
Active Hours Week of 18/5/2011
Steps
2402
24
18
12
6
0
usual
2K
1.5K
1K
500
0
18/5
19/5
20/5
21/5
22/5
23/5
Today
Active Hours
Show Steps

FIG. 24

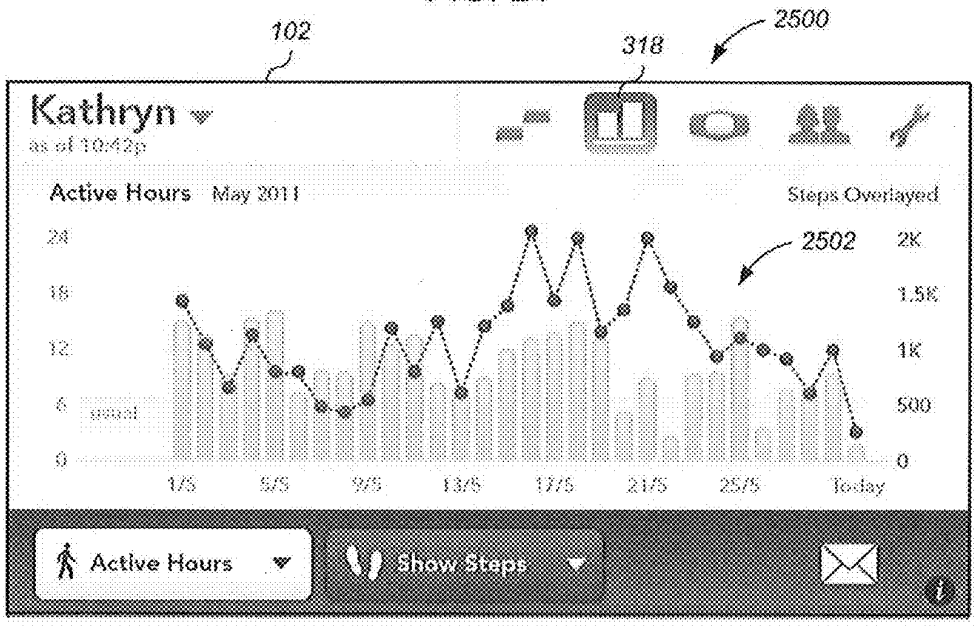

102
318
2500
Kathryn
as of 10:42p
Active Hours May 2011
Steps Overlayed
2502
24
18
12
6
0
usual
2K
1.5K
1K
500
0
1/5
5/5
9/5
13/5
17/5
21/5
25/5
Today
Active Hours
Show Steps

FIG. 25

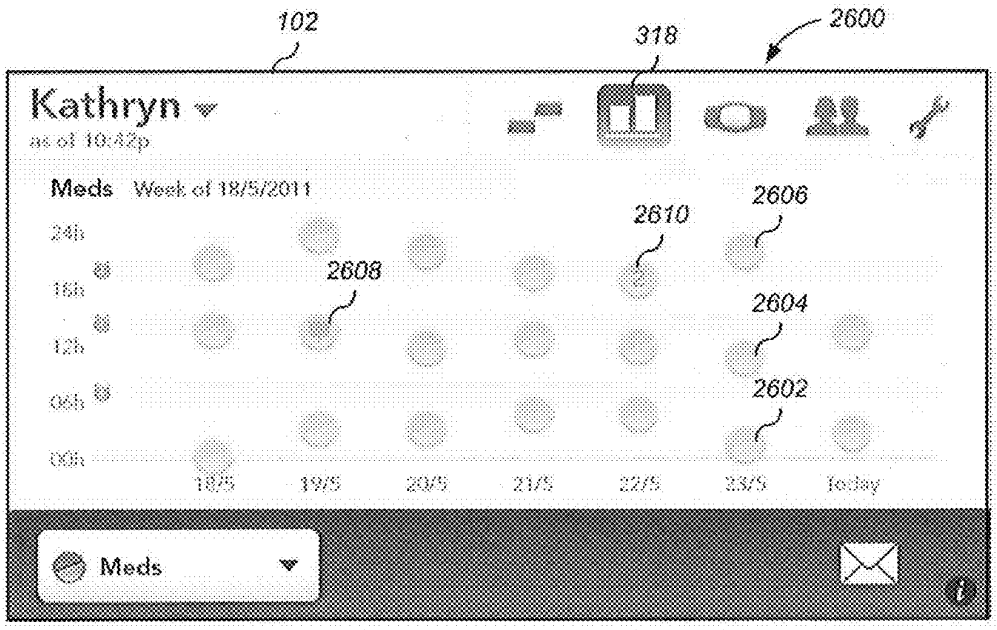

102
318
2600
Kathryn
as of 10:42p
Meds Week of 18/5/2011
2610
2606
2608
2604
2602
24h
16h
12h
06h
00h
18/5
19/5
20/5
21/5
22/5
23/5
Today
Meds

FIG. 26

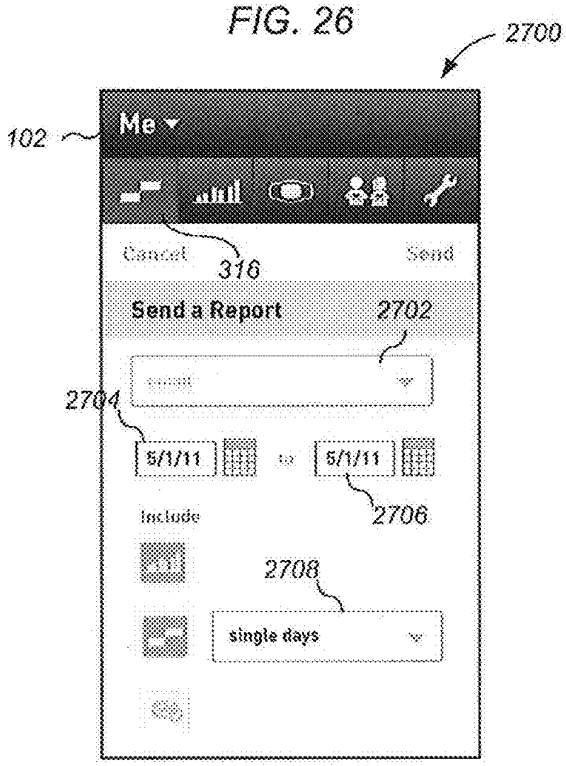

2700
102
Me
Cancel
316
Send
Send a Report
2702
2704
5/1/11
to
5/1/11
2706
Include
2708
single days

FIG. 27

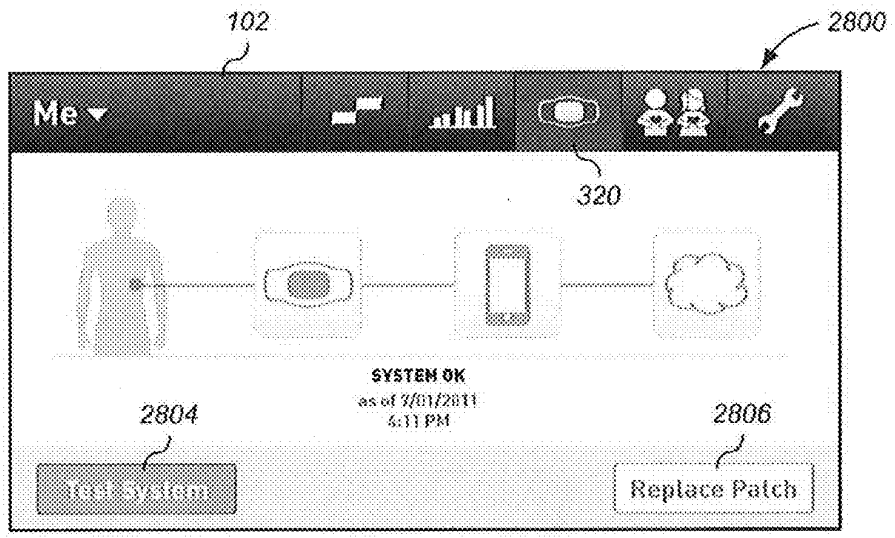

102
2800
Me
320
SYSTEM OK
2804
2806
Test System
Replace Patch

FIG. 28

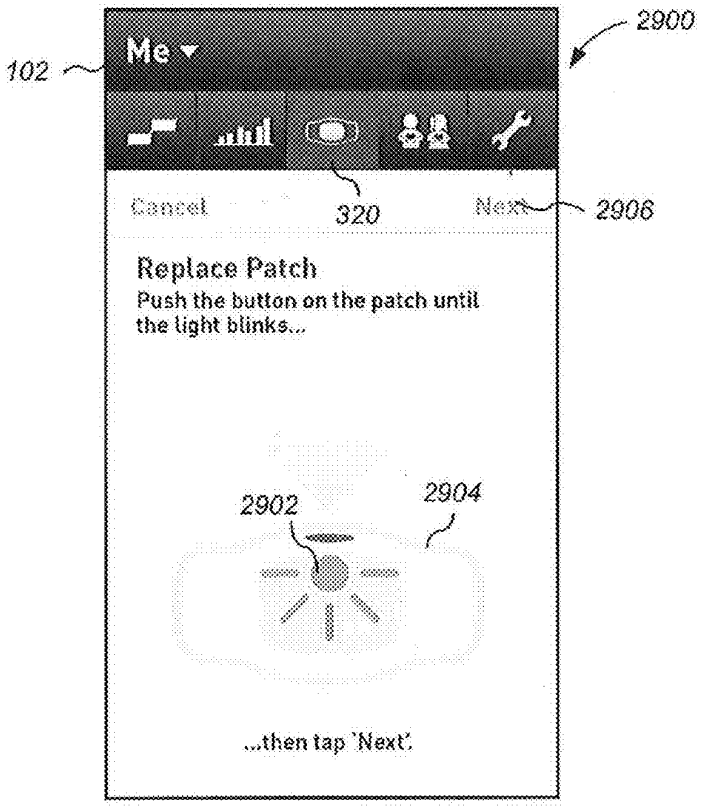

2900
102
Me
Cancel
320
Next
2906
Replace Patch
Push the button on the patch until the light blinks...
2902
2904
...then tap 'Next'.

FIG. 29

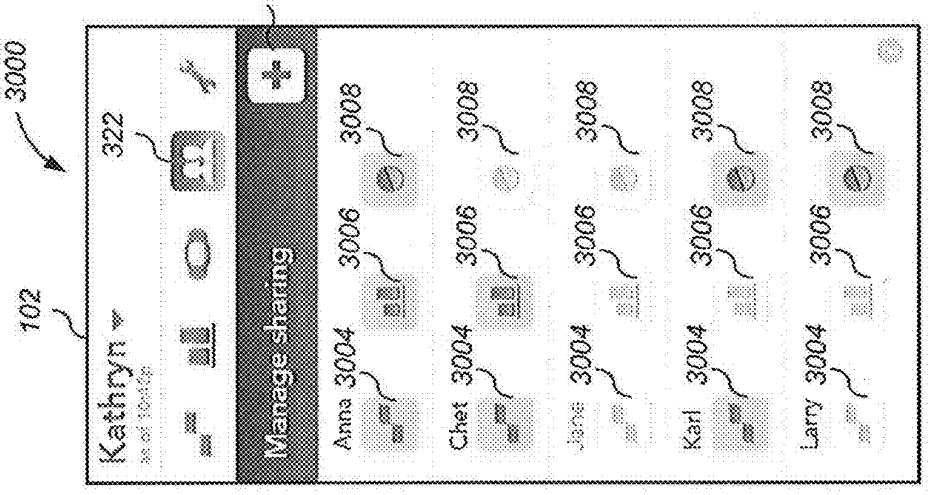

3000
102
Kathryn
322
Manage sharing
3010
Anna 3004
3006
3008
Chet 3004
3006
3008
Jane 3004
3006
3008
Karl 3004
3006
3008
Larry 3004
3006
3008

FIG. 30

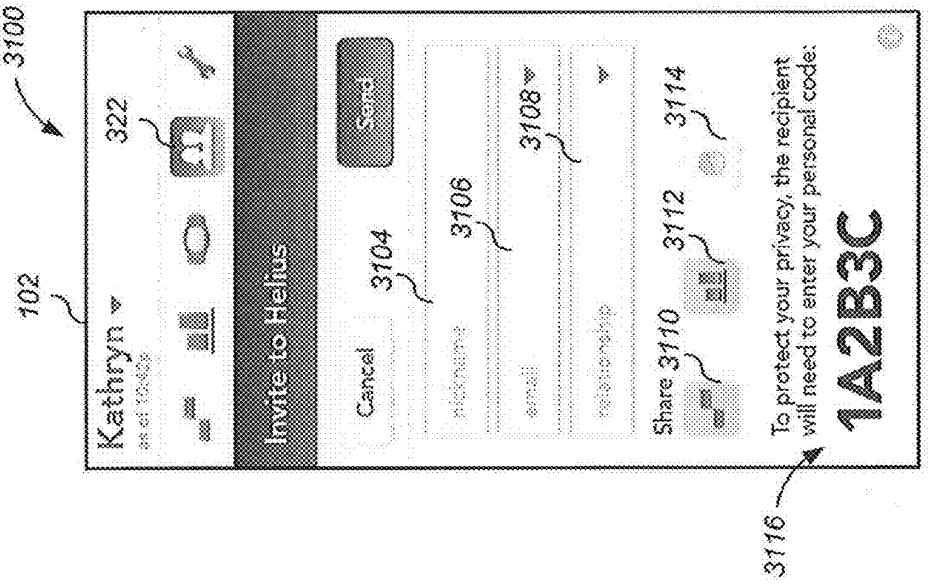

3100
102
Kathryn
322
Invite to Helius
Cancel
3104
Send
3106
3108
Share 3110
3112
3114
To protect your privacy, the recipient will need to enter your personal code:
1A2B3C
3116

FIG. 31

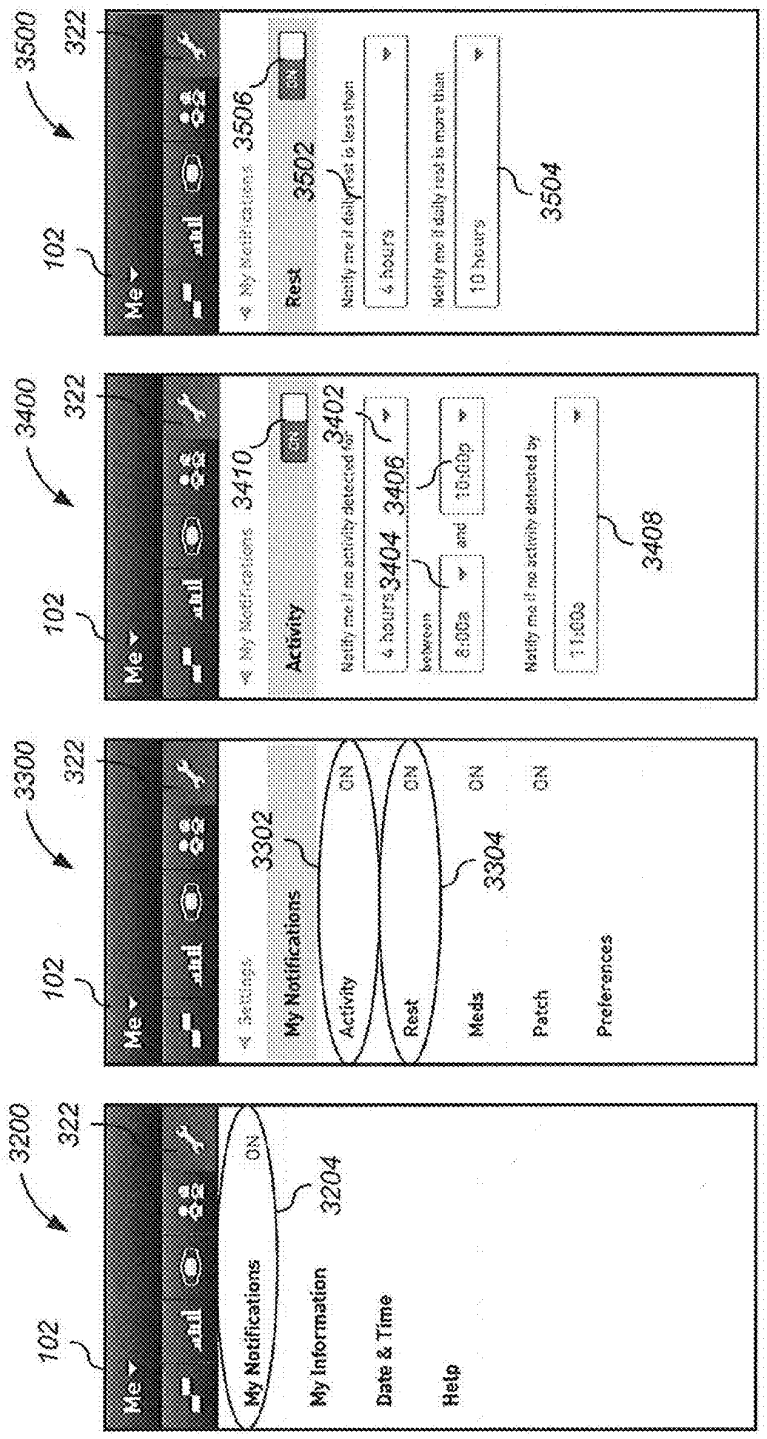


FIG. 32

FIG. 33

FIG. 34

FIG. 35

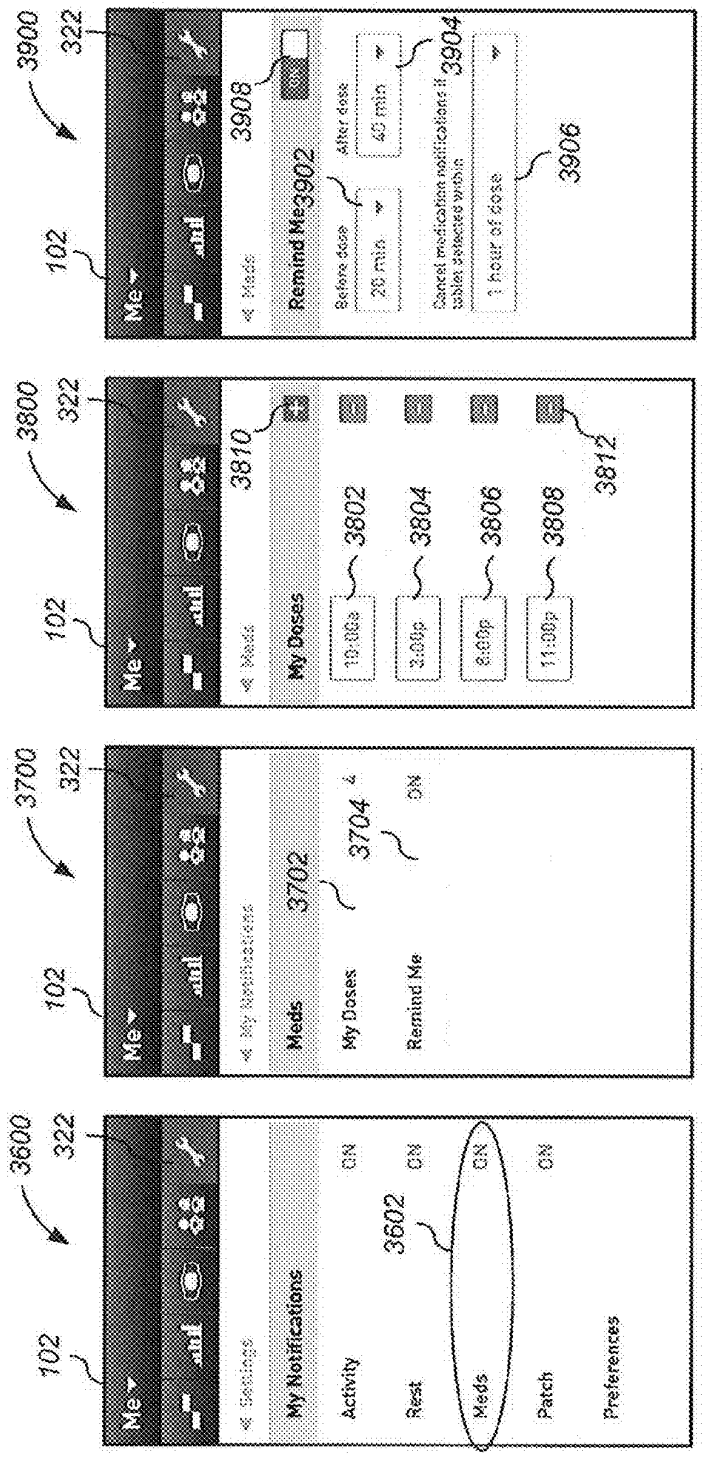


FIG. 36

FIG. 37

FIG. 38

FIG. 39

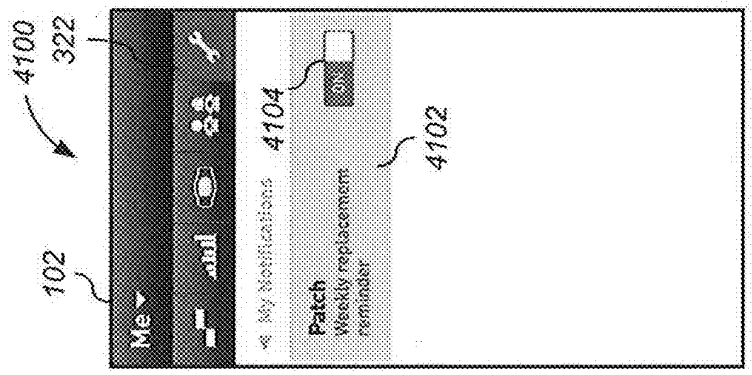

4100
322
102
Me
My Notifications
Patch
Weekly replacement reminder
ON
4104
4102

FIG. 41

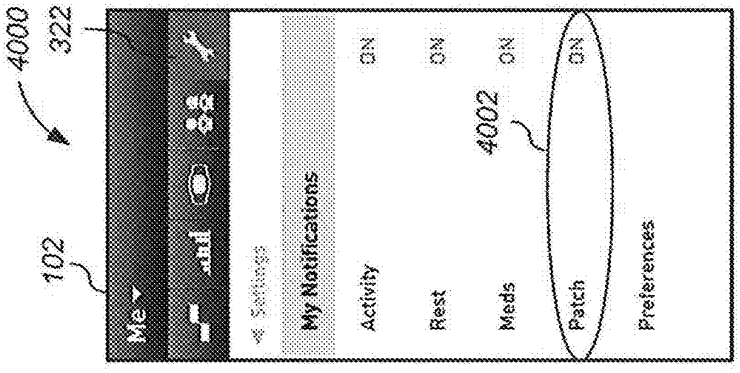

4000
322
102
Me
Settings
My Notifications
Activity
ON
Rest
ON
Meds
ON
Patch
ON
4002
Preferences

FIG. 40

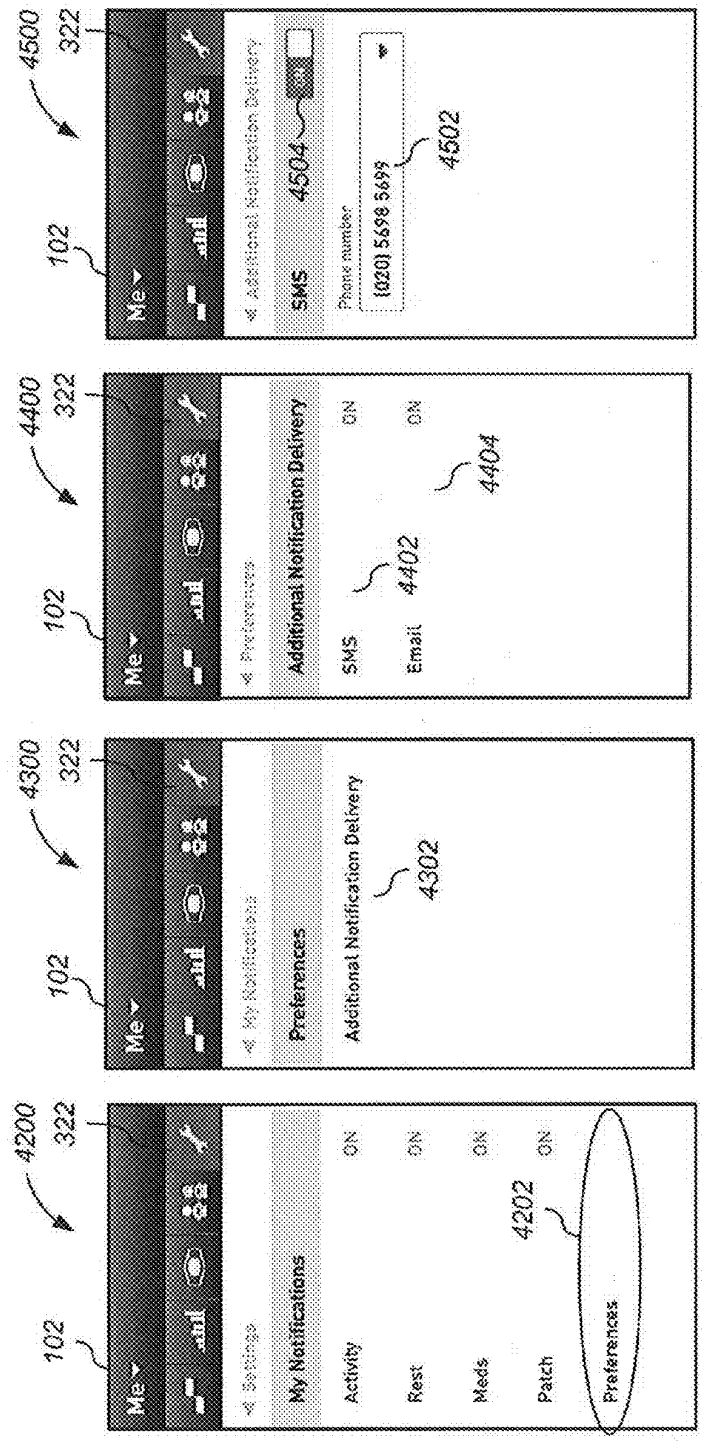


FIG. 42

FIG. 43

FIG. 44

FIG. 45

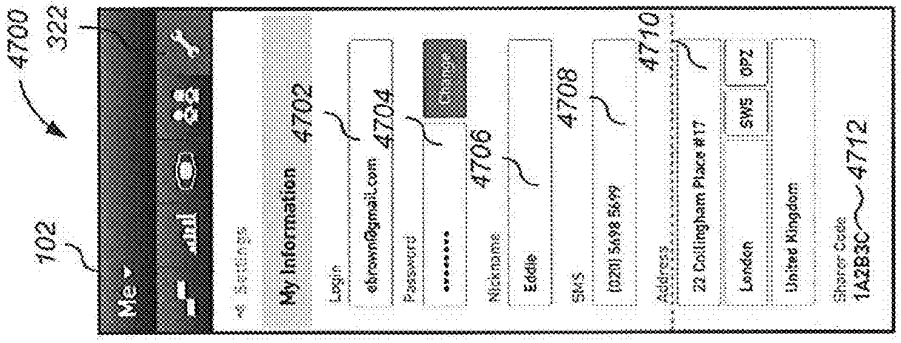

4700
322
102
Me
My Information
4702
Login
4704
Password
4706
Nickname
Eddie
4708
SMS
4710
Address
4712
1A2B3C

FIG. 47

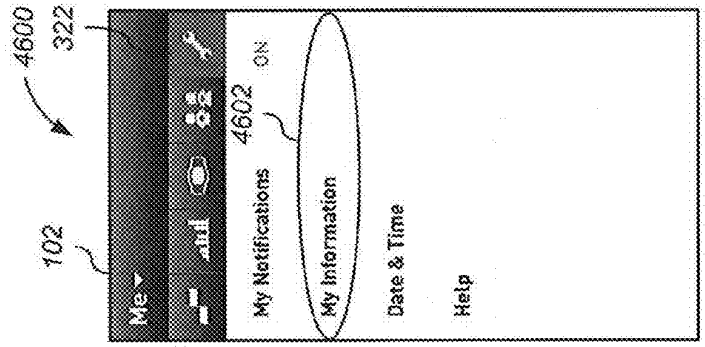

4600
322
102
Me
My Notifications
ON
4602
My Information
Date & Time
Help

FIG. 46

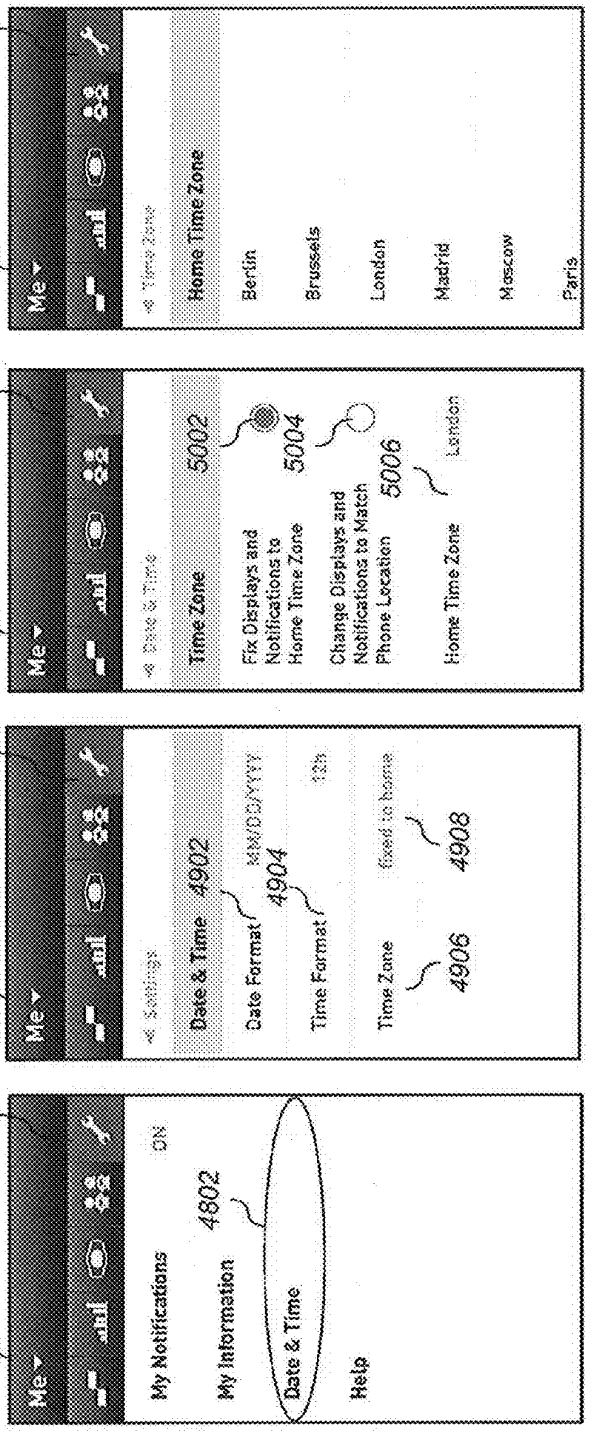


FIG. 48

FIG. 49

FIG. 50

FIG. 51

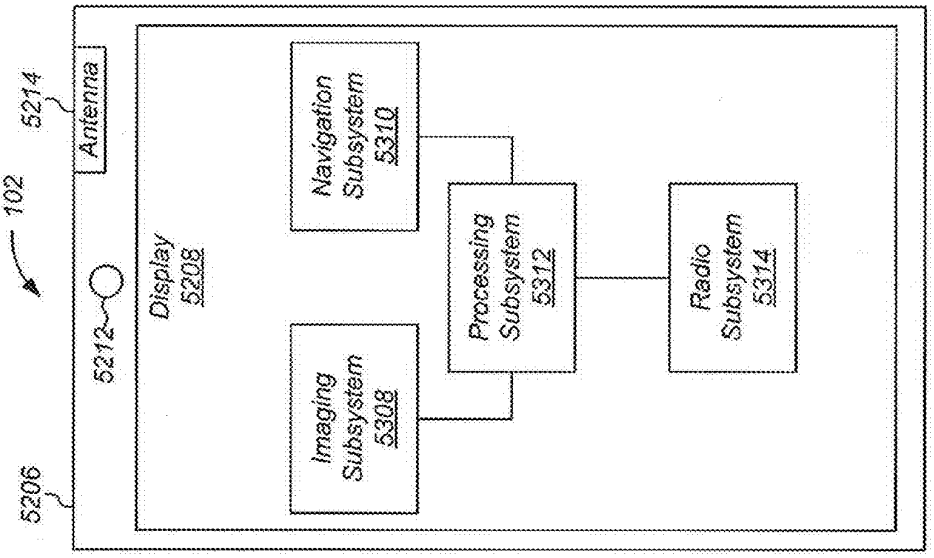

102
5214
Antenna
5212
Display
5208
5206
Navigation Subsystem 5310
Processing Subsystem 5312
Radio Subsystem 5314
Imaging Subsystem 5308

FIG. 53

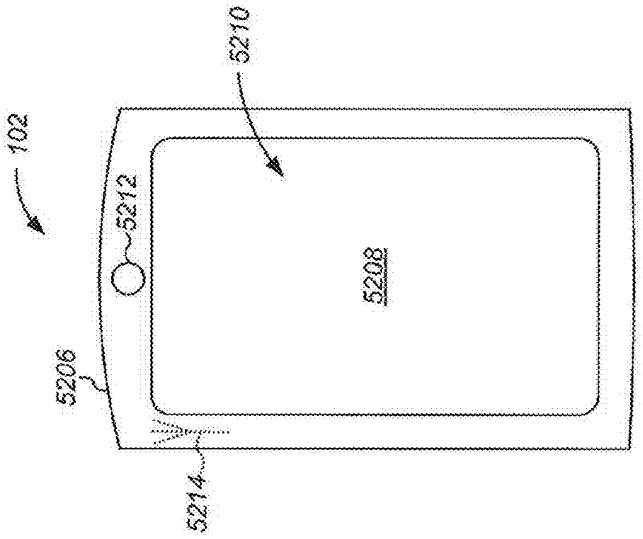

102
5210
5212
5208
5206
5214

FIG. 52

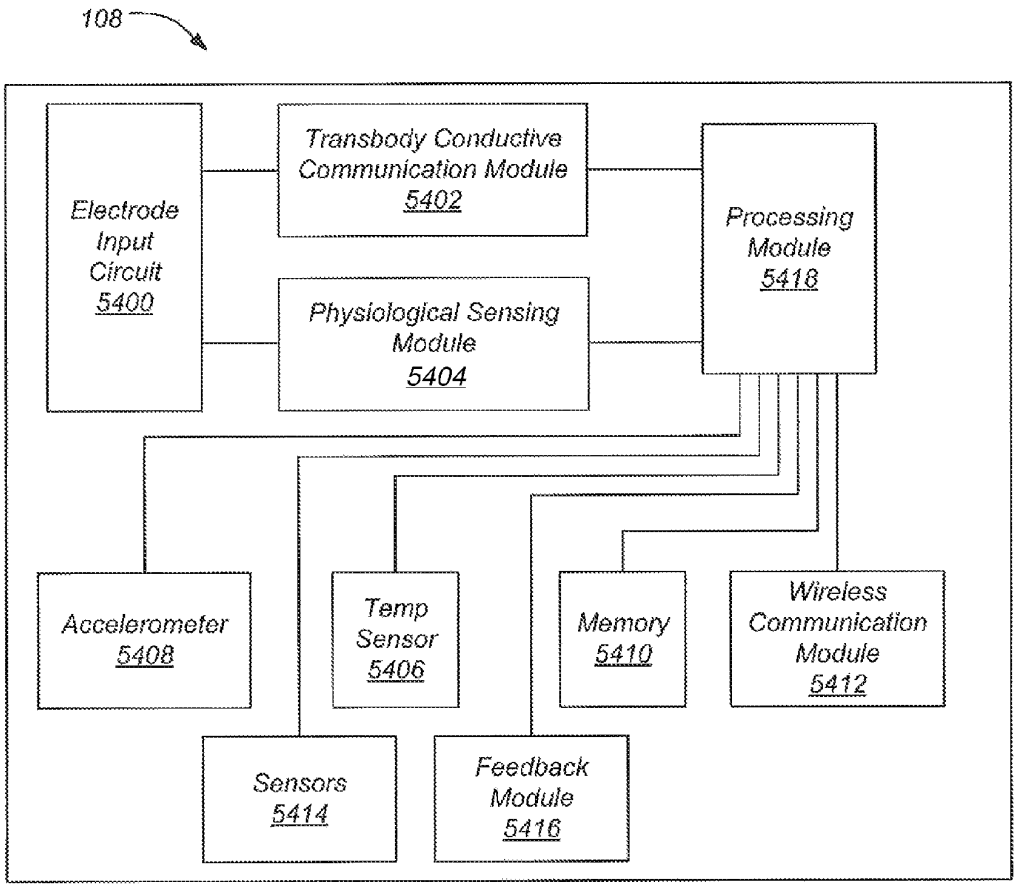

108
Electrode Input Circuit 5400
Transbody Conductive Communication Module 5402
Physiological Sensing Module 5404
Processing Module 5418
Accelerometer 5408
Temp Sensor 5406
Memory 5410
Wireless Communication Module 5412
Sensors 5414
Feedback Module 5416

FIG. 54

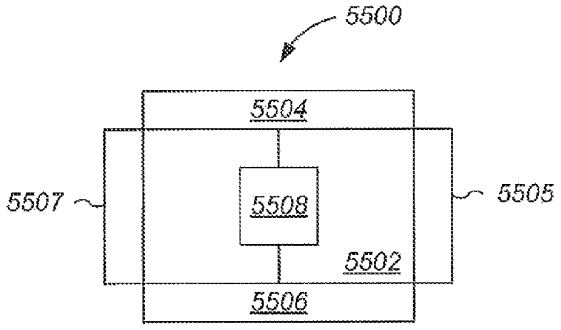
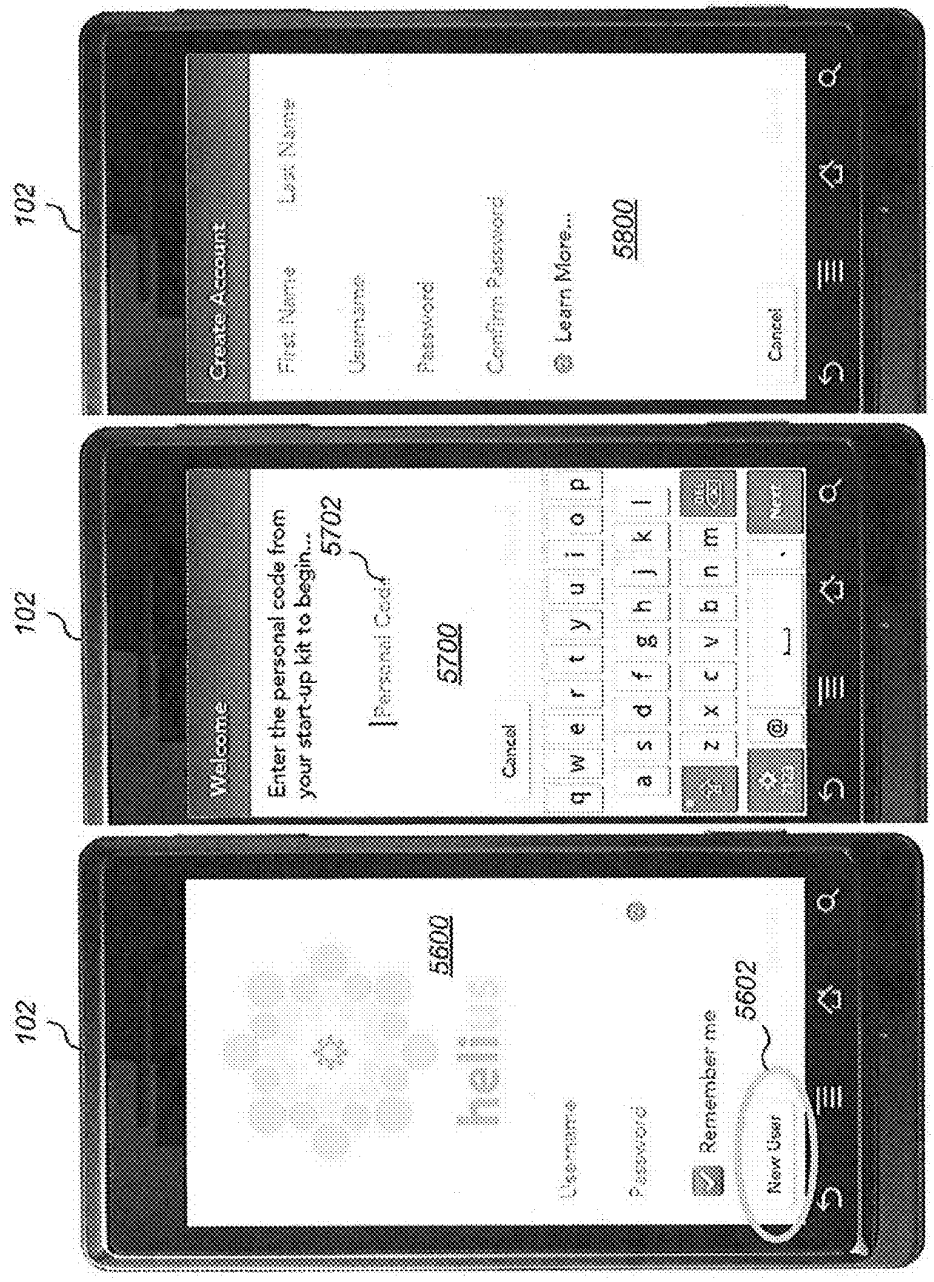

5500
5504
5507
5508
5505
5502
5506

FIG. 55


102
5600
Username
Password
Remember me
New User
5602
FIG. 56
102
Welcome
Enter the personal code from your start-up kit to begin...
5702
Personal Code
5700
Cancel
FIG. 57
102
Create Account
First Name
Last Name
Username
Password
Confirm Password
Learn More...
5800
Cancel
FIG. 58

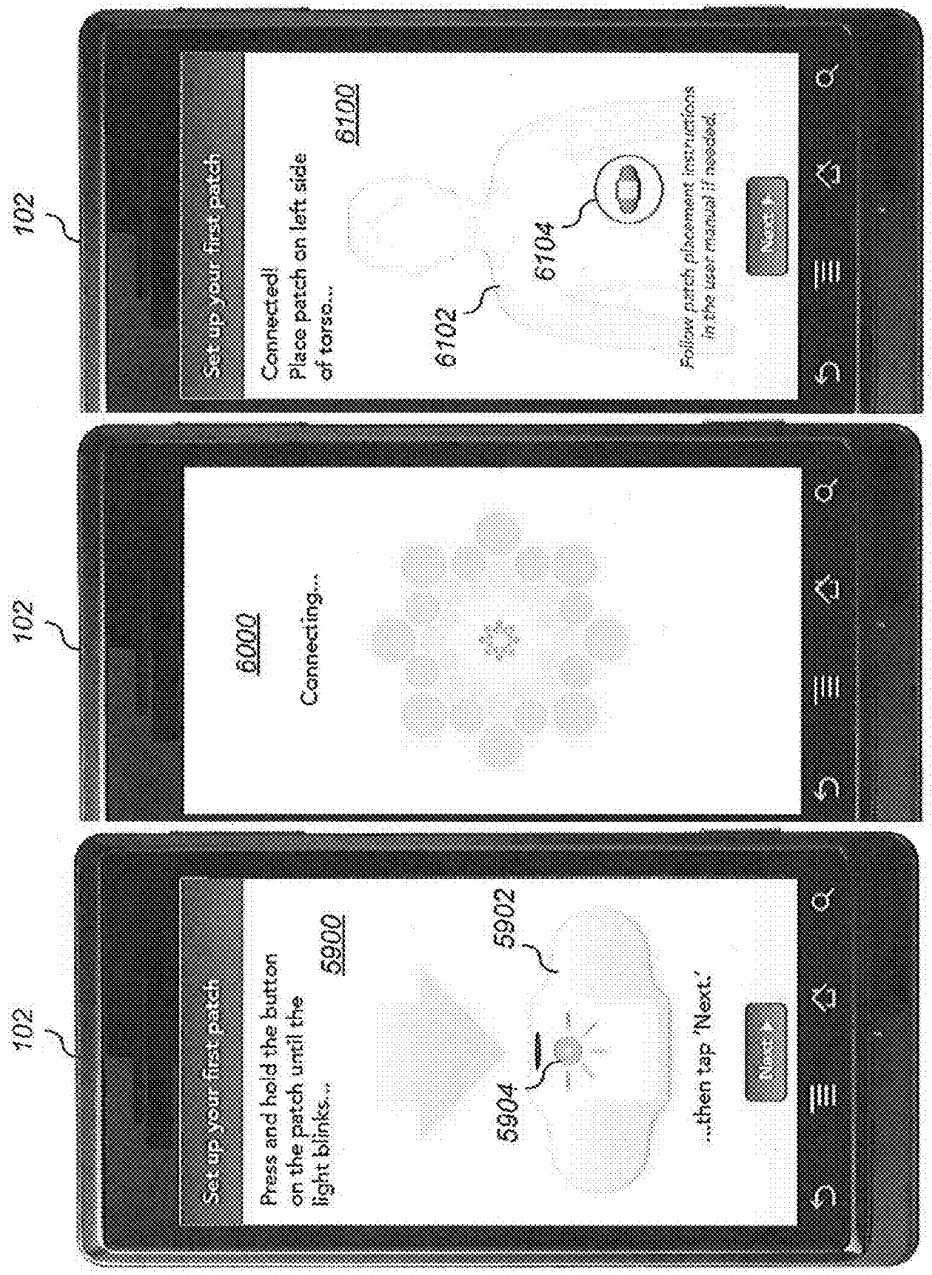


FIG. 59

FIG. 60

FIG. 61

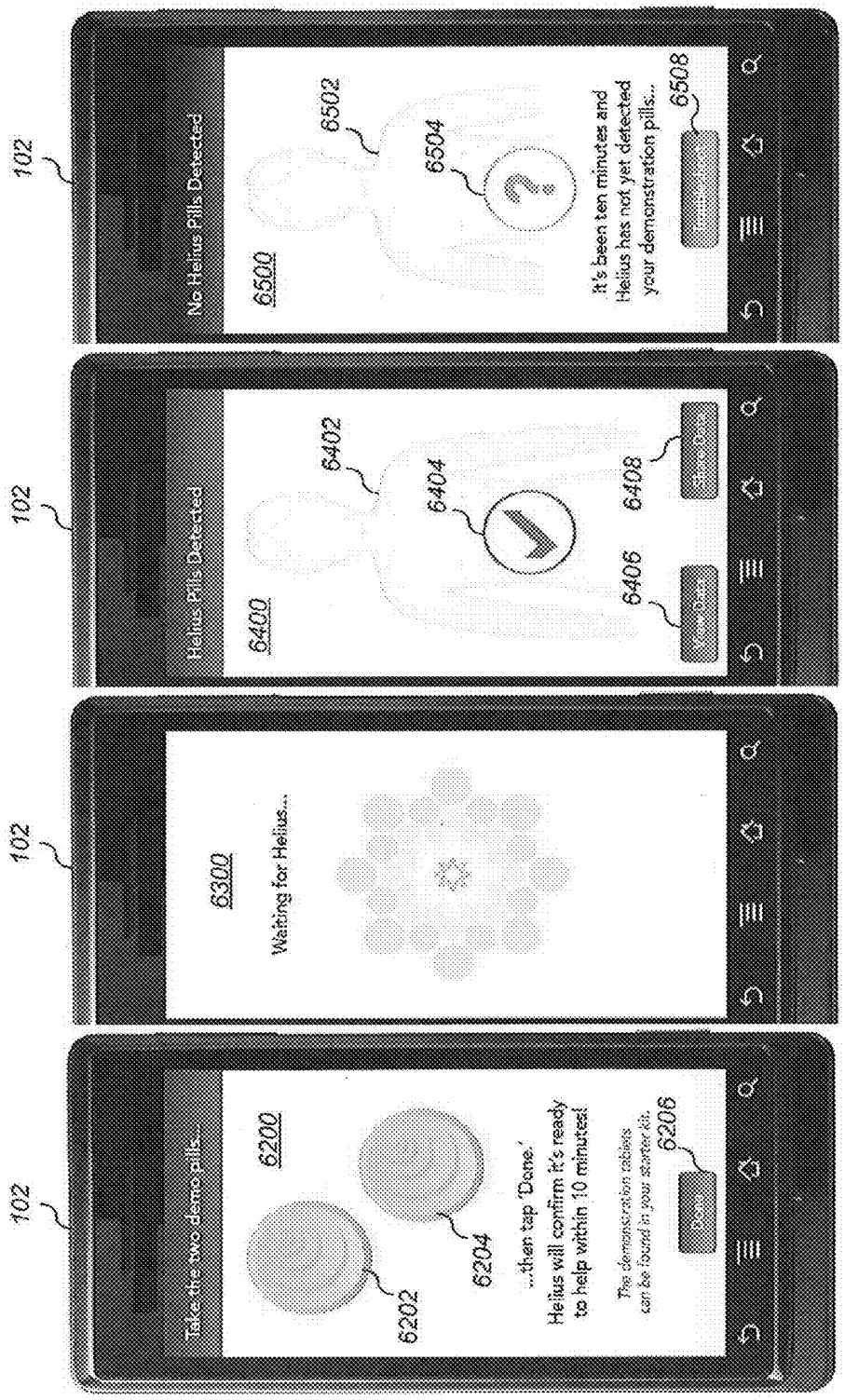


FIG. 62

FIG. 63

FIG. 64

FIG. 65

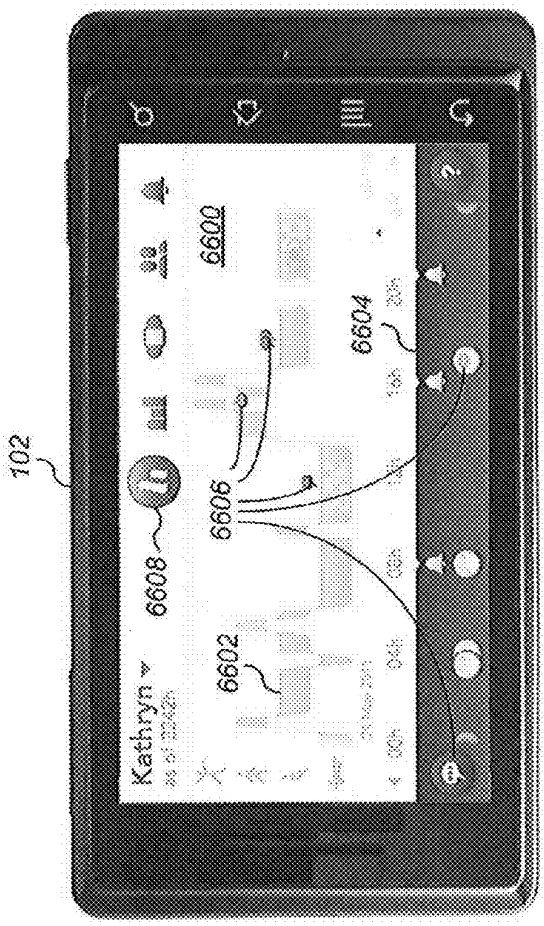


FIG. 66

FIG. 67

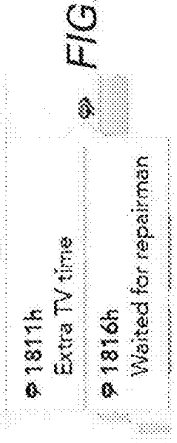


FIG. 68

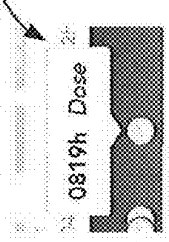


FIG. 69

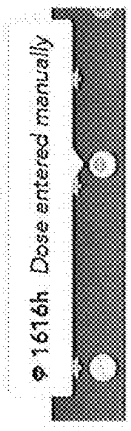


FIG. 70

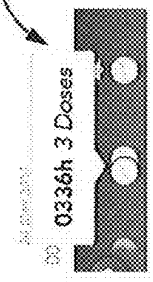


FIG. 71

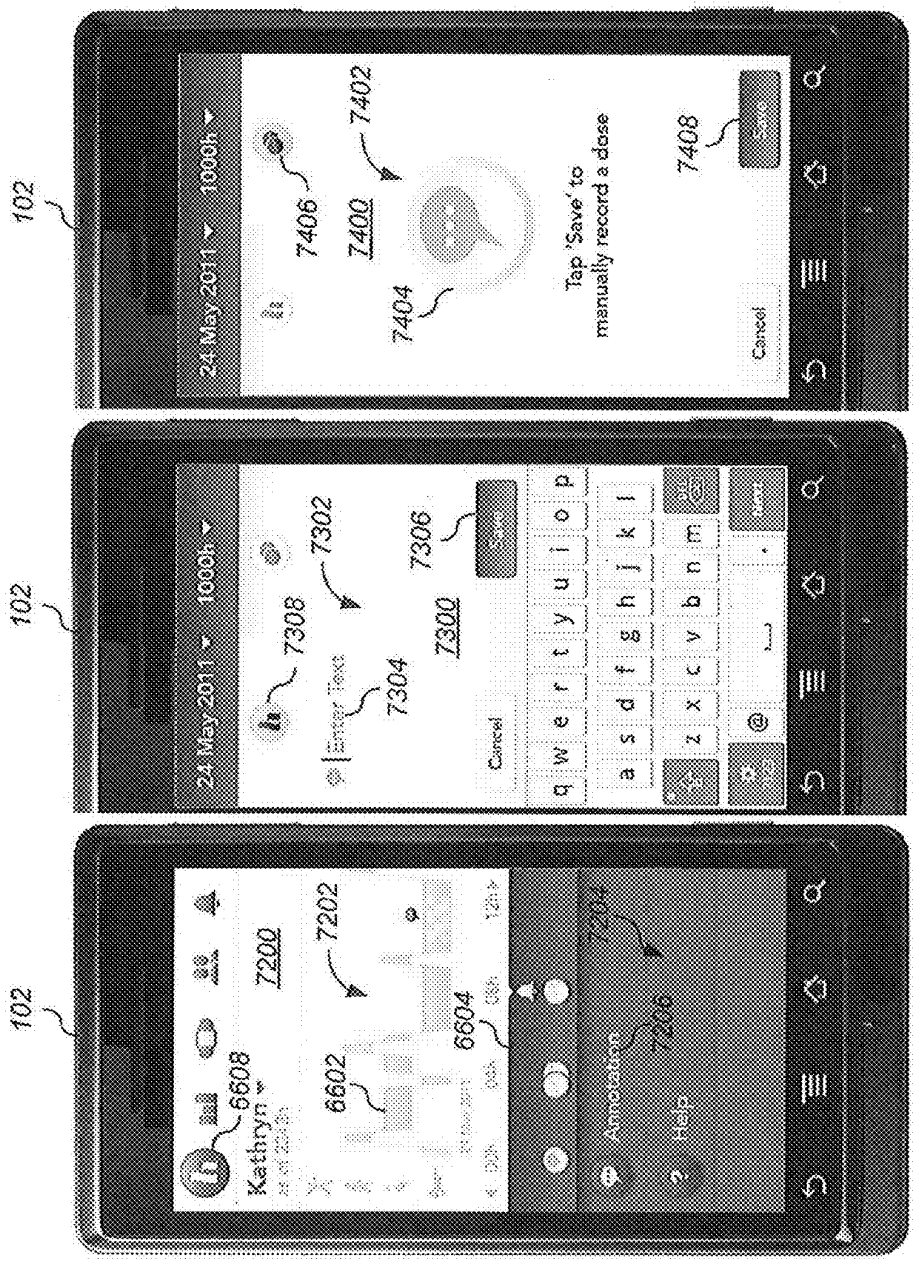


FIG. 72 FIG. 73 FIG. 74

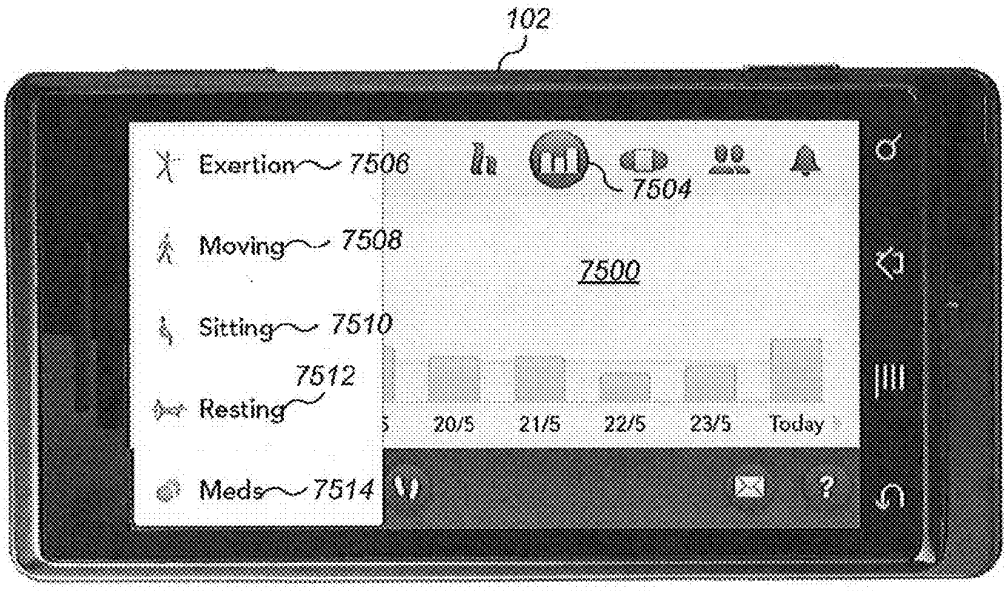

102
Exertion 7506
Moving 7508
Sitting 7510
7512
Resting
Meds 7514
7504
7500
20/5
21/5
22/5
23/5
Today

FIG. 75

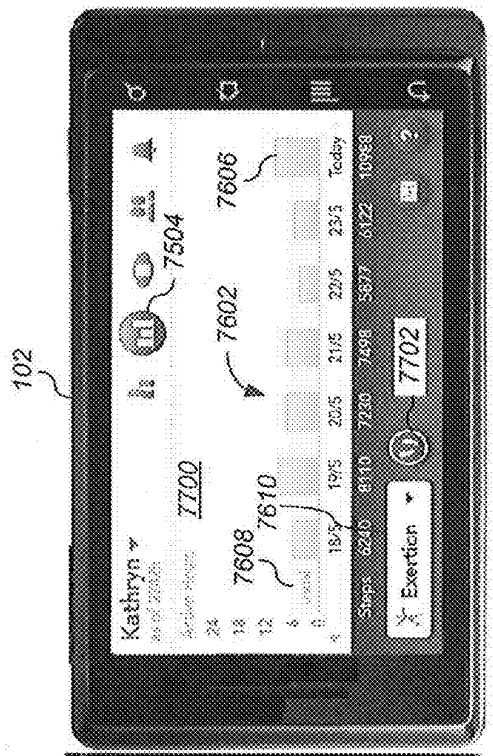


FIG. 77

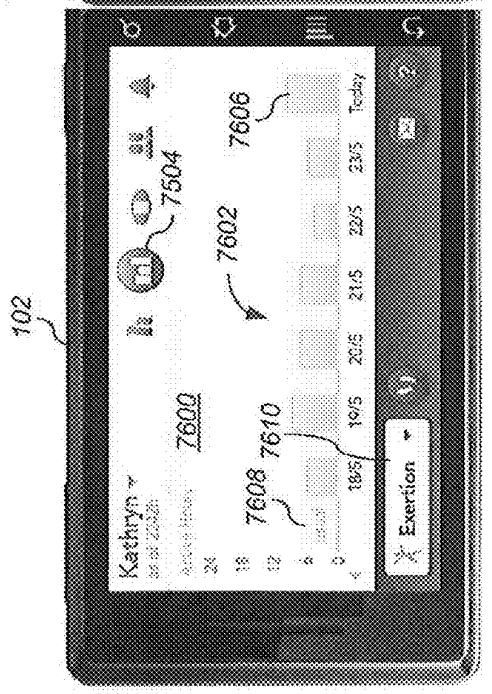


FIG. 76

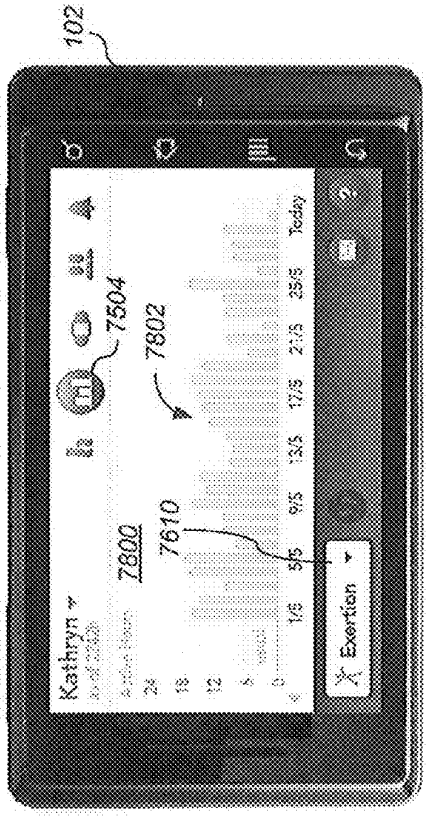


FIG. 78

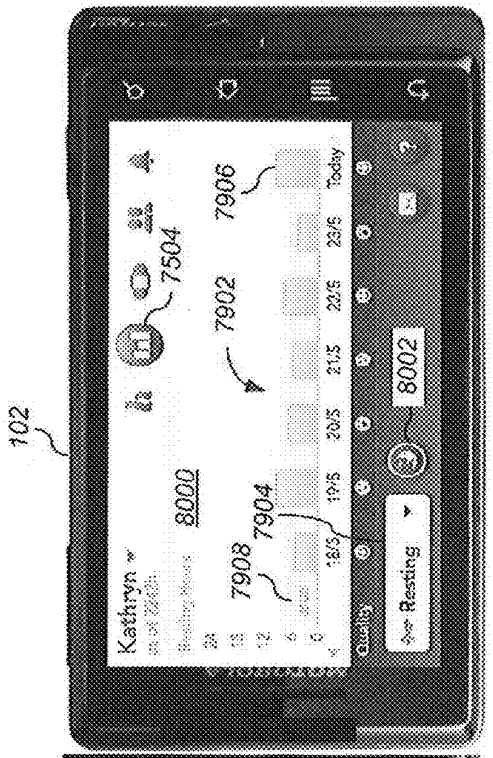


FIG. 80

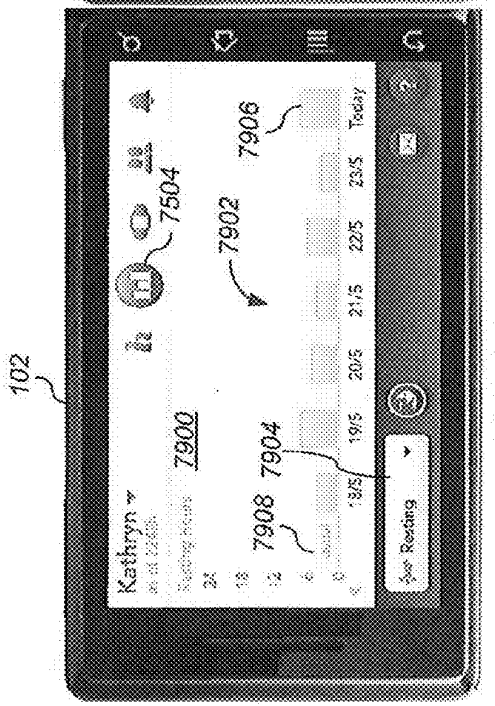


FIG. 79

FIG. 81

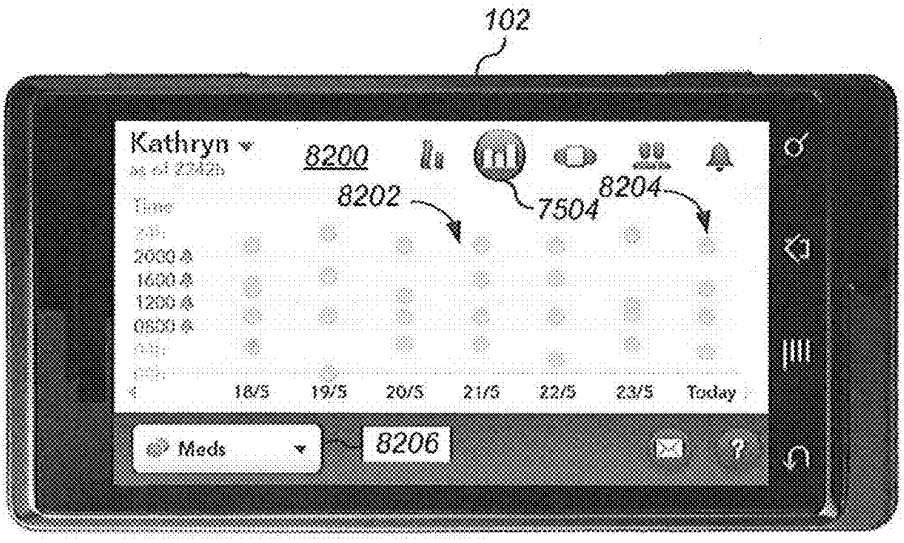

102
Kathryn
8200
8202
7504
8204
2000
1600
1200
18/5
19/5
20/5
21/5
22/5
23/5
Today
Meds
8206

FIG. 82

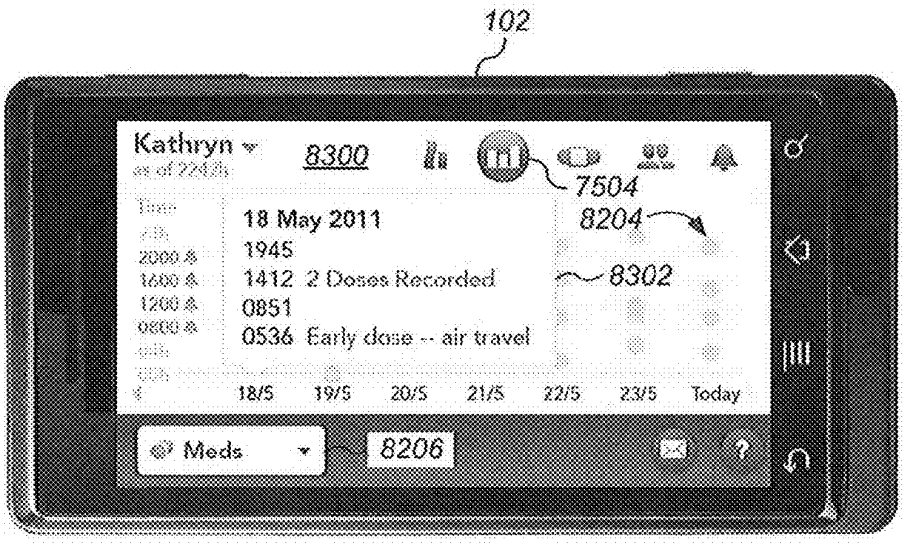

102
Kathryn
8300
7504
18 May 2011
1945
1412 2 Doses Recorded
0851
0536 Early dose -- air travel
8204
8302
2000
1600
1200
18/5
19/5
20/5
21/5
22/5
23/5
Today
Meds
8206

FIG. 83

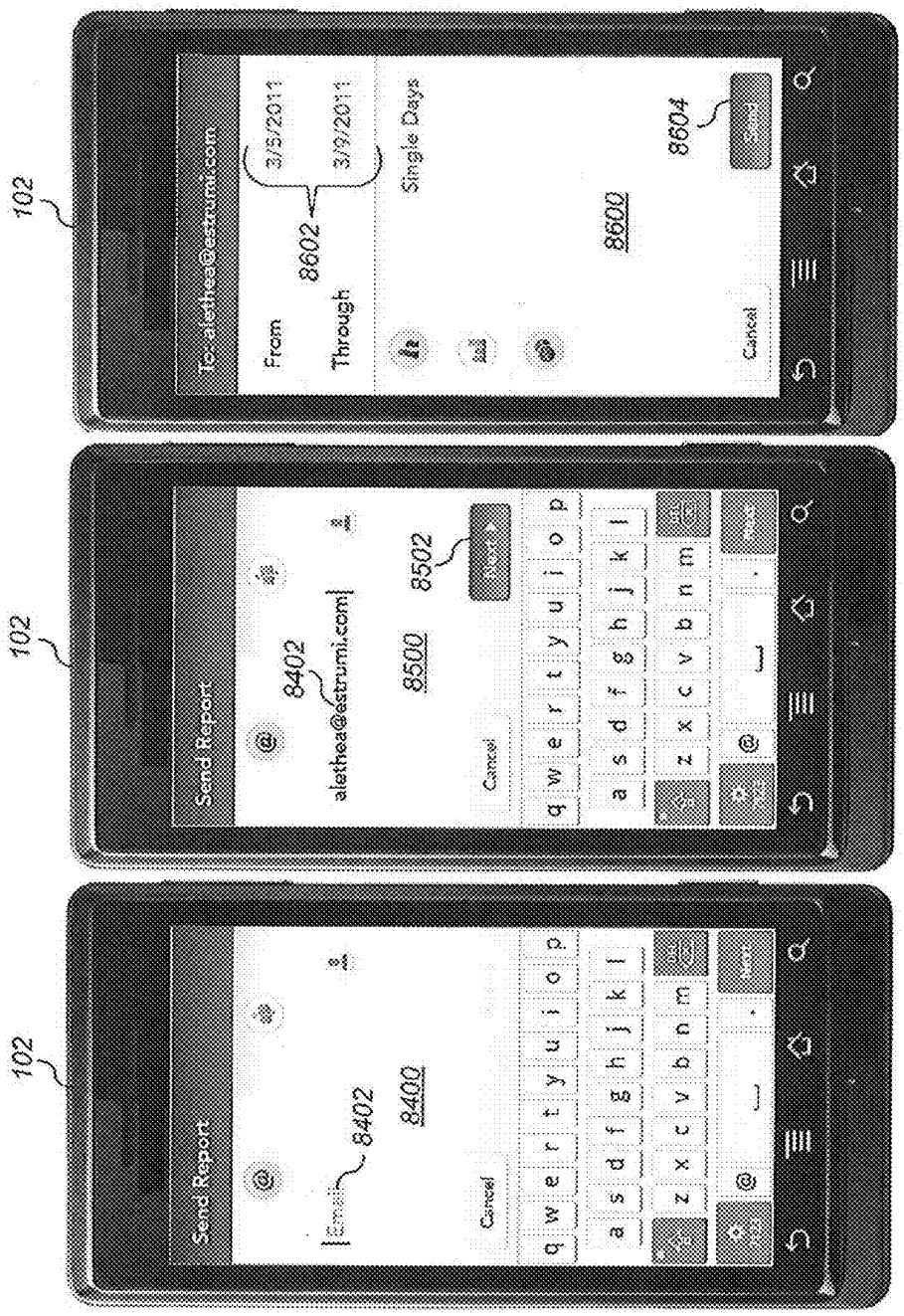


FIG. 84

FIG. 85

FIG. 86

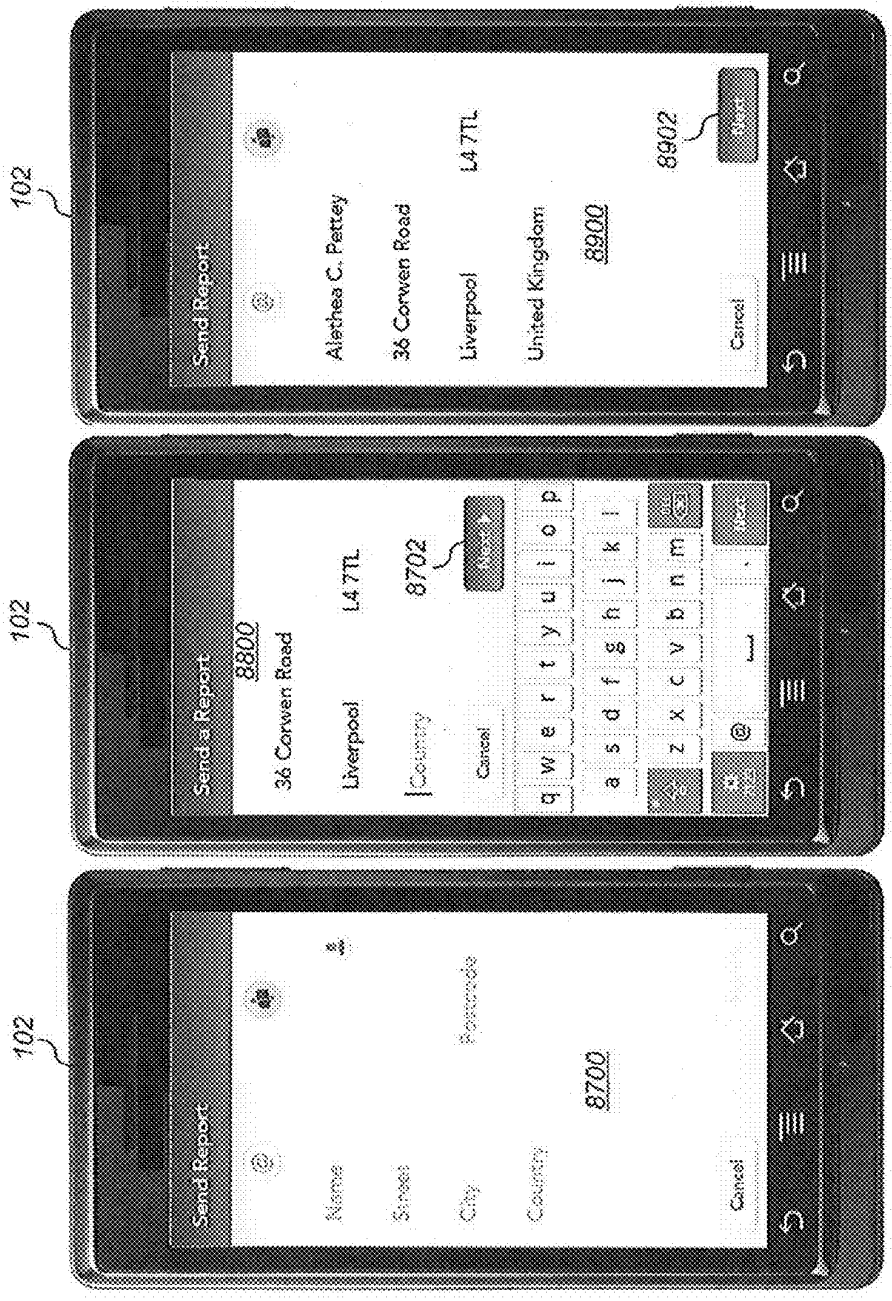


FIG. 87

FIG. 88

FIG. 89

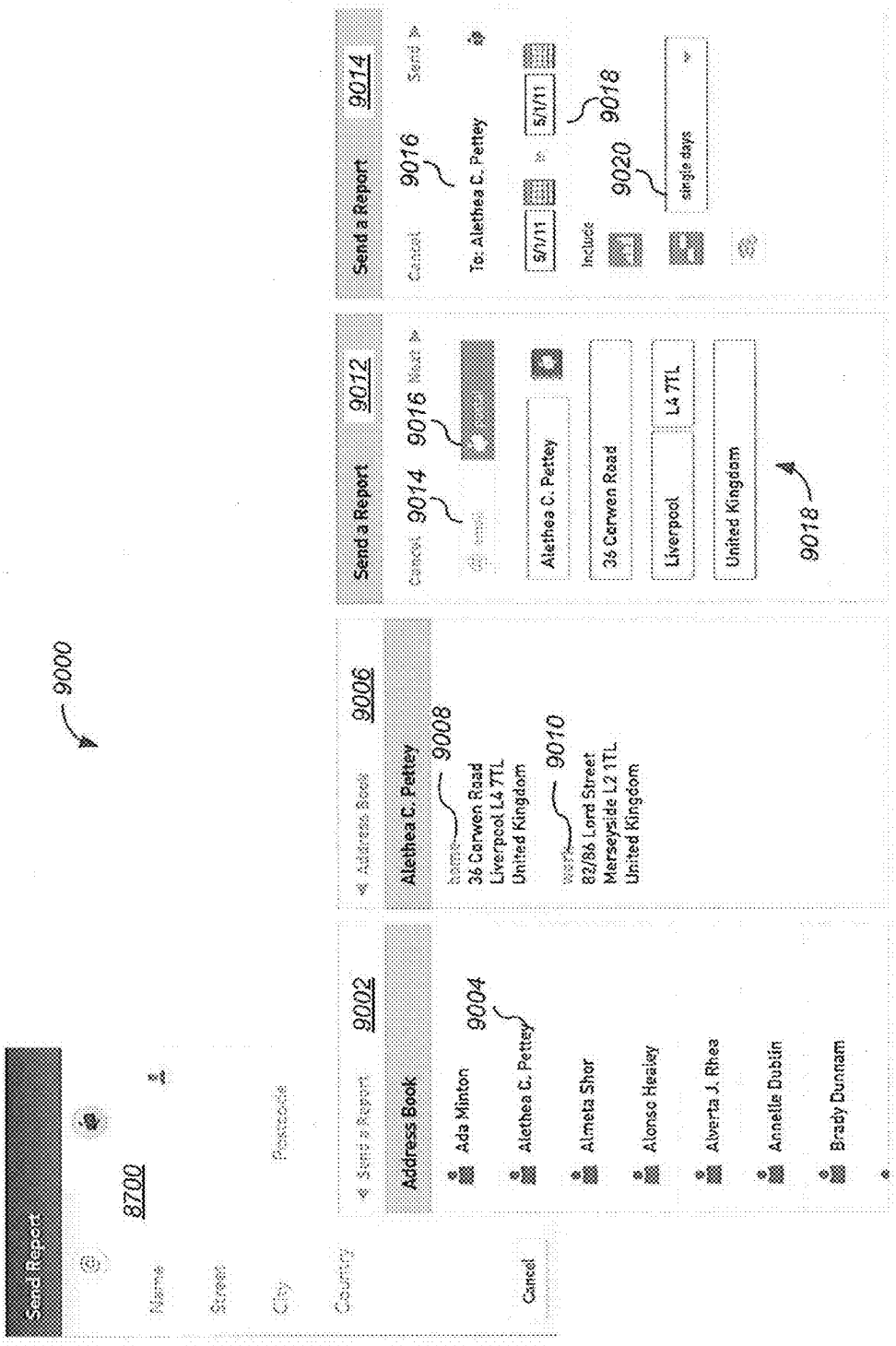

9000
Send Report
8700
Name
Street
City
Postcode
Country
Cancel
Send a Report 9002
Address Book
Ada Minton
Alethea C. Pettey
Almeta Shor
Alonso Healey
Alverta J. Rhea
Annelle Dublin
Brady Dunnam
9004
Address Book 9006
Alethea C. Pettey
Home 9008
36 Carwen Road
Liverpool L4 7TL
United Kingdom
Work 9010
82/86 Lord Street
Merseyside L2 1TL
United Kingdom
Send a Report 9012
Cancel 9014
Next 9016
Alethea C. Pettey
36 Carwen Road
Liverpool
L4 7TL
United Kingdom
9018
Send a Report 9014
Cancel 9016
Send
To: Alethea C. Pettey
5/1/11
5/1/11
9018
Include
9020
single days

FIG. 90

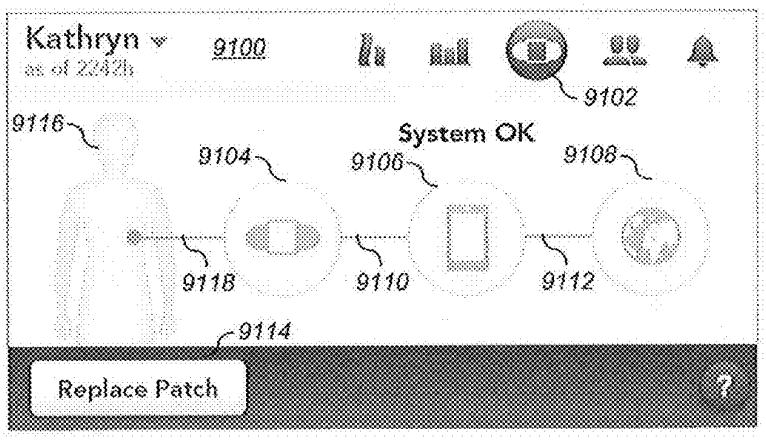


FIG. 91

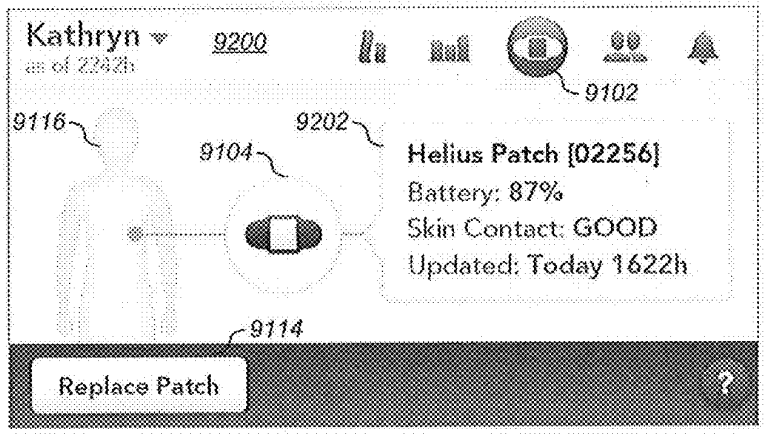


FIG. 92

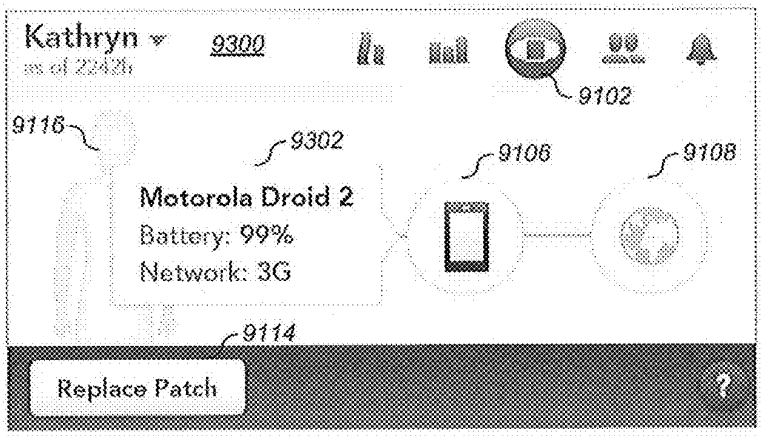


FIG. 93

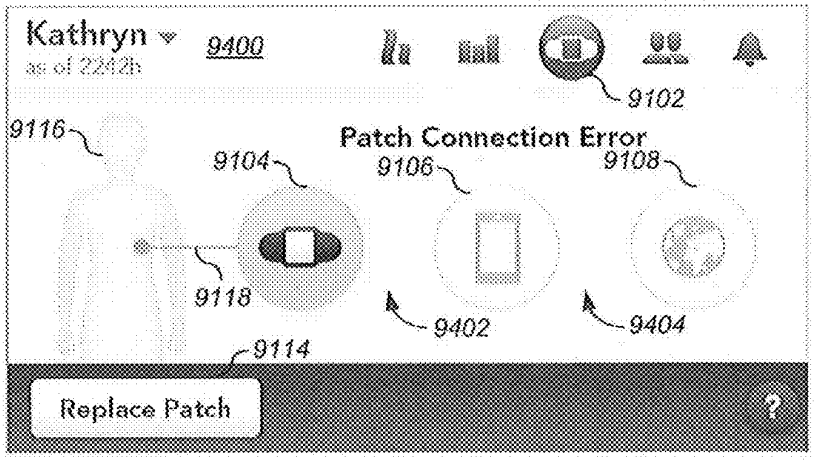


FIG. 94

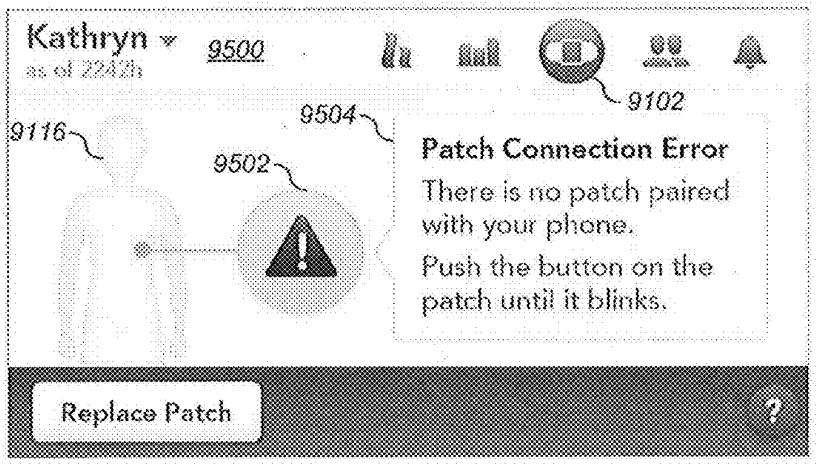


FIG. 95

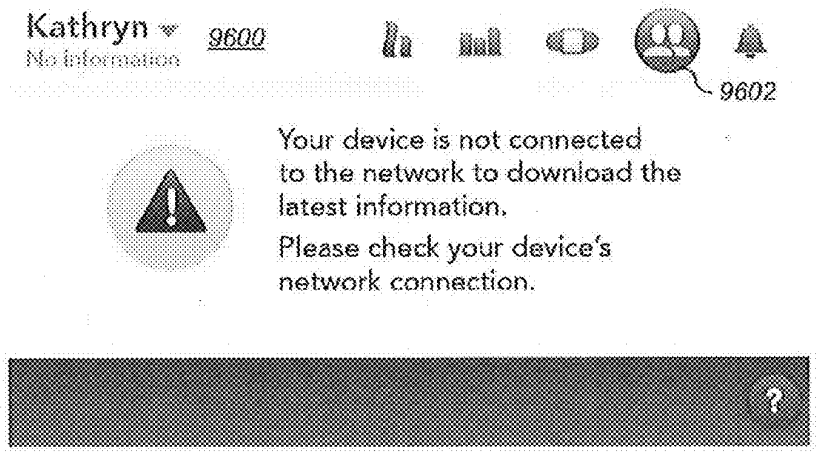


FIG. 96

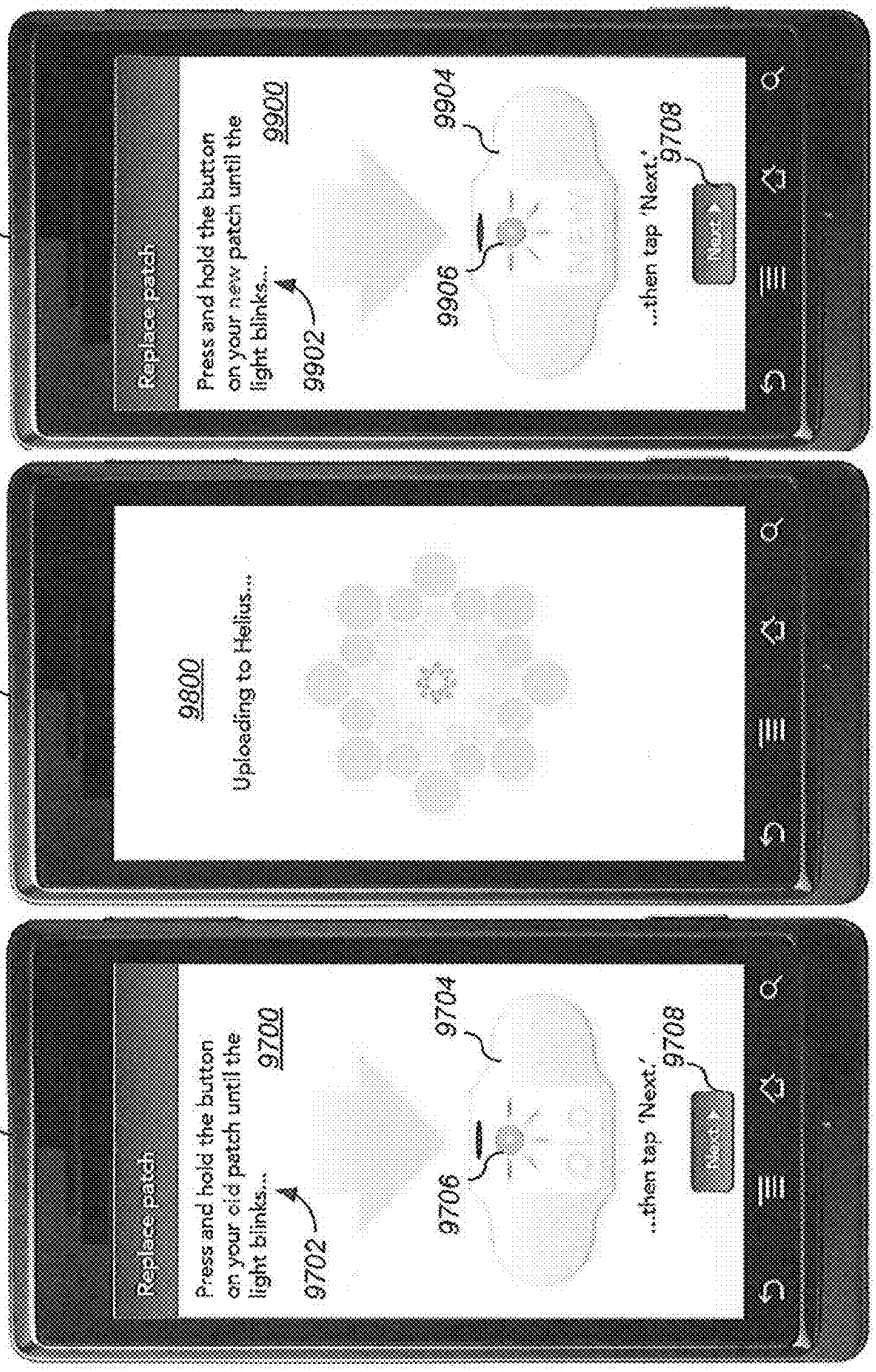


FIG. 97 FIG. 98 FIG. 99

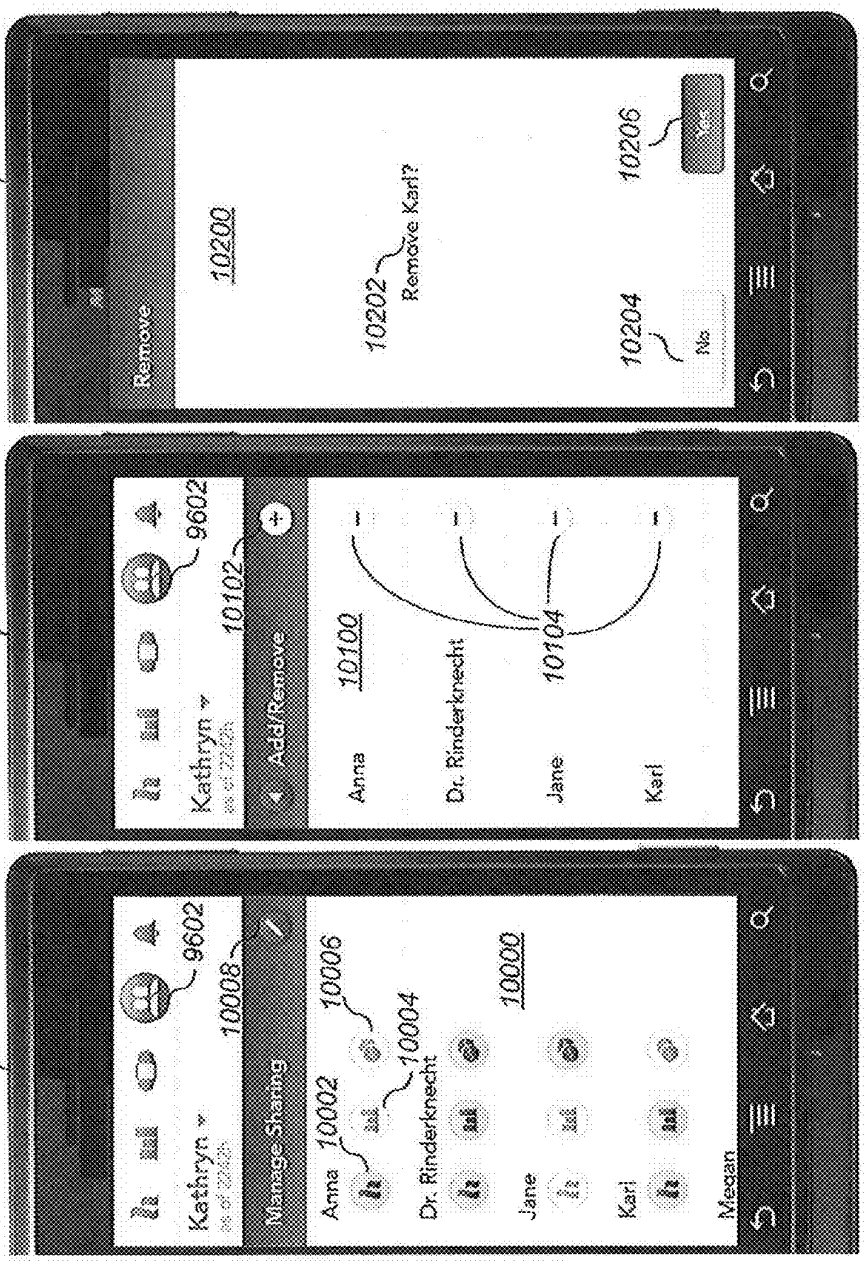


FIG. 100

FIG. 101

FIG. 102

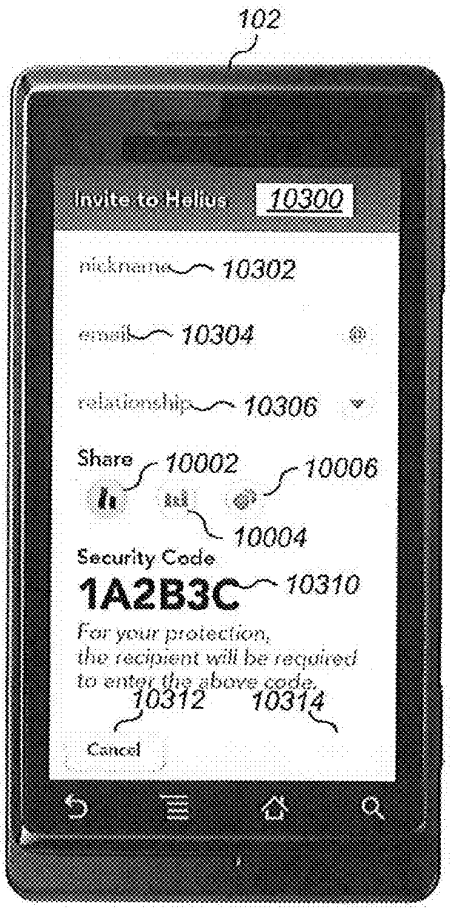


FIG. 103

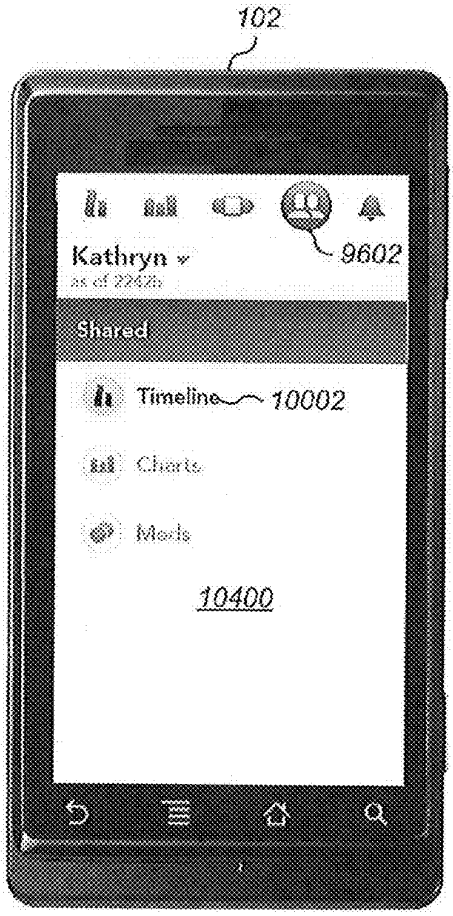


FIG. 104

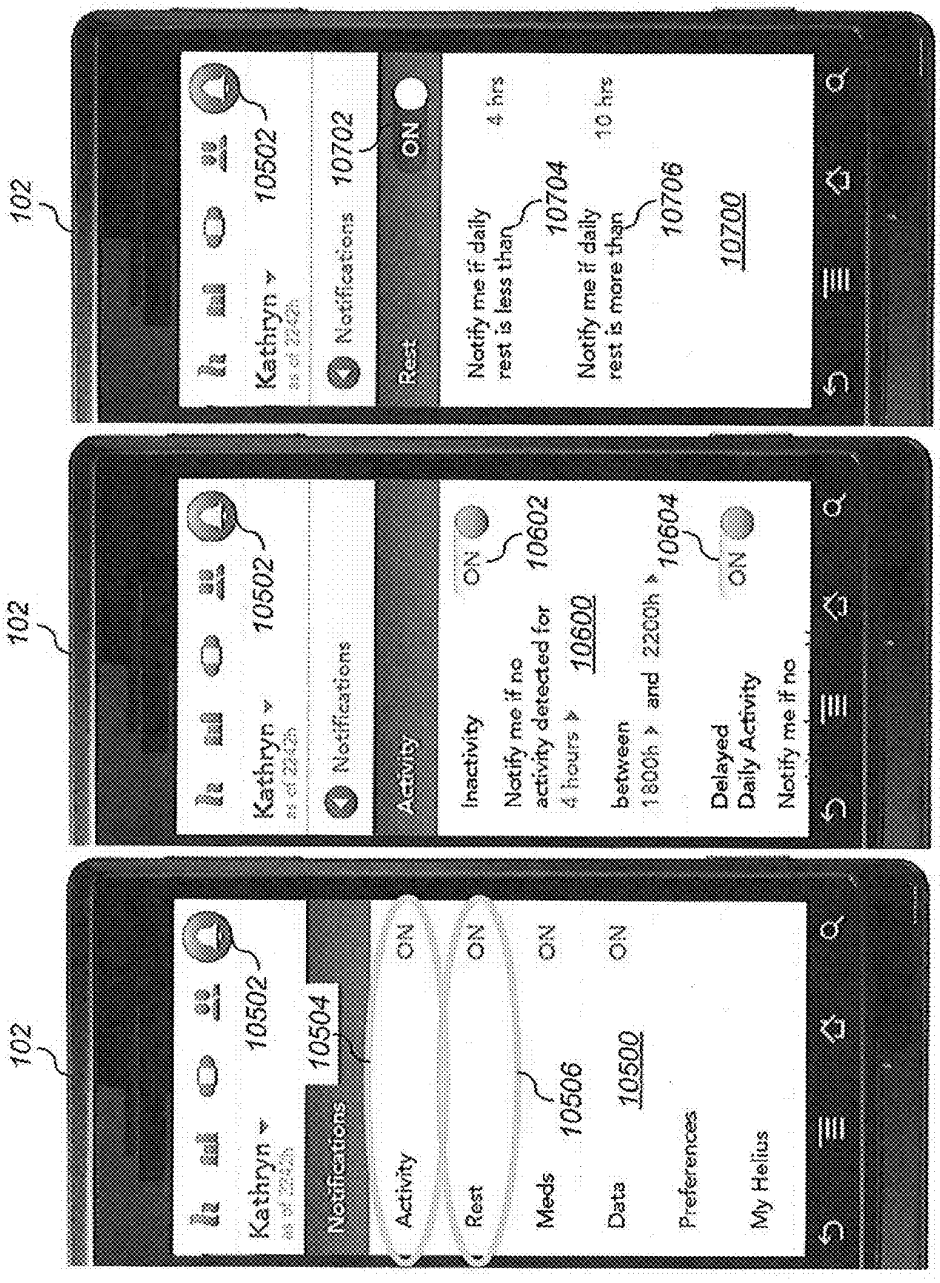


FIG. 105

FIG. 106

FIG. 107

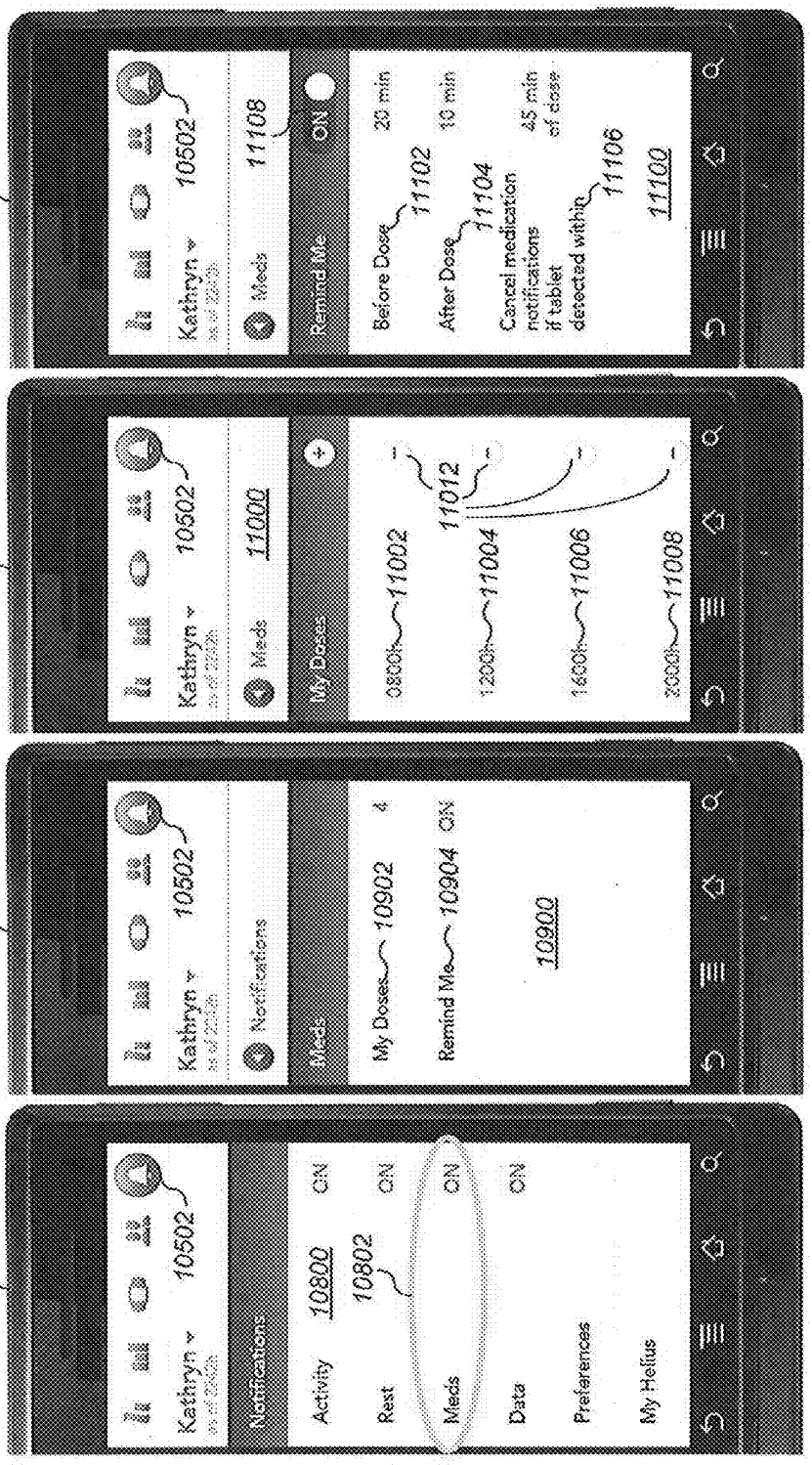


FIG. 108 FIG. 109 FIG. 110 FIG. 111

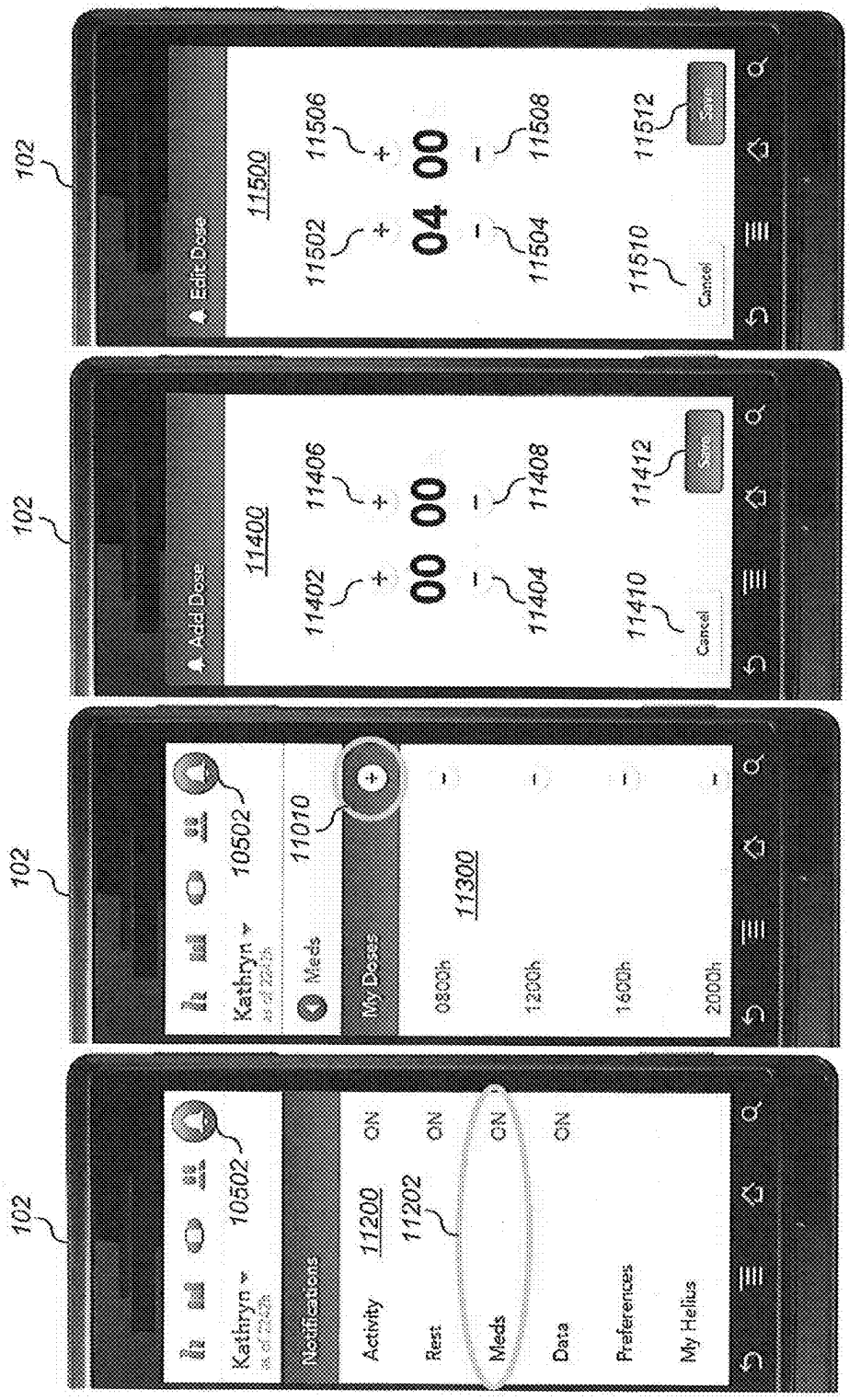


FIG. 112

FIG. 113

FIG. 114

FIG. 115

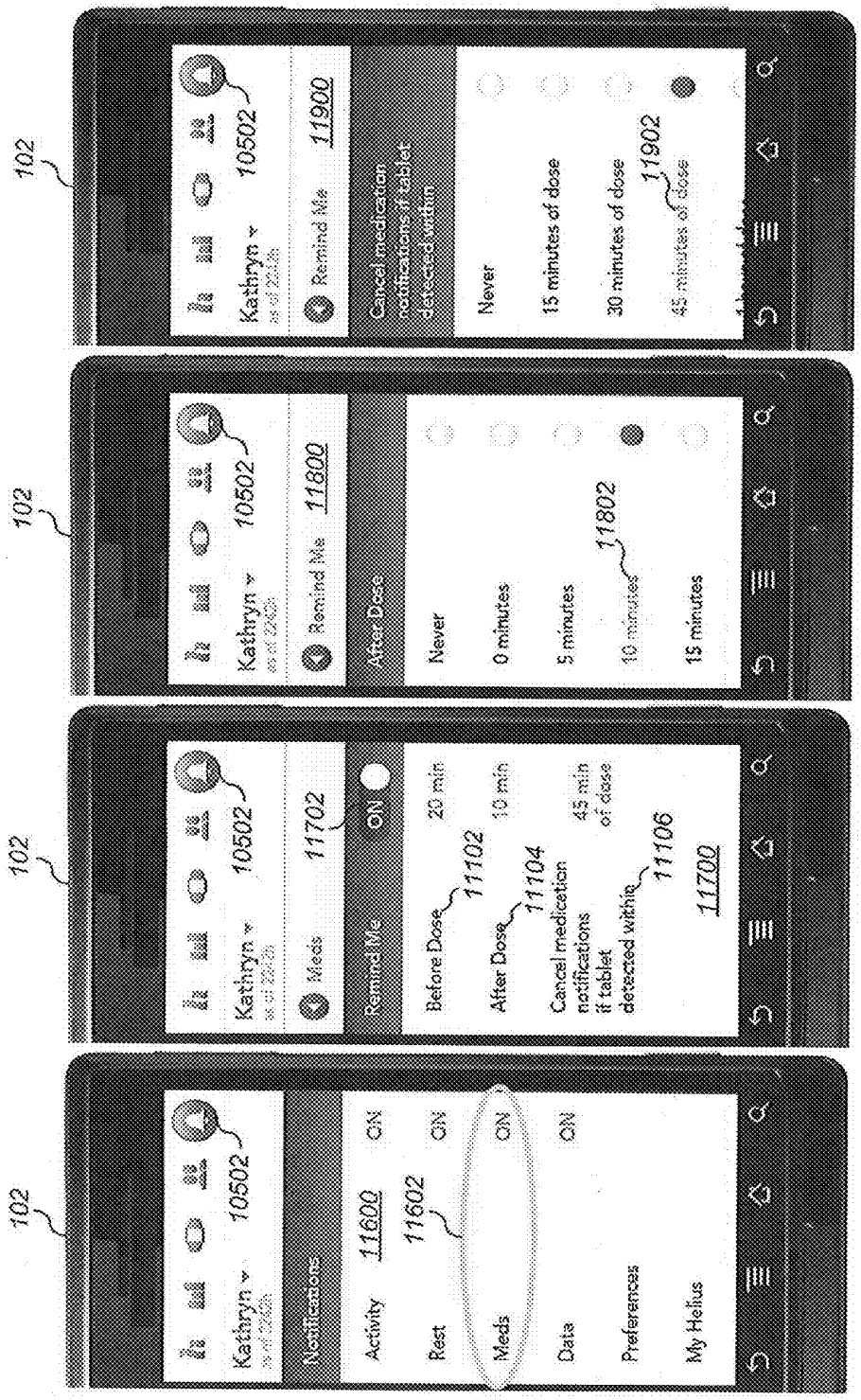


FIG. 116 FIG. 117 FIG. 118 FIG. 119

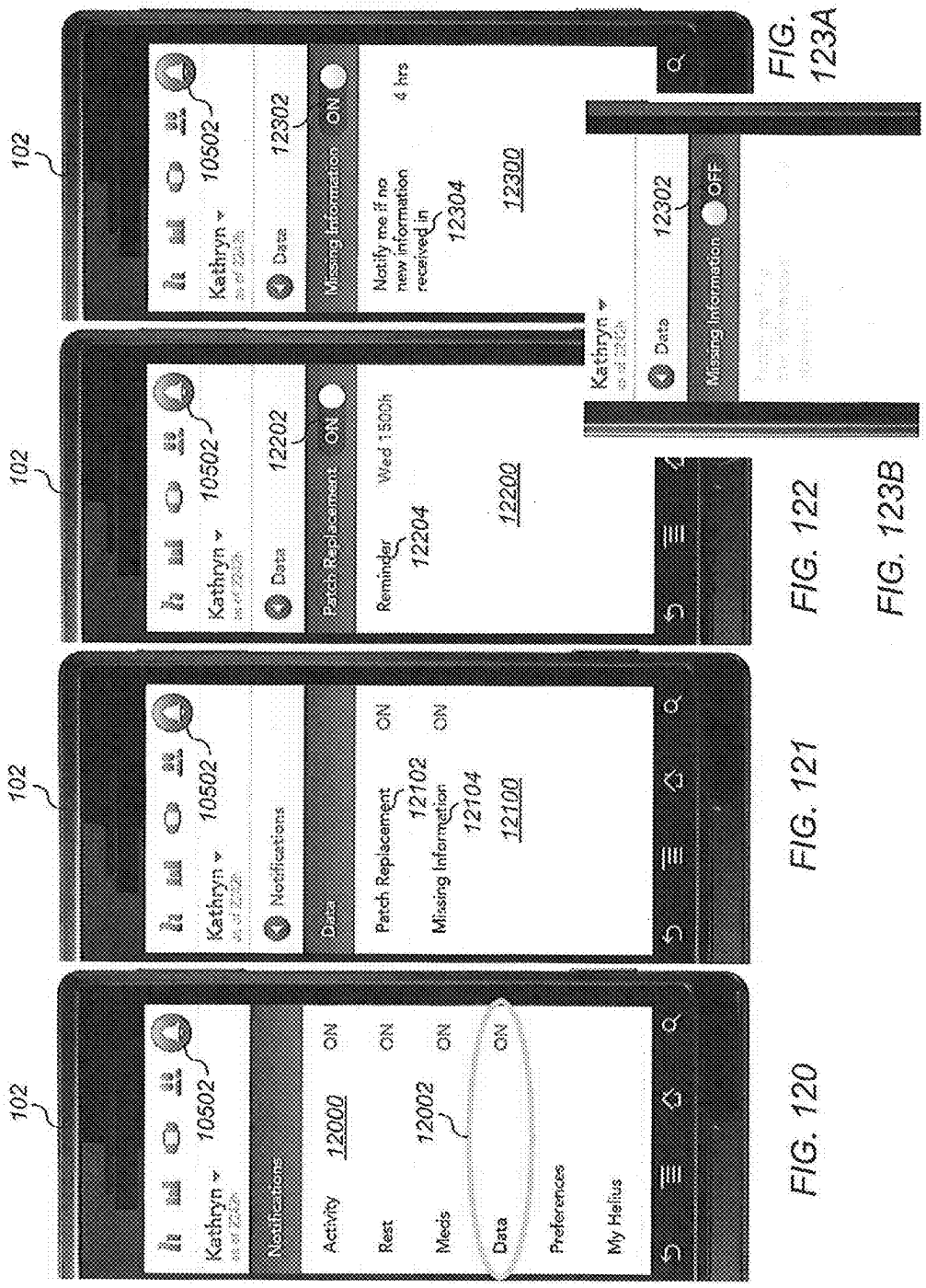


FIG. 120

FIG. 121

FIG. 122

FIG. 123B

FIG. 123A

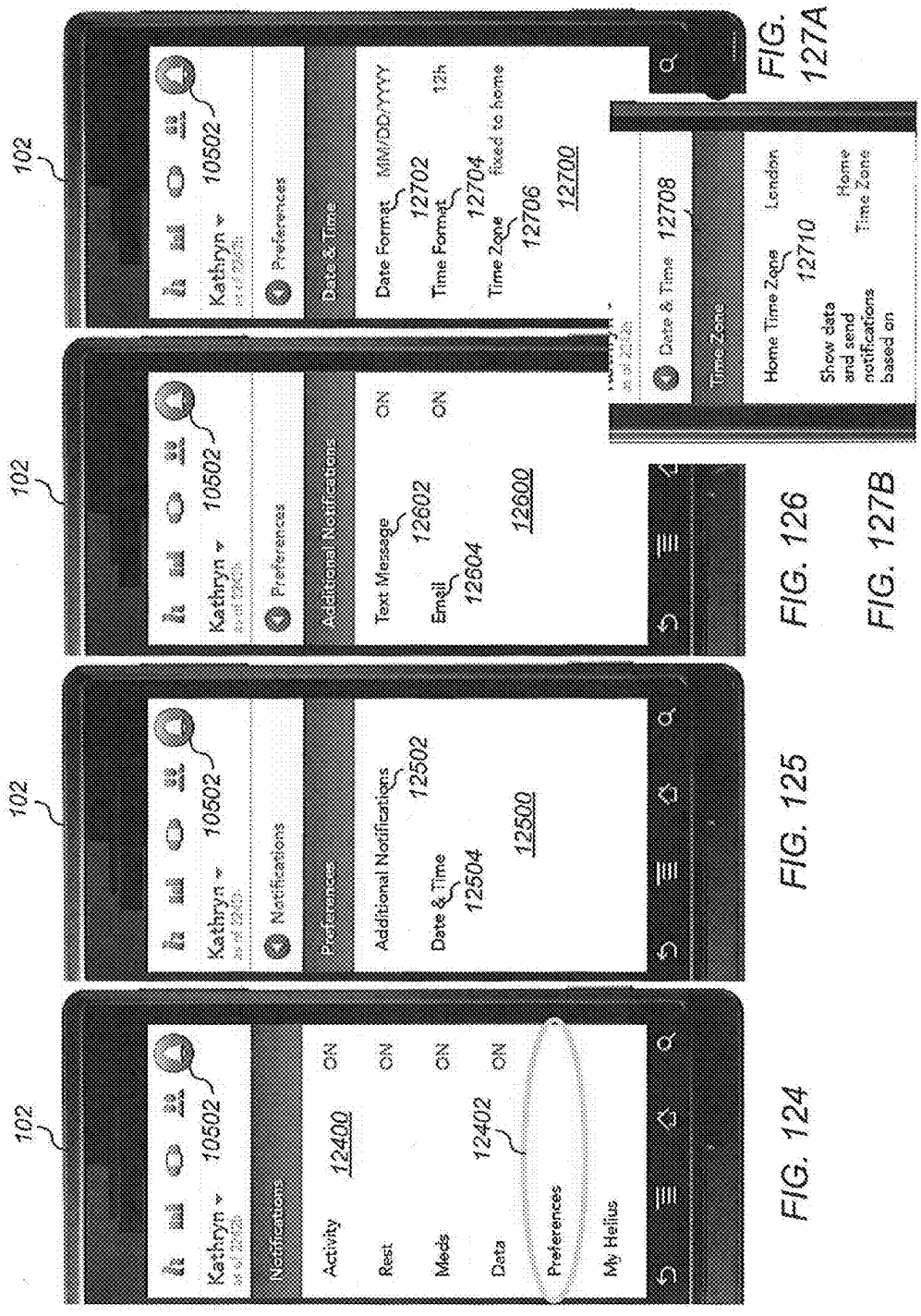


FIG. 124

FIG. 125

FIG. 126

FIG. 127A

FIG. 127B

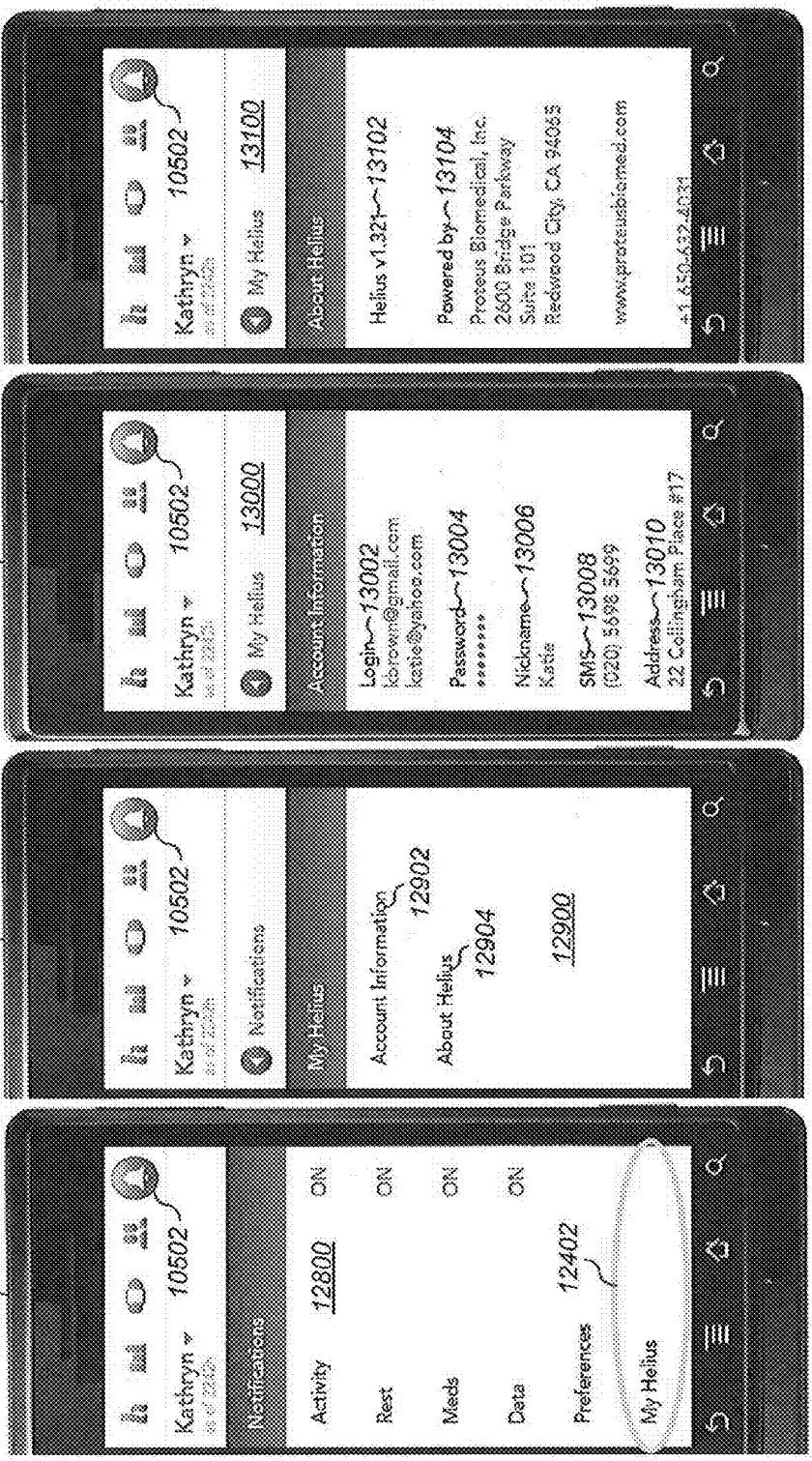


FIG. 128 FIG. 129 FIG. 130 FIG. 131

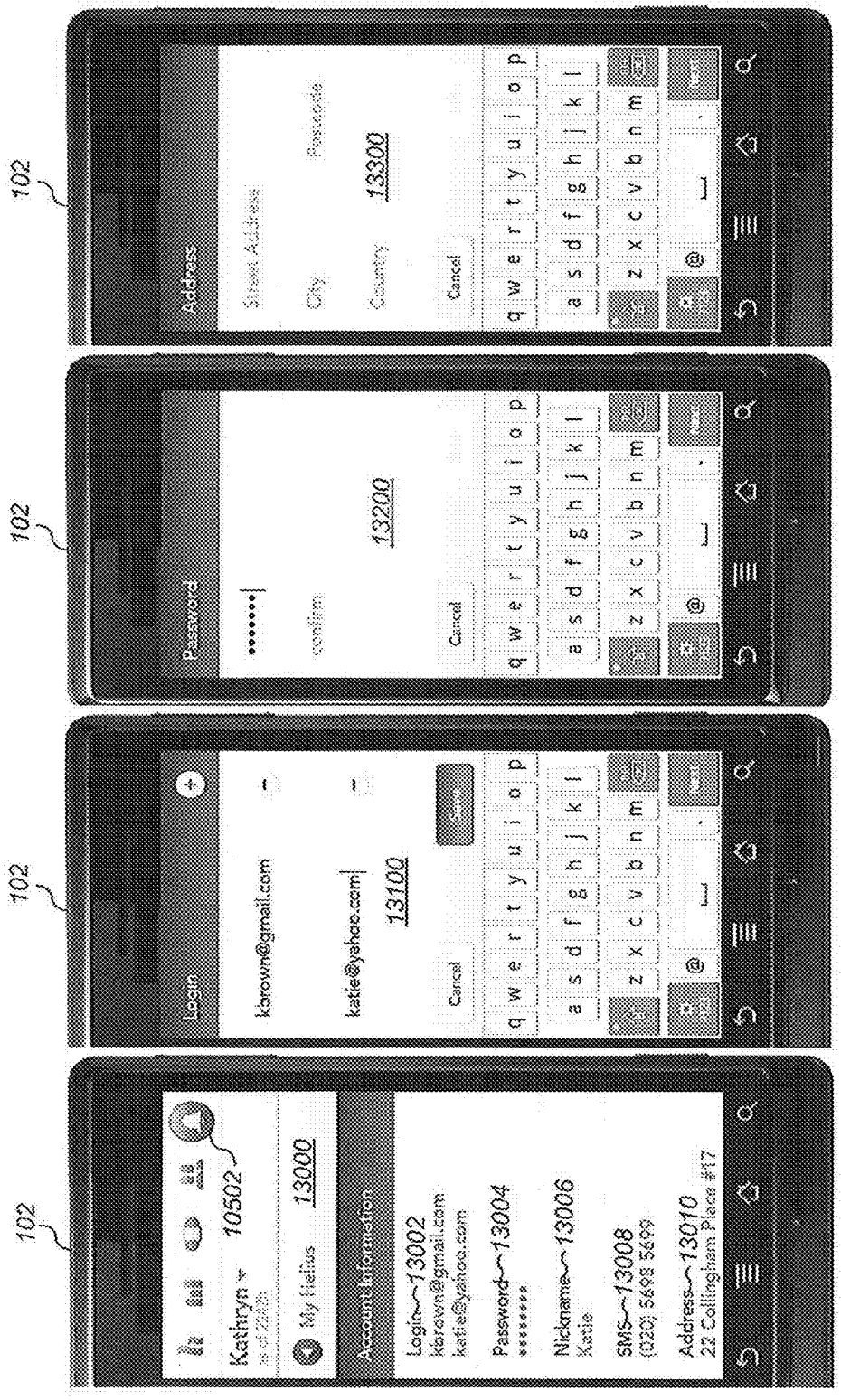


FIG. 132

FIG. 133

FIG. 134

FIG. 135

APPARATUS, SYSTEM, AND METHOD FOR MANAGING ADHERENCE TO A REGIMEN

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INTRODUCTION

The present disclosure is related generally to a healthcare subscription information system, apparatus, and method therefor. The subscription information system transforms existing medication adherence packaging into a digital tool for tracking activity, medication, and, trending metrics associated with the patient. The system assists patients in taking medications on schedule and managing activities of daily life by facilitating communication between patients and third parties such as caregivers, loved ones, spouses, family members, friends, physicians, pharmacists, among others, for example. A mobile device apparatus, system, and method may be employed for detecting a communication from a device such as an ingestible device, e.g., an ingestible event marker (IEM) device associated with a medication. In the case of an IEM device associated with a medication event, for example, a receiver, e.g., a wearable patch device worn by the person taking the medication, detects the ingestion of an IEM device embedded in a medicinal dose. The present disclosure is related to a mobile device such as a handheld portable device, computer, mobile telephone, sometimes referred to as a smartphone, tablet personal computer (PC), kiosk, desktop computer, or laptop computer, or any combination thereof, configured to, among other things, detect the ingestion of an ingestible device by a patient; receive communications related to the ingestible device, e.g., from a receiver; communicate the information to a back end processing system' and/or assist the patient in managing ingestion of medication, physical activity, and communications with third parties.

Generally, detecting the ingestion of an IEM device is done by detection electronics provided in the form factor of a receiver, e.g., a wearable receiver (e.g., a patch). The wearable receiver may be worn on an outer surface of the skin; an implantable receiver; a partially implantable receiver; a receiver configured in or to be worn as apparel, (e.g., a wristband receiver). In alternative aspects, the receiver may be embodied as a mobile device, e.g., a mobile phone.

The patch, for example, may include wet or dry electrodes which are made to contact the skin. An adhesive layer may be provided on the patch to affix the entire patch arrangement to the patient. When an IEM device is ingested by the patient and comes into contact with stomach fluids, the IEM device initiates a communication which is detected by the detection circuitry of the patch to indicate that the particular IEM device was ingested by the patient.

To address various issues associated with medication adherence, a subscription information system described herein, layered above conventional adherence packaging products is needed. Currently, pharmacies provide medication adherence packages that are pre-filled by a pharmacist in a set of blister packs containing enough medication for predetermined period such as, for example, several days, a week, or a month supply of medication at different dosage times.

What is needed is the addition of an ingestible device, e.g., an IEM device, associated with prescribed medication dose into each of the blister packs to identify ingestion and medication-related events and a processing system to track and manage the identified data and the medication process to document adherence and provide feedback, e.g., to the patient, to the caregiver, etc. A subscription information system layered on top of conventional adherence packaging is needed to assist a patient in taking the medication on schedule, managing activities of normal daily life, such as, getting up and moving around, taking medication, ensuring the patient is getting adequate rest. Assistance with these activities is provided by the system by facilitating communication between the patient, third parties, and a back end processing system that records and tracks the patient's medication and physical patterns and stores them in a database. In one aspect, a receiver (e.g., patch with electronic functionality) is worn by the patient to detect the ingestion of an IEM device. The wearable receiver then communicates the event to a mobile device. In another aspect, the IEM device may communicate directly with the mobile device without the need of a wearable receiver. In either aspect, the mobile device communicates the information received from the IEM device in a discreet private manner to a back end processing system. The backend processing system stores the information, analyzes the information, and provides feedback to the patient via the mobile device.

SUMMARY

In one aspect, a method of managing adherence to a regimen in a subscription based computer implemented healthcare information environment is provides. At a mobile device information is received from a receiver that a dose was ingested by a living subject. The mobile device comprises a processor, a memory coupled to the processor, and a display coupled to the processor. The information is wirelessly communicated over a wireless network to a backend computer processing system. A personal information stream is received from the computer at the backend processing system. The personal information stream characterizes behavior of the living subject based on the received information over a predetermined period.

In one aspect, an adherence package is provided. The adherence package comprises a sheet with a plurality of tear-away strips associated with a personalized dose.

In one aspect, a system for managing adherence to a regimen in a subscription based computer implemented healthcare information environment is provided. The system comprises a mobile device configured to receive information from a receiver that a dose was ingested by a living subject. The mobile device comprises a processor, a memory coupled to the processor, and a display coupled to the processor. The information is wirelessly communicated over a wireless network to a backend computer processing system. A personal information stream is received from the computer at the backend processing system. The personal information stream characterizes behavior of the living subject based on the received information over a period.

FIGURES

The patent or application file contains at least one drawing executed in color. Copies of this patent or patent application publication with color drawing(s) will be provided by the Office upon request and payment of the necessary fee.

FIG. **1** illustrates one aspect of a system comprising a mobile device for detecting an electrical signal generated by an ingestible event marker (IEM) device and/or communicating data related thereto.

FIG. **2** illustrates one aspect of a weekly medication adherence package received by the patient.

FIG. **3** illustrates one aspect of a personal information stream graphical user interface (GUI) for a display screen of a mobile device.

FIG. **4** illustrates one aspect of a personal notification GUI for a display screen of a mobile device.

FIG. **5** illustrates one aspect of an activity trend GUI for a display screen of a mobile device.

FIG. **6** illustrates one aspect of an account creation GUI for a display screen of a mobile device.

FIG. **7** illustrates one aspect of a "Manage sharing" GUI for a display screen of a mobile device enabling a patient to select with whom to share data and what data to share.

FIG. **8** illustrates one aspect of a third party caregiver GUI for a display screen of a mobile device for sharing information with a patient.

FIGS. **9-11** illustrate various aspects of support GUIs for a display screen of a mobile device.

FIGS. **12-14** illustrate various aspects of GUIs for a display screen of a mobile device for creating an account.

FIGS. **15-18** illustrate various aspects of GUIs for a display screen of a mobile device for wearing and demonstrating the wearable receiver.

FIG. **19** illustrates one aspect of a home GUI for a display screen of a mobile device.

FIGS. **20-23** illustrate various aspects of timeline GUIs for a display screen of a mobile device characterizing a patient's daily physical activity and medication ingestions.

FIG. **24** illustrates one aspect of an activity trend chart GUI for a display screen of a mobile device showing a patient's activity trend over a one week period.

FIG. **25** illustrates one aspect of an activity trend chart GUI for a display screen of a mobile device showing a patient's activity trend over a one month period.

FIG. **26** illustrates one aspect of a medication trend GUI for a display screen of a mobile device showing a patient's medication trend over a one week period.

FIG. **27** illustrates one aspect of a "Send a Report" GUI for a display screen of a mobile device for sending a report.

FIG. **28** illustrates one aspect of a "Test System" GUI for a display screen of a mobile device for managing a wearable receiver (e.g., patch).

FIG. **29** illustrates one aspect of "Replace Patch" GUI for a display screen of a mobile device for replacing a wearable receiver (e.g., patch).

FIG. **30** illustrates one aspect of a "Manage sharing" GUI for a display screen of a mobile device for inviting caregivers to data sharing.

FIG. **31** illustrates one aspect of an "Invite" GUI for a display screen of a mobile device for inviting caregivers to share and controlling data sharing.

FIGS. **32-35** illustrate various aspects of utility tools GUIs for a display screen of a mobile device for tailoring the subscription information system based on personal needs and requirements of a patient.

FIGS. **36-39** illustrate various aspects of Utilities GUIs for a display screen of a mobile device for tailoring the subscription information system based on personal needs and requirements of the patient.

FIGS. **40-41** illustrate various aspects of GUIs for a display screen of a mobile device for tailoring the subscription information system based on personal needs of a patient.

FIGS. **42-45** illustrate various aspects of GUIs for a display screen of a mobile device for tailoring the subscription information system based on personal needs of a patient.

FIGS. **46-47** illustrate various aspects of GUIs for a display screen of a mobile device for tailoring the subscription information system based on personal needs of a patient.

FIGS. **48-51** illustrate various aspects of GUIs for a display screen of a mobile device for tailoring the subscription information system based on personal needs of a patient.

FIG. **52** illustrates one aspect of a mobile device.

FIG. **53** is a functional system diagram of one aspect of a mobile device.

FIG. **54** is a block functional diagram of one aspect of an integrated circuit component of a wearable receiver.

FIG. **55** illustrates a system corresponding to one aspect of an ingestible event marker device.

FIGS. **56-135** illustrate ornamental designs for various aspects of GUIs for a display screen of a mobile device, where:

FIGS. **56-58** illustrate the ornamental design for various GUIs for a display screen of a mobile device for creating an account.

FIGS. **59-61** illustrate ornamental designs for several additional "Onboarding" GUIs for a display screen of a mobile device for setting up a wearable receiver.

FIGS. **62-65** illustrate ornamental designs for several additional "Onboarding" GUIs for a display screen of a mobile device for demonstrating the healthcare subscription information system according to the present disclosure.

FIGS. **66-71** illustrate ornamental designs for several additional "Ribbon" GUIs for a display screen of a mobile device for viewing annotations.

FIGS. **72-74** illustrate ornamental designs for several additional "Ribbon" GUIs for a display screen of a mobile device for making annotations.

FIG. **75** illustrates an ornamental design for a charts selection GUI for a display screen of a mobile device.

FIGS. **76-78** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device for displaying charts associated with patient exertion periods.

FIGS. **79-81** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device for displaying charts associated with patient rest periods.

FIGS. **82-83** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device for displaying charts associated with patient rest periods.

FIGS. **84-86** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device for sending reports associated with patient via email.

FIGS. **87-89** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device for sending reports associated with patient via the post.

FIG. **90** illustrates the "Send Report" GUI shown in FIG. **87**, with a series of address book GUI screens for a display screen of a mobile device for populating the "Send Report" GUI using a local address book.

FIGS. **91-96** illustrate ornamental designs for several "Patch" GUIs for a display screen of a mobile device for managing the wearable receiver communication system.

FIGS. **97-99** illustrate ornamental designs for several additional "Patch" GUIs for a display screen of a mobile device for replacing the wearable receiver.

FIGS. **100-104** illustrate ornamental designs for several "Share" GUIs for a display screen of a mobile device for managing permissions and adding/removing caregivers.

FIGS. **105-107** illustrate ornamental designs for several "Notifications" GUIs for a display screen of a mobile device for notifying patients of activity and rest information.

FIGS. **108-111** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device for notifying patients of medication dosing times and reminders.

FIGS. **112-115** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device for adding daily medications dose times.

FIGS. **116-119** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device for adding daily medication reminders for taking medications.

FIGS. **120-123** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device for providing data alerts.

FIGS. **124-127** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device for setting notification preferences.

FIGS. **128-131** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device for displaying information about the account and about the system.

FIGS. **132-135** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device for editing account.

DESCRIPTION

In various aspects, the present disclosure is directed generally to an apparatus, system, and method for managing adherence to a regimen in a subscription based computer implemented healthcare information environment. For example, the regimen may be a medication regimen, an exercise regimen, a combination of medication and exercise regimen, etc. In accordance with the present disclosure, medication adherence packaging is transformed into a digital tool that assists in taking medications on schedule and managing activities of daily life by facilitating communication between users (e.g., patients) and third parties, such as, for example, personal caregivers (e.g., carers), loved ones, spouses, family members, friends, physicians, pharmacists, among others. In one aspect, a wearable receiver (e.g., electronic patch) is worn by a person taking medications. As used herein, the term "medication" includes ingestible preparations such as pharmaceuticals, such as prescribed or over-the-counter preparations; vitamins; placebos, etc. Medications may be provided in one or more form factors, e.g., pills, tablets, capsules, gel capsules, soft gel capsules, etc. The wearable receiver detects a communication from an ingestible device such as an implantable device, an implantable pulse generator such as a pacemaker, for example, a stent; an implantable transceiver; an ingestible device, such as an ingestible event marker (IEM) device, an ingestible RFID device, an ingestible coil or antenna device; among other devices. In the case of an IEM device, a microelectronic circuit is associated with a medication, e.g., a medicinal dose, to indicate the occurrence of a medication event, for example. The wearable patch device is worn by the person taking the medication to detect the ingestion of the medicinal dose comprising an IEM device embedded therein. The wearable receiver communicates the information to a mobile device. In one aspect, the present disclosure provides a system where the mobile device communicates over one or more than one wireless network to communicate information associated with medication dosing events to a back-end processing system that manages the administration of medication and facilitates communication between the person taking the medication and third parties such as their caregivers, physicians, and/or pharmacists, for example. In one aspect, an adherence package according to the present disclosure comprises, in addition to the medication, a wearable receiver and an IEM device.

The subscription information system according to the present disclosure enables focus on care management of and communication with the patient. Various aspects of the system may be configured to convey trends in activities of daily life, including activity, rest, and medication taking. Also, in other aspects, the system may be configured to assist managing activities of daily life, including taking the appropriate medications on schedule and managing amount and timing of activity and rest. In various aspects, the system also may be configured to facilitate communication between patients and designated third parties. In various aspects, the system may be configured for patients who are primarily responsible for their own care, taking multiple medications, and who are candidates for adherence support. In other aspects, the system may be configured for patients with personal caregivers who assist with or oversee their care. In other aspects, the system may be configured for patients who are capable of using, or have a caregiver capable of using smartphone technology.

In one aspect, the subscription information system according to the present disclosure may be based on adherence packaging products already available on the market. Pharmacies may provide these adherence packages where the pharmacist pre-fills a set of blister packs with a person's medications at different dosage times for a predetermined period such as a day, a week, a month, and so forth. The present disclosure adds one more component, an ingestible device, into at least one blister. For example, a medicinal dose (e.g., a tablet) is added into each of the existing blisters, where the medicinal dose includes an event marker or other ingestible device such as an IEM device, RFID device, etc. In another example, a placebo is added to at least one of the blisters, where the placebo includes an ingestible device such as an IEM device, RFID device, etc.

In one aspect, the subscription information system according to the present disclosure is based on a predetermined adherence packaging form factor and assists a person in taking medication on schedule and managing their activities of daily life. Activities of daily life, among other things, include getting up and moving around, taking medications, ensuring they get adequate rest. One way of assisting with these activities is by facilitating communication between the patient and their caregivers. It will be appreciated, that the subscription information system according to the present disclosure is not intended to replace other forms of communication between the patient and third parties. It is meant, however, to facilitate communication and to provide a layer of information that a patient, carer, etc., would not otherwise have and to focus on interpersonal communication with people on things that are not tactical, generally speaking. Thus, for example, when a relative calls an ill person, the conversation can focus on some normal daily activity such as the book she is reading rather than focusing on whether the person took their medications or whether they exercised for ten minutes on that day.

Once the information is communicated to a mobile device, the subscription information system according to the present disclosure provides a graphical user interface (GUI). In one aspect, the GUI is associated with the mobile device and provides a personal information stream which is effectively a timeline for any given day in the form of an activity indicator, e.g., displayed as an "activity ribbon," that shows in a simple and concise manner how the person is spending each moment

of the day. For example, generally, people will spend a lot of time sleeping, then get up to run some errands, and maybe rest in their chair and watch television when they are done. Later they may get up and go for a walk that elevates their heart rate, get a little exercise, and then return home to sit, rest, and eventually go to sleep. In one aspect, an activity ribbon is provided to show how a person transitions between different states throughout a predetermined period such as day or night. Accordingly, at a glance, the person can readily tell if, in a given night, they have been really disruptive and getting up to go to the bathroom multiple times, or if they tossed and turned all night with really sleeping restfully. This information can be obtained just by looking at the state of an activity ribbon as displayed on a mobile device display GUIs. In addition, in one aspect, the medication events timeline associated with the person can be shown below the activity ribbon along a running time line. Accordingly, the subscription information system according to the present disclosure presents the scheduled medication times as one set of icons and the actual detected medication ingestion times by another set of icons. A person can visually correlate the scheduled versus actual medication times without judgment as presented by the GUI. In this manner, the absence of judgment may enhance usability of the system which, in turn, optimizes adherence to various regimens.

The subscription information system according to the present disclosure provides certain value propositions across the stakeholders, e.g., for the patient, the caregiver, the physician, and the pharmacy. For the patient, the subscription information system according to the present disclosure provides personalized data-driven feedback notifications to help the patient manage his or her daily life. The system further provides earlier detection of negative trends, easier communication with personal physicians, and decreased isolation via an enhanced sense of connectedness. Overall, the system may provide the patient with better quality relationships with caregivers and with less focus on tactical care needs. In addition, use of the system may result in significant cost savings as a result of adherence to medication regimens, e.g., costs otherwise incurred due to non-adherence such as the cost of treating escalated illnesses, etc.

For the caregiver, the subscription information system according to the present disclosure provides reassurance that a loved one is doing okay. Personalized data-driven notifications are set as per personal thresholds. This also leads to better quality relationships with patients with less focus on tactical care needs.

For the pharmacist, the subscription information system according to the present disclosure provides improved adherence to medication by the patient and to increased prescriptions. The system also provides consumer pay, subscription-based mobile phone applications, premium priced adherence packaging services, and increased share of care-at-home services. In addition, the system provides increased consumer loyalty, store traffic and retail cross-selling and new ways to partner with local trusts and health authorities, among other things.

For clarity of disclosure, these and other aspects of the present disclosure will now be described in conjunction with the associated figures. Also, prior to describing the subscription information system, the disclosure first turns to a description of an overall system in which the subscription information system may be practiced. Accordingly, turning now to FIG. **1**, where one aspect of a system **100** is illustrated. The system **100** comprises a mobile device **102** (e.g., a first node), such as a mobile communication device, for detecting a communication associated with the ingestible event marker **104** (IEM), e.g., an electrical signal generated by the IEM **104**; data associated with the electrical signal and communicated from a receiver to the mobile device **102**, etc. As shown, a living subject such as a patient **106** has recently ingested an IEM device **104** and is holding a mobile device **102** in her hands. In one aspect, the patient **106** puts on a wearable receiver **108** (e.g., electronic patch) that senses a communication from the IEM device **104** via one or more electrodes and then communicates with the mobile device **102**. The mobile device **102** is configured to communicate to a backend processing system such as a remote processing system **122** using a variety of techniques over a variety of wired or wireless communication networks as described in more detail hereinbelow.

Various aspects of an IEM device are disclosed in commonly assigned U.S. Patent Application Publication No. 2008-0284599 A1 entitled, "Pharma-Informatics System" filed on Apr. 28, 2006, which is herein entirely incorporated by reference.

The architecture and operation of a typical wearable receiver **108** and various related aspects are disclosed in commonly assigned U.S. Patent Application Publication No 2010-0312188 A1 entitled "Body-Associated Receiver and Method" filed on Dec. 15, 2009, and is further explained in more detail below in connection with FIG. **54** whereas the architecture and operation of a typical IEM device **104** is explained in more detail below in connection with FIG. **55**.

In one aspect, shortly after the patient **106** ingests an IEM device **104**, the digestive fluids **114** in the stomach **116** activate the IEM device **104** to begin conducting a unique electrical current signature, which corresponds to various data. The data, for example, may include data identifying the IEM device **104**, data identifying the medication, etc. In various aspects, for example, an IEM device **104** or components thereof may pass through the patient's system. In various aspects, the IEM device **104** may be partially or fully digestible. In various aspects, IEM devices **104** may be configured to communicate continuously or intermittently with the wearable receiver **108** after ingestion. In other aspects, an IEM device **104** may be configured to be selectively activated, deactivated, and/or reactivated.

The electrical current signature generated by the IEM device **104** while disintegrating in the digestive fluids **114** is detectable by a detection arrangement portion of the wearable receiver **108** coupled to the patient **106**.

In use, after the patient **106** ingests the IEM device **104**, the electrodes portion of the wearable receiver **108** contacting the skin of the patient **106** pick up the current signal generated by the activated IEM device **104**. Once the detection arrangement is in place, an application is launched on the mobile device **102** and the patient **106** takes their medication from the blister pack, which includes the IEM device **104**. The application may be launched automatically upon detection of a transmission from the wearable receiver **108** or may be launched by user selection using conventional techniques such as a mouse over and click, pushbutton switch activation, virtual pushbutton switch activation, voice recognition, vibration, tapping a GUI element, orientation of the device, for example.

With reference still to FIG. **1**, the wearable receiver **108** acts as a first node for the detection of the unique current signature generated by the IEM **104** and the mobile device **102** acts as a second node for the detection of a communication from the wearable receiver **108**. In response to a detection of the unique current signature generated by the IEM device **104** via the wearable receiver **108**, the mobile device **102** may perform a number of functions. In one aspect, the mobile

device **102** may store the time and date when the communication was detected, which corresponds approximately to the time and date of ingestion of the IEM device **104** by the patient **106**. In addition, the mobile device **102** may store the information encoded in local memory. For example, the identity of the IEM device **104**, the type of medication associated with the IEM device **104**, the manufacturer of the medication and/or IEM device **104**, among other information, may be encoded by the unique electrical current signature, without limitation.

Generally, however, the mobile device **102** transmits the detected information associated with the IEM device **104** either to a wireless node **110** (e.g., a third node or local node) or to a cellular tower **124** in order to transmit the information to a remote processing system **122**, also known as a backend processing system. The wireless node **110** may comprise, for example, a mobile station or fixed station having wireless capabilities. Examples for the wireless node **110** may include any of the examples given for the mobile device **102**, and further may include a wireless access point, base station or node, base station radio/transceiver, router, switch, hub, gateway, and so forth. In one aspect, for example, the wireless node **110** may comprise a base station for a cellular radiotelephone communications system. Although some aspects may be described with the wireless node **110** implemented as a base station by way of example, it may be appreciated that other aspects may be implemented using other wireless devices as well. The wireless node **110** may be a communication hub, access point, another mobile device, and so on. Accordingly, the wireless node **110** may act as a local access point to wide area networks such as the Internet to communicate the information received from the IEM device **104** to a node **122**, which is remotely located from the first and second nodes, e.g., the mobile device **102** and the wireless node **110**, respectively. The remote node **122** may be a healthcare facility (physician's office, hospital, pharmacy), drug manufacturer, nutrition center, back end patient healthcare data processing facility, backend processing system, and the like.

In one aspect, the mobile device **102** communicates with the wireless node **110** over a wireless medium **134**. In various aspects, the mobile device **102** and the wireless node **110** may comprise or be implemented by a wireless device. The wireless device generally may comprise various physical or logical elements implemented as hardware, software, or any combination thereof, as desired for a given set of design parameters or performance constraints. In various aspects, the physical or logical elements may be connected by one or more communications media. For example, communication media may comprise wired communication media, wireless communication media, or a combination of both, as desired for a given implementation. In various implementations, the described aspects of the mobile device **102** and/or the wireless node **110** may comprise part of a cellular communication system to communicate with a cellular network **128** via cellular tower **124** over wireless medium **136**.

As shown in FIG. **1**, the wireless node **110** is in communication with a remote node **122**, e.g., a backend processing system. The remote node **122** comprises a processing system **138** communicatively coupled to a database **140**. Information associated with patients, including identity and medication types and doses, may be stored in the database **140**. In one aspect, the processing system **138** receives information from the mobile device **102** via the wireless node **110** and accesses the information in the database **140** to provide information to the care provider through the wireless node **110** and/or the mobile device **102**. The remote node **122** can communicate various information; for example, identification information such as a photo of the patient for identification, a photo of the IEM device **104** before it is ingested, the type of medication combined with the IEM device **104**, as well as confirmation of the type and dose of medication that the patient ingested. The wireless node **110** can communicate with the remote node **122** using any mode and frequency of communication that is available at the site, such as wireless, G2, G3, G4, real-time, periodically based on predetermined time delays, as well as store and forward at later time.

Vehicles of communication between the wireless node **110** and the remote node **122** include a network. In various aspects, the network may comprise a LAN as well as a WAN including without limitation Internet, wired channels, wireless channels, communication devices including telephones, computers, wire, radio, optical or other electromagnetic channels, and combinations thereof, including other devices and/or components capable of/associated with communicating data. For example, the communication environments include in-body communications, various devices, various modes of communications such as wireless communications, wired communications, and combinations of the same.

The processing system **138** at the remote node **122** may comprise servers configured as desired, e.g., to provide for subject directed permissions. For example, the servers may be configured to allow a family caregiver to participate in the subject's therapeutic regimen, e.g., via an interface (such as a web interface) that allows the family caregiver to monitor alerts and trends generated by the server, and provide support back to the patient. The servers also may be configured to provide responses directly to the subject, e.g., in the form of subject alerts, subject incentives, which are relayed to the subject via the communication device. The servers also may interact with a health care professional, e.g., RN, physician, which can use data processing algorithms to obtain measures of health and compliance of the subject, e.g., wellness index summaries, alerts, cross-patient benchmarks, and provide informed clinical communication and support back to the patient. The servers also may interact with pharmacies, nutrition centers, and drug manufactures.

In one aspect, the remote node **122** may store information received from the mobile device **102** in the database **140**. Such information may comprise the approximate time and date stamp when the IEM device **104** was ingested by the patient **106**. In addition, an identification number such as a serial number, for example, associated with the IEM device **104**, the individual patient identification, the source of the medication, and the expiration date or shelf life of the medication combined with the IEM device **104** may be stored in the database **140**.

Still with reference to FIG. **1**, in one aspect, shortly after the IEM device **104** is ingested by the patient **106**, the IEM device **104** communicates information to the wearable receiver **108** via the detection arrangement, e.g., the electrodes. The wearable receiver **108**, in turn, communicates the information to the mobile device **102**, which may communicate the information either to the wireless local node **110** (e.g., via a Wi-Fi connection) or may communicate with a cellular tower **124** and base station **126** and can access the Internet **130** via a cellular network **128**. Accordingly, information received by the mobile device **102** from the IEM device **104** can be communicated to the remote node **122** via the Internet **130** through the cellular network **128**. The processing system **138** at the remote node **122** receives the information from the mobile device **102** and may store it in the database **140**.

In another aspect, the mobile device **102** communicates with a local wireless access point **110** (e.g., Wi-Fi), which is coupled to a LAN **112**. The LAN **112** is coupled to a WAN

such as the Internet **130**, which is coupled to the remotely located remote node **122**. Upon detecting the unique electrical current signature generated by the IEM device **104**, (e.g., by way of receiving data/information associated with the electrical current signature from the wearable receiver **108**), the mobile device **102** can communicate the information to the processing system **138** at the remote node **122** via the access point **110**, LAN **112**, and Internet **130**. The processing system **138** stores the information in the database **140**. The remote node **122** can access other networks **132** for additional processing of the information associated with the IEM device **104** stored in the database **140**.

In another aspect, the mobile device **102** may transmit information associated with the IEM device **104** to another mobile device. The other mobile device then communicates with the cellular tower **124**, base station **126**, cellular network **128**, and the Internet **130** to the remote node **122**. In another aspect, the other mobile device communicates with the access point **110**, LAN **112**, and the Internet **130** to the remote node **122**. Once communication is established with the remote node **112**, the information associated with the IEM device **104** can be processed by the processing system and/or stored in the database **140**. Additional details associated with the system **100** are described hereinbelow.

In connection with the description of FIGS. **2-51**, for conciseness and clarity reference will also be made to the system **100** and elements thereof shown in FIG. **1**. Having described a basic system, in which the subscription information system according to the present disclosure may be implemented, the description now turns to FIG. **2**, which illustrates one aspect of a weekly adherence package **200** received by the patient **106**. The adherence package **200** comprises, for example, a foldable sheet **202** that can be creased at various sections **214** and folded into a discreet and convenient package for the patient **106** to use. The contents of the adherence package **200** generally include a wearable receiver **108** (e.g., an electronic patch), a plurality of identification labels **206**, and a plurality of blisters **208** containing a predetermined supply of medications located therein. Each blister **208** may be filled by the pharmacist and may include an IEM device **104** for tracking the medication events and generating a medication timeline as described in detail hereinbelow. It will be appreciated that each daily dosing section of the adherence package **200** may include any number of blisters **208** based on the medication needs and requirements of the patient **106**. As shown, the adherence package **200** includes a weekly supply of medication where each day includes four dosing events, and therefore, there are twenty-eight separate blisters **208**. The weekly blister pack supply of medications also includes a perforation **212** along a horizontal direction so that the patient **106** can remove one or more than one day's personalized supply of medication and take with him by simply tearing along the perforation **212**. It will be appreciated that although the perforations are shown along a horizontal direction for tearing off a daily supply of medications, the perforations also can be provided along a vertical direction **216**. In other aspects, the medication blister packs associated with various predetermined time periods, e.g., individual days of the week, may be configured in a vertical direction rather than a horizontal direction as shown in FIG. **2**. In that aspect, the daily perforations would be provided along a vertical rather than horizontal direction.

In a general sense, the adherence package **200** comprises a sheet **202** with a plurality of tear-away strips associated with a personalized dose. At least one blister pack **208** may be coupled to the sheet for containing the personalized dose and a perforation **212** provided on the sheet **202** to enable removal of the at the least one blister pack **208** from the sheet **202** by tearing along the perforation **212**. In one aspect of the adherence package **200**, at least one of the plurality of tear-away strips comprises an indicia thereon to correlate a time period with the at least one tear-away strip. As illustrated such indicia corresponds to days of the week, although the indicia also may correspond to times of the day, and so on. In another aspect of the adherence package **200**, at least one of the plurality of tear-away strips comprises an indicia **206** thereon to correlate a personalized dose with the at least one tear-away strip. In one aspect, the adherence package **200** further comprises at least one receiver **108** configured to be associated with a living subject **106** and to receive a communication from an ingestible device **104**. The receiver **108** comprises communication circuits to wirelessly communicate with a mobile device **102**. In one aspect, the adherence package **200** further comprises a mobile device **102** configured to communicate with the at least one receiver. In one aspect, the adherence package **200** further comprises at least one ingestible device **104**.

In various aspects, in order to receive the weekly medication adherence package **200**, the patient **106** must enroll, subscribe, register, etc., to the subscription information system according to the present disclosure. Although initially, the patient **106** will receive a start-up kit, the patient **106** will eventually receive weekly medication adherence packages **200** on a weekly or monthly basis, for example. It will be appreciated, however, that a medication adherence package may be implemented in various forms based on whether it is part of an initial purchase, an ongoing weekly, monthly, or other subscription, or an alternative do-it-yourself configuration, which may simply include refill blister packs and wearable receivers, as described hereinbelow. For example, in one aspect, as part of the initial purchase, the patient **106** receives a start-up kit which includes a personal code, a wearable receiver **108** (e.g., electronic patch), several demonstration tablets, and instructions on how to get started using the kit. If the patient **106** does not own a mobile device **102**, one may be provided with the initial purchase. Thus, in one aspect, the start-up kit also may comprise a pre-installed smartphone (e.g., Android) along with use instructions. As part of ongoing monthly subscription, for example, the patient **106** would receive a package similar to the weekly medication adherence package **200** shown in FIG. **2**. A month's supply would include, for example, four weekly medication adherence packages **200**. Each weekly adherence package **200** may include a box of six wearable receivers **108** and wipes and twenty-eight blisters **208** for storing a weekly supply of medication at four daily doses. Each daily dose would also comprise an IEM device **104**. A do-it-yourself supply, may include a box of wearable receivers **108** (e.g., one or two or more and preferably six wearable receivers **108**) and a multi-count blister pack, one box per daily dosing event.

Within minutes of receiving the initial start-up adherence package and opening it up, the patient **106** is able to install the appropriate applications on the mobile device **102** in order to start collecting data from the wearable receiver **108**. The wearable receiver **108** starts collecting activity data after the patient ingests demonstration tablets. Eventually, the patient **106** will receive the actual weekly medication adherence package **200** which contains actual medications and a corresponding IEM device **104** for each medication blister **208** to track the medication events. Once the system is operational, a GUI application launched on the mobile device **102** can be configured to display a variety of personal information such activity and medication streams, personal notifications,

insights into activity and medication trends, among others, which are described in detail hereinbelow in connection with FIGS. **3-51**, for example.

FIG. **3** illustrates one aspect of a personal information stream graphical user interface **300** (GUI) for a display screen of a mobile device **102**. The left top portion of the personal information stream GUI **300** shows the patient's name "Kathryn" along with several GUI elements or icons displayed along the top horizontal portion of the GUI **300**. These GUI elements, for example, may include a first GUI element **316** which corresponds to the display of an activity timeline, generally in the form of an activity ribbon **306** and a medication timeline. One skilled in the art will recognize that the display of an activity timeline may be embodied in various formats and, as such, is not limited to any particular expression thereof. A second GUI element **318** corresponds to the display of activity and/or medication trends. A third GUI element **320** corresponds to the display of configurations, initial set-up, management, and replacement of the wearable receiver **108**. A fourth GUI element **322** corresponds to managing and control of data sharing functions such as invitations and control which data is being shared with the invitee. A fifth GUI element **324** corresponds to system utility tools to personalize and tailor the system to the needs and requirements of the patient **106**.

To activate the GUI **300** the user selects the first GUI element **316** and the display screen of the mobile device **102** shows the activity timeline **302** and a medication timeline **304**. In FIG. **3**, the personal information stream comprising the activity timeline **302** and the medication timeline **304** corresponds to a single 24-hour day. The personal information stream however, may be customized to cover periods of one week, one month, or any suitable custom tailored period. The activity timeline **302** comprises an activity ribbon **306** that shows how the patient **106** is spending each moment of the day being tracked. The activity timeline **302** is shown along the bottom horizontal axis and the level of activity is shown along the vertical axis on the left side of the GUI **300**. In the aspect shown in FIG. **3**, the level of patient activity is displayed as four discrete increments, namely, sleep **308**, rest **310**, moderate physical activity **312**, and elevated physical activity **314**. The activity ribbon **306** scrolls over the timeline and tracks the patient's activities throughout the day. A comment bubble **326** is provided for the patient **106** to enter personal notes to clarify any particular recorded level of activity. Also shown along the bottom horizontal portion of the GUI **300** is the medication timeline **304**, which is marked by an icon of a tablet **328** to indicate the time when a particular medication event occurred. The system displays the times when medications are scheduled to be taken as one set of icons and the actual ingestions corresponding to the detection of the IEM device **104**, as detected by the wearable device **108**, as another set of icons **328**. Accordingly, the system **100** provides no judgment and allows the patient **106**, or third party, to visually correlate daily physical activity levels and medication events by simply presenting the information on the personal information stream GUI **300**.

Accordingly, generally, patients will spend a lot of time sleeping and then they will get up and run some errands and then maybe rest in their chair and watch television at mid-day. Later they may get up and go for a walk that elevates their heart rate, get a little exercise and then come back and sit and rest until they go to sleep. The activity ribbon **306** shows the patient how the patient **106** flows between all those different states throughout a day. Therefore, at a glance, the user can tell if the patient **106**, in a given night, for example, has been really disruptive and has been getting up multiple times to go to the bathroom or if they were tossing and turning and not really sleeping restfully. This can be seen by looking at the state of the activity ribbon **306**. For example a sub-activity portion **330** of the activity ribbon **306** shows that the patient was restless during a period of time when they should have been sleeping.

FIG. **4** illustrates one aspect of a personal notification GUI **400** for a display screen of a mobile device **102**. The personal notification GUI **400** is provided to the mobile device **102** of a third party that has been selected by the patient **106**, such as the patient's caregiver, to notify the caregiver of the occurrence or lack of occurrence of a particular event. The personal notification GUI **400** also may be used to invite the third party to view the patient's data. This is referred to as the sharing function. The patient **106** has complete control over what data the third party can view. The illustrated personal notification GUI **400** provides a notification **402** that the system **100** has not detected any movement by the patient **106** even though at the stated time the patient **106** is usually up and about. The caregiver can then follow up with a suitable action. Other aspects of the personal notification functions are described hereinbelow.

FIG. **5** illustrates one aspect of an activity trend GUI **500** for a display screen of a mobile device **102**. To activate the activity trends GUI **500** the second GUI element **318** is selected. As shown, the activity trends GUI **500** provides the patient's physical activity trend for a given week. The corresponding days of the week **502** are shown along the bottom horizontal portion of the GUI **500**. A first button **514** shows the number of active hours **504** when selected. The corresponding number of hours **504** that the patient **106** is physically active during the course of a day is shown along the left vertical portion of the GUI **500** axis. The active hours **504** are graphed using a bar graph **510**. A horizontal line **512** represents the usual number of hours **504** that the patient is active during the course of a day. A second button **516** shows the number of steps **506** taken by the patient when selected by the user. The number of steps **506** taken by the patient during the course of a day is provided along the right vertical axis. The number of steps **506** taken by a patient is graphed using icons **508** that look like a pair of footprints positioned within a circle. The number of steps **506** taken by the patient **106** is shown along the left vertical portion of the GUI **500**.

Having described the subscription information system according to the present disclosure in general terms, one use aspect of the subscription information system is now described with reference to the foregoing FIGS. **1-5** and subsequent FIGS. **6-11**. Accordingly, once a patient **106** decides to participate in a medication adherence program, they can purchase an adherence start-up kit from the pharmacist.

FIG. **6** illustrates one aspect of an account creation GUI **600** for a display screen of a mobile device **102**. The subscription information system **100** is set up by first creating an account, pairing the wearable receiver **108** with a mobile device **102**, ingesting some demonstration tablets provided in the start-up kit, launching an application, and then viewing the data shown on the display of the mobile device **102**. The system **100** starts providing data to the mobile device **102** with activity capture as soon as the patient **106** sets up the start-up kit. The actual adherence package **200** is generally provided a few days after the start-up kit is set up. As shown in FIG. **6**, after the patient **106** pairs the wearable receiver **108** with the mobile device **102**, an application is launched by the mobile device **102** to create an account. In response, the account creation GUI **600** is shown by the mobile device **102** display. The patient **106** enters the required information in the

appropriate text box, such as, "first name," "last name," "username," "password," and "confirm password."

FIG. **7** illustrates one aspect of a "Manage sharing" GUI **700** for a display screen of a mobile device **102***a* enabling a patient to select with whom to share data and what data to share. FIG. **8** illustrates one aspect of a third party caregiver GUI **710** for a display screen of a mobile device **102***b* for sharing information with a patient. FIGS. **7** and **8** illustrate a patient's mobile device **102***a* and a third party mobile device **102***b*, respectively. The third party has been invited and approved for sharing information with the patient **106** as described hereinbelow. FIG. **7** illustrates a patient (Kathryn) mobile device **102***a* display showing a "Manage sharing" GUI **700** to enable the patient **106** to select with whom to share data and what data to share. As shown in FIG. **7**, the "Manage sharing" GUI **700** shows several elements including the group of GUI elements **316**, **318**, **320**, **322**, **324** described in connection with FIG. **3** icons **702** displayed along the top horizontal portion of the GUI **700**. Each GUI element corresponds to a different action including, for example, the first GUI element **316** corresponds to the display of activity and medication timelines, the second GUI element **318** corresponds to the display of activity and/or medication trends, the third GUI element **320** corresponds to the display of configurations, initial set-up, management, and replacement of the wearable receiver **108**, the fourth GUI element **322** corresponds to managing and control of data sharing functions such as invitations and control which data is being shared with the invitee, and the fifth GUI element **324** corresponds to system utility tools to personalize and tailor the system to the needs and requirements of the patient **106**.

In particular, as shown in FIG. **7**, the fourth GUI element **322** has been selected to open and display the "Manage sharing" GUI **700**. Using the "Manage sharing" GUI **700** the patient **106** can control who can share data and what data can be shared with an invitee. As shown, the "Manage sharing" GUI **700** displays (1) three caregivers named Anna, Jane, and Karl; (2) a pharmacist named Phillips and (3) a physician named Dr. Johnson. The patient **106** can control the information that can be viewed by each of these people separately by selecting the appropriate GUI element. For example, Anna has been enabled to view the personal information activity timeline by selection of element **716***a*; the activity trend chart by selecting element **716***b*; and the medication timeline by selecting element **716***c*. Phillipa (Pharmacist) is only able to view the activity trend chart and the medication timeline because only elements **716***b* and **716***c* were selected. Jane cannot share any data. Dr. Johnson (Physician) can only view the medication timeline because only element **716***c* was selected. Taking Karl as an example, section **704** shows that Karl has been enabled to share the activity timeline and the medication timeline based on selected corresponding elements **716***a* and **716***c*, but not the trend chart. Accordingly, Karl is able to monitor whether Kathryn is moving around and taking her medications. Since the trend chart element **716***b* is not selected, Kathryn has not granted Karl access to view her trend charts.

FIG. **8** illustrates one aspect of a third party caregiver (Karl) GUI **710** for a display screen of a mobile device **102***b* while sharing information with the patient **106** (Kathryn). The caregivers' mobile device **102***b* display shows a third party sharing GUI **710**. The GUI **710** displays only the data that the patient **106** has granted permission for. As previously discussed, the patient **106** (Kathryn) invited the caregiver (Karl) to share some of her data. Accordingly, the GUI **710** shows the patient's name Kathryn in the upper left portion **712** of the GUI **710**. Since the patient **106** Kathryn has granted Karl permission to view her activity timeline **714** and medication timeline **718**, Karl is able to view these elements by selecting the activity timeline GUI element **708** on the GUI **710**.

FIGS. **9-11** illustrate various aspects of support GUIs for a display screen of a mobile device **102**. FIG. **9** illustrates one aspect of a "Medication trends" GUI **720** for a display screen of a third party mobile device **102***c*. In the illustrated example, the third party mobile device **102***c* belongs to the patient's physician. As shown, the "Medication trends" GUI **720** shows a daily medication trend chart **724** recorded events over a one week period. The physician is able to view the daily medication trend chart **724** if the patient **106** previously enabled this action using the "Manage sharing" GUI **700** as described in FIG. **7**. Returning to FIG. **9**, the physician can display the daily medication trend chart **724** by selecting the activity trend chart element **722**. The medication trend chart **724** shows the number of doses taken by the patient **106** and at what time on a daily basis over a one week period. The days of the week are shown along a bottom horizontal portion of the "Medication trends" GUI **720** and dosing times are shown along the left vertical portion of the "Medication trends" GUI **720**. As shown, the physician is able to see that the patient **106** often takes the mid-day dose along with the evening dose as shown by the tablet icon **726** with the number two located thereon.

FIG. **10** illustrates one aspect of an "Activity trends" GUI **730** for a display screen of a third party (e.g., physician) mobile device **102***c*. As illustrated in FIG. **10**, if the physician was granted permission to view the patient's activity trend chart, the physician simply selects the activity trend charts element **722** to display the activity trend charts **734**, **736**. The first activity trend chart **734** corresponds to the number of daily active hours over a one week period. Days of the week are shown along a bottom horizontal portion of the "Activity trends" GUI **730** and the hours 0-24 are shown along the left vertical portion of the "Activity trends" GUI **730**. The second activity trend chart **736** corresponds to the number of steps taken by the patient **106** on a daily basis over a one week period. The number of steps from 0-2 k is shown along the right vertical portion of the "Activity trends" GUI **730**. Accordingly, the physician is able to see the patient's level of activity over the week period.

FIG. **11** illustrates one aspect of a custom notification GUI **740** for a display screen of a patient's mobile device **102***a*. The custom notification GUI **740** is used by the patient to set notifications before or after a medication dose is due to be taken or to cancel medication notifications if an IEM device **104** is detected within a predetermined period of taking the medication (e.g., ingesting the IEM device **104**). In particular, a drop-down list element **742** may be used to set a reminder at a predetermined time before the dose is due (e.g., 20 minutes). A second drop-down list element **744** may be used to set a reminder at a predetermined time after the dose is due (e.g., 40 minutes). A third drop-down list element **746** may be used to cancel medication notifications if an IEM device is detected with in a predetermined time (e.g., 1 hours) of taking the dose.

In respect to sharing the patient's data with a caregiver or other party, in one aspect, applications associated with the subscription information system according to the present disclosure whether they are executed on the mobile device **102** or the remote processing system **122**, provide a mechanism to ensure that the person with whom the patient intends to share the data is really the intended person. It is the industry standard, for example with web sites like Google Health or Microsoft Health Vault, that such applications requests that the user enter their email address in twice and then press send.

It is very common, however, that a person incorrectly enters their email address both times. Therefore, in conventional applications there is no real guarantee that entering an email address twice assures that the intended party receives the information being shared by the patient. In accordance with one aspect, for security and privacy reasons, the present application requests that the user enter their email address once and then select the "send" button. The patient receives a personal code and an email from the remote system **122** saying that the patient has invited a caregiver, or other third party, to share the patient's medical data. The patient then must communicate separately with the invitee either over the phone or separate email to disclose to the invitee the patient's personal code. The caregiver must enter the personal code to accept the patient's invitation to share data. The subscription information system according to the present disclosure does not replace any sort of interpersonal communication with the caregiver, but rather strengthens those relationships and opens up a different line of communication between patient and caregiver.

FIGS. **12-51** will now focus on a specific implementation of the mobile device **102** functionality from creating an account, pairing the wearable receiver with the mobile device, viewing timelines, managing and replacing the wearable receiver, setting up invitees to share data, and using tools to configure the system to the specifications of the patient. Accordingly, turning now to FIGS. **12-14**, where a mobile device **102** display showing a series of GUIs for a display screen of a mobile device **102** that are displayed during the process of creating an account. Once the create account application is launched, the patient mobile device **102** display screen shows a "Sign In" GUI **1200** shown in FIG. **12**. The "Sign In" GUI **1200** comprises a "username" text box **1202** as well as a "password" text box **1024** that enables the patient **106** to enter the appropriate information.

Once the appropriate information is entered into the "username" text box **1202** and the "password" text box **1204** and the "Create Account" button **1206** is selected, the display screen of the mobile device **102** shows the "Welcome" GUI **1300** as shown in FIG. **13**. The "Welcome" GUI **1300** comprises a "personal code" text box **1302** for the patient to enter the personal code located on the start-up kit in before moving to the next screen by selecting the "Next" button **1304**. As briefly mentioned above, the personal code comes with the start-up kit and for security reasons is communicated to an invitee to share data on a separate communication by the patient.

Upon entering the personal code from the start-up kit into the "personal code" text box **1302** and selecting the "Next" button **1302**, the display screen of the mobile device **102** shows a "Create Account" GUI **1400** as shown in FIG. **14**. The "Create Account" GUI **1400** comprises a "first name" text box **1402**, a "last name" text box **1404**, a "username" text box **1406**, a "password" text box **1408**, and a "confirm password" text box **1410**. Selecting the "Next" button **1412** sends the information entered by the user to the remote processing system **122** (e.g., the backend processing system) and creates an account in the name of the patient.

FIGS. **15-18** illustrate various aspects of GUIs for a display screen of a mobile device **102** for wearing and demonstrating the wearable receiver. As shown in FIG. **15**, a first GUI **1550** provides instructions to set up the wearable receiver (e.g., electronic patch). The GUI **1500** shows a wearable receiver element **1502** having a flashing button element **1504** and provides instructions to push the corresponding button on the actual wearable receiver **108** (patch) until the light blinks. Accordingly, at this time the patient removes the wearable receiver from the start-up kit and pushes the button on the receiver **108**. The patient then selects (taps) the "Next" button **1506** to proceed to the subsequent GUI.

FIG. **16** shows a subsequent GUI **1600** on the display screen of the mobile device **102**. The GUI **1600** shows a wearable receiver element **1602**, a mobile device element **1604**, and a wireless element **1606** indicating that the mobile device **102** and the wearable receiver **108** are in the process of connecting. During the connecting process, the wearable receiver **108** is paired with the mobile device **102** so that the two devices can communicate with each other.

FIG. **17** shows a new GUI **1700** on the display screen of the mobile device **102** when the wearable receiver **108** and the mobile device **102** are connected. The GUI **1700** provides feedback that the mobile device **102** and the wearable receiver **108** are connected and provides instructions to place the wearable receiver **108** on the left side of the patient's torso. The screen also displays a patient element **1702** with a wearable receiver element **1704** placed on the left side of the torso of the patient element **1702**. Upon accomplishing this task, selecting the "Next" button **1706** launches the next GUI **1800**.

FIG. **18** shows a GUI **1800** on the display screen of the display device **102**. The GUI **1800** provides instructions for the patient **106** to take the two demonstration pills that were provided with the start-up kit and then select the "Done" button **1808**. The GUI **18000** also displays two demonstration pill elements **1802**, **1804** and a clock element **1806** to indicate to the patient that the remote processing system **122** will confirm that the system **100** will be ready to help the patient in a predetermined amount of time. As illustrated by the screen **1800**, the patient **106** is advised that the remote processing system **122** will be ready to assist within 10 minutes, for example. It will be appreciated that additional GUIs may be provided to indicate to the patient **106** that the mobile device **102** is waiting for a response back from the remote processing system **122**. Another GUI may be provided to inform the patient **106** that the remote processing system **122** has detected the two demonstration pills and further display two buttons: (1) A first button "See may data" and (2) a second button "Share my data," for example. An additional GUI may be provided to indicate that the remote processing system **122** has not yet detected the demonstration pills and display an additional "Troubleshoot" button.

Once the patient **106** has completed the tasks associated with the wear and demonstrate phase as shown and described in connection with FIGS. **15-18** and the remote processing system **122** has successfully detected the ingestion of the demonstration pills, the display screen of the mobile device **102** shows a home GUI **1900** as shown in FIG. **19**. The home GUI **1900** shows the timeline view that characterizes the patient's daily activities and medication ingestions. The GUI **1900** is similar to the GUI **300** shown and described in connection with FIG. **3** and for the sake of conciseness will not be repeated here.

FIGS. **20-23** illustrate various aspects of timeline GUIs for a display screen of a mobile device **102** characterizing a patient's daily physical activity and medication ingestions. FIG. **20** illustrates a GUI **2000** for a display screen of a mobile device **102** showing an activity timeline **2004** and a medication timeline **2008** that characterizes the patient's daily physical activity and medication ingestions, respectively. The GUI **2000** is displayed when the timeline element first GUI element **316** corresponding to the display of activity and medication timelines is selected from a group of elements displayed along the top horizontal portion of the screen layout **2000**. To enter a note that will be displayed either on the

activity timeline **2004** or the medication timeline **2008**, the lower portion of the screen **2006** where the text "Make a Note . . . " appears is selected.

Upon selecting the lower portion of the screen **2006**, the display screen of the mobile device **102** shows a "Make a Note" GUI **2100** to select whether the note will appear on the activity timeline **2004** or the medication timeline **2008**, as shown in FIG. **20**. As shown in FIG. **21**, selecting the "Meds" element **2104** will place the note in the medication timeline **2008** and selecting the "Activity" element **2106** will place the note in the activity timeline **2004**.

When the "Meds" element **2004** is selected in the "Make a Note" GUI **2100** of FIG. **21**, the display screen of the mobile device **102** shows a GUI **2200** as shown in FIG. **22**. A "text box" **2202** is provided to enter the note using the virtual keyboard **2204**. A medication element **2206** is shown along with the current date to reinforce that the note will be placed in the medication timeline rather than the activity timeline.

When the "Activity" element **2006** is selected in the "Make a Note" GUI **2100** of FIG. **21**, the display screen of the mobile device **102** shows a GUI **2300** as shown in FIG. **23**. A "text box" **2302** is provided to enter the note using the virtual keyboard **2304**. An activity timeline element **2306** is shown along with the current date to reinforce that the note will be associated in the activity timeline rather than the medication timeline.

FIG. **24** illustrates one aspect of an activity trend chart GUI **2400** for a display screen of a mobile device **102** showing a patient's activity trend over a one week period. The activity trend chart **2402** can be customized to show the patient's the patient's metrics (e.g., activity trend) over any predetermined period. For example, as shown in FIG. **25**, the activity trend chart **2502** shown in GUI **2500** shows the patient's activity trend over a one month period. The GUI **2400** may be opened by selecting the GUI element **318** corresponding to the display of activity and/or medication trends.

FIG. **26** illustrates one aspect of a medication trend GUI **2600** for a display screen of a mobile device **102** showing a patient's medication trend over a one week period. The GUI **2600** may be opened by selecting the GUI element **318** corresponding to the display of activity and/or medication trends. The medication trend chart **2602** shows the time of day when medication was ingested by the patient **106**. The ingestion time and medication type are communicated by the IEM device **210** to the wearable receiver **108**, which is communicated to the mobile device **102** and eventually to the remote processing system **122**. The medication trend chart **2602** may be illustrated as follows, for example, on day 23/5 the patient **106** took medication in the morning as indicated by pill element **2602**, medication at mid-day as indicated by pill element **2604**, and medication in the evening as indicated by pill element **2606**. On day 19/5 the patient **106** entered a note in the medication trend chart **2602** as indicated by pill element **2608**. On day 22/5 the patient **106** took two doses of medication in the evening as indicated by pill element **2610**. Under "Today," the medication trend chart **2602** shows that as of 10:42 pm, the patient **106** has not yet taken the evening medication. Overall, the medication trend chart **2602** shows that for the most part, the patient **106** has been taking their medication at the appropriate times and in the appropriate amounts.

FIG. **27** illustrates one aspect of a "Send a Report" GUI **2700** for a display screen of a mobile device **102** for sending a report. The GUI **2700** provides an email entry box **2702** for selecting or entering an email address where to send the report. The reporting period begin and end dates can be chosen by selecting the calendar elements **2704** and **2706**, respectively. Alternatively, the reporting period begin and end dates can be entered into respective text boxes next to the calendar elements **2704**, **2706**. A resolution text box **2708** is provided to select the resolution of the report, e.g., single days, weeks, months, and so on. The email text box **2702** and the resolution text box **2708** are provided with a drop-down list option to make the selecting process more convenient.

FIG. **28** illustrates one aspect of a "Test System" GUI **2800** for a display screen of a mobile device for managing a wearable receiver (e.g., patch). FIG. **29** illustrates one aspect of "Replace Patch" GUI **2900** for a display screen of a mobile device for replacing a wearable receiver (e.g., patch). With reference to FIGS. **28** and **29**, the "Test System" GUI **2800** and "Replace Patch" GUI **2900**, respectively, are associated with a wearable receiver (e.g., patch) system management and a wearable receiver (e.g., patch) replacement. Both GUIs **2800**, **2900** can be opened by selecting the patch element **2802**, **2902** displayed on the top horizontal portion of the screen. As shown in FIG. **28**, the system can be tested by selecting the "Test System" button **2804**. Selecting the "Replace Patch" button **2806** opens the "Replace Patch" GUI **2900** shown in FIG. **29** for replacing the wearable receiver (e.g., patch). The "Replace Patch" GUI **2900** displays a patch element **2902** corresponding to the wearable receiver **108** and a flashing button element **2904**. The wearable receiver **108** can be replaced by pushing the button located on the wearable receiver **108** until the light blinks and then selecting (e.g., tap) the "Next" element **2906**.

FIG. **30** illustrates one aspect of a "Manage sharing" GUI **3000** for a display screen of a mobile device for inviting caregivers to data sharing. FIG. **31** illustrates one aspect of an "Invite" GUI **3100** for a display screen of a mobile device for inviting caregivers to share and controlling data sharing. With reference to FIGS. **30** and **31**, the "Manage sharing" GUI **3000** and "Invite" GUI **3100**, respectively, are employed for inviting caregivers and controlling data sharing. The "Manage sharing" GUI **3000** and the "Invite" GUI **3100** can be opened by selecting the respective share GUI element **322** displayed at the top horizontal portion of the GUIs **3000**, **3100**. Turning now to FIG. **30**, the "Manage sharing" GUI **3000** is used to manage the data sharing with third parties, such as caregivers, whom the patient **106** wishes to share their personal data. Both a person with whom to share the data as well as the type of data to be shared can be selected. The selected elements are highlighted. In the aspect illustrated in FIG. **30**, Anna has been selected to share data associated with the activity timeline **3004**, activity trend chart **3006**, and medication timeline **3008**. Chet, however, has been selected to share only data associated with the activity timeline **3002** and activity trend chart **3006**, but not data associated with the medication timeline **3008**. No data is being shared Jane. Karl has been selected to share only data associated with the activity timeline **3004** and the medication timeline **3008**, but not data associated with the activity trend chart **3006**. Larry has been selected to share only data associated with the medication timeline **3008**. A new person with whom to share data can be added by selecting the add element **3010**. As previously discussed, data can be shared with anyone who is trusted such as a caregiver, loved one, family member, physician, pharmacist, friend, among others.

In FIG. **31**, the "Invite" GUI **3100** for creating an invitation to share data provides several text boxes for the purpose of identifying the person to send the invitation such as the nickname text box **3104**, an email text box **3106** to enter the person's email address, and a relationship text box **3108** to enter the relationship between the patient and the person they are about to invite to share data. As illustrated in FIG. **31**, both

the email test box **3106** and the relationship text box **3108** include a drop-down list element to select email addresses and relationship identifiers from a predetermined list. The type of data to share with the new person may be selected using the activity timeline element **3110**, the activity trending chart element **3112**, and/or the medication timeline element **3116**. All the data elements **3110**, **3112**, **3114**, a subset, or none at all may be selected. Toward the bottom portion of the "invite" GUI **3100**, the display provides a notification to protect the patient's privacy along with a personal code. As shown in FIG. **31**, the privacy notification informs the patient that the recipient of the invitation will need to enter the personal code shown on the display, which in the present illustrative example is "1A2B3C."

FIGS. **32-35** illustrate various aspects of utility tools GUIs **3200**, **3300**, **3400**, and **3500** for a display screen of a mobile device for tailoring the subscription information system based on personal needs and requirements of the patient **106**. Turning now to FIG. **32**, the utilities GUI **3200** may be opened by selecting the tool element **324** displayed at the top horizontal portion of the GUI **3200**. The display then shows a menu of four selectable elements: "My Notification," "My Information," "Date & Time," and "Help." Selecting any of these menu items results in a different function to be executed and opens a new GUI. As shown in FIG. **32**, the "My Notifications" element **3204** is encircled to illustrate that it has been selected. In actual operation, the selected is not encircled, but rather may be highlighted.

When the "My Notifications" element **3204** is selected, the display screen of the mobile device **102** shows the "My Notifications" GUI **3300** as shown in the FIG. **33**. The "My Notifications" GUI **3300** shows several elements that may be selected for notification: "Activity" notification element, "Rest" notification element, "Meds" notification element, "Patch" notification element, and "Preferences" notification element. When the Activity notification element **3302** is selected, the display screen of the mobile device **102** shows the "Activity" GUI **3400** as shown in FIG. **34**. Now specific regarding the "Activity" notification can be entered into the system. For example, a notification will be sent to the mobile device **102** if no activity has been detected for 4 hours, as indicated in the text box **3402**. A drop-down list element may be employed to select from various predetermined values. Also, a window of time when the "No Activity" notification should be sent can be entered using text boxes **3404** and **3406**. As shown, the selected notification window is between the hours of 8:00 am and 10:00 pm. These times may be selected using the respective drop-down lists. Finally, a notification may be requested if no activity is detected by a certain time as indicated in the text box **3408**. Again, a drop-down list element may be employed to select from predetermined values. A virtual slide switch element **3410** may be used to toggle the Activity notification function ON and OFF.

When the Rest notification element **3304** is selected the display screen of the mobile device **102** shows the "Rest" GUI **3500**. A "Rest" notification can be sent to the mobile device **102** if the daily rest is less than a selected amount of time (e.g., 4 hours) as shown in text box **3502**. Also, a "Rest" notification may be sent to the mobile device **102** if daily rest is more than a selected amount of time (e.g., 10 hours) as shown in text box **3504**. In the aspect illustrated in FIG. **35**, each of the text boxes **3502**, **3504** also include a drop-down list element to simplify the selection process.

FIGS. **36-39** illustrate various aspects of Utilities GUIs **3600**, **3700**, **3800**, and **3900** for a display screen of a mobile device **102** for tailoring the subscription information system based on the personal needs and requirements of the patient **106**. In FIG. **36**, the display screen of the mobile device **102** shows the "My Notifications" screen **3600** with the Meds element **3602** selected.

When the Meds element **3602** is selected the display screen of the mobile device **102** shows the "Meds" notification screen **3700** as shown in FIG. **37**. From within the "Meds" notification screen **3700**, the number of daily medication doses can be selected via "My Doses" element **3702** and whether to be reminded of taking the medication doses can be selected via the "Remind Me" element **3704**. As shown, the four medication doses have been selected and the "Remind Me" element is set to ON.

Selecting the "My Doses" element **3702** in FIG. **37** opens the "My Doses" notification screen **3800** shown in FIG. **38**. For each of the daily medication doses selected in the "Meds" notification screen **3700** shown in FIG. **37**, the "My Doses" notification screen **3800** display shows a corresponding text box in which a scheduled time for taking the medication is entered. Control buttons **3810** and **3812** can be used to change the times.

Selecting the "Remind Me" element **3704** in FIG. **37** opens the "Remind Me" notification screen **3900** shown in FIG. **39**. The screen **3900** enables setting both a reminder before the scheduled medication time in text box **3902** (e.g., 20 min) and after the scheduled medication time in text box **3904** (e.g., 40 min). In addition, the medication notification can be cancelled if the ingestion of an IEM device **114** (FIG. **1**) is detected within the time indicated in text box **3906**. Each of the text boxes **3902**, **3904**, **3906** may include a drop-down list element for selecting times from a predetermined list. Also, a virtual slide switch element **3908** may be used to toggle the Remind Me notification function ON and OFF.

FIGS. **40-41** illustrate various aspects of GUIs **4000**, **4100** for a display screen of a mobile device **102** for tailoring the subscription information system based on the personal needs of the patient **106**. In FIG. **40**, the display screen of the mobile device **102** shows the "My Notifications" screen **4000**, similar to the "My Notifications" screen **3300** shown in FIG. **33**, except that the "My Notifications" screen **4000** in FIG. **40** shows that the Patch notification element **4002** has been selected. Upon selecting the Patch notification element **4002**, the display screen of the mobile device **102** shows a Patch notification screen **4100** in FIG. **41**. A weekly replacement reminder for the patch may be set by selecting the Patch notification reminder element **4102**. A virtual slide switch element **4104** may be used to toggle the weekly patch replacement notification function ON and OFF.

FIGS. **42-45** illustrate various aspects of GUIs **4200**, **4300**, **4400**, **4500** for a display screen of a mobile device **102** for tailoring the subscription information system based on the personal needs of the patient. In FIG. **42**, the display screen of the mobile device **102** shows the "My Notifications" screen **4200**, similar to the "My Notifications" screen **3300** shown in FIG. **33**, except that the "My Notifications" screen **4000** in FIG. **40** shows that the Preferences notification element **4202** has been selected. Upon selecting the Preferences notification element **4202**, the display screen of the mobile device **102** shows a Preferences notification screen **4300** in FIG. **43**, where additional notification delivery services can be set. Upon selecting the additional notification delivery **4302** element, an Additional Notification Delivery screen **4400** is opened as shown in FIG. **44**, where either Short Message Service (SMS) **4402** or Email **4404** can be selected as an additional notification delivery service if email notification had been previously selected. Otherwise, if the SMS had been previously selected, the Email notification service may be selected as an additional notification delivery service. If SMS

4402 is selected, the display screen of the mobile device 102 shows the SMS screen 4500 shown in FIG. 45. A text box 4502 can be used to enter the telephone number where to send the SMS notification. The text box 4502 may include a drop-down list element for selecting telephone numbers associated with SMS notification from a predetermined list. Also, a virtual slide switch element 4504 may be used to toggle the SMS additional notification function ON and OFF.

FIGS. 46-47 illustrate various aspects of GUIs 4600 and 4700 for a display screen of a mobile device 102 for tailoring the subscription information system based on the personal needs of the patient 106. In FIG. 46, the display screen of the mobile device 102 shows the tools screen 4600 similar to the tools screen shown in FIG. 32, which may be opened by selecting the tool element 3202 displayed at the top horizontal portion of the screen 4600. The display then shows four selectable menu items: "My Notification," "My Information," "Date & Time," and "Help." As shown in FIG. 46, the "My Information" tool 4602 is encircled to illustrate that it has been selected. Upon selecting the "My Information" tool 4602, the mobile device 102 application opens the My Information screen 4700 shown in FIG. 47. As shown in FIG. 47, the My Information screen 4700 provides several text boxes for entering personal information such as a Login text box 4702 to enter an email address, a Password text box 4704 to enter a user password, a Nickname text box 4706 to enter a nickname, an SMS text box 4708 to enter an SMS telephone number, and an Address text box 4710 to enter an address. A sharer code 4712 is provided at the bottom portion of the My information screen 4700 (e.g., 1A2B3C), which is the code that the patient communicates to a person invited to share the patient's information. As previously discussed, after receiving an invitation to share personal data from the patient, for security and privacy reasons the sharer must enter the sharer code 4712 before being able to share any information. The sharer code 4712 may be communicated to the sharer by the patient using any suitable means.

FIGS. 48-51 illustrate various aspects of GUIs 4800, 4900, 5000, 5100 for a display screen of a mobile device 102 for tailoring the subscription information system based on the personal needs of the patient. In FIG. 48, the display screen of the mobile device 102 shows the tools screen 4800 similar to the tools screen shown in FIG. 32, which may be opened by selecting the tool element 3202 displayed at the top horizontal portion of the screen 4800. The display then shows four selectable menu items: "My Notification," "My Information," "Date & Time," and "Help." As shown in FIG. 48, the "Date & Time" tool 4802 is encircled to illustrate that it has been selected. Upon selecting the "Date & Time" tool 4802, the mobile device 102 application opens the Date & Time screen 4900 shown in FIG. 49. As shown in FIG. 49, the Date Format 4902, Tine Format 4904, and Time Zone 4906 may be selected within the Date & Time screen 4900. In addition, the time zone may be "fixed to home" 4908, which may be useful when the patient travels in different time zones and wants to keep the home time zone as a reference time frame for ingestions their medications. As shown in FIG. 50, selecting the Time Zone element 4906 opens the Time Zone screen 5000. Therein, selecting the top radio button 5002, fixes displays and notifications to the home time zone, whereas selecting the bottom radio button 5004 changes the display and notifications may be fixed to the home time zone. If the bottom radio button 5004 is selected, the displays and notifications are changed to match the location of the mobile device 102, e.g., using the GPS location based function available in most modern smartphones. As a matter of convenience, the Home Time Zone is displayed toward the bottom portion of the Time Zone screen 5000. As shown in FIG. 50, the Home Time Zone is London. This may be changed by selecting the Home Time Zone element 5006 and invoking the Home Time Zone selection screen 5100 as shown in FIG. 51 where a new Home Time Zone may be selected.

With reference now back to FIG. 1, in one aspect, the mobile device 102 and/or the wireless node 110 may provide voice and/or data communications functionality in accordance with different types of cellular radiotelephone systems. Examples of cellular communication systems may include Code Division Multiple Access (CDMA) cellular radiotelephone communication systems, Global System for Mobile Communications (GSM) cellular radiotelephone systems, North American Digital Cellular (NADC) cellular radiotelephone systems, Time Division Multiple Access (TDMA) cellular radiotelephone systems, Extended-TDMA (E-TDMA) cellular radiotelephone systems, Narrowband Advanced Mobile Phone Service (NAMPS) cellular radiotelephone systems, third generation (3G) systems such as Wide-band CDMA (WCDMA), CDMA-2000, Universal Mobile Telephone System (UMTS) cellular radiotelephone systems compliant with the Third-Generation Partnership Project (3GPP), fourth generation systems (4G), and so forth.

In addition to voice communication services, the mobile device 102 and the wireless node 110 may be arranged to communicate using a number of different wireless wide area network (WWAN) data communication services. Examples of cellular data communication systems offering WWAN data communication services may include GSM with General Packet Radio Service (GPRS) systems (GSM/GPRS), CDMA/1xRTT systems, Enhanced Data Rates for Global Evolution (EDGE) systems, Evolution Data Only or Evolution Data Optimized (EV-DO) systems, Evolution For Data and Voice (EV-DV) systems, High Speed Downlink Packet Access (HSDPA) systems, and so forth.

In one aspect, the wireless node 110 may be connected by wired communications medium to additional nodes and connections to other networks, including a voice/data network such as the Public Switched Telephone Network (PSTN), a packet network such as the Internet, a local area network (LAN), a metropolitan area network (MAN), a wide area network (WAN), an enterprise network, a private network, and so forth. In one aspect, for example, network 130 may be arranged to communicate information in accordance with one or more Internet protocols as defined by the Internet Engineering Task Force (IETF), such as the Transmission Control Protocol/Internet Protocol (TCP/IP), for example. The network also may include other cellular radio telephone system infrastructure and equipment, such as base stations, mobile subscriber centers, central offices, and so forth.

In various aspects, the mobile device 102 and the wireless node 110 also may be capable of voice and/or data communications. Communications between the mobile device 102 and the wireless node 110 may be performed over wireless shared media 134 in accordance with a number of wireless protocols. Examples of wireless protocols may include various wireless local area network (WLAN) protocols, including the Institute of Electrical and Electronics Engineers (IEEE) 802.xx series of protocols, such as IEEE 802.11a/b/g/n, IEEE 802.16, IEEE 802.20, and so forth. Other examples of wireless protocols may include various WWAN protocols, such as GSM cellular radiotelephone system protocols with GPRS, CDMA cellular radiotelephone communication systems with 1xRTT, EDGE systems, EV-DO systems, EV-DV systems, HSDPA systems, and so forth. Further examples of wireless protocols may include wireless personal area network (PAN) protocols, such as an Infrared protocol, a protocol from the

Bluetooth Special Interest Group (SIG) series of protocols, including Bluetooth Specification versions v1.0, v1.1, v1.2, v2.0, v2.0 with Enhanced Data Rate (EDR), as well as one or more Bluetooth Profiles, and so forth. In one aspect, the Bluetooth wireless technology uses short wavelength radio transmissions in the industrial, scientific, and medical (ISM) radio band from 2400-2480 MHz) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security. Yet another example of wireless protocols may include near-field communication techniques and protocols, such as electro-magnetic induction (EMI) techniques. An example of EMI techniques may include passive or active radio-frequency identification (RFID) protocols and devices. Other suitable protocols may include Ultra Wide Band (UWB), Digital Office (DO), Digital Home, Trusted Platform Module (TPM), Zig Bee, and other protocols.

In various aspects, the mobile device **102** may have one or more application client modules. In one aspect, an application client module receives information from the detection arrangement **108** and process the information to confirm that the patient **106** has ingested the IEM device **104**. The application client module records a time and date that the IEM device **104** was detected, which corresponds approximately to the time and date when the IEM device **104** was ingested by the patient **106**. In addition, client application module may store information encoded in the unique electrical current signature such as the identity of the IEM device **104**, the type of medication associated with the IEM device **104**, the manufacturer of the medication and/or IEM device **104**, among other information. In some aspects, the client application module may implement a data logging function tracking the ingestible events associated with the patient **106**. The client application module can initiate communication with other devices and/or networks.

Other client application modules may be arranged to retrieve and process information from a network (e.g., servers) and display the information on a display or audibly announce the information by way of speaker. The mobile device **102** may be implemented as an open platform adaptable to execute one or more application client programs and integrate with third party software application client programs. The application client modules may provide the necessary interface to existing data sources or backend services, such as web related and wireless services, support GPS navigation modules, process browser based content, and operate with one or more wireless mobile computing devices and web applications, for example. In one aspect, the application client modules may integrate with third party application client programs via APIs to retrieve location information, such as, for example, geographic coordinates, map interfaces, queries for search engines, interfaces to third party location based services (LBS), and any other services provided via servers, and the like. The application client modules may include a GUI layer to process search queries, search results, display maps (e.g., zoom/pan), provide turn-by-turn directions, provide voice activated turn-by-turn directions, and provide permission based interface for LBS type location information, among others. The application client modules also may include an interface layer to process local information, point of interface (POI) data, and a data abstraction layer to process map data, for example. The application client modules also may process data from various data sources or backend services distributed throughout a network (e.g., servers) such as, for example, GPS integrated circuits located either on or off the mobile device **500**, carrier AGPS, various prolific search engines (e.g., GOOGLE, YAHOO, and the like), vector data, tile data, among others, for example. It will be appreciated by those skilled in the art that tile data may be defined as a spatial unit representing a sub-region of an image, usually of rectangular nature, by which geographic data is organized, subdivided, and stored in a map library.

In one aspect, for example, the mobile device **102** may employ a software architecture for retrieving and processing information from a communications network. The software architecture may enable the mobile device **102** to communicate and process information from the network and servers, for example. The software architecture includes component implementations and specifies standard programmatic interfaces such as APIs to assist in the common requirements of retrieving information wirelessly between an application client and multiple data source servers. As a result, the software architecture may provide a method to enable application clients to interact with disparate data providers.

In one aspect, for example, the software architecture may be implemented using object-oriented programming (OOP) techniques. OOP is a computer programming paradigm. OOP assumes that a computer program is composed of a collection of individual units, or objects, as opposed to a traditional assumption that a program is a list of instructions to the computer. Each object is capable of receiving messages, processing data, and sending messages to other objects. Almost any concept may be represented as an object. Examples of an object may include menu objects, image objects, frame objects, title objects, border objects, tab objects, list objects, color blue objects, button objects, scroll bar objects, input field objects, text and image objects, and so forth. Although the software architecture may be described in the context of OOP by way of example, it may be appreciated that other software paradigms may be used as desired for a given implementation. For example, the software architecture may be implemented using a model-view-controller (MVC) architecture as well. The aspects are not limited in this context.

In various aspects, a node may comprise an optional display. The display may be implemented using any type of visual interface such as a liquid crystal display (LCD), capacitive touch screen panel, and the like.

In various aspects, a node may comprise a memory. In various aspects, the memory may comprise any machine-readable or computer-readable media capable of storing data, including both volatile and non-volatile memory. For example, memory may include read-only memory (ROM), random-access memory (RAM), dynamic RAM (DRAM), Double-Data-Rate DRAM (DDR-RAM), synchronous DRAM (SDRAM), static RAM (SRAM), programmable ROM (PROM), erasable programmable ROM (EPROM), electrically erasable programmable ROM (EEPROM), flash memory (e.g., NOR or NAND flash memory), content addressable memory (CAM), polymer memory (e.g., ferroelectric polymer memory), phase-change memory (e.g., ovonic memory), ferroelectric memory, silicon-oxide-nitride-oxide-silicon (SONOS) memory, disk memory (e.g., floppy disk, hard drive, optical disk, magnetic disk), or card (e.g., magnetic card, optical card), or any other type of media suitable for storing information.

The various aspects, a node may comprise a processor such as a central processing unit (CPU). In various aspects, the processor may be implemented as a general purpose processor, a chip multiprocessor (CMP), a dedicated processor, an embedded processor, a digital signal processor (DSP), a network processor, a media processor, an input/output (I/O) processor, a media access control (MAC) processor, a radio baseband processor, a co-processor, a microprocessor such as a complex instruction set computer (CISC) microprocessor, a reduced instruction set computing (RISC) microprocessor,

and/or a very long instruction word (VLIW) microprocessor, or other processing device. The processor also may be implemented by a controller, a microcontroller, an application specific integrated circuit (ASIC), a field programmable gate array (FPGA), a programmable logic device (PLD), and so forth.

In various aspects, the processor may be arranged to run an operating system (OS) and various mobile applications. Examples of an OS include, for example, operating systems generally known under the trade name of Microsoft Windows OS, and any other proprietary or open source OS. Examples of mobile applications include, for example, a telephone application, a camera (e.g., digital camera, video camera) application, a browser application, a multimedia player application, a gaming application, a messaging application (e.g., e-mail, short message, multimedia), a viewer application, and so forth.

In various aspects, the processor may be arranged to receive information through a communications interface. The communications interface may comprise any suitable hardware, software, or combination of hardware and software that is capable of coupling a node **110** to one or more networks and/or devices. In one aspect, the wireless node **110** is in wireless communication with the mobile device **102** via the wireless medium **134**. The wireless node **110** also may communicate with the remote node **122** via a wired communication medium **134** or a wireless communication medium **120**. The communications interface may be arranged to operate using any suitable technique for controlling information signals using a desired set of communications protocols, services or operating procedures. The communications interface may include the appropriate physical connectors to connect with a corresponding communications medium, whether wired or wireless.

Vehicles of communication include a network. In various aspects, the network may comprise LANs as well as WANs including without limitation Internet, wired channels, wireless channels, communication devices including telephones, computers, wire, radio, optical or other electromagnetic channels, and combinations thereof, including other devices and/or components capable of/associated with communicating data. For example, the communication environments include in-body communications, various devices, various modes of communications such as wireless communications, wired communications, and combinations of the same.

Wireless communication modes include any mode of communication between points that utilizes, at least in part, wireless technology including various protocols and combinations of protocols associated with wireless transmission, data, and devices. The points include, for example, wireless devices such as wireless headsets, audio and multimedia devices and equipment, such as audio players and multimedia players, telephones, including mobile telephones and cordless telephones, and computers and computer-related devices and components, such as tablet computers, printers.

Wired communication modes include any mode of communication between points that utilizes wired technology including various protocols and combinations of protocols associated with wired transmission, data, and devices. The points include, for example, devices such as audio and multimedia devices and equipment, such as audio players and multimedia players, telephones, including mobile telephones and cordless telephones, and computers and computer-related devices and components, such as tablet computers, printers.

Accordingly, in various aspects, the communications interface may comprise one or more interfaces such as, for example, a wireless communications interface, a wired communications interface, a network interface, a transmit interface, a receive interface, a media interface, a system interface, a component interface, a switching interface, a chip interface, a controller, and so forth. When implemented by a wireless device or within wireless system, for example, the wireless node **110** may include a wireless communication interface comprising one or more antennas, transmitters, receivers, transceivers, amplifiers, filters, control logic, and so forth.

In various aspects, the wireless node **110** may comprise the functionality to wirelessly receive and/or wirelessly transmit data received from the mobile device **102** and transmit that data to other nodes, such as the external node **122** or other nearby nodes, for example. Further, in various aspects, the wireless node **110** may incorporate and/or be associated with, e.g., communicate with, various devices. Such devices may generate, receive, and/or communicate data, e.g., physiologic data. The devices include, for example, "intelligent" devices such as gaming devices, e.g., electronic slot machines, handheld electronic games, electronic components associated with games and recreational activities.

In addition to the standard voice function of a telephone, various aspects of mobile telephones may support many additional services and accessories such as short message service (SMS) for text messaging, email, packet switching for access to the Internet, java gaming, wireless, e.g., short range data/voice communications, infrared, camera with video recorder, and multimedia messaging system (MMS) for sending and receiving photos and video. Some aspects of mobile telephones connect to a cellular network of base stations (cell sites), which is, in turn, interconnected to the public switched telephone network (PSTN) or satellite communications in the case of satellite phones. Various aspects of mobile telephones can connect to the Internet, at least a portion of which can be navigated using the mobile telephones.

Some aspects may be implemented, for example, using a machine-readable medium or article which may store an instruction or a set of instructions that, if executed by a machine, may cause the machine to perform a method and/or operations in accordance with the aspects. Such a machine may include, for example, any suitable processing platform, computing platform, computing device, processing device, computing system, processing system, computer, processor, or the like, and may be implemented using any suitable combination of hardware and/or software. The machine-readable medium or article may include, for example, any suitable type of memory unit, memory device, memory article, memory medium, storage device, storage article, storage medium and/or storage unit, for example, memory, removable or non-removable media, erasable or non-erasable media, writeable or re-writeable media, digital or analog media, hard disk, floppy disk, Compact Disk Read Only Memory (CD-ROM), Compact Disk Recordable (CD-R), Compact Disk Rewriteable (CD-RW), optical disk, magnetic media, magneto-optical media, removable memory cards or disks, various types of Digital Versatile Disk (DVD), a tape, a cassette, or the like. The instructions may include any suitable type of code, such as source code, compiled code, interpreted code, executable code, static code, dynamic code, and the like. The instructions may be implemented using any suitable high-level, low-level, object-oriented, visual, compiled and/or interpreted programming language, such as C, C++, Java, BASIC, Perl, Matlab, Pascal, Visual BASIC, arrangement language, machine code, and so forth.

In one aspect, the wireless node **110** may be configured as a communication hub and may include any hardware device, software, and/or communications component(s), as well as

systems, subsystems, and combinations of the same which generally function to communicate information received from the mobile device **102** to the remote node **122**. Communication of the information includes receiving, storing, manipulating, displaying, processing, and/or transmitting the data to the remote node **122** via wired or wireless media **118**, **120**.

In various aspects, the wireless node **110** also functions to communicate, e.g., receive and transmit, non-physiologic data. Example of non-physiologic data include gaming rules and data generated by a separate cardiac-related device such as an implanted pacemaker and communicated to the hub (wireless node **110**) directly or indirectly, e.g., via the mobile device **102**.

Broad categories of each of the mobile device **102** and/or the wireless node **110** include, for example, base stations, personal communication devices, handheld devices, mobile telephones, and mobile computing devices having wireless capabilities generally known as smartphones capable of executing computer applications, as well as voice communications and/or data communications. Examples of mobile computing devices include any type of wireless device, mobile station, or portable computing device with a self-contained power source, e.g., battery. Examples of smartphones include, for example, products generally known under the trade designations Palm, Blackberry, iPhone, Android, Windows Phone, among others. In various aspects, the mobile device **102** and/or the wireless node **110** may comprise, or be implemented as, a PDA, laptop computer, ultra-laptop computer, combination cellular telephone/PDA, mobile unit, subscriber station, user terminal, portable computer, handheld computer, palmtop computer, wearable computer, media player, messaging device, data communication device, a laptop computer, ultra-laptop computer, portable computer, handheld computer, palmtop computer, tablet computer, e-book reader, cellular telephone, pager, one-way pager, two-way pager, messaging device, data communication device, and so forth. Examples of a mobile device **102** and/or wireless node **110** also may include computers that are arranged to be worn by a person, such as a wrist computer, finger computer, ring computer, eyeglass computer, belt-clip computer, arm-band computer, shoe computers, clothing computers, and other wearable computers. A fixed computing device, for example, may be implemented as a desk top computer, workstation, client/server computer, and so forth.

The mobile device **102** and/or wireless node **110** may comprise personal communication devices including, for example, devices having communication and computer functionality and typically intended for individual use, e.g., mobile computers, sometimes referred to as "handheld devices." Base stations comprise any device or appliance capable of receiving data such as physiologic data. Examples include computers, such as desktop computers and laptop computers, and intelligent devices/appliances. Intelligent devices/appliances include consumer and home devices and appliances that are capable of receipt of data such as physiologic data. Intelligent devices/appliances may also perform other data-related functions, e.g., transmit, display, store, and/or process data. Examples of intelligent devices/appliances include refrigerators, weight scales, toilets, televisions, door frame activity monitors, bedside monitors, bed scales. Such devices and appliances may include additional functionality such as sensing or monitoring various physiologic data, e.g., weight, heart rate. Mobile telephones include telephonic communication devices associated with various mobile technologies, e.g., cellular networks.

FIG. **52** illustrates one aspect of a mobile device **102**. The mobile device **102** comprises a housing **5206**, a display **5208**, an input/output (I/O) system **5210** (e.g., a touch sensitive screen), an aperture **5212** for capturing digital images, and an antenna **5214**. The functional modules of the mobile device **102** are described below in connection with FIG. **52**.

The display **5208** may comprise any suitable display unit for displaying information appropriate for a mobile device **102**. The I/O system **5210** may comprise any suitable I/O device for entering information into the mobile device **102**. Examples for the I/O system **5210** may include an alphanumeric keyboard, a numeric keypad, a touch pad, a capacitive touch screen panel, input keys, buttons, switches, rocker switches, voice recognition device and software, and so forth. The I/O system **5210** may comprise a microphone and speaker, for example. Information also may be entered into the mobile device **102** by way of the microphone. Such information may be digitized by a voice recognition device. As used throughout the present disclosure the term "button" may be used to refer to a mechanical type switch, an electromechanical switch, or a "virtual button" that may be selected using a simple touch over a touch sensitive screen or a point/click with a mouse pointer.

FIG. **53** illustrates a system diagram of one aspect of a mobile device **102** for detecting an electrical signal generated by an ingestible event marker, such as the IEM device **104** (FIG. **1**), for example, configured to couple to an external detection arrangement. FIG. **53** illustrates a more detailed block diagram of the mobile computing device **102** described with reference to FIG. **1**. As shown in FIG. **53**, for example, the mobile device **102** may comprise multiple elements. Although FIG. **53** shows a limited number of elements in a certain topology by way of example, it can be appreciated that additional or fewer elements in any suitable topology may be used in the mobile device **102** as desired for a given implementation. Furthermore, any element as described herein may be implemented using hardware, software, or a combination of both, as previously described with reference to node implementations. Aspects of the mobile device **102**, however, are not limited in this context.

In various aspects, the mobile device **102** comprises a housing **5206**, an antenna **5214**, a radio subsystem **5314**, and a processing subsystem **5312** connected to the radio subsystem **5314** via a bus. The radio subsystem **5314** may perform voice and data communications operations using wireless shared media for the mobile device **102**. The processing subsystem **5312** may execute software for the mobile device **102**. A bus may comprise a universal serial bus (USB), micro-USB bus, dataport, and appropriate interfaces, as well as others. In one aspect the radio subsystem **5314** may be arranged to communicate voice information and control information over one or more assigned frequency bands of the wireless shared media.

In one aspect, the mobile device **102** may comprise an imaging subsystem **5308** for processing images captured through the aperture **5212**. A camera may be coupled (e.g., wired or wirelessly) to the processing subsystem **5312** and is configured to output image data (photographic data of a person or thing, e.g., video data, digital still image data) to the processing subsystem **5312** and to the display **5208**. In one aspect, the imaging subsystem **5208** may comprise a digital camera implemented as an electronic device used to capture and store images electronically in a digital format. Additionally, in some aspects the digital camera may be capable of recording sound and/or video in addition to still images.

In one aspect, the imaging subsystem **5208** may comprise a controller to provide control signals to components of a

digital camera, including lens position component, microphone position component, and a flash control module, to provide functionality for the digital camera. In some aspects, the controller may be implemented as, for example, a host processor element of the processing subsystem **5312** of the mobile device **102**. Alternatively, the imaging controller may be implemented as a separate processor from the host processor.

In various aspects, the imaging subsystem **5308** may comprise memory either as an element of the processing subsystem **5312** of the mobile device **102** or as a separate element. It is worthy to note that in various aspects some portion or the entire memory may be included on the same integrated circuit as the controller. Alternatively, some portion or the entire memory may be disposed on an integrated circuit or other medium (e.g., hard disk drive) external to the integrated circuit of the controller.

In various aspects, the imaging subsystem **5308** may comprise an aperture **5212** with a lens component and a lens position component. The lens component may consist of a photographic or optical lens or arrangement of lenses made of a transparent material such as glass, plastic, acrylic or Plexiglass, for example. In one aspect, the one or more lens elements of the lens component may reproduce an image of an object and allow for zooming in or out on the object by mechanically changing the focal length of the lens elements. In various aspects, a digital zoom may be employed in the imaging subsystem **5308** to zoom in or out on an image. In some aspects, the one or more lens elements may be used to focus on different portions of an image by varying the focal length of the lens elements. The desired focus can be obtained with an autofocus feature of the digital imaging subsystem **5308** or by manually focusing on the desired portion of the image, for example.

A navigation subsystem **5310** supports navigation using the mobile device **102**. In various aspects the mobile device **102** may comprise location or position determination capabilities and may employ one or more location determination techniques including, for example, Global Positioning System (GPS) techniques, Cell Global Identity (CGI) techniques, CGI including timing advance (TA) techniques, Enhanced Forward Link Trilateration (EFLT) techniques, Time Difference of Arrival (TDOA) techniques, Angle of Arrival (AOA) techniques, Advanced Forward Link Trilateration (AFTL) techniques, Observed Time Difference of Arrival (OTDOA), Enhanced Observed Time Difference (EOTD) techniques, Assisted GPS (AGPS) techniques, hybrid techniques (e.g., GPS/CGI, AGPS/CGI, GPS/AFTL or AGPS/AFTL for CDMA networks, GPS/EOTD or AGPS/EOTD for GSM/GPRS networks, GPS/OTDOA or AGPS/OTDOA for UMTS networks), among others.

In one aspect, the mobile device **102** may be configured to operate in one or more location determination modes including, for example, a standalone mode, a mobile station (MS) assisted mode, and/or a MS-based mode. In a standalone mode, such as a standalone GPS mode, the mobile device **102** may be configured to determine its position without receiving wireless navigation data from the network, though it may receive certain types of position assist data, such as almanac, ephemeris, and coarse data. In a standalone mode, the mobile device **102** may comprise a local location determination circuit such as a GPS receiver which may be integrated within the housing **5206** configured to receive satellite data via the antenna **5214** and to calculate a position fix. Local location determination circuit may alternatively comprise a GPS receiver in a second housing separate from the housing **5206** but in the vicinity of the mobile device **102** and configured to communicate with the mobile device **102** wirelessly (e.g., via a PAN, such as Bluetooth). When operating in an MS-assisted mode or an MS-based mode, however, the mobile device **102** may be configured to communicate over a radio access network (e.g., UMTS radio access network) with a remote computer (e.g., a location determination entity (LDE), a location proxy server (LPS) and/or a mobile positioning center (MPC), among others).

In various aspects, the mobile device **102** also may comprise a power management subsystem (not shown) to manage power for the mobile device **102**, including the radio subsystem **5314**, the processing subsystem **5312**, and other elements of the mobile device **102**. For example, the power management subsystem may include one or more batteries to provide direct current (DC) power, and one or more alternating current (AC) interfaces to draw power from a standard AC main power supply.

In various aspects, the radio subsystem **5314** may include an antenna **5214**. The antenna **5214** may broadcast and receive RF energy over the wireless shared media **120** (FIG. **1**). Examples for the antenna **5214** may include an internal antenna, an omni-directional antenna, a monopole antenna, a dipole antenna, an end fed antenna, a circularly polarized antenna, a micro-strip antenna, a diversity antenna, a dual antenna, an antenna array, a helical antenna, and so forth. The aspects are not limited in this context.

In various aspects, the antenna **5214** may be connected to a multiplexer. The multiplexer multiplexes signals from a power amplifier for delivery to the antenna **5214**. The multiplexer demultiplexes signals received from the antenna for delivery to an RF chipset.

In various aspects, the multiplexer may be connected to a power amplifier, where the power amplifier may be used to amplify any signals to be transmitted over the wireless shared media **120** (FIG. **1**). The power amplifier may work in all assigned frequency bands, such as four (4) frequency bands in a quad-band system. The power amplifier also may operate in various modulation modes, such as Gaussian Minimum Shift Keying (GMSK) modulation suitable for GSM systems and 8-ary Phase Shift Keying (8-PSK) modulation suitable for EDGE systems.

In various aspects, the power amplifier may be connected to an RF chipset. The RF chipset also may be connected to the multiplexer. In one aspect, the RF chipset may comprise an RF driver and an RF transceiver. The RF chipset performs all of the modulation and direct conversion operations required for GMSK and 8-PSK signal types for quad-band E-GPRS radio. The RF chipset receives analog in-phase (I) and quadrature (Q) signals from a baseband processor, and converts the I/Q signals to an RF signal suitable for amplification by the power amplifier. Similarly, the RF chipset converts the signals received from the wireless shared media **120** (FIG. **1**) via the antenna **5214** and the multiplexer to analog I/Q signals to be sent to the baseband processor. Although the RF chipset may use two chips by way of example, it may be appreciated that the RF chipset may be implemented using more or less chips and still fall within the intended scope of the aspects. In addition, other aspects of amplification are in commonly owned application bearing U.S. Publication No. 2008-0316020 A1, titled "RFID Antenna for In-Body Device," published Dec. 25, 2008 which is incorporated by reference in its entirety.

In various aspects, the RF chipset may be connected to the baseband processor, where the baseband processor may perform baseband operations for the radio subsystem **5314**. The baseband processor may comprise both analog and digital baseband sections. The analog baseband section includes I/Q

filters, analog-to-digital converters, digital-to-analog converters, audio circuits, and other circuits. The digital baseband section may include one or more encoders, decoders, equalizers/demodulators, GMSK modulators, GPRS ciphers, transceiver controls, automatic frequency control (AFC), automatic gain control (AGC), power amplifier (PA) ramp control, and other circuits.

In various aspects, the baseband processor also may be connected to one or more memory units via a memory bus. In one aspect, for example, the baseband processor may be connected to a flash memory unit and a secure digital (SD) memory unit. The memory units may be removable or non-removable memory. In one aspect, for example, the baseband processor may use approximately 1.6 megabytes of static read-only memory (SRAM) for E-GPRS and other protocol stack needs.

In various aspects, the baseband processor also may be connected to a subscriber identity module (SIM). The baseband processor may have a SIM interface for the SIM, where the SIM may comprise a smart card that encrypts voice and data transmissions and stores data about the specific user so that the user can be identified and authenticated to the network supplying voice or data communications. The SIM also may store data such as personal phone settings specific to the user and phone numbers. The SIM can be removable or non-removable.

In various aspects, the baseband processor may further include various interfaces for communicating with a host processor of the processing subsystem **5312**. For example, the baseband processor may have one or more universal asynchronous receiver-transmitter (UART) interfaces, one or more control/status lines to the host processor, one or more control/data lines to the host processor, and one or more audio lines to communicate audio signals to an audio subsystem of processing subsystem **5314**. The aspects are not limited in this context.

In various aspects, the processing subsystem **5314** may provide computing or processing operations for the mobile device **102**. For example, the processing subsystem **5314** may be arranged to execute various software programs for the mobile device **102**. Although the processing subsystem **5314** may be used to implement operations for the various aspects as software executed by a processor, it may be appreciated that the operations performed by the processing subsystem **5314** also may be implemented using hardware circuits or structures, or a combination of hardware and software, as desired for a particular implementation.

In various aspects, the processing subsystem **5312** may include a processor implemented using any processor or logic device, such as a complex instruction set computer (CISC) microprocessor, a reduced instruction set computing (RISC) microprocessor, a very long instruction word (VLIW) microprocessor, a processor implementing a combination of instruction sets, or other processor device. In one aspect, for example, a processor may be implemented as a general purpose processor, such as a processor made by Intel Corporation, Santa Clara, Calif. The processor also may be implemented as a dedicated processor, such as a controller, microcontroller, embedded processor, a digital signal processor (DSP), a network processor, a media processor, an input/output (I/O) processor, a media access control (MAC) processor, a radio baseband processor, a field programmable gate array (FPGA), a programmable logic device (PLD), and so forth.

In one aspect, the processing subsystem **5314** may include a memory to connect to the processor. The memory may be implemented using any machine-readable or computer-readable media capable of storing data, including both volatile and non-volatile memory. For example, the memory may include ROM, RAM, DRAM, DDRAM, SDRAM, SRAM, PROM, EPROM, EEPROM, flash memory, polymer memory such as ferroelectric polymer memory, ovonic memory, phase change or ferroelectric memory, silicon-oxide-nitride-oxide-silicon (SONOS) memory, magnetic or optical cards, or any other type of media suitable for storing information. It is worthy to note that some portion or all of the memory may be included on the same integrated circuit as the processor thereby obviating the need for a memory bus. Alternatively some portion or all of the memory may be disposed on an integrated circuit or other medium, for example a hard disk drive, that is external to the integrated circuit of the processor, and the processor may access the memory via a memory bus, for example.

In various aspects, the memory may store one or more software components (e.g., application client modules). A software component may refer to one or more programs, or a portion of a program, used to implement a discrete set of operations. A collection of software components for a given device may be collectively referred to as a software architecture or application framework. A software architecture for the mobile device **500** is described in more detail below.

A software architecture suitable for use with the mobile device **500** may include a GUI module, an interface module, a data source or backend services module (data source), and a third party API module. An optional LBS module may comprise a user based permission module, a parser module (e.g., National Maritime Electronic Association or NMEA), a location information source module, and a position information source module. In some aspects, some software components may be omitted and others added. Further, operations for some programs may be separated into additional software components, or consolidated into fewer software components, as desired for a given implementation. The mobile device **500** software architecture may comprise several elements, components or modules, collectively referred to herein as a "module." A module may be implemented as a circuit, an integrated circuit, an application specific integrated circuit (ASIC), an integrated circuit array, a chipset comprising an integrated circuit or an integrated circuit array, a logic circuit, a memory, an element of an integrated circuit array or a chipset, a stacked integrated circuit array, a processor, a digital signal processor, a programmable logic device, code, firmware, software, and any combination thereof.

FIG. **54** is a system diagram of one aspect of a wearable receiver **108**. The wearable receiver is configured to detect an electrical signal generated by an ingestible event marker, such as the IEM device **104** (FIG. **1**), for example. FIG. **54** is a block functional diagram of one aspect of an integrated circuit component. As shown in FIG. **54**, the wearable receiver **108** comprises an electrode input circuit **5400**, which receives the electrical current signature generated by the IEM device **104**. In one aspect, electrically coupled to the electrode input circuit **5400** is a transbody conductive communication module **5402** and, in another aspect, a physiological sensing module **5404** optionally may be coupled to the electrode input circuit **5400**. In one aspect, the transbody conductive communication module **5402** may be implemented as a first, e.g., high, frequency (HF) signal chain and the physiological sensing module **5404** may be implemented as a second, e.g., low, frequency (LF) signal chain. In one aspect, the wearable receiver **108** also may include a temperature sensing module **5406** for detecting ambient temperature and a 3-axis accelerometer **5408**. In one aspect, the temperature sensing module **5406** may be implemented using complementary oxide semi-

conductor (CMOS) circuit elements. In various aspects, additional modules may be provided for sensing of the environment around the IEM device **104**, for example, including, without limitation, Ph sensing, impedance sensing. The wearable receiver **108** also may comprise a memory **5410** for data storage (similar to any of the previously discussed memory elements), and a wireless communication module **5412** to receive data from and/or transmit data to another device, for example in a data download/upload action, respectively. In various aspects, the sensors **5414** and the feedback modules **5416** also may be included in the wearable receiver **108**. In one aspect, as shown in FIG. **54**, the various functional modules are coupled to the processing subsystem **5418** of the mobile device **102** (FIGS. A, B). In other aspects, a detection subsystem may comprise its own dedicated processing engine. For example, in one aspect, the wearable receiver **108** may comprise a dedicated processing engine, for example, a microcontroller or a digital signal processor that is separate from the processing subsystem **5418** of the mobile device **102**.

With reference back to FIG. **54**, in various aspects, the transbody conductive communication module **5402** and the wireless communication module **5412** each may comprise one or more transmitters/receivers ("transceiver") modules. As used herein, the term "transceiver" may be used in a very general sense to include a transmitter, a receiver, or a combination of both, without limitation. In one aspect, the transbody conductive communication module **5402** is configured to communicate with the IEM device **104** (FIG. **1**). In one aspect, the wireless communication module **5412** may be configured to communicate with the wireless access point **110** (FIG. **1**). In another aspect, the wireless communication module **5412** may be configured to communicate with other mobile devices.

In various aspects, the sensors **5414** typically contact the patient **106** (FIG. **1**), e.g., can be removably attached to the torso. In various other aspects, the sensors **5414** may be removably or permanently attached to the wearable receiver **108**. For example, the sensors **5414** may be removably connected to the wearable receiver **108** by snapping metal studs. The sensors **5414** may comprise, for example, various devices capable of sensing or receiving the physiologic data. The types of sensors **5414** include, for example, electrodes such as wet or dry biocompatible electrodes. The sensors **5414** may be configured, for example, as a pressure sensor, a motion sensor, an accelerometer **5408**, an electromyography (EMG) sensor, an IEM device **104** (FIG. **1**), a biopotential sensor, an electrocardiogram sensor, a temperature sensor, a tactile event marker sensor, an impedance sensor, among other sensors.

In various aspects, the feedback module **5416** may be implemented with software, hardware, circuitry, various devices, and combinations thereof. The function of the feedback module **5416** is to provide communication with the patient **106** (FIG. **1**) in a discreet, tactful, circumspect manner as described above. In various aspects the feedback module **5416** may be implemented to communicate with the patient **106** using techniques that employ visual, audio, vibratory/tactile, olfactory, and taste.

FIG. **55** illustrates a system **5500** corresponding to one aspect of an ingestible event marker device. In various aspects the IEM devices **104** shown in FIG. **1**, for example, may be implemented in accordance with the system **5500** shown in FIG. **55**. The system **5500** can be used in association with any medication product, as mentioned above, to determine the origin of the medication and to confirm that at least one of the right type and the right dosage of medication was delivered to the patient and in some aspects to determine when a patient takes the medication product. The scope of the present disclosure, however, is not limited by the environment and the medication product that may be used with the system **5500**. For example, the system **5500** may be activated either in wireless mode, in galvanic mode by placing the system **5500** within a capsule and then placing the capsule within a conducting fluid, or a combination thereof, or exposing the system **5500** to air. Once placed in a conducting fluid, for example, the capsule would dissolve over a period of time and release the system **5500** into the conducting fluid. Thus, in one aspect, the capsule would contain the system **5500** and no product. Such a capsule may then be used in any environment where a conducting fluid is present and with any product. For example, the capsule may be dropped into a container filled with jet fuel, salt water, tomato sauce, motor oil, or any similar product. Additionally, the capsule containing the system **5500** may be ingested at the same time that any pharmaceutical product is ingested in order to record the occurrence of the event, such as when the product was taken. Such pharma products and methods of encapsulating such pharma products are described in the commonly owned applications U.S. Publication No. 2008-0284599 A1, titled "Pharma Informatics System," published Nov. 20, 2008, U.S. Publication No. 2011-0054265 A1, titled "Highly Reliable Ingestible Event Markers and Methods for using the Same," published Mar. 3, 2011 and U.S. Application No. 61/416,150, titled: "Ingestible Device with Pharmaceutical Product," filed Nov. 22, 2010 which applications are incorporated by reference in their entirety.

In the specific example of the system **5500** shown in FIG. **55**, when the system **5500** is combined with a medication or pharmaceutical product, as the product or pill is ingested, or exposed to air, the system **5500** is activated in galvanic mode. The system **5500** controls conductance to produce a unique electrical current signature that is detected by the electrode assemblies (e.g., wet or dry electrodes), for example, thereby signifying that the pharmaceutical product has been taken. When activated in wireless mode, the system controls modulation of capacitive plates to produce a unique voltage signature associated with the system **5500** that is detected. Various aspects of the system **2100** are described in commonly assigned U.S. Pat. No. 7,978,064, issued Jul. 12, 2011 titled "Communication System with Partial Power Source, and U.S. patent application Ser. No. 13/153,312 titled "Communication System with Partial Power Source" filed Jun. 3, 2011, and U.S. patent application Ser. No. 13/180,516, titled "Communication System With Remote Activation," filed Jul. 11, 2011; and U.S. patent application Ser. No. 13/180,498, titled "Communication System with Multiple Sources of Power," filed Jul. 11, 2011; and U.S. patent application Ser. No. 13/180,539, titled "Communication System Using an Implantable Device," filed Jul. 11, 2011; and U.S. patent application Ser. No. 13/180,525, titled "Communication System With Enhanced Partial Power And Method Of Manufacturing Same," filed Jul. 11, 2011; and U.S. patent application Ser. No. 13/180,538, titled "Communication System using Polypharmacy Co-packaged Medication Dosing Unit," filed Jul. 11, 2011; and U.S. patent application Ser. No. 13/180,507, titled "Communication System Incorporated in an Ingestible Product," filed Jul. 11, 2011, U.S. Publication No. 2010-0214033 A1 titled "In-vivo Low Voltage Oscillator for Medical Devices Stable Output With Varying Supply Voltage," published Aug. 26, 2010, U.S. Publication No. 2011-0065983 A1, titled "Ingestible Circuitry," published Mar. 17, 2011 and U.S. Publication No. 2010-0239616 A1, titled:

"Controlled Activation Ingestible Identifier," published Sep. 23, 2010 all of which are entirely herein incorporated by reference.

In one aspect, the system D includes a framework **5502**. The framework **5502** is a chassis for the system **5500** and multiple components are attached to, deposited upon, or secured to the framework **5502**. In this aspect of the system **5500**, a digestible material **5504** is physically associated with the framework **5502**. The material **5504** may be chemically deposited on, evaporated onto, secured to, or built-up on the framework all of which may be referred to herein as "deposit" with respect to the framework **5502**. The material **5504** is deposited on one side of the framework **5502**. The materials of interest that can be used as material **5504** include, but are not limited to: Cu, CuCl, or CuI. The material **5504** is deposited by physical vapor deposition, electrodeposition, or plasma deposition, among other protocols. The material **5504** may be from about 0.05 to about 500 μm thick, such as from about 5 to about 100 μm thick. The shape is controlled by shadow mask deposition, or photolithography and etching. Additionally, even though only one region is shown for depositing the material, each system **5500** may contain two or more electrically unique regions where the material **5504** may be deposited, as desired.

At a different side, which is the opposite side as shown in FIG. **55**, another digestible material **5506** is deposited, such that the materials **5504**, **5506** are dissimilar and insulated from each other. Although not shown, the different side selected may be the side next to the side selected for the material **5504**. The scope of the present disclosure is not limited by the side selected and the term "different side" can mean any of the multiple sides that are different from the first selected side. In various aspects, the dissimilar material may be located at different positions on a same side. Furthermore, although the shape of the system is shown as a square, the shape may be any geometrically suitable shape. The materials **5504**, **5506** are selected such that they produce a voltage potential difference when the system **5500** is in contact with conducting liquid, such as body fluids. The materials of interest for material **5506** include, but are not limited to: Mg, Zn, or other electronegative metals. As indicated above with respect to the material **5504**, the material **5506** may be chemically deposited on, evaporated onto, secured to, or built-up on the framework. Also, an adhesion layer may be necessary to help the material **5506** (as well as material **5504** when needed) to adhere to the framework **2102**. Typical adhesion layers for the material **2106** are Ti, TiW, Cr or similar material. Anode material and the adhesion layer may be deposited by physical vapor deposition, electrodeposition or plasma deposition. The material **5506** may be from about 0.05 to about 500 μm thick, such as from about 5 to about 100 μm thick. The scope of the present disclosure, however, is not limited by the thickness of any of the materials nor by the type of process used to deposit or secure the materials to the framework **5502**.

According to the disclosure set forth, the materials **5504**, **5506** can be any pair of materials with different electrochemical potentials. Additionally, in the aspects wherein the system **5500** is used in-vivo, the materials **5504**, **5506** may be vitamins that can be absorbed. More specifically, the materials **5504**, **5506** can be made of any two materials appropriate for the environment in which the system **5500** will be operating. For example, when used with an ingestible product, the materials **5504**, **5506** are any pair of materials with different electrochemical potentials that are ingestible. An illustrative example includes the instance when the system **5500** is in contact with an ionic solution, such as stomach acids. Suitable materials are not restricted to metals, and in certain aspects the paired materials are chosen from metals and non-metals, e.g., a pair made up of a metal (such as Mg) and a salt (such as CuCl or CuI). With respect to the active electrode materials, any pairing of substances—metals, salts, or intercalation compounds—with suitably different electrochemical potentials (voltage) and low interfacial resistance are suitable.

Materials and pairings of interest include, but are not limited to, those reported in TABLE 1 below. In one aspect, one or both of the metals may be doped with a non-metal, e.g., to enhance the voltage potential created between the materials as they come into contact with a conducting liquid. Non-metals that may be used as doping agents in certain aspects include, but are not limited to: sulfur, iodine, and the like. In another aspect, the materials are copper iodine (CuI) as the anode and magnesium (Mg) as the cathode. Aspects of the present disclosure use electrode materials that are not harmful to the human body.

TABLE 1

	Anode	Cathode
Metals	Magnesium, Zinc Sodium, Lithium Iron	
Salts		Copper salts: iodide, chloride, bromide, sulfate, formate, (other anions possible) Fe^{3+} salts: e.g. orthophosphate, pyrophosphate, (other anions possible) Oxygen or Hydrogen Ion (H+) on platinum, gold or other catalytic surfaces
Intercalation compounds	Graphite with Li, K, Ca, Na, Mg	Vanadium oxide Manganese oxide

Thus, when the system **5500** is in contact with the conducting fluid, a current path is formed through the conducting fluid between the dissimilar materials **5504**, **5506**. A control device **5508** is secured to the framework **5502** and electrically coupled to the materials **5504**, **5506**. The control device **5508** includes electronic circuitry, for example control logic that is capable of controlling and altering the conductance between the materials **5504**, **5506**.

The voltage potential created between the dissimilar materials **5504**, **5506** provides the power for operating the system as well as produces the current flow through the conducting fluid and the system **5500**. In one aspect, the system **5500** operates in direct current mode. In an alternative aspect, the system **5500** controls the direction of the current so that the direction of current is reversed in a cyclic manner, similar to alternating current. As the system reaches the conducting fluid or the electrolyte, where the fluid or electrolyte component is provided by a physiological fluid, e.g., stomach acid, the path for current flow between the dissimilar materials **5504**, **5506** is completed external to the system **5500**; the current path through the system **5500** is controlled by the control device **5508**. Completion of the current path allows for the current to flow and in turn a receiver, not shown, can detect the presence of the current and recognize that the system **2100** has been activate and the desired event is occurring or has occurred.

In one aspect, the two dissimilar materials **5504**, **5506** are similar in function to the two electrodes needed for a direct current power source, such as a battery. The conducting liquid acts as the electrolyte needed to complete the power source. The completed power source described is defined by the

physical chemical reaction between the dissimilar materials **5504**, **5506** of the system **5500** and the surrounding fluids of the body. The completed power source may be viewed as a power source that exploits reverse electrolysis in an ionic or a conduction solution such as gastric fluid, blood, or other bodily fluids and some tissues. Additionally, the environment may be something other than a body and the liquid may be any conducting liquid. For example, the conducting fluid may be salt water or a metallic based paint.

In certain aspects, the two dissimilar materials **5504**, **5506** are shielded from the surrounding environment by an additional layer of material. Accordingly, when the shield is dissolved and the two dissimilar materials **5504**, **5506** are exposed to the target site, a voltage potential is generated.

In certain aspects, the complete power source or supply is one that is made up of active electrode materials, electrolytes, and inactive materials, such as current collectors, packaging. The active materials are any pair of materials with different electrochemical potentials. Suitable materials are not restricted to metals, and in certain aspects the paired materials are chosen from metals and non-metals, e.g., a pair made up of a metal (such as Mg) and a salt (such as CuI). With respect to the active electrode materials, any pairing of substances—metals, salts, or intercalation compounds—with suitably different electrochemical potentials (voltage) and low interfacial resistance are suitable.

A variety of different materials may be employed as the materials that form the electrodes. In certain aspects, electrode materials are chosen to provide for a voltage upon contact with the target physiological site, e.g., the stomach, sufficient to drive the system of the identifier. In certain aspects, the voltage provided by the electrode materials upon contact of the metals of the power source with the target physiological site is 0.001 V or higher, including 0.01 V or higher, such as 0.1 V or higher, e.g., 0.3 V or higher, including 0.5 volts or higher, and including 1.0 volts or higher, where in certain aspects, the voltage ranges from about 0.001 to about 10 volts, such as from about 0.01 to about 10 V.

Still referring to FIG. **55**, the dissimilar materials **5504**, **5506** provide the voltage potential to activate the control device **5508**. Once the control device **5508** is activated or powered up, the control device **2108** can alter conductance between the first and second materials **5504**, **5506** in a unique manner. By altering the conductance between the first and second materials **5504**, **5506**, the control device **5508** is capable of controlling the magnitude of the current through the conducting liquid that surrounds the system **5500**. This produces a unique current signature that can be detected and measured by a receiver (not shown), which can be positioned internal or external to the body. The receiver is disclosed in greater detail in U.S. patent application Ser. No. 12/673,326 entitled "BODY-ASSOCIATED RECEIVER AND METHOD" filed on Dec. 15, 2009, and published as 2010/0312188 A1 dated Dec. 9, 2010 which is incorporated herein by reference in its entirety. In addition to controlling the magnitude of the current path between the materials, non-conducting materials, membrane, or "skirt" are used to increase the "length" of the current path and, hence, act to boost the conductance path, as disclosed in the U.S. Publication No. 2009-0082645 A1, titled "In-Body Device With Virtual Dipole Signal Amplification," published Mar. 26, 2009, and U.S. Publication No. 2009-0256702 A1, titled "Multi-Mode Communication Ingestible Event Markers, and Methods of Using the Same" published Oct. 15, 2009, the entire content of which is incorporated herein by reference. Alternatively, throughout the disclosure herein, the terms "non-conducting material," "membrane," and "skirt" are interchangeably used with the term "current path extender" without impacting the scope or the present aspects and the claims herein. The skirt, shown in portion at **5505**, **5507**, respectively, may be associated with, e.g., secured to, the framework **5502**. Various shapes and configurations for the skirt are contemplated as within the scope of the various aspects of the present invention. For example, the system **5500** may be surrounded entirely or partially by the skirt and the skirt maybe positioned along a central axis of the system **5500** or off-center relative to a central axis. Thus, the scope of the present disclosure as claimed herein is not limited by the shape or size of the skirt. Furthermore, in other aspects, the dissimilar materials **5504**, **5506** may be separated by one skirt that is positioned in any defined region between the dissimilar materials **5504**, **5506**.

The system **5500** may be grounded through a ground contact. The system **5500** also may include a sensor module. In operation, ion or current paths are established between the first material **5504** to the second material **5506** and through a conducting fluid in contact with the system **5500**. The voltage potential created between the first and second materials **5504**, **5506** is created through chemical reactions between the first and second materials **5504**, **5506** and the conducting fluid. In one aspect, the surface of the first material **5504** is not planar, but rather an irregular surface. The irregular surface increases the surface area of the material and, hence, the area that comes in contact with the conducting fluid.

In one aspect, at the surface of the first material **5504**, there is chemical reaction between the material **5504** and the surrounding conducting fluid such that mass is released into the conducting fluid. The term mass as used herein refers to protons and neutrons that form a substance. One example includes the instant where the material is CuCl and when in contact with the conducting fluid, CuCl becomes Cu (solid) and Cl— in solution. The flow of ions into the conduction fluid is via ion paths. In a similar manner, there is a chemical reaction between the second material **5506** and the surrounding conducting fluid and ions are captured by the second material **5506**. The rate of ionic exchange and, hence the ionic emission rate or flow, is controlled by the control device **5508**. The control device **5508** can increase or decrease the rate of ion flow by altering the conductance, which alters the impedance, between the first and second materials **5504**, **5506**. Through controlling the ion exchange, the system **5500** can encode information in the ionic exchange process. Thus, the system **5500** uses ionic emission to encode information in the ionic exchange.

The control device **5508** can vary the duration of a fixed ionic exchange rate or current flow magnitude while keeping the rate or magnitude near constant, similar to when the frequency is modulated and the amplitude is constant. Also, the control device **5508** can vary the level of the ionic exchange rate or the magnitude of the current flow while keeping the duration near constant. Thus, using various combinations of changes in duration and altering the rate or magnitude, the control device **5508** encodes information in the current flow or the ionic exchange. For example, the control device **5508** may use, but is not limited to any of the following techniques namely, Binary Phase-Shift Keying (PSK), Frequency Modulation (FM), Amplitude Modulation (AM), On-Off Keying, and PSK with On-Off Keying.

Various aspects of the system **5500** may comprise electronic components as part of the control device **5508**. Components that may be present include but are not limited to: logic and/or memory elements, an integrated circuit, an inductor, a resistor, and sensors for measuring various parameters. Each component may be secured to the framework

and/or to another component. The components on the surface of the support may be laid out in any convenient configuration. Where two or more components are present on the surface of the solid support, interconnects may be provided.

The system **5500** controls the conductance between the dissimilar materials and, hence, the rate of ionic exchange or the current flow. Through altering the conductance in a specific manner the system is capable of encoding information in the ionic exchange and the current signature. The ionic exchange or the current signature is used to uniquely identify the specific system. Additionally, the system **5500** is capable of producing various different unique exchanges or signatures and, thus, provides additional information. For example, a second current signature based on a second conductance alteration pattern may be used to provide additional information, which information may be related to the physical environment. To further illustrate, a first current signature may be a very low current state that maintains an oscillator on the chip and a second current signature may be a current state at least a factor of ten higher than the current state associated with the first current signature.

FIGS. **56-58** illustrate various aspects of ornamental designs for various GUIs for a display screen of a mobile device **102**. FIGS. **56-58** illustrate the ornamental design for various "Onboarding" GUIs for a display screen of a mobile device for creating an account. FIG. **56** shows a GUI **5600** for creating an account. A "New User" button **5602** launches a "Welcome" GUI **5700**, as shown in FIG. **57**, when the "New User" button **5602** is selected. The "Welcome" GUI **5700** requests that the user enter the personal code from the start-up kit to begin. A text box **5702** is provided for entering the personal code. In FIG. **58**, a "Create Account" GUI **5800** is displayed for entering the user's First Name, Last Name, Username, Password, and to Confirm Password.

FIGS. **59-61** illustrate ornamental designs for several additional "Onboarding" GUIs for a display screen of a mobile device **102** for setting up a wearable receiver **108**, e.g., a patch. FIG. **59** shows a GUI **5900** for setting up the wearable receiver **108**. A GUI element **5902** of the wearable receiver **108** is displayed with a blinking button **5904** along with text instructing the user to press and hold the button on the patch (wearable receiver **108**) until the light blinks. FIG. **60** shows a GUI **6000** that is displayed while the wearable receiver **108** and the mobile device **102** are connecting. A GUI **6100** shown in FIG. **61** is displayed when the wearable receiver **108** and the mobile device **102** are connected. The GUI **6100** also instructs the user to place the wearable receiver **108** patch on the left side of the torso and also displays a silhouette of a person **6102** wearing a receiver **6104** on the left side of the torso as indicated.

FIGS. **62-65** illustrate ornamental designs for several additional "Onboarding" GUIs for a display screen of a mobile device **102** for demonstrating the healthcare subscription information system according to the present disclosure. FIG. **62** shows a GUI **6200** for instructing to the user to take the two demonstration tablets **6202**, **6204** located in the starter kit and then tap the "Done" button **6206**. The healthcare subscription information system will confirm that it is ready to help within 10 minutes, for example, to set up the wearable receiver **108**. While waiting for a confirmation from the healthcare subscription information system, a GUI **6300** is displayed, as shown in FIG. **63**. When the healthcare subscription information system successfully detects the ingestion of the demonstration tablets, a GUI **6400**, as shown in FIG. **64**, is displayed. A silhouette of a person **6402** is displayed in conjunction with a check mark element **6404**. At this point, the user can select a "View Data" button **6406** or a "Share Data" button **6408** to view or share data, respectively. When the healthcare subscription information system fails to detect the ingestion of the demonstration tablets, a GUI **6500**, as shown in FIG. **65**, is displayed. The GUI **6500** displays a silhouette **6502** of a person with a question mark element **6506** to indicate that it has been over ten minutes and the healthcare subscription information system has not yet detected the ingestion of the demonstration tablets. A "Troubleshoot" button **6508** is provided to troubleshoot the situation.

FIGS. **66-71** illustrate ornamental designs for several additional "Ribbon" GUIs for a display screen of a mobile device **102** for viewing annotations. FIG. **66** shows a GUI **6600** for displaying an activity ribbon **6602** and a medication timeline **6604** with several annotations **6606**. A pop-up text bubble **6700** is displayed to provide additional information about the activity ribbon **6602** is shown in FIG. **67**, where the user entered "Ran to catch bus" at "1519 h." Another pop-up text bubble **6800** is displayed to provide additional information about the activity ribbon **6602** is shown in FIG. **68** where the user entered "Extra TV time" at "1811 h" and "Waited for repairmen" at "1816 h." FIG. **69** shows a pop-up text bubble **6900** that is displayed to provide additional information about the medication timeline **6604** to indicate that a "dose" was taken by the patient **108** at "0819 h." Another pop-up text bubble **7000** is displayed to provide additional information about the medication timeline **6604** is shown in FIG. **70** to indicate "Dose entered manually" at "1616 h." FIG. **71** shows another pop-up text bubble **7100** displayed to provide additional information about the medication timeline **6604** to indicate that at "0366 h" the patient took "3 Doses."

FIGS. **72-74** illustrate ornamental designs for several additional "Ribbon" GUIs for a display screen of a mobile device **102** for making annotations. FIG. **72** shows a GUI **7202** for entering an annotation on the activity ribbon **6602** or the medication timeline **6604**. To display the annotation GUI **7202**, the user taps the activity ribbon/medication timeline GUI element **7208**. When the "Annotation" element **7206** is selected, the display screen of the mobile device **102** shows a GUI **7303** for entering annotation text in a text box **7304** associated with the activity ribbon **6602** as indicated by highlighted GUI element **7308**. The annotation on the activity ribbon **6602** can be saved by tapping on the "Save" button **7306**. FIG. **74** shows a GUI **7402** for entering an annotation **7404** associated with the medication timeline **6604** to manually record a dose as indicated by highlighted GUI element **7406**. To save the manually recorded dose, the user taps the "Save" button **7408**.

FIG. **75** illustrates an ornamental design for a charts selection GUI **7500** for a display screen of a mobile device **102**. The charts selection GUI **7500** is displayed by tapping or selecting the charts GUI element **7504**. A charts selection box **7502** includes several GUI elements for opening corresponding display screens associated with charts: "Exertion" chart GUI element **7506**, "Moving" chart GUI element **7508**, "Sitting" chart GUI element **7510**, "Resting" chart GUI element **7512**, and "Meds" chart GUI element **7514**. Each of these elements open corresponding "Charts" GUIs as described hereinbelow.

FIGS. **76-78** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device **102** for displaying charts associated with patient exertion periods. FIG. **76** shows an exertion chart GUI **7600** displaying a bar graph **7602** for tracking and quantifying patient exertion periods on a daily basis. The exertion chart GUI **7600** can be displayed by selecting or tapping the charts GUI element **7504** and the "Exertion" chart GUI element **7506** (FIG.

75). The bar graph **7602** quantifies the patient's daily active hours along the vertical axis. The patient's active hours over a one week period (seven days) including the present day **7606** are displayed along the horizontal axis. A usual level **7608** of active hours per day is shown for comparison purposes. The GUI **7700** shown in FIG. **77** is displayed after tapping or selecting the Steps GUI element **7702** to show the number of steps taken by the patient per day. The number of daily steps taken by the patient is shown for a week along the horizontal axis. FIG. **78** shows a GUI **7800** displaying a bar graph **7802** for tracking and quantifying patient exertion on a daily basis where the patient exertion in terms of active hours is quantified along the vertical axis over a period of one month along the horizontal axis. Tapping or selecting the "Exertion" button **7610** displays the charts selection box **7502** as shown in FIG. **75**.

FIGS. **79-81** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device **102** for displaying charts associated with patient rest periods. FIG. **79** shows a rest chart GUI **7900** displaying a bar graph **7902** for tracking and quantifying patient rest periods on a daily basis. The rest chart GUI **7900** is can be displayed by selecting or tapping the charts GUI element **7504** and the "Resting" chart GUI element **7512** (FIG. **75**). The bar graph **7902** quantifies the patient's daily resting hours along the vertical axis. The patient's resting hours over a one week period (seven days) including the present day **7906** is displayed along the horizontal axis. A usual level **7908** of active hours per day is shown for comparison purposes. The GUI **8000** shown in FIG. **80** is displayed after tapping or selecting the moon GUI element **8002**, which shows the quality of rest by the patient per day. The quality of daily rest is indicated by a variety of face elements **8004** along the horizontal axis. A face element **8004** with a smile indicates good quality rest. A face element **8004** with a neutral face indicates average rest. A face element **8004** with a yawning face indicates poor quality rest. FIG. **81** shows a GUI **8100** displaying a pop-up text bubble **8102** to provide additional information about the day such as the number of resting hours for a given day. As shown in FIG. **81**, on day "19/5" the patient rested for "8 h 04 m." Tapping or selecting the "Resting" button **7904** displays the charts selection box **7502** as shown in FIG. **75**.

FIGS. **82-83** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device **102** for displaying charts associated with patient rest periods. FIG. **82** shows a meds GUI **8200** displaying a medications chart **8202** for tracking and quantifying patient medication periods on a daily basis. The med chart GUI **8200** can be displayed by selecting or tapping the charts GUI element **7504** and the "Meds" chart element **7512** (FIG. **75**). The medications chart **8202** tabulates daily times and doses of medication taken by the patient along the vertical axis. The medications chart **8202** shown in FIG. **82** tracks medication doses over a one week period (seven days) including the present day **8204** is displayed along the horizontal axis. The GUI **8300** shown in FIG. **83** is displayed after tapping or selecting the zone near the day of the week along the horizontal axis. A pop-up text bubble **8302** is displayed to provide additional information about the selected day such as day of the week ("18 May 2011"), times of the day when the doses were taken, and special notes such as multiple doses detected, early dosing, and the like. Tapping or selecting the "Meds" button **8206** displays the charts selection box **7502** as shown in FIG. **75**.

FIGS. **84-86** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device **102** for sending reports associated with patient via email. FIG. **84** shows a "Send Report" GUI **8400** displaying a destination email address input field **8402**. FIG. **85** shows the "Send Report" GUI **8400** with the destination email address field **8401** filled in. Tapping or selecting the "Next" button **8502** opens the "Send Report" GUI **8600** shown in FIG. **86**. The "Send Report" GUI **8600** displays the date range **8602** for the reporting period and a "Send" button **8604** for sending the report via email.

FIGS. **87-89** illustrate ornamental designs for several additional "Charts" GUIs for a display screen of a mobile device **102** for sending reports associated with patient via the post. FIG. **87** shows a "Send Report" GUI **8700** displaying destination Name, Street, City, Postcode, and Country input fields. FIG. **88** shows the "Send Report" GUI **8700** with the destination address fields filled in. Tapping or selecting the "Next" button **8702** opens the "Send Report" GUI **8900** shown in FIG. **89**. The "Send" button **8902** sends the paper report to the printer so that it can be sent to the destination via post.

FIG. **90** illustrates the "Send Report" GUI **8700** shown previously in FIG. **87**, with a series of address book GUI screens for a display screen of a mobile device **102** for populating the "Send Report" GUI **8700** using a local address book. A first address book GUI **9002** is displayed by selecting an address book element **9000** in "Send Report" GUI **8700**. The GUI **9002** provides an alphabetical list of names of contacts stored in a locally or remotely stored address book database. Tapping or selecting the second name on the list **9004** "Alethea C. Pettey" displays the next address book GUI **9006**, which displays both a "home" address element **9008** associated with the contact's home address and a "work" address element **9010** associated with the contact's work address. The corresponding home and work addresses also are displayed. Tapping or selecting the "home" address element **90**, for example, displays the next address book GUI **9012**, which shows the contact's home address populated in the address fields **9018**. Also displayed within the address book GUI **9012** is an "email" GUI element **9014** and a "postal" GUI element **9016** to enable the user to select the mode of send the report. Tapping or selecting the "postal" GUI element **9016** displays the next address book GUI **9014**, which enables the user to select the date range **9018** of the report and the increment, e.g., single days or others such weekly, monthly, etc., by tapping or selecting the resolution GUI element **9020**.

FIGS. **91-96** illustrate ornamental designs for several "Patch" GUIs for a display screen of a mobile device **102** for managing the wearable receiver **108** communication system. FIGS. **91-93** show "Patch" GUIs **9100**, **9200**, **9300** that are displayed when the receiver communication system is functioning properly. FIGS. **94-96** show "Patch" GUIs **9400**, **9500**, **9600** that are displayed when the receiver communication system is not functioning properly and an error occurs during a system test.

Turning now to FIG. **91**, the "Patch" GUI **9100** can be displayed by selecting the wearable receiver (e.g., patch) GUI element **9102** when the communication system is functioning properly. The GUI **9100** displays an icon of the patient **9116** and a wearable receiver element **9104** shown connected to the patient **9116** via connection **9118**. The wearable receiver element **9104** is shown connected to a mobile device element **9106** via connection **9110** indicating that the wearable receiver **108** is paired with the mobile device **102**. The mobile device element **9106** is shown connected to a network element **9108** via connection **9112** indicating that the mobile device **102** is connected to an external network such as the Internet, for example. If the wearable receiver **108** is connected to the network "System OK" is displayed by the GUI

9100. Additional information in regards to the wearable receiver 108 or the mobile device 102 may be obtained by tapping or selecting the corresponding element 9104 or 9106. FIG. 92 shows a GUI 9200 that is displayed after tapping the wearable receiver element 9104. In response, the GUI 9200 displays a pop-up text bubble 9202 to provide additional information about the wearable receiver 108 such as the serial number of the wearable receiver 108 (Helius Patch [02256]), battery charge level (Battery: 87%), skin contact (Skin Contact: GOOD), last update (Updated: Today 1622 h). Additional information about the mobile device 102 can be obtained by tapping or selecting the mobile device element 9106 which displays the GUI 9300 shown in FIG. 93. As shown, a pop-up text bubble 9302 is displayed to provide additional information about the mobile device 102 such as the mobile device type and model number (Motorola Droid 2), mobile device battery level (Battery: 99%), communication network (Network: 3G). When it is time to replace the wearable receiver 108, the "Replace Patch" button 9114 is tapped or selected.

Turning now to FIG. 94, the "Patch" GUI 9400 can be displayed by selecting the wearable receiver (e.g., patch) GUI element 9102 when the communication system is not functioning properly. The GUI 9400 displays an icon of the patient 9116 and a wearable receiver element 9104 shown connected to the patient 9116 via connection 9118. The wearable receiver element 9104, however, is not connected to the mobile device element 9106 as shown by arrow 9402 indicating that the wearable receiver 108 is not paired with the mobile device 102. Also, the mobile device element 9106 is not connected to the network element 9108 as shown by arrow 9404 indicating that the mobile device 102 is not connected to an external network such as the Internet, for example. If the wearable receiver 108 is not connected to the mobile device 102 and/or the network, "Patch Connection Error" is displayed by the GUI 9400. Additional information in regards to the wearable receiver 108 or the mobile device 102 may be obtained by tapping or selecting the wearable receiver element 9104. FIG. 95 shows a GUI 9500 that is displayed after tapping the wearable receiver element 9104 when there is a connection error. In response, the GUI 9500 displays a pop-up text bubble 9504 to provide additional information about the wearable receiver 108 connection error. In one aspect, the pop-up text bubble 9504 provides additional information such as "Patch Connection Error—There is no patch paired with your phone. Push the button on the patch until it blinks." In other words, the pop-up text box 9504 provides instructions to pair the wearable receiver 108 with the mobile device 102. To check network connectivity, the share GUI element 9602 may be selected. Since, the GUI 9600 presents instructional text such as "Your device is not connected to the network to download the latest information. Please check your device's network connection."

FIGS. 97-99 illustrate ornamental designs for several additional "Patch" GUIs for a display screen of a mobile device 102 for replacing the wearable receiver 108. As shown in FIGS. 91-95, to replace the wearable receiver 108, the "Replace Patch" button 9114 is tapped or selected. Upon selecting the "Replace Patch" button 9114, the "Patch" GUI 9700 shown in FIG. 7 is shown. The replace patch GUI 9700 provides textual instructions 9702 to "Press an hold the button on your old patch until the light blinks . . . " on the old wearable receiver 108. A wearable receiver GUI element 9704 includes a blinking GUI element 9706 and text to indicate that the wearable receiver GUI element 9704 is associated with the old patch receiver. Once the light on the wearable receiver 108 blinks, the GUI 9700 instructs to " . . . then tap 'Next.'" Accordingly, upon tapping or selecting the "Next" button 9708 the replace patch GUI 9800 shown in FIG. 98 is shown to indicate that the mobile device 102 is uploading the information to the remote processing system 122. FIG. 99 shows a replace patch GUI 9900 that provides instructional text 9902 to "Press and hold the button on your new patch until the light blinks . . . " on the new wearable receiver 108. The GUI 9900 also displays a wearable receiver GUI element 9904 that includes a blinking GUI element 9906 and text to indicate that the wearable receiver GUI element 9904 is associated with the new patch receiver.

FIGS. 100-104 illustrate ornamental designs for several "Share" GUIs for a display screen of a mobile device 102 for managing permissions and adding/removing caregivers. FIG. 100 illustrates one aspect of a "Manage Sharing" GUI 10000 for a display screen of a mobile device 102 for viewing the current data sharing status of caregivers. The "Manage sharing" GUI 10000 is displayed when the sharing GUI element 9602 is tapped or selected. The GUI 10000 shows a list of caregivers Anna, Dr. Rinderknecht, Jane, Karl, Megan and their current data sharing permission status indicated by the activity timeline element 10002, the activity trend chart element 10004, and the medication timeline element 10006. Permission is indicated by the any of these elements 10002, 10004, 10006 is highlighted. As shown by the GUI 10000, for example, Anna has permission for sharing activity timeline data as indicated by the highlighted element 10002. Dr. Rinderknecht has permission for sharing activity timeline data, activity trend chart data, and medication timeline data as indicated by the highlighted elements 10002, 10004, 10006. Jane has permission only for sharing medication timeline data as indicated by highlighted element 10006. Karl has permission for sharing activity timeline data and activity trend chart data as indicated by highlighted elements 10002, 10004. Megan's permissions are not visible because they appear below the screen. To view Megan's permissions, the touch sensitive display screen of the mobile device 102 can be tapped and dragged upwardly using a commonly employed gesturing technique in modern smart phone and touch pad computer technology. Tapping or selecting the edit (pencil) GUI element 10008 displays the "Add/Remove" GUI 10100. The "Add/Remove" GUI 10100 can be used to add a new caregiver by tapping or selecting the plus ("+") element 10102 or to remove a caregiver by tapping or selecting the minus ("−") element 10104 associated with a current caregiver. For example, to remove Karl, the minus ("−") element 10104 to the right of Karl's name can be tapped or selected. The "Remove" GUI 10200 as shown in FIG. 102 is then displayed along with a confirmatory query "Remove Karl?" 10202. In response either the "No" button 10204 or the "Yes" button 10206 can be selected. To invite a new caregiver, or add a new giver, the plus ("+") element in GUI 10100 is selected and then "Invite to Helius" GUI 10300 is displayed as shown in FIG. 103. The GUI 10300 provides a "nickname" field 10302, an "email" field 10304, and a "relationship" field 10306 for entering corresponding information associated with the caregiver being invited to share data. In addition, the type of data 10308 to be shared is displayed such as activity timeline data, activity trend chart data, and medication timeline data as indicated by the highlighted elements 10002, 10004, 10006 by tapping or selecting the corresponding element 1002, 10004, 10006. The security code 10310 (e.g., "1A2B3C"), which is to be shared with the invitee is also displayed along with the text "For your protection, the recipient will be required to enter the above code." The transaction can be cancelled by tapping or selecting the "Cancel" button 10312 or the invitation can be sent by tapping or selecting the

"Invite" button **10314**. Once the invitation is send, the caregiver invitee sees a "Caregiver View" GUI **10400** as shown in FIG. **104**. The new caregiver has been invited to share the activity timeline data as indicated by the highlighted element **10002**.

FIGS. **105-107** illustrate ornamental designs for several "Notifications" GUIs for a display screen of a mobile device **102** for notifying patients of activity and rest information. FIG. **105** illustrates one aspect of a "Notifications" GUI **10500** for a display screen of a mobile device **102** for displaying which notifications have been enabled for sharing. The GUI **10500** is displayed by tapping or selecting the notifications GUI element **10502**. As shown, activity, rest, medications, and data have been turned ON for notifications. Selecting the "Activity" element **10504** displays the "Activity" GUI **10600** shown in FIG. **106**, which provides an "inactivity" button **10602** and a "Delayed Daily Activity" button **10604** that can be turned "ON" or "OFF." As shown both buttons **10602**, **10604** are both turned "ON" and will provide notifications if no activity is detected for 4 hours between the hours of 1800 h and 2200 h, for example. These values are user selectable. In one aspect, the no activity value can be selected from 4-24 hours with 4 hour increments, then 36 hours and 48 hours, and so on. The inactivity period can be selected from any time between 0000 h-2300 h with 1 hour increments to any time between 0000 h-2300 h in 1 hour increments. Notification in regards to delayed daily activity can be sent anytime between 0500 h-1800 h with 1 hour increments. Selecting the "Activity" element **10504** displays the "Activity" GUI **10600** shown in FIG. **106**, which provides an "inactivity" button **10602** and a "Delayed Daily Activity" button **10604** that can be turned "ON" or "OFF." Selecting the "Rest" element **10506** in FIG. **105** displays the "Rest" GUI **10700** shown in FIG. **107**, which provides a "rest" button **10702** that can be turned "ON" or "OFF." The GUI **10700** provides a first portion **10704** where notification is provided if daily rest is less than a predetermined time from 1 hour-1 hours with 1 hour increments, e.g., 4 hrs as shown, and a second portion **10706** where notification is provided if daily rest is more than a predetermined time from 8 hours-20 hours with 1 hour increments, e.g., 10 hrs as shown.

FIGS. **108-111** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device **102** for notifying patients of medication dosing times and reminders. FIG. **108** illustrates one aspect of a "Notifications" GUI **10800** for a display screen of a mobile device **102**. Selecting element **10802** displays the "Meds Notification" GUI **10900** shown in FIG. **109**. The GUI **10900** provides two options, a first option **10902** to notify the patient when to take the daily medication doses and a second option **10904** to remind the patient when to take the daily medication doses. As shown in GUI **10900**, the patient is currently taking 4 daily doses and the reminder option is set to "ON." Tapping or selecting the first option **10902** displays the "My Doses" GUI **11000**, which indicates the times when the patient is scheduled to take their medications. Since 4 doses were selected in GUI **10900** in FIG. **109**, the GUI **11000** displays the four times of the day when the patient is scheduled to take their medications. As shown, the first scheduled medication time **11002** is due at 0800 h, the second scheduled medication time **11004** is due at 1200 h, the third scheduled medication time **11006** is due at 1600 h, and the fourth schedule medication time **11008** is 2000 h. A new medication time may be added or removed by tapping or selecting the plus ("+") GUI element **11010** or the minus ("−") GUI element **11012**, respectively. Tapping or selecting the second option **10904** in GUI **10900** displays the "Remind Me" GUI **11100**, which indicates the times when the patient is scheduled to be reminded about taking their medications. Since the "Remind Me" option was turned "ON" in GUI **10900**, the "Remind Me" GUI **11100** shows the "ON" button **11108**. The GUI **11100** also shows a "Before Dose" reminder **11102**. In one aspect, the "Before Dose" reminder **11102** can be selected from a drop down menu, for example, such as: never, 2 hours, 1 hour, 45 minutes, 30 minutes, 15 minutes, 10 minutes, 5 minutes, or zero minutes. In other aspects, other suitable times may be provided for selection. An "After Dose" reminder **11104** can be selected from a drop down menu, for example, such as: never, 0 minutes, 5 minutes, 10 minutes, 15 minutes, 30 minutes, 45 minutes, 1 hour, 2 hours. In other aspects, other suitable times may be provided for selection. A "Cancel medication notifications if tablet detected within" **11106** a predetermined time from a pull down menu, for example, such as: never, 0 minutes, 15 minutes, 30 minutes, 45 minutes, 1 hour, 2 hours. In other aspects, other suitable times may be provided for selection.

FIGS. **112-115** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device **102** for adding daily medications dose times. FIG. **112** illustrates one aspect of a "Notifications" GUI **11200** for a display screen of a mobile device **102**. Selecting element **11202** displays GUI **11300** as shown in FIG. **113**. Selecting the plus ("+") GUI element **11010** displays the "Add Dose" GUI **11400** shown in FIG. **114**. Setting the medication dosing time can be done by tapping or selecting the plus ("+") or minus ("−") GUI elements **11402**, **11404**, respectively, to increase or decrease, respectively, the hour portion of the time and tapping or selecting the plus ("+") or minus ("−") GUI elements **11406**, **11408**, respectively, to increase or decrease, respectively, the minutes portion of the time. Once the clock time is set, the clock time can be cancelled by tapping or selecting the "Cancel" button **11410** or can be saved by tapping or selecting the "Save" button **11410**. FIG. **115** shows "Edit Dose" GUI **11500** for editing the dosing time. As shown, editing the medication dosing time can be done by tapping or selecting the plus ("+") or minus ("−") GUI elements **11502**, **11504**, respectively, to increase or decrease, respectively, the hour portion of the time and tapping or selecting the plus ("+") or minus ("−") GUI elements **11506**, **11508**, respectively, to increase or decrease, respectively, the minutes portion of the time. Once the revised clock time is set, the clock time can be cancelled by tapping or selecting the "Cancel" button **11510** or can be saved by tapping or selecting the "Save" button **11510**.

FIGS. **116-119** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device **102** for adding daily medication reminders for taking medications. FIG. **116** illustrates one aspect of a "Notifications" GUI **11600** for a display screen of a mobile device **102**. Selecting element **11602** displays the "Remind Me" GUI **11700** as shown in FIG. **117**. As shown in FIG. **117**, the GUI **11700** provides a "Remind Me" button element **11702**, which indicates that reminders are enabled or turned "ON." As shown, the "Before Dose" reminder **11704** is set for 20 min, the "After Dose" reminder **11706** is set for 10 min, and the "Cancel medication notifications if tablet detected within" reminder **11708** is set for 45 min of dose. As discussed previously, the "Before Dose" **11704** reminder can be selected from a drop down menu, for example, such as: never, 2 hours, 1 hour, 45 minutes, 30 minutes, 15 minutes, 10 minutes, 5 minutes, or zero minutes. The "After Dose" reminder **11706** can be selected from a drop down menu, for example, such as: never, 0 minutes, 5 minutes, 10 minutes, 15 minutes, 30 minutes, 45 minutes, 1 hour, 2 hours. The "Cancel" reminder

11708 can be selected from a pull down menu, for example, such as: never, 0 minutes, 15 minutes, 30 minutes, 45 minutes, 1 hour, 2 hours. An "After Dose" GUI **11800** shown in FIG. **118** is for selecting the "After Dose" reminder time from a menu list. As shown, "10 minutes" **11802** was selected. A "Cancel" reminder GUI **11900** shown in FIG. **19** is for selecting when to cancel medication notifications if a tablet is detected within a predetermined period. As shown, the reminder is cancelled if the tablet is detected within "45 minutes of dose" **11902**.

FIGS. **120-123** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device **102** for providing data alerts. FIG. **120** illustrates one aspect of a "Notifications" GUI **12000** for a display screen of a mobile device **102**. Selecting element **12002** displays the "Data" GUI **12100** as shown in FIG. **121**. The GUI **12100** displays a "Patch Replacement" GUI element **12102** and a "Missing Information" GUI element **12104**. Selecting the "Patch Replacement" GUI element **12102** displays the "Patch Replacement" GUI **12200** shown in FIG. **122**. A "Patch Replacement" button **12202** is set to "ON" indicating the patch notification function is enabled. A "Reminder" **12204** to replace the patch is scheduled to be delivered on Wednesday (Wed) at 1500 h. Selecting the "Missing Information" GUI element **12104** in FIG. **121** displays the "Missing Information" GUI **12300** as shown in FIG. **123**A. A "Missing Information" button **12302** is set to "ON" indicating that the missing information notification function is enabled. As shown in FIG. **123**A, a notification of missing information **12304** is sent if no new information is received in a predetermined time, such as, for example, 4 hrs. The notification can be set to any predetermined time. In one aspect, the notification can be sent if no new information is received in 12 hours, 24 hours, 36 hours, 48 hours, 72 hours, for example. FIG. **123**B shows the "Missing Information" button **12302** is set to "OFF" to indicate that the missing information notification function is disabled.

FIGS. **124-127** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device **102** for setting notification preferences. FIG. **124** illustrates one aspect of a "Notifications" GUI **12400** for a display screen of a mobile device **102**. Selecting element **12402** displays the "Preferences" GUI **12500** as shown in FIG. **125**. The GUI **12500** displays an "Additional Notifications" GUI element **12502** and a "Date & Time" GUI element **12504**. Selecting the "Additional Notifications" GUI element **12502** displays the "Additional Notifications" GUI **12600**, which indicates how the additional notifications will be sent such as by "Text Message" **12602** or "Email" **12604**, which can be turned "ON" or "OFF." Selecting the "Date & Time" GUI element **12504** in FIG. **125** displays the "Date & Time" GUI **12700** in FIG. **127**A. The "Date & Time" GUI **12700** enables the selection of the "Date Format" **12702**, the "Time Format" **12704**, and the "Time Zone" **12706**. The "Date Format" **12702** can be selected, for example, as "MM/DD/YYY" or "DD/MM/YYYY" among other formats. The "Time Format" **12704** can be selected, for example, as "12 h" or "24 h" among other formats. The "Time Zone" **12706** can be fixed to home, for example, as shown in FIG. **127**A. The "Time Zone" GUI **12708** in FIG. **127**B shows the location of the "Home Time Zone" **12710**, for example, London. The "Time Zone" GUI **12708** also shows that the data is shown and notifications are sent based on the home time zone.

FIGS. **128-131** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device **102** for displaying information about the account and about the system. FIG. **128** illustrates one aspect of a "Notifications" GUI **12800** for a display screen of a mobile device **102**. Selecting element **12802** displays information about the system (e.g., Helius) in the "My Helius" GUI **12900** as shown in FIG. **129**. The GUI **12900** displays an "Account Information" GUI element **12902** and an "About Helius" GUI element **12904**. Selecting the "Account Information" GUI element **12902** displays the "Account Information" GUI **13000**, which provides the "Login" **13002**, "Password" **13004**, "Nickname" **13006**, "SMS" **13008**, "Address" **13010**. Selecting the "About Helius" GUI element **12904** in FIG. **129** displays the "About Helius" GUI **13100** in FIG. **131**. The "About Helius" GUI **13100** provides the software version **13102** and the underlying powering and supporting system **13104**.

FIGS. **132-135** illustrate ornamental designs for several additional "Notifications" GUIs for a display screen of a mobile device **102** for editing account. FIG. **132** illustrates one aspect of the "Account Information" GUI **13000** for a display screen of a mobile device **102**. Selecting the "Login" element **13002** displays the "Login" GUI **13300** as shown in FIG. **133** to enable editing the login email account. Selecting the "Password" element **13004** displays the "Password" GUI **13400** as shown in FIG. **134** to enable editing the password. Selecting the "Address" element **13010** displays the "Address" GUI **13500** as shown in FIG. **135** to enable editing the address.

It will be appreciated that the term "mobile device" may refer generally to any device which can be configured as a communication node for receiving a first communication from a first device and transmitting a second communication to a second device. In one aspect, the mobile device may comprise various physical or logical elements implemented as hardware, software, or any combination thereof, as desired for a given set of design parameters or performance constraints. In various aspects, the physical or logical elements may be connected by one or more communications media. For example, communication media may comprise wired communication media, wireless communication media, or a combination of both, as desired for a given implementation.

In various aspects, the mobile device or elements of the mobile device such as the physical or logical elements of the device may be incorporated in any suitable device including, without limitation, a personal digital assistant (PDA), laptop computer, ultra-laptop computer, combination cellular telephone/PDA, smartphone, mobile unit, subscriber station, user terminal, portable computer, handheld computer, palmtop computer, wearable computer, media player, messaging device, data communication device, a laptop computer, ultra-laptop computer, portable computer, handheld computer, palmtop computer, tablet computer, e-book reader, cellular telephone, pager, one-way pager, two-way pager, messaging device, data communication device, computers that are arranged to be worn by a person, such as a wrist computer, finger computer, ring computer, eyeglass computer, belt-clip computer, arm-band computer, shoe computers, clothing computers, and other wearable computers, media or multimedia controllers (e.g., audio and/or visual remote control devices), intelligent devices/appliances such as consumer and home devices and appliances that are capable of receipt of data such as physiologic data and perform other data-related functions, e.g., transmit, display, store, and/or process data, refrigerators, weight scales, toilets, televisions, door frame activity monitors, bedside monitors, bed scales, mobile telephones, portable telephones, eyeglasses, hearing aids, headwear (e.g., hats, caps, visors, helmets, goggles, earmuffs, headbands), wristbands, jewelry, furniture, and/or any suitable object that may be configured to incorporate the appro-

priate physical and/or logical elements for implementing the mobile device and to receive a first communication from a first device and transmit a second communication to a second device.

It will be appreciated that the term "medication" or "medicinal dose" as used throughout this disclosure may include, without limitation, various forms of ingestible, inhalable, injectable, absorbable, or otherwise consumable medicaments and/or carriers therefor such as, for example, pills, capsules, gel caps, placebos, over capsulation carriers or vehicles, herbal, over-the-counter (OTC) substances, supplements, prescription-only medication, and the like, to be taken in conjunction with an IEM. Such carriers are described in commonly owned applications U.S. application Ser. No. 12/673,150 titled "Pharmaceutical Dosages Delivery System," filed Feb. 11, 2010 which is incorporated by reference in its entirety.

It also will be appreciated that as described in the present disclosure, that the mobile devices that incorporate an image capture device (e.g., a digital camera) may be used to capture an image of the IEM device, medication, container in which the medication, among others. Once the image is captured it can be used to verify the patient taking the medication, the medication itself, expiration dates on the package, among other information. The digitally captured image can be stored, compressed, transmitted over local and wide area networks (such as the Internet), and so on.

It is worthy to note that any reference to "one aspect" or "an aspect" means that a particular feature, structure, or characteristic described in connection with the aspect is included in at least one aspect. Thus, appearances of the phrases "in one aspect" or "in an aspect" in various places throughout the specification are not necessarily all referring to the same aspect. Furthermore, the particular features, structures or characteristics may be combined in any suitable manner in one or more aspects.

Some aspects may be described using the expression "coupled" and "connected" along with their derivatives. It should be understood that these terms are not intended as synonyms for each other. For example, some aspects may be described using the term "connected" to indicate that two or more elements are in direct physical or electrical contact with each other. In another example, some aspects may be described using the term "coupled" to indicate that two or more elements are in direct physical or electrical contact. The term "coupled," however, also may mean that two or more elements are not in direct contact with each other, but yet still co-operate or interact with each other.

While certain features of the aspects have been illustrated as described herein, many modifications, substitutions, changes and equivalents will now occur to those skilled in the art. It is therefore to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the aspects.

The invention claimed is:

1. A method of managing adherence to a regimen in a subscription based computer implemented healthcare information environment, the method comprising:

automatically receiving a first wireless transmission, at a mobile device, the first wireless transmission including dosage ingestion information detected from a marker embedded within a corresponding dose of medicine ingested by a living subject, the mobile device comprising a processor, a memory coupled to the processor, and a display coupled to the processor, wherein the mobile device automatically receives the dosage ingestion information from one or more wireless, wearable receivers coupled to a body of the living subject, wherein the mobile device continuously receives the dosage ingestion information as the dose of medicine is ingested by the living subject;

automatically addressing a second wireless transmission to a backend computer processing system, the second wireless transmission including the dosage ingestion information;

receiving, from a computer at the backend computer processing system, a personal information stream characterizing behavior of the living subject based at least in part on the dosage ingestion information sent to the computer over a predetermined period;

displaying a graphical user interface screen on the display;

displaying, within the graphical user interface screen, a plurality of selectable graphical user interface elements, wherein selection of one of the plurality of selectable graphical user interface elements causes the graphical user interface screen to display information associated with the living subject,

wherein the plurality of selectable graphical user interface elements comprises at least one graphical user interface element which corresponds to the display of an activity timeline based at least in part on the personal information stream;

receiving by the mobile device an input selecting the at least one graphical user interface element;

in response to the input selecting the at least one graphical user interface element, displaying, within the graphical user interface screen, the activity timeline, wherein the activity timeline comprises an activity ribbon showing the level of activity of the living subject over the predetermined period; and

displaying the ingestion of the dose within the graphical user interface screen relative to the activity ribbon and the activity timeline,

wherein the graphical user interface screen presents scheduled medication times as one set of icons and actual detected medication ingestion times based on the dosage ingestion information by another set of icons along the activity timeline such that scheduled versus actual medication times are visually correlated by the graphical user interface screen.

2. The method of claim **1**, further comprising:

continuously tracking the level of activity of the living subject over the predetermined period; and

displaying the activity ribbon.

3. The method of claim **1**, further comprising displaying a comment bubble on the activity ribbon.

4. The method of claim **1**, further comprising displaying a sub-activity element within the activity ribbon to indicate a first level of activity when a second level of activity is expected.

5. The method of claim **1**, wherein the plurality of selectable graphical user interface elements comprises at least one other graphical user interface element which corresponds to the display of a dose timeline based on the personal information stream, the method further comprising:

receiving by the mobile device an input selecting the at least one other graphical user interface element; and

in response to the input selecting the at least one other graphical user interface element, displaying, within the graphical user interface screen, the dose timeline,

wherein the dose timeline indicates a time during when a dose was ingested by the living subject over a predetermined period.

6. The method of claim 5, comprising:
tracking the dose timeline over the predetermined period; and
displaying dose events.

7. The method of claim 5, further comprising displaying a comment bubble in the dose timeline.

8. The method of claim 1, wherein the plurality of selectable graphical user interface elements comprises at least a one other graphical user interface element which corresponds to the display of a physical activity trend of the living subject based on the personal information stream, the method further comprising:
receiving by the mobile device an input selecting the at least one other graphical user interface element; and
in response to the input selecting the at least one other graphical user interface element, displaying, within the graphical user interface screen, a physical activity trend timeline,
wherein the physical activity trend timeline comprises the level of physical activity over a first predetermined period and wherein the physical activity trend timeline extends over a second predetermined period.

9. The method of claim 8, wherein the first predetermined period is a 24-hour day and the second predetermined period is a week, the method further comprising:
displaying a bar graph element to show the level of activity over the 24-hour period; and
displaying additional bar graph elements over the week for each additional 24-hour period, wherein each of the additional bar graph elements show corresponding levels of activity for each of the additional 24-hour period over the week.

10. The method of claim 8, wherein the first predetermined period is a 24-hour day and the second predetermined period is a week, the method further comprising:
displaying an icon element to show the number of steps taken by the living subject over the 24-hour period; and
displaying icon elements over the week for each additional 24-hour period, wherein each of the additional icon elements graph elements show corresponding number of steps taken by the living subject for each of the additional 24-hour periods over the week.

11. The method of claim 1, wherein the plurality of selectable graphical user interface elements comprises at least one other graphical user interface element which corresponds to the display of a dose trend of the living subject based on the personal information stream, the method further comprising:
receiving by the mobile device an input selecting the at least one other graphical user interface element; and
in response to the input selecting the at least one other graphical user interface element, displaying, within the graphical user interface screen, a dose trend timeline,
wherein the dose trend timeline comprises a number of doses ingested by the living subject and a time stamp associated with the ingestion of the dose over a first predetermined period and wherein the dose trend timeline extends over a second predetermined period.

12. The method of claim 11, wherein the first predetermined period is a 24-hour day and the second predetermined period is a week, the method further comprising:
displaying an element to show when over the 24-hour period the dose was ingested by the living subject; and
displaying additional elements over the week for each additional 24-hour period, wherein each of the additional elements show corresponding times when the dose was ingested by the living subject for each of the additional 24-hour period over the week.

13. The method of claim 11, further comprising displaying the number of doses ingested at the same time on the element.

14. The method of claim 11, further comprising displaying a note on the element.

15. The method of claim 1, wherein the plurality of selectable graphical user interface elements comprises at least one other graphical user interface element which corresponds to the display of configurations, initial set-up, management, and replacement of the receiver, the method further comprising:
receiving by the mobile device an input selecting the at least one other graphical user interface element; and
in response to the input selecting the at least one other graphical user interface element, displaying, within the graphical user interface screen, a button element.

16. The method of claim 15, further comprising:
receiving by the mobile device a second input associated with the button element, wherein the button element is associated with testing the operation of the receiver, mobile device, and backend computer processing system; and
in response to the second input, testing the operation of the receiver, the mobile device, and the backend computer processing system.

17. The method of claim 15, further comprising: receiving by the mobile device a second input associated with the button element, wherein the button element is associated with replacing the receiver; and in response to the second input, replacing the receiver.

18. The method of claim 1, wherein the plurality of selectable graphical user interface elements comprises at least one other graphical user interface element which corresponds to managing and controlling data sharing functions such as invitations and control of which data is shared with at least one invitee, the method further comprising:
receiving by the mobile device an input selecting the at least one other graphical user interface element;
in response to the input selecting the at least one other graphical user interface element, displaying, within the graphical user interface screen, a manage sharing screen comprising elements associated with the at least one invitee and at least one selection element associated with the at least one invitee, wherein the at least one element corresponds to any of an activity timeline element, an activity trend chart element, and a dose timeline element;
receiving by the mobile device a second input associated with selecting one of the elements associated with the invitee;
in response to the second input, selecting one of the elements associated with the at least one invitee; and
sending an invitation to the at least one invitee for sharing data associated with the selected element.

19. The method of claim 18, further comprising:
receiving by the mobile device a communication from the at least one invitee, wherein the communication comprises a personal code associated with the living subject; and
enabling sharing data associated with the selected element only when the personal code is received and verified by the backend computer processing system.

20. The method of claim 1, further comprising receiving a communication from an ingestible device.

21. The method of claim 1, wherein the mobile device further comprises an application stored on the mobile device that is configured to automatically receive the first wireless transmission.

22. The method of claim 1, wherein the dosage ingestion information includes data about the dose of medicine ingested by the living subject and the data is selected from the group consisting of: a first identity of the dose of medicine, a second identity of a manufacturer of the dose of medicine, a unique identity of the marker, and a combination thereof.

23. The method of claim 1, further comprising determining a time when the dosage ingestion information is received, wherein the wireless transmission to the backend computer further includes the time.

24. The method of claim 1, wherein the personal information stream is further based on data stored at a memory of the computer in association with a unique identity of the marker.

25. The method of claim 1, further comprising addressing a third wireless transmission to a second mobile device, the third wireless transmission including the personal information stream.

26. The method of claim 1, further comprising addressing a third wireless transmission to the backend computer processing system, third wireless transmission including subscription information associated with the living subject.

27. A system for managing adherence to a regimen in a subscription based computer implemented healthcare information environment, the system comprising:

a mobile device comprising a processor, a memory coupled to the processor, and a display coupled to the processor, the mobile device configured to:

automatically receive a first wireless transmission including dosage ingestion information detected from a marker embedded within a corresponding dose of medicine ingested by a living subject, wherein the mobile device automatically receives the dosage ingestion information from one or more wireless, wearable receivers coupled to the living subject's body and wherein the mobile device continuously receives the dosage ingestion information as the dose of medicine is ingested by the living subject;

in response to automatically receiving the first wireless transmission, automatically and wirelessly communicate the dosage ingestion information over a wireless network to a computer at a backend computer processing system;

receive from the computer at the backend processing system a personal information stream characterizing behavior of the living subject based at least in part on the received dosage ingestion information over a predetermined period,

display a graphical user interface screen on the display;

display within a graphical user interface screen, a plurality of selectable graphical user interface elements, wherein selection of one of the plurality of graphical user interface elements causes the graphical user interface screen to display information associated with the living subject; wherein the plurality of selectable graphical user interface elements comprises at least one graphical user interface element which corresponds to the display of an activity timeline based at least in part on the personal information stream;

receive an input selecting the at least one graphical user interface element;

in response to the input selecting the at least one graphical user interface element, display, within the graphical user interface screen, the activity timeline, wherein the activity timeline comprises an activity ribbon showing the level of activity of the living subject over the predetermined period, and

display the ingestion of the dose within the graphical user interface screen relative to the activity ribbon and the activity timeline; wherein the graphical user interface presents scheduled medication times as one set of icons and actual detected medication ingestion times by another set of icons along the activity timeline such that scheduled versus actual medication times are visually correlated by the graphical user interface screen.

28. A method comprising the steps of:

automatically receiving a first wireless transmission, at a mobile device, the first wireless transmission including dosage ingestion information detected from a marker embedded within a corresponding dose of medicine ingested by a subject, the mobile device comprising a processor, a memory coupled to the processor, and a display coupled to the processor, wherein the mobile device automatically receives the dosage ingestion information from one or more wireless, wearable receivers coupled to the subject's body and wherein the mobile device continuously receives the dosage ingestion information as the dose of medicine is ingested by the subject;

in response to automatically receiving the first wireless transmission, automatically addressing a second wireless transmission to a computer, the second wireless transmission including the dosage ingestion information;

receiving, from the computer, a personal information stream characterizing behavior of the subject based at least in part on the dosage ingestion information sent to the computer over a predetermined period;

displaying, on the mobile device, the personal information stream characterizing the level of activity of the subject over a predetermined period of time based on the received information,

displaying a graphical user interface screen on the display;

displaying within the graphical user interface screen, a plurality of selectable graphical user interface elements, wherein selection of one of the plurality of graphical user interface elements causes the graphical user interface screen to display information associated with the subject,

wherein the plurality of selectable graphical user interface elements comprises at least one graphical user interface element which corresponds to the display of an activity timeline based on a personal information stream;

receiving an input selecting the at least one graphical user interface element; and

in response to the input selecting the at least one graphical user interface element, displaying, within the graphical user interface screen, the activity timeline,

wherein the activity timeline comprises an activity ribbon showing the level of activity of the subject over the predetermined period, and

displaying the ingestion of the dose within the graphical user interface screen relative to the activity ribbon and the activity timeline;

wherein the graphical user interface screen presents scheduled medication times as one set of icons and actual detected medication ingestion times by another set of icons along the activity timeline such that scheduled versus actual medication times are visually correlated by the graphical user interface screen.

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