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(54) Title: SYSTEMS AND METHODS FOR DIABETES MANAGEMENT

(57) Abstract: Systems, devices and methods are provided for incorporating a medication delivery device into an integrated management system. The integrated management system may be an integrated diabetes management system and may include a glucose monitor, a connected insulin pen, and software. The integrated management system may produce a plurality of reports that may include data related to analyte levels (e.g., glucose levels) and medication delivered (e.g., insulin delivered).

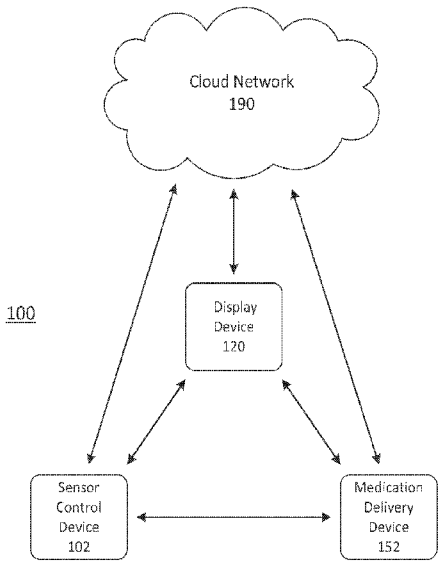


FIG. 1A

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SYSTEMS AND METHODS FOR DIABETES MANAGEMENT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 63/177,706, filed April 21, 2021, and U.S. Provisional Application No. 63/236,910, filed August 25, 2021, both of which are expressly incorporated herein by reference in their entireties for all purposes.

FIELD

[0002] The subject matter described herein relates generally to systems, devices, and methods relating to integrated systems for diabetes management such as, for example, an integrated platform that connects insulin pens with a common viewing platform such that data can be shared among many parties.

BACKGROUND

[0003] The detection and/or monitoring of analyte levels, such as glucose, ketones, lactate, oxygen, hemoglobin A1C, or the like, can be vitally important to the health of an individual having diabetes. Patients suffering from diabetes mellitus can experience complications including loss of consciousness, cardiovascular disease, retinopathy, neuropathy, and nephropathy. Diabetics are generally required to monitor their glucose levels to ensure that they are being maintained within a clinically safe range, and may also use this information to determine if and/or when insulin is needed to reduce glucose levels in their bodies or when additional glucose is needed to raise the level of glucose in their bodies.

[0004] Growing clinical data demonstrates a strong correlation between the frequency of glucose monitoring and glycemic control. Despite such correlation, many individuals diagnosed with a diabetic condition do not monitor their glucose levels as frequently as they should due to a combination of factors including inconvenience, testing discretion, pain associated with glucose testing, and cost.

[0005] For patients that rely on the administration of medications (e.g., insulin) to treat or manage diabetes, it is desirable to have systems, devices, or methods that can integrate glucose data with insulin dosing data and provide more actionable insights to both patients, caregivers, and HCPs. Manual logging of insulin doses is not only a huge time commitment but often results in inaccurate dosing logs. Moreover, sharing these manual logs with the HCP is a big hassle for patients and fraught with workflow issues.

[0006] Therapeutic management of diabetes often requires the use of multiple drugs that have different delivery frequencies (i.e., daily, weekly) as well as routes of administration (oral or injection). The combination of drug types, delivery frequencies and routes of administration can be difficult to manage, creating significant cognitive burden for a user that often translates to poor dose regimen concordance. Studies have shown that amongst insulin-dependent people with Type 1 diabetes, up to 24% of mealtime rapid acting insulin boluses and 36% of long acting once daily basal doses are missed, leading to poor glucose control and diabetes management. Existing dose logbooks are only as useful as a user wants to make them. Their efficacy is directly correlated to a user's willingness to log doses and reference past loggings. The dawn of connected dosing technology, such as BLUETOOTH®-enabled insulin pens, has enabled doses to be logged automatically into companion mobile phone applications as they are delivered with no user action required. While useful in day-to-day management, this method suffers from two notable shortcomings: (1) it is not able to correlate directly with glycemic outcomes; and (2) insulin doses are often presented in tabular form that is difficult to read and interpret over a large time window.

[0007] For these and other reasons, needs exist for improved systems, methods, and devices relating to integrated systems for diabetes management.

SUMMARY

[0008] Provided herein are example embodiments of systems, devices and methods relating to management of diabetes, including integrated managements systems that include an analyte monitoring device, a medication delivery device, a reader device, monitoring software, and reporting software. In many embodiments, the analyte monitoring device (e.g., a continuous or flash glucose monitor) and the medication delivery device (e.g., an insulin pen) are communicatively coupled with the reader device to enable an easy transfer of analyte data, dose logs, and other information to computing devices that include monitoring and/or reporting software. The integrated system can include GUI displays that instruct and assist the user in connecting a medication delivery device to the monitoring software on, e.g., the reader device, such that dosing logs and other information can be transferred from the medication delivery device. The integrated system also includes reporting software that can produce a plurality of

reports that incorporate data regarding analyte levels and metrics and medication dosing amounts and metrics.

[0009] This method addresses both of those concerns by utilizing glucose data as an indicator of poor dose concordance and presenting the data in a way that will allow a trained health care professional to quickly identify situations where poormedication dose concordance results in poor glycemic control. In some embodiments, the glucose data may be the sole indicator of poor dose concordance.

[0010] Other systems, devices, methods, features and advantages of the subject matter described herein will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, devices, methods, features and advantages be included within this description, be within the scope of the subject matter described herein, and be protected by the accompanying claims. In no way should the features of the example embodiments be construed as limiting the appended claims, absent express recitation of those features in the claims.

BRIEF DESCRIPTION OF THE FIGURES

[0011] The details of the subject matter set forth herein, both as to its structure and operation, may be apparent by study of the accompanying figures, in which like reference numerals refer to like parts. The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the subject matter. Moreover, all illustrations are intended to convey concepts, where relative sizes, shapes and other detailed attributes may be illustrated schematically rather than literally or precisely.

[0012] FIGS. 1A and 1B are block diagrams of example embodiments of a integrated management system.

[0013] FIG. 2A is a schematic diagram depicting an example embodiment of a sensor control device.

[0014] FIG. 2B is a block diagram depicting an example embodiment of a sensor control device.

[0015] FIG. 3A is a schematic diagram depicting an example embodiment of a medication delivery device.

[0016] FIG. 3B is a block diagram depicting an example embodiment of a medication delivery device.

[0017] FIG. 4A is a schematic diagram depicting an example embodiment of a display device.

[0018] FIG. 4B is a block diagram depicting an example embodiment of a display device.

[0019] FIG. 5 is a block diagram depicting an example embodiment of a user interface device.

[0020] FIG. 6 is a flow diagram of a user experience of an example embodiment of the integrated management system.

[0021] FIG. 7 is a flow diagram of a user experience of adding a medication delivery device to the integrated management system.

[0022] FIG. 8A is a block diagram depicting an example embodiment of a Snapshot report.

[0023] FIGS. 8B-C are example embodiments of Snapshot reports.

[0024] FIG. 9A is a block diagram depicting an example embodiment of a Weekly Summary report.

[0025] FIGS. 9B-9G are example embodiments of Weekly Summary reports.

[0026] FIG. 10A is a block diagram depicting an example embodiment of a Daily Log report.

[0027] FIGS. 10B-10C are example embodiments of Daily Log reports.

[0028] FIG. 11A is a block diagram depicting an example embodiment of a Daily Pattern report.

[0029] FIGS. 11B-11C are example embodiments of Daily Pattern reports.

[0030] FIGS. 11D-11E are exemplary embodiments of Daily Pattern report GUIs that may be displayed on the display device.

[0031] FIG. 12A is a block diagram depicting an example embodiment of a Mealtime Patterns report.

[0032] FIGS. 12B-12C are example embodiments of a Mealtime Patterns report.

[0033] FIG. 13A is a block diagram depicting an example embodiment of a Device Details report.

[0034] FIG. 13B is an example embodiment of a Device Details report.

[0035] FIG. 14 is a block diagram depicting an example embodiment of an AGP report.

[0036] FIG. 15A is a block diagram depicting an example embodiment of a GUI from a Patient Dashboard.

[0037] FIG. 15B is an example embodiment of a GUI from a Patient Dashboard.

[0038] FIG. 16A is a block diagram depicting an example embodiment of a GUI related to a Data Sources Modal with Connected Pen.

[0039] FIG. 16B is an example embodiment of a GUI related to a Data Sources Modal with Connected Pen.

[0040] FIG. 17A is a block diagram depicting an example embodiment of an alert related to a connected insulin pen.

[0041] FIG. 17B is an example embodiment of an alert related to a connected insulin pen.

[0042] FIGS. 18A-18B are block diagrams depicting example embodiments of comparative AGP reports.

[0043] FIG. 18C is an exemplary AGP illustrating all data.

[0044] FIG. 18D is an exemplary AGP illustrating data excluding missed doses.

[0045] FIG. 19 is example embodiment of a Comparison Report.

[0046] FIGS. 20A-20D are example embodiments of GUIs for use with connecting a medical delivery device with a monitoring application.

[0047] FIGS. 20E-20F are example embodiments of GUIs for use with managing the user's connected medication delivery device.

[0048] FIGS. 21A-21B are example embodiments of GUIs for use with downloading and reviewing dosing records.

[0049] FIG. 21C are example embodiments of GUIs for use with editing medication dosage notes.

[0050] FIG. 21D is an example embodiment of a GUI for use with prompting a user to learn about connecting a medication delivery device.

[0051] FIG. 22 are example embodiments of GUIs for use with customizing a name for a medication delivery device.

[0052] FIGS. 23A-23C are example embodiments of GUIs for use concerning errors in transferred data.

[0053] FIGS. 24A-24C are example embodiments of Insulin Summary Report GUIs.

[0054] FIG. 25 is an exemplary method for displaying a missed meal dose alert or message.

[0055] FIG. 26 is an exemplary method for displaying a correction dose alert or message.

[0056] FIG. 27 is an exemplary method for displaying a congratulatory alert or message.

[0057] FIGS. 28A-E are exemplary embodiments of GUIs of Daily View Report GUIs.

DETAILED DESCRIPTION

[0058] Before the present subject matter is described in detail, it is to be understood that this disclosure is not limited to the particular embodiments described herein, as such may, of course, vary. It is also to be understood that the terminology used herein is for the purpose of describing particular embodiments only, and is not intended to be limiting, since the scope of the present disclosure will be limited only by the appended claims.

[0059] Generally, embodiments of the present disclosure include systems, devices, and methods related to integrated diabetes management. The integrated diabetes management system can include smart delivery systems, such as connected, smart insulin pens, glucose sensors, software to receive and process data from the glucose sensors and smart delivery systems, and a viewing platform capable of determining and visualizing dose analytics. The integrated management system (IMS) can further include reports that include insights as to the effects of various inulin doses and treatment advice, including dosing recommendations.

[0060] The integrated diabetes management can be implemented as software and/or firmware instructions stored in a memory of a computing device for execution by at least one processor or processing circuitry thereof. The computing device can be in the possession of a user or healthcare professional (HCP), and the user or HCP can interface with the computing device through a user interface. According to some embodiments, the computing device can be a server or trusted computer system that is accessible through a network, and the integrated management software can be presented to the user in the form of an interactive web page by way of a browser executed on a local display device (having the user interface) in communication with the server or trusted computer system through the network. In this and other embodiments, the integrated management software can be executed across multiple devices, or executed, in part, on processing circuitry of a local display device and, in part, on processing circuitry of a server or trusted computer system. It will be understood by those of skill in the art that when the IMS is described as performing an action, such action is performed according to instructions stored in a computer memory (including instructions hardcoded in read only memory) that, when executed by at least one processor of at least one computing device, causes the IMS to perform the described action. In all cases the action can alternatively be performed by hardware that is hardwired to implement the action (e.g., dedicated circuitry) as opposed to performance by way of instructions stored in memory.

[0061] Furthermore, as used herein, a system on which the IMS is implemented can be referred to as an integrated management system. The integrated management system can be configured for the sole purpose of providing integrated management or can be a multifunctional system of which integrated management is only one aspect. For example, in some embodiments the integrated management system can also be capable of monitoring analyte levels of a user. In some embodiments the integrated management system can also be capable of delivering medication to the user, such as with an injection or infusion device. In some embodiments, the integrated management system is capable of both monitoring analytes and delivering medication.

[0062] These embodiments and others described herein represent improvements in the field of computer-based dose determination, analyte monitoring, and medication delivery systems. The specific features and potential advantages of the disclosed embodiments are further discussed below.

[0063] Before describing the integrated management embodiments in detail, it is first desirable to describe examples of integrated management systems on or through which the integrated management application can be implemented.

Example Embodiments of Integrated Systems

[0064] FIG. 1A is a block diagram depicting an example embodiment of integrated system 100. In this embodiment, integrated management system 100 is capable of delivering one or more medications, logging medication doses, monitoring one or more analytes, and determining and viewing analytics, and providing treatment advice. This multifunctional example is used to illustrate the high degree of interconnectivity and performance obtainable by system 100.

[0065] Here, system 100 includes a sensor control device (SCD) 102 configured to collect analyte level information from a user, a medication delivery device (MDD) 152 configured to deliver medication to the user, and a display device 120 configured to present information to the user and receive input or information from the user. The structure and function of each device will be described in detail herein.

[0066] System 100 is configured for highly interconnected and highly flexible communication between devices. Each of the three devices 102, 120, and 152, can communicate directly with each other (without passing through an intermediate electronic device) or indirectly with each other (such as through cloud network 190, or through another device and then through network 190). Bidirectional communication capability between devices, as well as between

devices and network 190, is shown in FIG. 1A with a double-sided arrow. However, those of skill in the art will appreciate that any of the one or more devices (e.g., SCD) can be capable of unidirectional communication such as, for example, broadcasting, multicasting, or advertising communications. In each instance, whether bidirectional or unidirectional, the communication can be wired or wireless. The protocols that govern communication over each path can be the same or different, and can be either proprietary or standardized. For example, wireless communication between devices 102, 120, and 152 can be performed according to a BLUETOOTH® (including BLUETOOTH®Low Energy) standard, a Near Field Communication (NFC) standard, a Wi-Fi (802.11x) standard, a mobile telephony standard, or others. All communications over the various paths can be encrypted, and each device of FIG. 1A can be configured to encrypt and decrypt those communications sent and received. In each instance the communication pathways of FIG. 1A can be direct (e.g., BLUETOOTH®or NFC) or indirect (e.g., Wi-Fi, mobile telephony, or other internet protocol). Embodiments of system 100 do not need to have the capability to communicate across all of the pathways indicated in FIG. 1A.

[0067] In addition, although FIG. 1A depicts a single display device 120, a single SCD 102, and a single MDD 152, those of skill in the art will appreciate that system 100 can comprise a plurality of any of the aforementioned devices. By way of example only, system 100 can comprise a single SCD 102 in communication with multiple (e.g., two, three, four, etc.) display devices 120 and/or multiple MDDs 152. Alternatively, system 100 can comprise a plurality of SCDs 102 in communication with a single display device 120 and/or a single MDD 152. Furthermore, each of the plurality of devices can be of the same or different device types. For example, system 100 can comprise multiple display devices 120, including a smart phone, a handheld receiver, and/or a smart watch, each of which can be in communication with SCD 102 and/or MDD 152, as well in communication with each other.

[0068] Analyte data can be transferred between each device within system 100 in an autonomous fashion (e.g., transmitting automatically according to a schedule), or in response to a request for analyte data (e.g., sending a request from a first device to a second device for analyte data, followed by transmission of the analyte data from the second device to the first device). Other techniques for communicating data can also be employed to accommodate more complex systems like cloud network 190.

[0069] FIG. 1B is a block diagram depicting another example embodiment of integrated management system 100. Here, system 100 includes SCD 102, MDD 152, a first display device 120-1, a second display device 120-2, local computer system 170, and trusted computer system 180 that is accessible by cloud network 190. SCD 102 and MDD 152 are capable of communication with each other and with display device 120-1, which can act as a communication hub for aggregating information from SCD 102 and MDD 152, processing and displaying that information where desired, and transferring some or all of the information to cloud network 190 and/or computer system 170. Conversely, display device 120-1 can receive information from cloud network 190 and/or computer system 170 and communicate some or all of the received information to SCD 102, MDD 152, or both. Computer system 170 may be a personal computer, a server terminal, a laptop computer, a tablet, or other suitable data processing device. Computer system 170 can include or present software for data management and analysis and communication with the components in system 100. Computer system 170 can be used by the user or a medical professional to display and/or analyze analyte data measured by SCD 102. Furthermore, although FIG. 1B depicts a single SCD 102, a single MDD 152, and two display devices 120-1 and 120-2, those of skill in the art will appreciate that system 100 can include a plurality of any of the aforementioned devices, wherein each plurality of devices can comprise the same or different types of devices.

[0070] Referring still to FIG. 1B, according to some embodiments, trusted computer system 180 can be within the possession of a manufacturer or distributor of a component of system 100, either physically or virtually through a secured connection, and can be used to perform authentication of the devices of system 100 (e.g., devices 102, 120-*n*, 152), for secure storage of the user's data, and/or as a server that serves a data analytics program (e.g., accessible via a web browser) for performing analysis on the user's measured analyte data and medication history. Trusted computer system 180 can also act as a data hub for routing and exchanging data between all devices in communication with system 180 through cloud network 190. In other words, all devices of system 100 that are capable of communicating with cloud network 190 (e.g., either directly with an internet connection or indirectly via another device), are also capable of communicating with all of the other devices of system 100 that are capable of communicating with cloud network 190, either directly or indirectly.

[0071] Display device 120-2 is depicted in communication with cloud network 190. In this example, device 120-2 can be in the possession of another user that is granted access to the analyte and medication data of the person wearing SCD 102. For example, the person in possession of display device 120-2 can be a parent of a child wearing SCD 102, as one example, or a caregiver of an elderly patient wearing SCD 102, as another example. System 100 can be configured to communicate analyte and medication data about the wearer through cloud network 190 (e.g., via trusted computer system 180) to another user with granted access to the data.

Example Embodiments of Analyte Monitoring Devices

[0072] The analyte monitoring functionality of integrated management system 100 can be realized through inclusion of one or more devices capable of collecting, processing, and displaying analyte data of the user. Example embodiments of such devices and their methods of use are described in Int'l Publ. No. WO 2018/152241 and U.S. Patent Publ. No. 2011/0213225, both of which are incorporated by reference herein in their entireties for all purposes.

[0073] Analyte monitoring can be performed in numerous different ways. "Continuous Analyte Monitoring" devices (e.g., "Continuous Glucose Monitoring" devices), for example, can transmit data from a sensor control device to a display device continuously or repeatedly with or without prompting, e.g., automatically according to a schedule. "Flash Analyte Monitoring" devices (e.g., "Flash Glucose Monitoring" devices or simply "Flash" devices), as another example, can transfer data from a sensor control device in response to a user-initiated request for data by a display device (e.g., a scan), such as with a Near Field Communication (NFC) or Radio Frequency Identification (RFID) protocol.

[0074] Analyte monitoring devices that utilize a sensor configured to be placed partially or wholly within a user's body can be referred to as in vivo analyte monitoring devices. For example, an in vivo sensor can be placed in the user's body such that at least a portion of the sensor is in contact with a bodily fluid (e.g., interstitial (ISF) fluid such as dermal fluid in the dermal layer or subcutaneous fluid beneath the dermal layer, blood, or others) and can measure an analyte concentration in that bodily fluid. In vivo sensors can use various types of sensing techniques (e.g., chemical, electrochemical, or optical). Some systems utilizing in vivo analyte sensors can also operate without the need for finger stick calibration.

[0075] "In vitro" devices are those where a sensor is brought into contact with a biological sample outside of the body (or rather "ex vivo"). These devices typically include a port for

receiving an analyte test strip carrying bodily fluid of the user, which can be analyzed to determine the user's blood glucose level. Other ex vivo devices have been proposed that attempt to measure the user's internal analyte level non-invasively, such as by using an optical technique that can measure an internal body analyte level without mechanically penetrating the user's body or skin. In vivo and ex vivo devices often include in vitro capability (e.g., an in vivo display device that also includes a test strip port).

[0076] The present subject matter will be described with respect to sensors capable of measuring a glucose concentration, although detection and measurement of concentrations of other analytes are within the scope of the present disclosure. These other analytes can include, for example, ketones, lactate, oxygen, hemoglobin A1C, acetyl choline, amylase, bilirubin, cholesterol, chorionic gonadotropin, creatine kinase (e.g., CK-MB), creatine, DNA, fructosamine, glutamine, growth hormones, hormones, peroxide, prostate-specific antigen, prothrombin, RNA, thyroid stimulating hormone, troponin and others. The concentration of drugs, such as, for example, antibiotics (e.g., gentamicin, vancomycin, and the like), digitoxin, digoxin, drugs of abuse, theophylline, and warfarin, may also be monitored. The sensor can be configured to measure two or more different analytes at the same or different times. In some embodiments, the sensor control device can be coupled with two or more sensors, where one sensor is configured to measure a first analyte (e.g., glucose) and the other one or more sensors are configured to measure one or more different analytes (e.g., any of those described herein). In other embodiments, a user can wear two or more sensor control devices, each of which is capable of measuring a different analyte.

[0077] The embodiments described herein can be used with all types of in vivo, in vitro, and ex vivo devices capable of monitoring the aforementioned analytes and others.

[0078] In many embodiments, the sensor operation can be controlled by SCD 102. The sensor can be mechanically and communicatively coupled with SCD 102, or can be just communicatively coupled with SCD 102 using a wireless communication technique. SCD 102 can include the electronics and power supply that enable and control analyte sensing performed by the sensor. In some embodiments the sensor or SCD 102 can be self-powered such that a battery is not required. SCD 102 can also include communication circuitry for communicating with another device that may or may not be local to the user's body (e.g., a display device). SCD 102 can reside on the body of the user (e.g., attached to or otherwise placed on the user's skin, or

carried in the user's clothes, etc.). SCD 102 can also be implanted within the body of the user along with the sensor. Functionality of SCD 102 can be divided between a first component implanted within the body (e.g., a component that controls the sensor) and a second component that resides on or otherwise outside the body (e.g., a relay component that communicates with the first component and also with an external device like a computer or smartphone). In other embodiments, SCD 102 can be external to the body and configured to non-invasively measure the user's analyte levels. The sensor control device, depending on the actual implementation or embodiment, can also be referred to as a "sensor control unit," an "on-body electronics" device or unit, an "on-body" device or unit, an "in body electronics" device or unit, an "in-body" device or unit, or a "sensor data communication" device or unit, to name a few.

[0079] In some embodiments, SCD 102 may include a user interface (e.g., a touchscreen) and be capable of processing the analyte data and displaying the resultant calculated analyte levels to the user. In such cases, the integrated management embodiments described herein can be implemented directly by SCD 102, in whole or in part. In many embodiments, the physical form factor of SCD 102 is minimized (e.g., to minimize the appearance on the user's body) or the sensor control device may be inaccessible to the user (e.g., if wholly implanted), or other factors may make it desirable to have a display device usable by the user to read analyte levels and interface with the sensor control device.

[0080] FIG. 2A is a side view of an example embodiment of SCD 102. SCD 102 can include a housing or mount 103 for sensor electronics (FIG. 2B), which can be electrically coupled with an analyte sensor 101, which is configured here as an electrochemical sensor. According to some embodiments, sensor 101 can be configured to reside partially within a user's body (e.g., through an exterior-most surface of the skin) where it can make fluid contact with a user's bodily fluid and be used, along with the sensor electronics, to measure analyte-related data of the user. A structure for attachment 105, such as an adhesive patch, can be used to secure housing 103 to a user's skin. Sensor 101 can extend through attachment structure 105 and project away from housing 103. Those of skill in the art will appreciate that other forms of attachment to the body and/or housing 103 may be used, in addition to or instead of adhesive, and are fully within the scope of the present disclosure.

[0081] SCD 102 can be applied to the body in any desired manner. For example, an insertion device (not shown), sometimes referred to as an applicator, can be used to position all

or a portion of analyte sensor 101 through an external surface of the user's skin and into contact with the user's bodily fluid. In doing so, the insertion device can also position SCD 102 onto the skin. In other embodiments, the insertion device can position sensor 101 first, and then accompanying electronics (e.g., wireless transmission circuitry and/or data processing circuitry, and the like) can be coupled with sensor 101 afterwards (e.g., inserted into a mount), either manually or with the aid of a mechanical device. Examples of insertion devices are described in U.S. Patent Publication Nos. 2008/0009692, 2011/0319729, 2015/0018639, 2015/0025345, and 2015/0173661, 2018/0235520, all which are incorporated by reference herein in their entireties for all purposes.

[0082] FIG. 2B is a block diagram depicting an example embodiment of SCD 102 having analyte sensor 101 and sensor electronics 104. Sensor electronics 104 can be implemented in one or more semiconductor chips (e.g., an application specific integrated circuit (ASIC), processor or controller, memory, programmable gate array, and others). In the embodiment of FIG. 1B, sensor electronics 104 includes high-level functional units, including an analog front end (AFE) 110 configured to interface in an analog manner with sensor 101 and convert analog signals to and/or from digital form (e.g., with an A/D converter), a power supply 111 configured to supply power to the components of SCD 102, processing circuitry 112, memory 114, timing circuitry 115 (e.g., such as an oscillator and phase locked loop for providing a clock or other timing to components of SCD 102), and communication circuitry 116 configured to communicate in wired and/or wireless fashion with one or more devices external to SCD 102, such as display device 120 and/or MDD 152.

[0083] SCD 102 can be implemented in a highly interconnected fashion, where power supply 111 is coupled with each component shown in FIG. 2B and where those components that communicate or receive data, information, or commands (e.g., AFE 110, processing circuitry 112, memory 114, timing circuitry 115, and communication circuitry 116), can be communicatively coupled with every other such component over, for example, one or more communication connections or buses 118.

[0084] Processing circuitry 112 can include one or more processors, microprocessors, controllers, and/or microcontrollers, each of which can be a discrete chip or distributed amongst (and a portion of) a number of different chips. Processing circuitry 112 can include on-board memory. Processing circuitry 112 can interface with communication circuitry 116 and perform

analog-to-digital conversions, encoding and decoding, digital signal processing and other functions that facilitate the conversion of data signals into a format (e.g., in-phase and quadrature) suitable for wireless or wired transmission. Processing circuitry 112 can also interface with communication circuitry 116 to perform the reverse functions necessary to receive a wireless transmission and convert it into digital data or information.

[0085] Processing circuitry 112 can execute instructions stored in memory 114. These instructions can cause processing circuitry 112 to process raw analyte data (or pre-processed analyte data) and arrive at a final calculated analyte level. In some embodiments, instructions stored in memory 114, when executed, can cause processing circuitry 112 to process raw analyte data to determine one or more of: a calculated analyte level, an average calculated analyte level within a predetermined time window, a calculated rate-of-change of an analyte level within a predetermined time window, and/or whether a calculated analyte metric exceeds a predetermined threshold condition. These instructions can also cause processing circuitry 112 to read and act on received transmissions, to adjust the timing of timing circuitry 115, to process data or information received from other devices (e.g., calibration information, encryption or authentication information received from display device 120, and others), to perform tasks to establish and maintain communication with display device 120, to interpret voice commands from a user, to cause communication circuitry 116 to transmit, and others. In embodiments where SCD 102 includes a user interface, then the instructions can cause processing circuitry 112 to control the user interface, read user input from the user interface, cause the display of information on the user interface, format data for display, and others. The functions described here that are coded in the instructions can instead be implemented by SCD 102 with the use of a hardware or firmware design that does not rely on the execution of stored software instructions to accomplish the functions.

[0086] Memory 114 can be shared by one or more of the various functional units present within SCD 102, or can be distributed amongst two or more of them (e.g., as separate memories present within different chips). Memory 114 can also be a separate chip of its own. Memory 114 is non-transitory, and can be volatile (e.g., RAM, etc.) and/or non-volatile memory (e.g., ROM, flash memory, F-RAM, etc.).

[0087] Communication circuitry 116 can be implemented as one or more components (e.g., transmitter, receiver, transceiver, passive circuit, encoder, decoder, and/or other communication

circuitry) that perform the functions for communications over the respective communications paths or links. Communication circuitry 116 can include or be coupled to one or more antenna for wireless communication.

[0088] Power supply 111 can include one or more batteries, which can be rechargeable or single-use disposable batteries. Power management circuitry can also be included to regulate battery charging and monitor usage of power supply 111, boost power, perform DC conversions, and the like.

[0089] Additionally, an on-skin or sensor temperature reading or measurement can be collected by an optional temperature sensor (not shown). Those readings or measurements can be communicated (either individually or as an aggregated measurement over time) from SCD 102 to another device (e.g., display device 120). The temperature reading or measurement, however, can be used in conjunction with a software routine executed by SCD 102 or display device 120 to correct or compensate the analyte measurement output to the user, instead of or in addition to, actually outputting the temperature measurement to the user.

Example Embodiments of Medication Delivery Devices

[0090] The medication delivery functionality of integrated management system 100 can be realized through inclusion of one or more medication delivery devices (MDDs) 152. MDD 152 can be any device configured to deliver a specific dose of medication. The MDD 152 can also include devices that transmit data regarding doses to the IMS, e.g., pen caps, even though the device itself may not deliver the medication. The MDD 152 can be configured as a portable injection device (PID) that can deliver a single dose per one injection, such as a bolus. The PID can be a basic manually-operated syringe, where the medication is either preloaded in the syringe or must be drawn into the syringe from a container prior to injection. In most embodiments, however, the PID includes electronics for interfacing with the user and performing the delivery of the medication. PIDs are often referred to as medication pens, although a pen-like appearance is not required. PIDs having user interface electronics are often referred to as smart pens. PIDs can be used to deliver one dose and then disposed of, or can be durable and used repeatedly to deliver many doses over the course of a day, week, or month. PIDs are often relied upon by users that practice a multiple daily injection (MDI) therapy regimen.

[0091] The MDD can also comprise a pump and infusion set. The infusion set includes a tubular cannula that resides at least partially within the recipient's body. The tubular cannula is

in fluid communication with a pump, which can deliver medication through the cannula and into the recipient's body in small increments repeatedly over time. The infusion set can be applied to the recipient's body using an infusion set applicator, and the infusion set often stays implanted for 2 to 3 days or longer. A pump device includes electronics for interfacing with the user and for controlling the slow infusion of the medication. Both a PID and a pump can store the medication in a medication reservoir.

[0092] MDD 152 can function as part of a closed-loop system (e.g., an artificial pancreas system requiring no user intervention to operate), semi-closed loop system (e.g., an insulin loop system requiring seldom user intervention to operate, such as to confirm changes in dose), or an open loop system. For example, the diabetic's analyte level can be monitored in a repeated automatic fashion by SCD 102, and that information can be transmitted to the application and incorporated in various analytics and reports.

[0093] In many embodiments, the integrated management system may include data for different types of insulin (e.g., rapid-acting (RA), short-acting insulin, intermediate-acting insulin (e.g., NPH insulin), long-acting (LA), ultra long-acting insulin, and mixed insulin), and will be the same medication delivered by MDD 152. The type of insulin includes human insulin and synthetic insulin analogs. The insulin can also include premixed formulations. However, the integrated management embodiments set forth herein and the medication delivery capabilities of MDD 152 can be applied to other non-insulin medications. Such medications can include, but are not limited to exenatide, exenatide extended release, liraglutide, lixisenatide, semaglutide, pramlintide, metformin, SLGT1-i inhibitors, SLGT2-i inhibitors, and DPP4 inhibitors. The integrated management embodiments can also include combination therapies. Combination therapies can include, but are not limited to, insulin and glucagon-like peptide-1 receptor agonists (GLP-1 RA), insulin and pramlintide.

[0094] For ease of description of the integrated management embodiments herein, MDD 152 will often be described in the form of a PID, specifically a smart pen. However, those of skill in the art will readily understand that MDD 152 can alternatively be configured as a pen cap, a pump, or any other type of medication delivery device.

[0095] In some embodiments, the IMS may include a connected pen cap. After the connected pen cap is attached to an insulin pen and is paired with the display device, every time

a dose of insulin is delivered, the connected pen cap may automatically transmit dose data to the display device via e.g., BLUETOOTH®.

[0096] FIG. 3A is schematic diagram depicting an example embodiment of an MDD 152 configured as a PID, specifically a smart pen. MDD 152 can include a housing 154 for electronics, an injection motor, and a medication reservoir (see FIG. 3B), from which medication can be delivered through needle 156. Housing 154 can include a removable or detachable cap or cover 157 that, when attached, can shield needle 156 when not in use, and then be detached for injection. MDD 152 can also include a user interface 158 which can be implemented as a single component (e.g., a touchscreen for outputting information to the user and receiving input from the user) or as multiple components (e.g., a touchscreen or display in combination with one or more buttons, switches, or the like). MDD 152 can also include an actuator 159 that can be moved, depressed, touched or otherwise activated to initiate delivery of the medication from an internal reservoir through needle 156 and into the recipient's body. According to some embodiments, cap 157 and actuator 159 can also include one or more safety mechanisms to prevent removal and/or actuation to mitigate risk of a harmful medication injection. Details of these safety mechanisms and others are described in U.S. Patent Publ. No. 2019/0343385 (the '385 publication), which is hereby incorporated in its entirety for all purposes.

[0097] FIG. 3B is a block diagram depicting an example embodiment of MDD 152 having electronics 160, coupled with a power supply 161 and an electric injection motor 162, which in turn is coupled with power supply 161 and a medication reservoir 163. Needle 156 is shown in fluid communication with reservoir 163, and a valve (not shown) may be present between reservoir 163 and needle 156. Reservoir 163 can be permanent or can be removable and replaced with another reservoir containing the same or different medication. Electronics 160 can be implemented in one or more semiconductor chips (e.g., an application specific integrated circuit (ASIC), processor or controller, memory, programmable gate array, and others). In the embodiment of FIG. 3B, electronics 160 can include high-level functional units, including processing circuitry 164, memory 165, communication circuitry 166 configured to communicate in wired and/or wireless fashion with one or more devices external to MDD 152 (such as display device 120), and user interface electronics 168.

[0098] MDD 152 can be implemented in a highly interconnected fashion, where power supply 161 is coupled with each component shown in FIG. 3B and where those components that

communicate or receive data, information, or commands (e.g., processing circuitry 164, memory 165, and communication circuitry 166), can be communicatively coupled with every other such component over, for example, one or more communication connections or buses 169.

[0099] Processing circuitry 164 can include one or more processors, microprocessors, controllers, and/or microcontrollers, each of which can be a discrete chip or distributed amongst (and a portion of) a number of different chips. Processing circuitry 164 can include on-board memory. Processing circuitry 164 can interface with communication circuitry 166 and perform analog-to-digital conversions, encoding and decoding, digital signal processing and other functions that facilitate the conversion of data signals into a format (e.g., in-phase and quadrature) suitable for wireless or wired transmission. Processing circuitry 164 can also interface with communication circuitry 166 to perform the reverse functions necessary to receive a wireless transmission and convert it into digital data or information.

[00100] Processing circuitry 164 can execute software instructions stored in memory 165. These instructions can cause processing circuitry 164 to receive a selection or provision of a specified dose from a user (e.g., entered via user interface 158 or received from another device), process a command to deliver a specified dose (such as a signal from actuator 159), and control motor 162 to cause delivery of the specified dose. These instructions can also cause processing circuitry 164 to read and act on received transmissions, to process data or information received from other devices (e.g., calibration information, encryption or authentication information received from display device 120, and others), to perform tasks to establish and maintain communication with display device 120, to interpret voice commands from a user, to cause communication circuitry 166 to transmit, and others. In embodiments where MDD 152 includes user interface 158, then the instructions can cause processing circuitry 164 to control the user interface, read user input from the user interface (e.g., entry of a medication dose for administration or entry of confirmation of a recommended medication dose), cause the display of information on the user interface, format data for display, and others. The functions described here that are coded in the instructions can instead be implemented by MDD 152 with the use of a hardware or firmware design that does not rely on the execution of stored software instructions to accomplish the functions.

[00101] Memory 165 can be shared by one or more of the various functional units present within MDD 152, or can be distributed amongst two or more of them (e.g., as separate memories

present within different chips). Memory 165 can also be a separate chip of its own. Memory 165 is non-transitory, and can be volatile (e.g., RAM, etc.) and/or non-volatile memory (e.g., ROM, flash memory, F-RAM, etc.).

[00102] Communication circuitry 166 can be implemented as one or more components (e.g., transmitter, receiver, transceiver, passive circuit, encoder, decoder, and/or other communication circuitry) that perform the functions for communications over the respective communications paths or links. Communication circuitry 166 can include or be coupled to one or more antenna for wireless communication. Details of exemplary antenna can be found in the '385 publication, which is hereby incorporated in its entirety for all purposes.

[00103] Power supply 161 can include one or more batteries, which can be rechargeable or single-use disposable batteries. Power management circuitry can also be included to regulate battery charging and monitor usage of power supply 161, boost power, perform DC conversions, and the like.

[00104] MDD 152 may also include an integrated or attachable in vitro glucose meter, including an in vitro test strip port (not shown) to receive an in vitro glucose test strip for performing in vitro blood glucose measurements.

Example Embodiments of Display Devices

[00105] Display device 120 can be configured to display information pertaining to system 100 to the user and accept or receive input from the user also pertaining to system 100. Display device 120 can display recent measured analyte levels, in any number of forms, to the user. The display device can display historical analyte levels of the user as well as other metrics that describe the user's analyte information (e.g., time in range, ambulatory glucose profile (AGP), hypoglycemia risk levels, etc.). Display device 120 can display medication delivery information, such as historical dose information and the times and dates of administration. Display device 120 can display alarms, alerts, or other notifications pertaining to analyte levels and/or medication delivery.

[00106] Display device 120 can be dedicated for use with system 100 (e.g., an electronic device designed and manufactured for the primary purpose of interfacing with an analyte sensor and/or a medication delivery device), as well as devices that are multifunctional, general purpose computing devices such as a handheld or portable mobile communication device (e.g., a smartphone or tablet), or a laptop, personal computer, or other computing device. Display device

120 can be configured as a mobile smart wearable electronics assembly, such as a smart glass or smart glasses, or a smart watch or wristband. Display devices, and variations thereof, can be referred to as "reader devices," "readers," "handheld electronics" (or handhelds), "portable data processing" devices or units, "information receivers," "receiver" devices or units (or simply receivers), "relay" devices or units, or "remote" devices or units, to name a few.

[00107] FIG. 4A is a schematic view depicting an example embodiment of display device 120. Here, display device 120 includes a user interface 121 and a housing 124 in which display device electronics 130 (FIG. 4B) are held. User interface 121 can be implemented as a single component (e.g., a touchscreen capable of input and output) or multiple components (e.g., a display and one or more devices configured to receive user input). In this embodiment, user interface 121 includes a touchscreen display 122 (configured to display information and graphics and accept user input by touch) and an input button 123, both of which are coupled with housing 124.

[00108] Display device 120 can have software stored thereon (e.g., by the manufacturer or downloaded by the user in the form of one or more "apps" or other software packages) that interface with SCD 102, MDD 152, and/or the user. In addition, or alternatively, the user interface can be affected by a web page displayed on a browser or other internet interfacing software executable on display device 120.

[00109] FIG. 4B is a block diagram of an example embodiment of a display device 120 with display device electronics 130. Here, display device 120 includes user interface 121 including display 122 and an input component 123 (e.g., a button, actuator, touch sensitive switch, capacitive switch, pressure sensitive switch, jog wheel, microphone, speaker, or the like), processing circuitry 131, memory 125, communication circuitry 126 configured to communicate to and/or from one or more other devices external to display device 120), a power supply 127, and timing circuitry 128 (e.g., such as an oscillator and phase locked loop for providing a clock or other timing to components of SCD 102). Each of the aforementioned components can be implemented as one or more different devices or can be combined into a multifunctional device (e.g., integration of processing circuitry 131, memory 125, and communication circuitry 126 on a single semiconductor chip). Display device 120 can be implemented in a highly interconnected fashion, where power supply 127 is coupled with each component shown in FIG. 4B and where those components that communicate or receive data, information, or commands (e.g., user

interface 121, processing circuitry 131, memory 125, communication circuitry 126, and timing circuitry 128), can be communicatively coupled with every other such component over, for example, one or more communication connections or buses 129. FIG. 4B is an abbreviated representation of the typical hardware and functionality that resides within a display device and those of ordinary skill in the art will readily recognize that other hardware and functionality (e.g., codecs, drivers, glue logic) can also be included.

[00110] Processing circuitry 131 can include one or more processors, microprocessors, controllers, and/or microcontrollers, each of which can be a discrete chip or distributed amongst (and a portion of) a number of different chips. Processing circuitry 131 can include on-board memory. Processing circuitry 131 can interface with communication circuitry 126 and perform analog-to-digital conversions, encoding and decoding, digital signal processing and other functions that facilitate the conversion of data signals into a format (e.g., in-phase and quadrature) suitable for wireless or wired transmission. Processing circuitry 131 can also interface with communication circuitry 126 to perform the reverse functions necessary to receive a wireless transmission and convert it into digital data or information.

[00111] Processing circuitry 131 can execute software instructions stored in memory 125. These instructions can cause processing circuitry 131 to process raw analyte data (or pre-processed analyte data) and arrive at a corresponding analyte level suitable for display to the user. These instructions can cause processing circuitry 131 to read, process, and/or store a dose instruction from the user, and because the dose instruction to be communicated to MDD 152. These instructions can cause processing circuitry 131 to execute user interface software adapted to present an interactive group of graphical user interface screens to the user for the purposes of configuring system parameters (e.g., alarm thresholds, notification settings, display preferences, and the like), presenting current and historical analyte level information to the user, presenting current and historical medication delivery information to the user, collecting other non-analyte information from the user (e.g., information about meals consumed, activities performed, medication administered, and the like), and presenting notifications and alarms to the user. These instructions can also cause processing circuitry 131 to cause communication circuitry 126 to transmit, can cause processing circuitry 131 to read and act on received transmissions, to read input from user interface 121 (e.g., entry of a medication dose to be administered or confirmation of a recommended medication dose), to display data or information on user interface 121, to

adjust the timing of timing circuitry 128, to process data or information received from other devices (e.g., analyte data, calibration information, encryption or authentication information received from SCD 102, and others), to perform tasks to establish and maintain communication with SCD 102, to interpret voice commands from a user, and others. The functions described here that are coded in the instructions can instead be implemented by display device 120 with the use of a hardware or firmware design that does not rely on the execution of stored software instructions to accomplish the functions.

[00112] Memory 125 can be shared by one or more of the various functional units present within display device 120, or can be distributed amongst two or more of them (e.g., as separate memories present within different chips). Memory 125 can also be a separate chip of its own. Memory 125 is non-transitory, and can be volatile (e.g., RAM, etc.) and/or non-volatile memory (e.g., ROM, flash memory, F-RAM, etc.).

[00113] Communication circuitry 126 can be implemented as one or more components (e.g., transmitter, receiver, transceiver, passive circuit, encoder, decoder, and/or other communication circuitry) that perform the functions for communications over the respective communications paths or links. Communication circuitry 126 can include or be coupled to one or more antenna for wireless communication.

[00114] Power supply 127 can include one or more batteries, which can be rechargeable or single-use disposable batteries. Power management circuitry can also be included to regulate battery charging and monitor usage of power supply 127, boost power, perform DC conversions, and the like.

[00115] Display device 120 can also include one or more data communication ports (not shown) for wired data communication with external devices such as computer system 170, SCD 102, or MDD 152. Display device 120 may also include an integrated or attachable in vitro glucose meter, including an in vitro test strip port (not shown) to receive an in vitro glucose test strip for performing in vitro blood glucose measurements.

[00116] Display device 120 can display the measured analyte data received from SCD 102 and can also be configured to output alarms, alert notifications, glucose values, etc., which may be visual, audible, tactile, or any combination thereof. In some embodiments, SCD 102 and/or MDD 152 can also be configured to output alarms, or alert notifications in visible, audible, tactile forms or combination thereof. Further details and other display embodiments can be

found in, e.g., U.S. Patent Publ. No. 2011/0193704, which is incorporated herein by reference in its entirety for all purposes.

Example Embodiments Related to Integrated Management

[00117] The following example embodiments relate to an integrated management system (IMS) that will, in many embodiments, be implemented as a set of software instructions stored and/or executed on one or more electronic devices. In some embodiments, the IMS is stored, executed, and presented to the user on the same single electronic device. In other embodiments, the IMS can be stored and executed on one device, and presented to the user on a different electronic device. For example, the IMS can be stored and executed on trusted computer system 180 and presented to the user by way of a webpage displayed through an internet browser executed on display device 120.

[00118] Thus, there are many different embodiments pertaining to the number and type of electronic devices that are used in storing, executing, and presenting the IMS or portions thereof to a user. With respect to presentation to the user, the device that is configured to implement this capability will be referred to herein as a user interface device (UID) 200. FIG. 5 is a block diagram depicting an example embodiment of UID 200. In this embodiment, UID 200 includes a housing 201 that is coupled with a user interface 202. The user interface 202 is capable of outputting information to the user and receiving input or information from the user. In some embodiments, the user interface 202 is a touchscreen. As shown here, the user interface 202 includes a display 204, that may be a touchscreen, and an input component 206 (e.g., a button, actuator, touch sensitive switch, capacitive switch, pressure sensitive switch, jog wheel, microphone, touch pad, soft keys, keyboard, or the like).

[00119] Many of the devices described herein can be implemented as UID 200. For example, display device 120 will, in many embodiments, be used as UID 200. In some embodiments, MDD 152 can be implemented as UID 200. In embodiments where SCD 102 includes a user interface, then SCD 102 can be implemented as UID 200. Computer system 170 can also be implemented as UID 200.

Example Embodiments of the User Experience of the Integrated Management System

[00120] As seen in FIG. 6, in an exemplary method 300 of a user experience, a user can check an analyte level, such as a glucose level, in step 302. As described previously, a user may scan

an SCD 102, or otherwise effect the transfer of an analyte level or data indicative of an analyte level to the display device 120. In step 304, the user administers the medication (e.g., insulin) from a connected medication delivery device 152. The medication delivery device 152 may be a smart, connected insulin pen, a connected pen cap, or an automated insulin delivery (AID) device in a closed loop system, as described previously. In step 306, the user transfers the dosage information from the medication delivery device 152 to the display device 120. The transfer can be accomplished by methods known in the art. For example, the display device 120 (e.g., a smart phone) may scan the connected medication delivery device 152 and the information may be transferred via NFC. Alternatively, the dosage information may be transferred automatically without any further action required from the user. For instance, no scan may be necessary and the dose information may be transferred automatically via BLUETOOTH® or another wireless communication protocol. For example, in the case of a connected pen cap, a connected insulin pen, or an AID device, the data may automatically transfer to the display device after the detection of an administered dose. The transfer of the medication information can be referred to in many ways, including scanning, transferring, downloading, uploading, exporting, importing, connecting, syncing, pairing, and other equivalent terminology. The data may also be automatically transferred via wireless communication such as BLUETOOTH®. The data being transferred can include data relating to medication (e.g., insulin) injections, shots, events, notes, log entries, or other equivalent terminology. The data may be referred to as insulin data, insulin records, insulin logs, insulin doses, or other equivalent terminology. After the dose information has been transferred, optionally, a notification may appear on the display device, e.g., a lockscreen or banner notification, which includes a message that a logbook or other report or application has been updated and may also include an amount of medication delivered and a delivery time. In step 308, the user and others (e.g., caretakers, HCPs) may then view the combined history, which may include the analyte levels and medication dosages, in a variety of displays and reports to visualize and assist the user in treating their diabetes.

[00121] In order to be able to transfer data from the medication delivery device 152 to the IMS, the medication delivery device 152 must first be added to the IMS. FIG. 7 describes an exemplary method 320 for adding a medication delivery device 152 to the IMS and managing the connected medication delivery device 152. In method 310, a user can add an insulin pen by selecting “insulin pens” from a menu, such as a pull down menu. As seen in GUI 322 of FIG.

20A, a "Get Started" screen may contain a cartoon depiction of the medication delivery device 152 communicating with a display device 120, and also list different tasks or capabilities of the IMS after the medication delivery device 152 is connected to the IMS. These include connecting a compatible smart pen to record insulin doses, reviewing and learning from past doses, and sharing reports with the user's healthcare team. After selecting "get started," as seen in GUI 324 of FIG. 20A, the insulin pen settings may be opened, and the user may be prompted to select the medication delivery device 152 that they wish to connect in step 312. The medication delivery device 152, e.g., an insulin pen, may be listed by their brand names. After the user selects the appropriate medication delivery device and selects "next," as seen in GUI 326 in FIG. 20B, a graphic or an animation may be presented that illustrates how to scan the medication delivery device 152 (e.g., insulin pen) with the display device 120 (e.g., smart phone). Additionally, GUI 326 may also contain text that instructs to scan by holding the insulin pen display flat against the back of the phone. The GUI 326 may also provide text that indicates that the user may need to move the insulin pen around slowly to find the correct spot to affect a connection/communication between the insulin pen and the phone. A link may also be provided to a user manual for the insulin pen that contains more information about how to connect the insulin pen to the phone. After a successful connection has been affected, a GUI 328 as seen in FIG. 20B may appear, which indicates that a new medication delivery device 152 has been added to the IMS. The name of the newly added medication delivery device may also appear on the GUI 328. After selecting "next," in step 314, the user may be presented with a prompt to select a pen color for the newly connected medication delivery device 152. Selectable options with different colors 332 may appear on GUI 330, as seen in FIG. 20C. After selecting "next," in GUI 334 in FIG. 20C, the user may be prompted to select the type of medication contained in the newly connected medication delivery device 152. Where the medication delivery device 152 is an insulin pen, in step 316, the user may be prompted to select between different types of insulin, e.g., rapid-acting insulin, long-acting insulin, or other, from a list 336. After selecting "next," in step 318, the user may then be prompted to select the brand of the selected type of inulin in GUI 338 of FIG. 20D. A list 340 of available brands may be provided. Alternatively, the user may be able to add a new brand that is not included in the list provided. After selecting "next," in GUI 342 of FIG. 20D, the user may see an indication that the setup of the new medication delivery device 152 is complete. The GUI 342 may also include a reminder to scan the connected medication delivery

device 152 to transfer insulin doses to the software of the IMS. The GUI 342 may also include an animation that illustrates how to scan the medication delivery device 152 (e.g., insulin pen) with the display device 120 (e.g., smart phone). Additionally, the GUI may also contain text that instructs to scan by holding the insulin pen display flat against the back of the phone. The GUI may also provide text that indicates that the user may need to move the insulin pen around slowly to find the correct spot to affect a connection/communication between the insulin pen and the phone.

[00122] Additional medication delivery devices may be connected in the same manner described above. The additional medication delivery devices may be assigned a different color or other distinguishing feature or name from the previously connected medication delivery devices. For example, a medication delivery device 152 that delivers rapid acting insulin may be assigned a blue pen color, while a medication delivery device 152 that delivers long-acting insulin may be assigned a different color, e.g., red, silver, or black. Additional medication delivery devices may be added under the insulin pens menu, by selecting an option to add another medication delivery device, e.g., a plus symbol labeled "add another pen" (see 356 of FIG. 20E).

[00123] The user may select an option to "manage your own insulin pen connection" under the insulin pens menu. As seen in GUIs 350 and 368 of FIG. 20E, the user may be presented with a window depicting the connected medication delivery device 152, along with descriptions indicating the type and/or brand name of insulin delivered 358 by the medication delivery device 152, and details of the last scan 360, which may include the time of the scan and/or the amount of medication delivered. As described previously with respect to GUI 326, if a user selects an information *i* icon, a GUI 364a, b, as seen in FIG. 20F, may appear that includes information about how to transfer insulin logs and dosing information. The GUI 364a, b may include an animation of how to scan the medication delivery device 152 with the smart phone. Different GUIs may appear for instructing how to scan on an IOS system 364a and an Android system 364b. Additionally, the GUI 364a,b may also contain text that instructs to scan by holding the insulin pen display flat against the back of the phone. The GUI 364a,b may also provide text that indicates that the user may need to move the insulin pen around slowly to find the correct spot to result in a connection/communication between the insulin pen and the phone.

[00124] In some embodiments, the medication delivery device 152 may be a pen cap, such as Dialoq®, that may transfer the dose data wirelessly via BLUETOOTH®. The medication delivery device 152 may need to be paired with the monitoring application using BLUETOOTH® rather than NFC. The monitoring application may remind the user to make sure that BLUETOOTH® is enabled on the display device 120. The monitoring application may display a GUI that prompts the user the enter and/or confirm a code on the medication delivery device 152. The GUI may also include a picture, diagram, or animation to show where the code is located on the medication delivery device 152. After the code is entered, the monitoring application may display a GUI that contains instructions to press and release a button on the medication delivery device 152 to pair the device with the display device 120. The instructions may include a textual description, diagram, picture, or animation to assist the user with the pairing. A window may appear on the display device 120 indicating that the medication delivery device 152 wants to pair with the display device 120. The user may need to select "Pair" before the pairing is completed. After the medication delivery device has been paired with the display device 120, a GUI that displays a confirmation that the pairing and/or setup is complete may be displayed.

[00125] Once the medication delivery device 152 has been connected to the monitoring software on the display device 120, the dosing information may be downloaded or otherwise transferred (e.g., via NFC or BLUETOOTH®) from the medication delivery device 120 to the software. As seen in FIGS. 21A-21C, in GUI 390, the monitoring software may indicate that it can accept a download from a connected medication delivery device 152 (e.g., there may be a message indicating it is "ready to scan" in e.g., a banner). After the user has scanned the medication delivery device 152 in step 316, a window 394 may open indicating that a new dose(s) has appeared in a logbook. For example, the window 394 in GUI 390 indicates that 3 doses transferred from the medication delivery device to the monitoring software. The window 394 may also indicate which medication delivery device was scanned 396 and the type of insulin that was administered 398. Moreover, after the first time that the medication delivery device 152 is scanned, a GUI 400, as seen in FIG. 21A, may appear that allows the user to select a default selection for the insulin type, which will be used as the default the next time the user scans the insulin pen.

[00126] As seen in FIG. 21B, a home screen 410 may include a button or link 412 to select to scan a medication delivery device 152. The home screen 410 may also include an analyte profile, a time in range statistic, a last reading analyte level, an average analyte level, a graph of analyte readings for a time period (e.g., the current day), and an indication of the current sensor life. The home screen 410 may also include icons (e.g., syringe icons) 414 along the graph of the analyte readings that indicate when various medications were administered. The icons 414 may be positioned along the graph of analyte readings to correspond with/indicate the time that the medication was administered. In some embodiments, users may view and edit insulin notes by tapping the syringe icon 414 in the home screen 410. The user may tap the syringe icon to view the dose and then further tap a pencil icon to edit the entry, if needed. In some embodiments, a syringe icon with a question mark may mark a dose in which no additional comments or notes have been added. In some embodiments, a syringe icon with a notepad may indicate a dosage in which additional comments and notes have been added. In some embodiments, icons of syringes with no other annotations may mark a dose that was transferred automatically from a connected medication delivery device 152. Icons indicating food (e.g., an apple), exercise (e.g., a runner), or comments (e.g., a notepad) may also be indicated along or above the graph of the analyte reading, placed along the timeline (x-axis) according to when the food was consumed or the note was added.

[00127] A logbook GUI 416, as seen in FIG. 21B, may also be accessed from the insulin pen menu. The logbook GUI 416 may contain a listing of various events logged along with the time that the event occurred, including doses of medication administered. For the entries imported from the medication delivery device 152, a syringe icon may appear next to the amount of medication administered (e.g., in units). Instances in which the medication delivery device 152 was primed may also be listed in the logbook. Priming doses (or "prime") refers to a medication (e.g., insulin) shot to clear air from the needle tip. Priming doses may also be referred to as an airshot, flow check, squirt, or other equivalent term. Notes that have been manually added may also be included in the logbook.

[00128] The monitoring application may allow a user to edit the notes that are associated with a particular medication dosing event. If the user wants to edit details about the insulin dose, the user may tap the line entry in the logbook GUI 416, which links to a logbook detail GUI 430, as seen in FIG. 21C. The analyte graph on the logbook detail GUI 430 may include a vertical line

or other highlight to indicate the dose being viewed. If the user wants to edit the details about the selected insulin dose, the user may tap the edit (pencil) icon 444, which links to the Edit Note GUI 450, in which the user can edit the information associated with various fields. The Edit Note GUI 450 includes a banner that prominently indicates the dose amount and the date and time taken. It may also include various fields, such as, the type of dose (insulin administered or prime) 452, brand of insulin, number of units, name of the delivery device, food 454, exercise 456, and comments 458. The user may edit the type of insulin delivered by tapping the drop-down caret and selecting the insulin brand. The user may edit the dose from a therapy dose to a flow check (or prime) dose by tapping the drop-down caret icon to select the prime/flow check option. In some embodiments, after the user indicates that it is a prime dose, the banner at the top of the Edit Note screen will indicate that it is a prime dose, as seen in GUI 460 or FIG. 21C.

[00129] If there is an error, the monitoring application may request that the user confirm details of the dose administered. The details may include the dose amount, the type of medication, and the time it was delivered. As seen in FIGS. 23A-23C, window 1052 in GUI 1050 or window 1062 in GUI 1060 may appear to prompt the user to confirm details regarding the newly transferred dose(s) if an error was detected in the transferred dose data. Alternatively, errors may be noted in the Logbook GUI 1070 and/or Logbook Details GUI 1080. In some embodiments the Logbook GUI 1070 and/or Logbook Details GUI 1080 may include an error indicator associated with certain dosages. The error indicator may be a missing dosage amount 1072 and/or a different syringe icon (e.g., a syringe with an exclamation point or a question mark near it) 1074. The user can edit the dose entry with the error by tapping on the edit (pencil) icon 444, which can link to Edit Note GUI 1090 where individual fields can be edited as needed.

[00130] As seen in GUI 470 of FIG. 21D, the monitoring application may also prompt the user to learn more about a new feature of the monitoring application with a pop-up window 472. The prompt may inform the user of a new feature available by connecting a medication delivery device 152 (e.g., a smart insulin pen) and letting the application keep track of the user's insulin doses. A similar window may also pop up when an update is available for the monitoring application.

[00131] The monitoring application may also allow the user to customize the name of the connected medication delivery device 152. As seen in FIG. 22, the user may navigate to the insulin settings GUI 480, where the user may tap on or select the "name" field 482, which will

open up the Name GUI window 486. The user may tap on or select the "new name" field 488 and proceed to type in the new chosen name for the device. In FIG. 22, the user entered "Home Pen" as their custom name for that device. After the user selects "save," the new name will be displayed in the "current name" field 490 in updated GUI 492.

Insights and Alerts

Missed Meal Dose Hints

[00132] The monitoring application may display an alert, hint, or prompt if a dose appears to have been missed. In some embodiments, the dose data is automatically transferred via BLUETOOTH® to the monitoring application. For example, based on glucose levels rising and no dose logged within a period of time, e.g., 1 hour, alternatively 2 hours, alternatively 3 hours, the monitoring application may display an alert that asks the user – "Did you miss a meal dose?" Furthermore, the alert may indicate that the user's glucose is rising and the last logged dose was X hours ago. The alert may also suggest that the user sync the medication delivery device 152 to update the dosing data. The alert may also suggest that, if the user did miss a dose, that the user should follow their HCP's advice on what to do. In some embodiments, where the alert relates to a specific meal, the alert may ask if the user missed their [breakfast/lunch/dinner] dose and then indicate that the user usually takes this dose before X:XX (e.g., the user usually takes their lunch dose before 1:30 pm).

[00133] The user may set the conditions under which the missed meal dose alerts or hints are given in order to minimize the number of alerts popping up on their device. For each of a breakfast, lunch, dinner, and long-acting dose, the user may specify that a missed dose hint should only be displayed after a certain time of day. For example, the user may set the breakfast dose hint to be displayed after 10:00 am, the lunch dose to be displayed after 1:30 pm, and the dinner dose to be displayed after 8:00 pm if no dose was detected during a period of time before the indicated time.

[00134] As seen in FIG. 25, in exemplary method 1900, beginning with step 1902, the system or application may receive analyte data from a sensor control device 102. In step 1904, the system may receive insulin data of the subject (e.g., from MDD 152). For example, the system or application can automatically receive the insulin data wirelessly, e.g., via BLUETOOTH®, from a connected pen, connected pen cap, or other medication delivery device 152, without requesting the data. In other embodiments, the system or application can check for the latest

insulin dose data by requesting delivery information from different sources, including, but not limited to, the MDD 152, the MDD-associated application, or the interface that stores the latest insulin delivery information (such as the MDD application web server), or by checking the memory of the various applications for the latest insulin delivery information.

[00135] In step 1906, the system or application may determine if a meal has been consumed. This determination may be made by analyzing the received analyte data and determining if the analyte levels are rising above a high threshold or if a rate of change of the analyte level is greater than a minimum rate of change threshold. Meal dose detection is described in greater detail in US Publ. No. 2021/0030323, US Publ. No. 2021/0050085, and U.S. Application Serial No. 17/591,229, all of which are hereby expressly incorporated by reference in their entirety for all purposes. The high threshold analyte level may be 175 mg/dL, alternatively 180 mg/dL, alternatively 180 mg/dL, alternatively 190 mg/dL, alternatively 200 mg/dL, alternatively 210 mg/dL, alternatively 220 mg/dL, alternatively 230 mg/dL, alternatively 240 mg/dL, alternatively 250 mg/dL, alternatively 260 mg/dL, alternatively 270 mg/dL. The high threshold analyte level may be set by the user. If the system determines that a meal has not been consumed, then the system returns to step 1902 and receives additional analyte data.

[00136] If the system or application determines that a meal has been consumed, in step 1908, the system may analyze the insulin dose data received to determine if an insulin dose has been recorded or received for a period of time. The period of time may be about 1 hour, alternatively about 2 hours, alternatively about 3 hours. The period of time may optionally be set by the user instead of a default time set by the system. If an insulin dose has been recorded in the period of time, then the system determines that there has not been a missed dose and the system returns to step 1904 and receives additional insulin dose data.

[00137] In some embodiments, the period of time may be set for each meal by setting a time at which the meal dose should have been taken by the user. The system may also check to see if an insulin dose has been recorded or received before a set time for each meal. For example, if a breakfast dose was not recorded or received by 10:30 am, the system may determine that the user had missed their breakfast dose. Similarly, a lunchtime dose may have a time of 2:30 pm if the user will normally have taken a lunch dose by then. And a dinner dose may have a time of 7:30 pm if the user will normally have taken a dinner dose by that time. These times may be set by the user to align with their personal eating habits.

[00138] If the system or application determines that an insulin dose has not been recorded or received for the time period or by a set time for a particular meal, in step 1910, the system or application may display an alert interface relating to the missed meal dose. In some embodiments, the text of the alert interface may be customizable by the user.

Correction Dose Hints

[00139] The monitoring application may display an alert, hint, or prompt to the user to consider a correction dose if a period of time has passed since their last insulin dose and their glucose levels are still elevated. In some embodiments, the dose data is automatically transferred via BLUETOOTH® to the monitoring application. The user may set the conditions under which the correction dose alerts or hints are given in order to minimize the number of alerts popping up on their device. The user may configure the alerts to only be displayed when their glucose levels are above a high threshold, e.g., above about 250 mg/dL, and the period of time since the last insulin dose is longer than a minimum time threshold, e.g., about 2 hours.

[00140] The user may also customize the message that appears in the hint. For instance, the message may indicate that the dose they took X hours (e.g., 2 hours) ago isn't bringing down their glucose enough and that now is a good time to take an additional X units of insulin or take a walk around the park. A default message may be to follow their HCP's recommendations for correcting high glucose with treatment or exercise.

[00141] As seen in FIG. 26, in exemplary method 1920, beginning with step 1922, the system or application may receive analyte data from a sensor control device 102. In step 1924, the system or application may receive insulin data of the subject (e.g., from MDD 152). For example, the system or application can automatically receive the insulin data wirelessly, e.g., via BLUETOOTH®, from a connected pen, connected pen cap, or other medication delivery device 152, without requesting the data. In other embodiments, the system or application can check for the latest insulin dose data by requesting delivery information from different sources, including, but not limited to, the MDD 152, the MDD-associated application, or the interface that stores the latest insulin delivery information (such as the MDD application web server), or by checking the memory of the various applications for the latest insulin delivery information.

[00142] In step 1926, the system or application may determine if a received analyte level is above a high threshold, which may indicate that the user's glucose is outside of a target range. The high threshold analyte level may be 175 mg/dL, alternatively 180 mg/dL, alternatively 180

mg/dL, alternatively 190 mg/dL, alternatively 200 mg/dL, alternatively 210 mg/dL, alternatively 220 mg/dL, alternatively 230 mg/dL, alternatively 240 mg/dL, alternatively 250 mg/dL, alternatively 260 mg/dL, alternatively 270 mg/dL. The high threshold analyte level may be set by the user. If the system determines that an analyte level is not above a high threshold, then the system returns to step 1922 and receives additional analyte data.

[00143] If the system or application determines that an analyte level is above a high threshold, in step 1928, the system or application may analyze the insulin dose data received to determine if a period of time has passed since an insulin dose has been recorded or received. The period of time may be about 2 hours, alternatively about 2.5 hours, alternatively about 3 hours. The period of time may optionally be set by the user instead of a default time set by the system. If the period of time since the last insulin dose has been recorded has not passed yet, then the system returns to step 1924 and receives additional insulin dose data.

[00144] If the system or application determines that the period of time has passed since a last insulin dose, in step 1930, the system or application may display an alert interface relating to a correction dose. In some embodiments, the text of the alert interface may be customizable by the user.

Congratulatory Message

[00145] The monitoring application may also display congratulatory alerts or messages when an insulin dose resulted in glucose levels going back in a target range within a designated time period. For example, the alert or window may say "You got a glucose win! You got back in range 2 hours after your last insulin dose." The user may have the option to add a note (either by typing or talk to text) with details about what they did that may have helped them reach their target range.

[00146] The user may set the conditions under which the alert or window is displayed by setting a maximum glucose level and a time limit to return to the target range. For example, the user may set the target range as under 180 mg/dL and the time after the dose to get to the target as 2 hours.

[00147] As seen in FIG. 27, in exemplary method 1940, beginning with step 1942, the system or application may receive analyte data from a sensor control device 102. In step 1944, the system may receive insulin data of the subject (e.g., from MDD 152). For example, the system can automatically receive the insulin data wirelessly, e.g., via BLUETOOTH®, from a connected

pen, connected pen cap, or other medication delivery device 152, without requesting the data. In other embodiments, the system or application can check for the latest insulin dose data by requesting delivery information from different sources, including, but not limited to, the MDD 152, the MDD-associated application, or the interface that stores the latest insulin delivery information (such as the MDD application web server), or by checking the memory of the various applications for the latest insulin delivery information.

[00148] In step 1946, the system or application may determine if a received analyte level is below a high threshold, which may indicate that the user's glucose is inside a target range. The high threshold analyte level may be 190 mg/dL, alternatively 185 mg/dL, alternatively 180 mg/dL, alternatively 175 mg/dL, alternatively 170 mg/dL. The high threshold analyte level may be set by the user. If the system or application determines that an analyte level is not below a high threshold, then the system or application may return to step 1942 and receives additional analyte data.

[00149] If the system determines that an analyte level is below a high threshold, in step 1948, the system may analyze the insulin dose data received to determine if a period of time has passed since an insulin dose has been recorded or received. The period of time may be about 2 hours, alternatively about 2.5 hours, alternatively about 3 hours. The period of time may optionally be set by the user instead of a default time set by the system. If the period of time since the last insulin dose has been recorded has not passed yet, then the system returns to step 1944 and receives additional insulin dose data.

[00150] If the system determines that the period of time has passed since a last insulin dose, in step 1950, the system may display an alert interface relating to the analyte level being within a target range. In some embodiments, the text of the alert interface may be customizable by the user.

Reports

[00151] The monitoring application may transfer data, including analyte levels from the SCD 102 and dosing data/logs from the medication delivery device 152, to a reporting application. The reporting application may be able to generate a plurality of reports that summarize and highlight various aspects of the analyte and medication data and history. The reporting application may be run on the display device or on a separate computing device. In some embodiments, the monitoring application may include instructions that, when executed by one or

more processors, generates and display reports that include the insulin data in the monitoring application.

[00152] FIGS. 8A-8C depict example embodiments of an insulin dosage interface 502, as part of analyte monitoring system report GUI 500. According to one aspect of the embodiments, GUI 500 is a snapshot report covering a predetermined time period 504 (e.g., 14 days), and comprising a plurality of report portions on a single report GUI, including: a sensor usage interface portion 506, a glucose trend interface 508, which can include an AGP graph 511, a low glucose events graph 513, and other related glucose metrics (e.g., Glucose Management Indicator 515); a health information interface 510.

[00153] The AGP graph 511 may display the hourly 5^{th}, 25^{th}, 50^{th} (median), 75^{th}, and 95^{th} percentiles of glucose readings, presented over the "typical" day based on all days within the selected timeframe. The AGP graph 511 may also include two horizontal lines, which indicate the boundaries of the target range defined in the glucose statistics and targets portion and the Time-in-Ranges portion. The report 500 may also include a section 517 that lists metrics and/or statistics related to the average glucose. Metrics section 517 may list the average glucose, the percent of time above target range, the percent of time in a target range, and the percent of time below a target range. The low glucose events graph 513 may include a graph of the events in which the subject's glucose levels dropped below a low threshold, e.g., 72 mg/dL. The graph may show the glucose concentration (mg/dL) vs. time, such that the times of the low event episodes during the day are readily apparent. The report 500 may also include a section 519 that lists metrics and/or statistics related to the low glucose events. The low glucose events metrics section 519 may list the number of low glucose events and the average duration of the low glucose events.

[00154] The sensor usage interface 506 may include a Percentage Time Sensor Active graph 521 and a metrics section 523. The metric section 523 may include a percentage that the time sensor has been active and an Average Scans/Views metric (e.g., indicative of an average sum of a number of scans and a number of views). The Percentage Time Sensor Active graph 521 may include a graph of the percent of time that the sensor is active vs. a time of day (e.g., from 12 am to 12 am). An axis of the Percentage Time Sensor Active graph 521 may be aligned with a corresponding axis of one or more other graphs (e.g., average glucose trend graph 511, low glucose events graph 513), such that the user can visually correlate data between multiple graphs

from two or more portions of the report GUI by the common units (e.g., time of day) from the aligned axes.

[00155] The health information interface 510 may include a carbohydrates section 512, insulin administered section 502, and a comments section 514. The carbohydrates section 512 may include information logged by the user about the user's average daily carbohydrate intake and may include the average total number of carbohydrates consumed by the user during the time period 504.

[00156] The insulin administered section 502 may include a list of medication dosages (e.g., insulin dosages) that were administered during the time period 504. The list may include separate entries for rapid acting insulin 516, long acting insulin 518, and a total daily amount of insulin 520. The entries may include an icon indicating of the insulin type, and/or the type of insulin (e.g., rapid acting, long acting, basal, etc.), and/or the brand name of the insulin, and/or the average amount of insulin administered. Where multiple insulin pens are connected, the medication dosages portion of the display 502 may include different icons for the different types of insulin pens, e.g., different colors and/or icons. For example, a rapid-acting pen may have a light green icon 516 while a long-acting insulin pen may have a dark green icon 518.

[00157] In some embodiments, the insulin dose amounts may have been manually entered by the user and/or determined by a dosage calculator, rather than transferred directly from a connected medication delivery device 152. The insulin dose amounts may have been entered into either the monitoring application or the reporting application. Where the insulin dose amounts were manually entered, the report 500 may note the amount of rapid-acting insulin 516 and long-acting insulin 518 delivered, but may not list the brand names of the insulins. The units/day that were administered for each type of insulin and the average total daily insulin (units/day) may also be displayed in the insulin dosage interface 502. For the rapid-acting insulin dose 516, the dose may be listed as the total dose (in units/day) that was administered, but may also be broken down into the different components, which may include a meal amount, a correction amount, a user change, and a manual input.

[00158] The comments interface 514 may can include additional information about the user's analyte and medication patterns presented in a narrative format. For example, the comments section 514 may include an indication of the trend of the number of tests per day as compared to

a previous reporting period, detected fluctuations in the reporting period, and a ratio of the correction insulin of the average daily dose.

[00159] The report 500 may also include a listing of the sources 522 of the information provided. The sources may include the name of the glucose monitoring device, and also include the name of the insulin delivery device (e.g., brand name). If more than one insulin delivery device is being used by the patient, the sources section 525 may list all of the medication delivery devices or may contain the name of the first connected pen and the number (numerical value) of the additional medical device(s), but may not include the names of any specific insulin pens.

[00160] FIGS. 9A-9G depict example embodiments of another analyte monitoring system report GUI 600 including information regarding insulin doses administered. According to one aspect of the embodiments, GUI 600 is a Weekly Summary report for a time period 613 that includes a plurality of report portions, wherein each report portion is representative of a different day of the week. The time period may be for a single week or a plurality of weeks, e.g., 7 days, 14 days (see, e.g., FIGS. 9B-9C), 21 days, 28 days (see, e.g., FIGS. 9D-9G), 32 days, 36 days, etc. Each report portion may include a glucose trend graph 601a-601n for each day of the time period 613, which can include the user's measured glucose levels over a twenty-four hour period, and a health information interface 606, 608, 610, 612. For each day of the time period 613, the health information interface may include information about the user's average daily glucose 606a-606bb, carbohydrate intake 608a-608bb, insulin dosages 610a-610bb, and hypoglycemic ("low") events 612a-612bb.

[00161] In some embodiments, the glucose trend graphs 601a-601bb may include sensor usage markers to indicate that a scan, a view, or both had occurred at a particular time during the twenty-four hour period. The glucose trend graphs 601a-601bb may also include color-coding to highlight portions of the trend graph that are outside of the target range. For example, the trend graphs 601a-601bb may include coloring of the area under the curve a certain color or changing the portion of the graph to be a certain color, or otherwise highlighting the region with the corresponding color for the portion outside of the target range. The area under the curve of the portion above the target range 603 may be colored, e.g., yellow or orange, and the area under the curve of the portion below the target range 605 may be colored, e.g., red.

[00162] The "low" events column 612a-612bb may list the number of low events that were detected where the user's analyte levels went below a lower threshold (e.g., 80 mg/dL for glucose, alternatively 75 mg/dL). The low events may also be highlighted in the glucose trend graph by shading an area under the curve of the low event in a different color, e.g., red.

[00163] Similarly, the total carbohydrate amount 608a-608bb ingested may be listed for each day in the health information interface 604. These carbohydrate entries may be distinguishable from the insulin dosage entries by appearing in a different color, e.g., orange, with a different icon, e.g., an apple. The total carbohydrate entry 608a-608bb may be blank, a dash, or a plurality of dashes if no value for the amount of carbohydrates is available. Moreover, the amounts of carbohydrates ingested may also be included in the glucose trend graphs 602a-602bb. Similar to the insulin doses, the amount of carbohydrates in different meals or snacks can be noted at or near the time of ingestion, and the amount may be listed in an orange box. If insulin was administered at or around the same time as a meal (ingestion of carbohydrates), the amount of insulin may appear below the amount of carbohydrate ingested on the glucose trend graph.

[00164] The insulin dosages column 610a-610bb interface may include the total amount of insulin administered that day for each of the different types of insulin. The total dose amounts for the different insulin types may be differentiated by different colors. For instance, the total rapid-acting insulin administered may be denoted in a light green box and the total long-acting insulin administered may be denoted in a dark green box. The entry for the amount of insulin administered may appear as a dash or a plurality of dashes if no value is available. The specific doses of the different insulins may also be noted in the glucose trend graph 601a-601bb. For example, a box containing the dosage amount may appear in the glucose trend graph at or near the time at which the dose was administered. The boxes may be color-coded, similar to the total insulin amounts, in order to allow the user to quickly determine which insulin was administered. For example, the rapid-acting insulin doses administered may be in light green boxes and the total long-acting insulin doses administered may be in dark green boxes. The long-acting insulin doses may or may not be displayed on the glucose trend graphs. Moreover, when a rapid-acting dose was administered at or around the same time as a long-acting dose, the long-acting dose may appear below the box entry for the rapid-acting dose on the glucose trend graph. The insulin brand names for the different types of insulin administered may also be displayed in a legend 630, which may be located at the bottom of the weekly summary report 600.

[00165] In some embodiments, the dosing information may have been manually entered by the user rather than transferred directly from a connected medication delivery device 152. The insulin dose amounts may have been entered into either the monitoring application or the reporting application. Where the insulin dose amounts were manually entered, the report 600 may note the amount of rapid-acting insulin delivered, but may not list the brand name of the insulin in the legend 630, although the legend 630 may include the icon corresponding to the particular type of insulin administered. In some embodiments, the dosing information may be automatically transferred from the connected delivery device. The sources 632 of the data may include the name of the device providing the analyte data levels and the number of the additional merged glucose devices, but may not include the names of any specific insulin pens. The units/day that were administered for each type of insulin and the average total daily insulin (units/day) may also be displayed in the insulin dosage interface 610. The insulin doses administered on the glucose trend graph may be displayed below a carbohydrate entry if they are close in time. In other embodiments, the brand name of the insulin may be included in the weekly summary report 600, in, e.g., the legend 630.

[00166] The report may also list the sources 632 of the data, including the name of the device providing the analyte data levels and the name of the primary medication delivery device. When data from multiple connected insulin pens have been included in the weekly summary report, the sources 632 may contain the name of the first connected pen and the number (numerical value) of the additional medical devices.

[00167] FIGS. 10A-10C depict example embodiments of another analyte monitoring system report GUI 700 including information regarding multiple types of insulin administered in a daily log report. According to one aspect of the embodiments, GUI 700 is a Daily Log report that, for each day of the time period 701, may include a glucose trend graph 702a-702c, a scans or views section 704a-704c, a carbohydrates row 706a-706c, an insulin doses administered row 708a-708c, a notes row 710a-710c, and a legend 730. The time period may be for a single week or a plurality of weeks, e.g., 7 days, 14 days (see, e.g., FIG. 10B), 21 days, 28 days (see, e.g., FIG. 10B), 32 days, 36 days, etc. FIGS. 10A-10C show examples of a first page or screen of the report 700, which contains graphs and information for the first 3 days of the time period. The glucose trend graphs 702a-702c may include the user's glucose levels over a twenty-four-hour period. In some embodiments, the glucose trend graphs 702a-702c may include sensor usage

markers to indicate that a scan, a view, or both had occurred at a particular time during the twenty-four hour period. In some embodiments, the glucose level for the scan or view may be listed at the time of the scan or view in the scans or view section 704a-704c. Glucose trend graphs 702a-702c may also include logged event markers, such as logged carbohydrate intake markers and logged insulin dosage markers, as well as glucose event markers, such as low glucose event markers. Beneath the glucose trend graphs 702a-702c, the report 700 may include a plurality of rows with additional information, including a row corresponding to scans or views 704a-704c, carbohydrates 706a-706c, insulin administered 708a-708c, and notes 710a-710c. In the scans or views row 704a-704c, noteworthy glucose levels may be listed in the row in a position corresponding to the time that the glucose level was recorded. For example, a peak glucose level of an episode above the target range may be noted and color coded a first color, e.g., orange, and a low glucose level of a hypoglycemic episode may be color coded a second color, e.g., red. In the carbohydrates row 706a-706c, an amount of carbohydrates may be listed in the row in a position corresponding to the time that the carbohydrates were logged.

[00168] For the insulin administered row 708a-708c, the amounts of insulin injections may be displayed in rows under each glucose trend graph 702 for each hour time block. Each medication delivery device may appear in a separate row. For example, as seen in FIG. 10B, insulin doses from a rapid-acting pen may appear in a first row, while insulin doses from an insulin pen containing long-acting insulin may appear in another row, where the long-acting insulin doses row may appear below the rapid-acting insulin doses row. The rapid-acting insulin dose amounts may appear in white boxes with black outlines. User corrections or changes may appear before the dose amount. The long-acting insulin dose amounts may appear in dark green boxes. The sources 754 of the data may include the name of the device providing the analyte data levels and the name of the first connected insulin pen, along with a number of the additional merged glucose devices.

[00169] In some embodiments, the insulin dose amounts may have been manually entered by the user and/or determined by a dosage calculator, rather than transferred directly from a connected medication delivery device 152. The insulin dose amounts may have been entered into either the monitoring application or the reporting application. Where the insulin dose amounts were manually entered, the daily log report may note the amount of rapid-acting insulin and long-acting insulin 618 delivered, but may not list the brand name of the insulins next to

their respective icons. In some embodiments, the dosing information may be automatically transferred from the connected delivery device. The sources 754 of the data may include the name of the device providing the analyte data levels and the number of the additional merged glucose devices, but may not include the names of any specific insulin pens. A row may only be displayed for a particular insulin type if dosing data for that insulin type was entered for a particular day. If there is no data for a particular day, then a row for that insulin type may not appear below the glucose trend graph 702. Beside the glucose trend graphs 702a-702c, a color-coded icon and the brand name or the type of the insulin may appear next to the insulin dose row. As with other report embodiments, different icons and different colors can be used for the rapid-acting and long-acting insulin pens. For example, the rapid acting insulin may be depicted with a light green solid syringe icon. The long-acting insulin may be depicted with a dark green, wider syringe icon. A row may only appear for a particular day when there is insulin dose data for that day. The daily log report 700 may also include a note if the user switches insulin brands in a connected pen during a particular day. A note may appear when the inulin brand was changed, which includes the old and new insulin brand names. The new insulin brand name may then be listed in the text near the glucose trend graph 702. In other embodiments, the brand name of the insulin may be included in the daily log report 700, in, e.g., the legend 730.

[00170] The notes row 710a-710c may also be included in the daily log report 700. The notes may include text that was added regarding events, e.g., exercising. The text may appear in the row in a position corresponding to the time that the notes were logged.

[00171] FIGS. 11A-11D depicts example embodiments of a daily patterns report GUI 770. The daily patterns report 770 includes a user's ambulatory glucose profile 772, a section reflecting the amount of carbohydrates 774 consumed in different time of day periods, and a section reflecting the dosage amounts of different types of insulin 778a-778b. The daily pattern report 770 shows a 1 day, i.e., 24-hour, time period graphical representation of glucose measurement values organized by time of day for a period of days 771—e.g., 14 days (see FIG. 11B) or 28 days (see FIG. 11C). The glucose measurement values may be displayed as individual points, or may be averaged into a gradient pattern representative of density of measurement values within particular ranges. The ambulatory glucose profile 772 may include a representation of the target glucose range for the user, as well as a median over time, represented by an average or median line, and lines representing the 10 percentile, 25 percentile, 75

percentile and 90 percentiles. The daily pattern report 770 may also have an indication of the daily average glucose level 785. Above the ambulatory glucose profile 772, a row 773 may appear where the average glucose level for each time period may be listed. Each time period may be about 2 hours, alternatively about 3 hours, alternatively about 4 hours. Noteworthy glucose levels (e.g., the highest average glucose level) may be highlighted with a different color to aid the user in easily seeing which time period had the highest glucose levels.

[00172] In addition to measured glucose levels, the daily pattern report 770 may include other average daily information, such as carbohydrates 790, rapid-acting insulin 802, and long-acting insulin 804. The section reflecting the amount of carbohydrates 774 consumed in different time of day periods may include a daily average amount of carbohydrates ingested 790 and a graph of time (x-axis) and amount of carbohydrates (y-axis (grams)), which may include icons (e.g., apples) to mark the amounts of carbohydrates consumed during different time of day periods. The total amount of carbohydrates 794 consumed in a particular time of day period may be listed on top of the graph, along with the number of meals or snacks consumed during the time period (e.g., in parentheses).

[00173] The section reflecting the dosage amounts of different types of insulin 778a-778b of the daily patterns report 770 may include a row for each type of insulin administered through a connected medication delivery device 152, e.g., a top row for rapid-acting insulin 778a and a bottom row for long-acting insulin 778b. For each type of insulin (rapid or fast-acting 802 (including "other insulin") and long-acting 804, an icon representing the type of insulin, a daily average administered 803, 805, the average amount administered for each time of day period, and the number of entries (in parentheses) for that time of day period 810 may be reported in the insulin rows 778a-778b. The brand name of the insulin may also optionally be listed. As with other embodiments discussed herein, a light green syringe icon may be used to denote an insulin pen containing a fast-acting insulin and a dark green syringe icon may be used to denote an insulin pen containing a long-acting insulin. The sources 812 of the data may include the name of the device providing the analyte data levels and the name of the first connected insulin pen, along with a number of the additional connected device (e.g., additional insulin pens).

[00174] In some embodiments, where only a single insulin pen is connected, only a single row 778 of insulin doses may appear, along with the corresponding icon (e.g., light green syringe icon for rapid-acting insulin pen) and the brand name or type of the insulin delivered. Where

only a single insulin pen is connected, the sources 812 of the data may only include the name of the device providing the analyte data levels and the name of the connected insulin pen, without any number indicating additional devices are connected.

[00175] In some embodiments, the insulin dose amounts may have been entered into either the monitoring application or the reporting application. Where the insulin dose amounts were manually entered, the daily patterns report 770 may note the amount of rapid-acting insulin and long-acting insulin delivered, but may not list the brand name of the insulins near their respective icons. In some embodiments, the dosing information may be automatically transferred from the connected delivery device. The sources 812 of the data may include the name of the device providing the analyte data levels and the number of the additional merged glucose devices, but may not include the names of any specific insulin pens. The units/day that were administered for each type of insulin and the average total daily insulin (units/day) may also be displayed. In other embodiments, the brand name of the insulin may be included in the daily pattern report 770, in, e.g., a legend.

[00176] A daily patterns report GUI 1700 may also be available on the display device 120, through the monitoring application, a reporting application, or other application. As seen in FIG. 11D, the daily patterns report GUI 1700 may include a user's ambulatory glucose profile 772, the period of days or the number of days 771 that is being displayed in the GUI 1700, an insulin summary section 1778, and alternative time periods 1774a-1774d to select and display. The ambulatory glucose profile 772 has been described in detail with respect to other embodiments and reports. The ambulatory glucose profile 772 may also indicate how many days of the time period 771 that the glucose data was available. The ambulatory glucose profile 772 may also include syringes above or below the graph to indicate the times at which the doses were administered. Alternatively, the doses may be graphed along the median line of the ambulatory glucose profile to indicate what time they were administered. The insulin summary section 1778 may include a graphical representation of the amounts of insulin dosed during the time period 771. In some embodiments, the graph may be a bar graph of time (x-axis) vs. the average number of insulin units administered. The graph may include both fast-acting insulin doses and basal doses. The insulin summary section may also indicate how many days of the time period 771 that the dosing data was available. The x-axis (time) of the graph in the insulin summary section 1778 may align with the x-axis (time) of the ambulatory glucose profile 772, with the

average dose amounts for the different meal and basal doses being graphed at the average time that they were administered during the time period 771. Thus, the user may be easily able to see a correlation between their insulin doses and their glucose profile in the time periods relevant to the different doses. The GUI 1700 may also include tabs 1774a-1774b with different time periods for which the user may select to display the daily patterns report. For example, the time period tabs 1774a-1774d may be 1 day, 7 days, 14 days, 30 days, or 90 days.

[00177] Alternatively, as seen in GUI 1720 of FIG. 11D, the user may select the time period in a drop down menu 1775. In such a case, the GUI 1700 may include a date range 1775 and the user may scroll forward and backwards in time by tapping on the forward or backward carets. In some embodiments, when a user selects 1 day for the time period, a daily graph may be displayed, which shows the glucose and insulin data for the individual day selected. For the daily graph, instead of an ambulatory glucose profile, the daily graph may display the glucose profile for that day, while also highlighting the target range for the user. The glucose profile graph may also contain syringe icons above or below the graph to indicate the times at which the insulin was administered. Alternatively, the doses may be graphed along the median line of the glucose profile to indicate what time they were administered. The insulin summary section may display graphical representation of the amounts of insulin dosed during the day (as opposed to an average number of doses for a multi-day period). In some embodiments, the graph may be a bar graph of time (x-axis) vs. the number of insulin units administered. The graph may include both fast-acting insulin doses and basal doses. The x-axis (time) of the graph in the insulin summary section may align with the x-axis (time) of the glucose profile, with the dose amounts for the different meal and basal doses being graphed at the time that they were administered during the day. Thus, the bars in the bar graph may align at the same times with the syringe icons in the glucose profile graph.

[00178] As seen in FIG. 11E, if the user requests more information by, e.g., tapping on an "i" icon, a window 1800 may be displayed that includes an explanation 1806 that the daily patterns report shows the user's glucose and insulin patterns over a period of time. The window 1800 may also include the target range, e.g., 70 – 180 mg/dL. The user may also be able to select the type of insulin data to display – either rapid acting 1802 or long acting 1804.

[00179] FIGS. 28A-D depict example embodiments of another analyte system report GUI 2000 that includes information regarding multiple types of insulin administered in a Daily View

Report GUI 2000. According to one aspect of the embodiments, the Daily View Report GUI 2000 may include, for each day of the time period 2002, a glucose profile 2010a-g, a time-in-range metric 2012a-g, a listing of the total rapid-acting insulin administered 2014a-g, a listing of the total long-acting insulin administered 2016a-g, and a listing of the total amount of carbohydrates consumed 2016a-g. The time period 2002 may be for a single week or a plurality of weeks, e.g., 7 days, 14 days, 21 days, 28 days, 32 days, 36 days, etc. FIGS. 28A-B show examples of a first page or screen of the report 2000, which contains graphs and information for the first 7 days of the time period. The Daily View Report GUI 2000 may also list the time that a sensor was active 2020 during the time period, the average number of scans or views 2022 per day during the time period, a legend 2024 of the symbols used in the report 2000, and the sources 2026 of the data used in the report 2000.

[00180] The glucose profiles 2010a-g may include the user's glucose levels over a twenty-four-hour period. In some embodiments, the glucose profiles 2010a-g may optionally include sensor usage markers (e.g., a circle) 2066 to indicate that a scan, a view, or both had occurred at a particular time during the twenty-four-hour period. In some embodiments, the glucose level for the scan or view may be listed at the time of the scan or view in the scans or view section. Each daily profile may represent a midnight to midnight period with the date displayed in the same frame as the profile. In addition to the displaying the date, each profile may also indicate the corresponding day of the week. Each profile may also contain an indication of the target glucose range (e.g., a shaded region or lines indicating the upper and lower boundaries of the targe region) to illustrate which parts of each daily profile were within the target range 2056. Portions of the graph outside of the target range 2056 may also be color-coded as a further indication of readings or analyte levels that were outside of the target range 2056. The color coding may correspond to the colors used in the Time-in-Ranges graphical representations described in other reports. For example, portions of the graph above the target range 2056 in the "high" level (e.g., 181-250 mg/dL) may be color-coded yellow. Portions of the graph below the target range 2056 in the "low" level (e.g., 54-69 mg/dL) may be color-coded red. Portions of the graph below the in the "very low" level (e.g., <54 mg/dL) may be color-coded dark red or maroon. The color-coding may include coloring the area under the curve (e.g., the area between the curve and the high threshold, low threshold, or very low threshold) a certain color or

changing the portion of the graph to be a certain color, or otherwise highlighting the region with the corresponding color.

[00181] Glucose profiles 2010a-g may also optionally include logged event markers, such as logged exercise events 2064, logged carbohydrate intake markers, and logged insulin dosage markers, as well as glucose event markers, such as low glucose event markers. The logged event markers may be listed above or below the glucose graph at the time that the event was logged.

[00182] As seen in FIGS. 28B-E, in some embodiments, instead of including the numbers in the glucose profile 2010a-g, the report 2000 may include a plurality of rows with additional information beneath the glucose profiles 2010a-g, including a row corresponding carbohydrates consumed 2038a-e, rapid-acting insulin received 2034a-e, and long-acting insulin received 2036a-e. In the carbohydrates row 2038, an amount of carbohydrates 2058 may be listed in the row 2038 in a position corresponding to the time that the carbohydrates were logged. Similarly, in the rapid-acting row 2034, the amounts of rapid-acting insulin 2060 administered may be listed under the time of administration. In the long-acting insulin rows 2036, the amounts of long-acting insulin administered 2062 may be listed under the time of administration. In some embodiments where the dosing data was obtained from a connected pen or connected pen cap, the report 2000 may include the long-acting insulin row 2036. The color-coding for these entries may be the same as the listing of carbohydrates, rapid-acting insulin, and long-acting insulin in the listing of the total amounts 2018, 2014, and 2016.

[00183] In some embodiments, the report 2000 may also or alternatively contain rows that indicate scans or views, and notes. In the scans or views row, noteworthy glucose levels may be listed in the row in a position corresponding to the time that the glucose level was recorded. For example, a peak glucose level of an episode above the target range 2056 may be noted and color coded a first color, e.g., orange, and a low glucose level of a hypoglycemic episode may be color coded a second color, e.g., red. Optionally, noteworthy glucose levels may be included in the glucose profile 2010a-g.

[00184] In some embodiments, as seen in FIG. 28D, where the basal insulin was administered using an insulin pump, the report may also or alternatively include an insulin delivery graph 2042c located below or above the glucose profile 2010 that shows when and the amount of the insulin was delivered in lieu of a long-acting insulin row 2036 showing discrete doses. The insulin delivery graph 2042c may have an x-axis of time and a y-axis of units/hr. The time axis

of the insulin delivery graph 2042c and the glucose profile 2010 may be aligned. When an insulin pump is the source of basal dose information, the listing of the total long-acting insulin administered 2016c may include a name of the pump system and a percentage of time that the pump was active. FIG. 28D depicts a single day's entry from a Daily View Report 2000.

[00185] In some embodiments, as seen in FIG. 28E, where the insulin was administered using an insulin pump, the report may also or alternatively include an insulin delivery graph 2044c located below or above the glucose profile 2010 that shows how much insulin was delivered and the delivery mode of the insulin pump in lieu of a long-acting insulin row 2036 showing discrete doses. In some embodiments, the insulin graph 2044c may have an x-axis of time and a y-axis of units/hr. The insulin graph 2044c may include a trace 2052 of the insulin amount delivered and segments of time when the pump was operating on automated delivery 2046, maximum delivery 2048, or automated pause 2050, or if insulin was delivered manually 2054. When an insulin pump is the source of basal dose information, the listing of the total long-acting insulin administered 2016c may include a name of the pump system and a percentage of time that the pump was active. FIG. 28E depicts a single day's entry from a Daily View Report 2000.

[00186] The time-in-range metric 2012a-g may be a percentage of time spent in the target range 2056 for that day.

[00187] The listing of the total rapid-acting insulin administered 2014a-g for each day may be determined from data that is automatically transferred from a connected medication delivery device 152, such as a connected pen, connected pen cap, or an insulin pump. Alternatively, in some embodiments, the listing of the total rapid-acting insulin administered 2014a-g for each day may be determined from insulin doses that were manually logged by a user.

[00188] The listing of the total long-acting insulin administered 2016a-g for each day may be determined from data that is automatically transferred from a connected medication delivery device 152, such as a connected pen, connected pen cap, or an insulin pump. Alternatively, in some embodiments, the listing of the total long-acting insulin administered 2016a-g for each day may be determined from insulin doses that were manually logged by a user.

[00189] The listing of the total amount of carbohydrates consumed 2016a-g may be determined from carbohydrates logged by the user. Alternatively, the listing of the total amount of carbohydrates consumed 2016a-g may be determined from meals and snacks that are logged, where the carbohydrate content of the meals and snacks is estimated by a program.

[00190] FIGS. 12A-12C depict example embodiments of a Mealtime Patterns report GUI 850. The mealtime patterns report 850 may include graphical and numerical representations of glucose level information with respect to particular times periods of the day that may be associated with meals, i.e., morning (breakfast, e.g., 6am-10am), midday (lunch, e.g., 10am-4pm), evening (dinner, e.g., 4pm-10pm), and nighttime (bedtime, e.g., 10 pm-6am). A vertical line may be displayed to delineate the hours before (pre-meal) 852 and after (post-meal) 854 the corresponding meal. Further, the representations may include numerical indications of the glucose levels before 858a-858d and after 860a-860d the time of the ingestion of the particular meal for each of the days within the mealtime patterns time period 856, along with the average pre-meal 859a-859d and average post-meal glucose levels 861a-861d listed above the tables for each time period. Additionally, a representation of the amount of carbohydrates 864a-864d consumed for each of the days within the mealtime patterns time period, along with the average amount of carbohydrates 865a-865d ingested for the whole time period may be reported.

[00191] The Mealtime Patterns report 850 may also contain the amount of insulin administered. An amount of insulin 862a-862d administered for each of the days within the mealtime patterns time period may be displayed in, e.g., a column 862, along with the average amount of insulin administered 863a-863d for that time-of-day period in a row above the table. An icon corresponding to the type of insulin administered (e.g., light green syringe icon for rapid-acting insulin) may also be displayed to indicate the type of insulin administered.

[00192] The sources 874 of the data, including the name of the device providing the analyte data levels and the name of the primary medication delivery device may also be displayed where the medication delivery device 152 has been connected to the IMS. The insulin brand name for the type of insulin administered may also optionally be displayed in a legend 876, which may be located at the bottom of the mealtime patterns report 850.

[00193] In some embodiments, the insulin dose amounts may have been manually entered by the user and/or determined by a dosage calculator, rather than transferred directly from a connected medication delivery device 152. The insulin dose amounts may have been entered into either the monitoring application or the reporting application. Where the insulin dose amounts were manually entered, the mealtime patterns report 850 may note the amount of rapid-acting insulin 872 delivered, but may not list the brand name in the report. In some embodiments, the dosing information may be automatically transferred from the connected

delivery device. The sources 874 of the data may include the name of the device providing the analyte data levels and the number of the additional merged glucose devices, but may not include the names of any specific insulin pens. The insulin brand name for the type of insulin administered may not be displayed in the legend 876, which may be located at the bottom of the mealtime patterns report 850. Rather, the legend 876 lists the insulin as, e.g., "rapid-acting" without a brand name. In other embodiments, the brand name of the insulin may be included in the mealtime patterns report 850, in, e.g., the legend 876.

[00194] The mealtime patterns report 850 may also contain a plurality of graphs 868a-868d of the glucose levels for each of the times periods of the day, i.e., morning (breakfast, e.g., 6am-10am), midday (lunch, e.g., 10am-4pm), evening (dinner, e.g., 4pm-10pm), and nighttime (bedtime, e.g., 10 pm-6am). Each graph 868a-868d may include a vertical line depicting a meal start time and may span a time frame of about 1 hour before the meal start to about 3 hours after the meal start. The graph may further include data points on the vertical line indicating the plurality of glucose levels scanned or recorded at the beginning of the meal or just before the start of the meal, which are listed in the columns 858a-858d. The average glucose level of the plurality of glucose levels scanned or recorded at the beginning of the meal or just before the start of the meal indicated at the top of the columns 858a-858d may be highlighted in each graph. Additionally, the graphs 868a-868d may include data points indicating glucose levels after the meal, e.g., at least about 2 hours after the meal start, which are listed in the columns 860a-860d. The average glucose level of the plurality of glucose levels scanned or recorded after the meal, e.g., at least about 2 hours after the meal start, indicated at the top of the column 860a-860d may also be highlighted in the graphs. The graphs 858a-858d may also highlight the target range before the meal, e.g., about 70 mg/dL to about 130 mg/dL, and the target range after the meal, e.g., about 100 mg/dL to about 180 mg/dL, so that it is readily apparent if the recorded glucose levels are in or outside the target range at a glance.

[00195] FIGS. 13A-13B depict example embodiments of Device Details reports GUI 900. The device details report 900 may include glucose settings 910 for the primary glucose device, insulin settings for a first connected insulin pen 930, and insulin settings for a second (or additional) connected insulin pen 940. The glucose settings 910 may include a target range (e.g., 70 – 180 mg/dL) and the alarm settings for low glucose (e.g., 70 mg/dL), high glucose (e.g., 240 mg/dL), and signal loss. The target range may include a low and a high threshold and be set

from a monitoring application or a reader. The glucose settings 910 may optionally also include calculator settings and reminders. The Device Details report 900 may also contain details about the primary glucose device 916 that receives analyte levels or data indicative of analyte levels from the SCD 102, including the name of the device (and any icon associated with the device), the current software version on the device, the current operating system version, and the model of the smartphone on which related applications are being run. If the SCD 102 is being used in conjunction with a reader or meter, the device details 916 may include the seral number of the reader or meter.

[00196] The device details report 900 may also include details for any connected medication delivery devices 152 (e.g., connected insulin pens). The connected medication delivery devices 152 may be listed under the primary glucose device. If more than one medication delivery device is connected, then each may be displayed as its own device. For each connected medication delivery device, the insulin pen settings 930, 940 may include the insulin type, last scan (e.g., date and timestamp of last insulin value), and pen color. The insulin pen settings 930, 940 may optionally also include calculator settings, notes, and/or reminders. The device details report 900 may also contain details 935, 945 about the insulin pens near their respective settings. The details 935, 945 may include a colored icon or picture of the insulin pen, the brand name of the insulin pen or the type of insulin, and the serial number.

[00197] FIG. 14 depict an example embodiment of an AGP report GUI 950. The AGP report 950 may include a glucose statistics and targets section 952, a time in ranges section 954, a user's ambulatory glucose profile 956, and a daily glucose profiles section 958. The AGP report 950 shows various statistics and graphs for a period of days 960—e.g., 14 days or 28 days. The sources 962 of the information may be listed and may include the names (e.g., brand names) of the primary glucose device, the first connected pen, and the number of additional devices.

[00198] The glucose statistics and targets or glucose metrics 952 section may include any one or more of the following metrics: the days in which the statistics are reported, the amount of time the sensor was active (reported as a percentage), the amount of time (reported as percentages) that the detected analyte levels were within various ranges, the average glucose, the glucose management indicator (GMI), and the glucose variability. The amount of time in the various ranges may include the amount of time within a target range (e.g., 70 – 180 mg/dL), below a low threshold (e.g., below 70 mg/dL), below a lower threshold (e.g., below 54 mg/dL),

above a high threshold (e.g., above 180 mg/dL), and above a higher threshold (e.g., above 250 mg/dL).

[00199] The time in ranges section 954 may include Time-in-Ranges (also referred to as Time-in-Range and/or Time-in-Target) GUIs, each of which comprise a plurality of bars or bar portions, wherein each bar or bar portion indicates an amount of time that a user's analyte level is within a predefined analyte range correlating with the bar or bar portion. In some embodiments, for example, the amount of time can be expressed as a percentage of a predefined amount of time. Time-in-Ranges GUI portion 954 may include a single bar comprising up to five bar portions including (from top to bottom): a first bar portion indicating that the user's glucose range is "Very High" or above 250 mg/dL of a predefined amount of time, a second bar portion indicating that the user's glucose range is "High" or between 180 and 250 mg/dL of the predefined amount of time, a third bar portion indicating that the user's glucose range is within a "Target Range" or between 70 and 180 mg/dL of the predefined amount of time, a fourth bar portion indicating that the user's glucose range is "Low" or between 54 and 69 mg/dL of the predefined amount of time, and a fifth bar portion indicating that the user's glucose range is "Very Low" or less than 54 mg/dL of the predefined amount of time. Time-in-Ranges GUI 954 may display text adjacent to each bar portion indicating an actual amount of time, e.g., in hours and/or minutes.

[00200] According to one aspect of the embodiment shown in FIG. 14, each bar portion of Time-in-Ranges GUI 954 may comprise a different color. In some embodiments, bar portions can be separated by dashed or dotted lines and/or interlineated with numeric markers to indicate the ranges reflected by the adjacent bar portions. In some embodiments, the time in ranges reflected by the bar portions can be further expressed as a percentage, an actual amount of time (e.g., 4 hours and 19 minutes), or both. Furthermore, those of skill in the art will recognize that the percentages of time associated with each bar portion can vary depending on the analyte data of the user. In some embodiments of Time-in-Ranges GUI 954, the Target Range can be configured by the user. In other embodiments, the Target Range of Time-in-Ranges GUI 954 is not modifiable by the user.

[00201] The AGP report 950 may also contain an AGP portion 956 similar to the AGP graph 511. The AGP graph may display the hourly 5^{th}, 25^{th}, 50^{th} (median), 75^{th}, and 95^{th} percentiles of glucose readings, presented over the "typical" day based on all days within the selected

timeframe. The AGP graph may also include two horizontal lines, which indicate the boundaries of the target range defined in the glucose statistics and targets portion 952 and the Time-in-Ranges portion 954. For example, a first line may correspond to the lower boundary of the target range (e.g., 70 mg/dL) and a second line may correspond to an upper boundary of the target range (e.g., 250 mg/dL). The first and second lines may also be color-coded and correspond to the same color as the target range bar portion in the Time-in-Ranges portion 308 (e.g., green). The data or portions of the AGP within the respective concentration ranges may also be color-coded and correspond to the same color as the target range bar portions in the Time-in-Ranges portion (308). For example, data points or portions of the AGP in the target range may be colored green, data points or portions of the AGP in the high concentration range may be colored orange, data points or portions of the AGP in the high range may be colored orange, data points or portions of the AGP in the low range may be colored red, and data points or portions of the AGP in the very low range may be colored dark red or maroon. Thus, the AGP plot easily illustrates the amount of time spent in (or amount of readings falling within) the target range.

[00202] The AGP report 950 may also include a daily glucose profiles section 958. The daily glucose profiles section 958 displays a plurality of daily profiles 958-1 – 958-14, one for each day of the time period 960. Each daily profile may represent a midnight to midnight period with the date displayed in the same frame as the profile. In addition to the displaying the date, each profile may also indicate the corresponding day of the week. Each profile may also contain an indication of the target glucose range (e.g., a shaded region or lines indicating the upper and lower boundaries of the targe region) to illustrate which parts of each daily profile were within the target range. Portions of the graph outside of the target range may also be color-coded as a further indication of readings or analyte levels that were outside of the target range. The color coding may correspond to the colors used in the Time-in-Ranges 954 portion. For example, portions of the graph above the target range in the "high" level (e.g., 181-250 mg/dL) may be color-coded yellow. Portions of the graph below the target range in the "low" level (e.g., 54-69 mg/dL) may be color-coded red. Portions of the graph below the in the "very low" level (e.g., <54 mg/dL) may be color-coded dark red or maroon. The color-coding may include coloring the area under the curve (e.g., the area between the curve and the high threshold, low threshold, or very low threshold) a certain color or changing the portion of the graph to be a certain color, or otherwise highlighting the region with the corresponding color.

[00203] FIG. 19 depicts an example embodiment of a Comparison report GUI 1020. The Comparison report 1020 may include two sections 1022a, b that display metrics for first and second time periods 1024a, b. The metrics for the first and second time periods may be displayed side-by-side to allow for easy analysis and comparison of the different time periods. Each of the sections of the Comparison report 1020 may include a glucose metrics section 1026a,b, a time in ranges section 1028a, b, an ambulatory glucose profile section 1030a, b, and a low glucose events section 1032a, b. The Comparison report 1020 shows various statistics and graphs for two time periods—e.g., 14 days each. In some embodiments, a banner may also appear, e.g., in the header, to inform the viewer if any glucose threshold levels have been adjusted.

[00204] The Comparison report GUI 1020 may report the days in which the various metrics are reported 1024a, b, and the amount of time the sensor was active (reported as a percentage) 1034a, b.

[00205] The glucose metrics sections 1026a, b may include, for example, the average glucose, the glucose management indicator (GMI), and the glucose variability.

[00206] The time in ranges section 1028a, b may include Time-in-Ranges (also referred to as Time-in-Range and/or Time-in-Target) graphical representations, each of which comprise a plurality of bars or bar portions, wherein each bar or bar portion indicates an amount of time that a user's analyte level was within a predefined analyte range correlating with the bar or bar portion. In some embodiments, for example, the amount of time can be expressed as a percentage of a predefined amount of time. Time-in-Ranges graphs 1028a, b may each include a single bar comprising a plurality of bar portions stacked vertically. In some embodiments, the graph may include 5 bar portions: a first bar portion indicating the amount of time that the user's glucose range was "Very High" or above 250 mg/dL for a predefined amount of time, a second bar portion indicating the amount of time that the user's glucose range was "High" or between 180 and 250 mg/dL for the predefined amount of time, a third bar portion indicating the amount of time that the user's glucose range was within a "Target Range" or between 70 and 180 mg/dL for the predefined amount of time, a fourth bar portion indicating the amount of time that the user's glucose range was "Low" or between 54 and 69 mg/dL for the predefined amount of time, and a fifth bar portion indicating the amount of time that the user's glucose range was "Very Low" or less than 54 mg/dL for the predefined amount of time. Time-in-Ranges graphs 1028a, b

may optionally also each display text adjacent to each bar portion indicating an actual amount of time, e.g., in hours and/or minutes. In some embodiments, the time in ranges reflected by the bar portions can be further expressed as a percentage, an actual amount of time (e.g., 4 hours and 19 minutes), or both. Furthermore, those of skill in the art will recognize that the percentages of time associated with each bar portion can vary depending on the analyte data of the user.

[00207] According to one aspect of the embodiment shown in FIG. 19, each bar portion of Time-in-Ranges graph 1028a, b may comprise a different color. In some embodiments, bar portions can be separated by dashed or dotted lines and/or interlineated with numeric markers to indicate the ranges reflected by the adjacent bar portions. In some embodiments, the "Very High" portion may be colored orange, the "High" portion may be colored yellow, the "Target Range" may be colored green, the "Low" portion may be colored red, and the "Very Low" portion may be colored dark red or maroon. This color scheme may be followed in other portions of the Comparison report 1020, such as the ambulatory glucose profile section 1030a, b and the low glucose events section 1032a, b. For example, the analyte levels in displayed in the graphs in the ambulatory glucose profile section 1030a, b and a low glucose events section 1032a, b may be color coded according to the concentration range that the analyte level falls within. For example, an analyte level of 156 mg/dL may be colored green in an ambulatory glucose profile while an analyte level of 48 mg/dL may be colored dark red or maroon in an ambulatory glucose profile or low glucose events graph. In some embodiments of Time-in-Ranges graphs 1028a, b, the Target Range can be configured by the user. In other embodiments, the Target Range of Time-in-Ranges GUI 1028a, b is not modifiable by the user.

[00208] Each section of the Comparison report 1020 may also contain an AGP portion 1030a, b similar to the AGP graph 511 displayed in FIG. 8. The AGP graph may display the hourly 5^{th}, 25^{th}, 50^{th} (median), 75^{th}, and 95^{th} percentiles of glucose readings, presented over the "typical" day based on all days within the selected timeframe. The AGP graph may also include two horizontal lines, which indicate the boundaries of the target range defined in the glucose statistics and targets portion 1026a.b and the Time-in-Ranges graph 1028a, b. For example, a first line may correspond to the lower boundary of the target range (e.g., 70 mg/dL) and a second line may correspond to an upper boundary of the target range (e.g., 250 mg/dL). The first and second lines may also be color-coded and correspond to the same color as the target range bar portion in the Time-in-Ranges portion 308 (e.g., green). The AGP graphs may adopt the same

color coding as in the Time-in-Ranges GUI 1028a, b such that the glucose levels in the "Very High" range (e.g., about 250 mg/dL) may be colored orange, the glucose levels in the "High" range (e.g., between 180 mg/dL and 250 mg/dL) may be colored yellow, the glucose levels in the "Target Range" (e.g., between 70 mg/dL and 180 mg/dL) may be colored green, the glucose levels in the "Low" range (e.g., between 54 mg/dL and 70 mg/dL) may be colored red, and the glucose levels in the "Very Low" range (e.g., below 54 mg/dL) may be colored dark red or maroon. Thus, each AGP plot may easily illustrate the amount of time spent in or, the amount of readings falling within, the target range for each time period 1024a, b.

[00209] Each section of the Comparison report 1020 may also include a low glucose events section 1032a, b. The low glucose events sections 1032a, b may each include a graph of the events in which the subject's glucose levels dropped below a low threshold, e.g., 70 mg/dL and a very low threshold, e.g., 54 mg/dl. Each graph may also include a line illustrating a low threshold (e.g., 70 mg/dl) and a very low threshold (e.g., 54 mg/dl). The graph may show the glucose concentration (mg/dL) vs. time, such that the times of the low event episodes during the day are readily apparent. As mentioned previously, the graph of the glucose levels in the low glucose events section 1032a, b may adopt the same color coding as in the Time-in-Ranges GUI 1028a, b such that the glucose levels in between the low threshold and very low threshold (e.g., between 54 mg/dl and 70 mg/dl) may be colored red, and the glucose levels below the very low threshold (e.g., below 54 mg/dl) may be colored may be colored dark red or maroon. The color-coding may include coloring the area under the curve a certain color or changing the portion of the graph to be a certain color, or otherwise highlighting the region with the corresponding color. The low glucose events sections 1032a, b may also list metrics and/or statistics related to the low glucose events. In some embodiments, the low glucose events metrics sections 1032a, b may list the number of low glucose events and, optionally, the average duration of the low glucose events.

[00210] FIGS. 15A-15B depict example embodiments of a GUI associated with a patient dashboard 970. The dashboard 970 may allow a user to display merged insulin data from different sources, e.g., connected pens and manually entered insulin data. The user may select different columns to include in the patient dashboard display, including the average rapid-acting insulin administered per day (units), the average long-acting insulin administered per day (units), and the average total insulin administered per day (units). Other parameters that may be shown

on the patient dashboard include average glucose (mmol/L), sensor low glucose events average duration (min), % below target, % in target, % above target, low-glucose events, standard deviation (mmol/L), estimated A1c %, and estimated A1c mmol/mol.

[00211] FIGS. 16A-16B depicts an exemplary embodiment of a GUI for a data sources modal with connected pens 980. In the modal 980, the user is able to select the connected pen(s) that they want to include in a report using the show/hide icon 982. A default may be set to display any connected pens with data during the reporting period. Each connected pen may appear as its own device in the modal 980. The connected devices may appear in an order according to the date of the last upload 986, which is the date of the last insulin timestamp. The listing of the devices (insulin pens) may include the insulin pen brand name, insulin pen serial number, and insulin pen image. The pen image may be positioned above the brand name. The modal 980 may also display an estimated device time 988. The estimated device time 988 may be blank if it is unknown or the same time as the device used to upload at the time of the upload. Days with insulin data captured in the last 90 days from the report end date 990 may be displayed in a different color, e.g., green, to differentiate from data related to glucose. With this GUI, an HCP or other user may determine which data sources to include in any of the reports described herein.

[00212] FIGS. 17A-17B depict exemplary alerts 1002, e.g., a toast alert, for reporting information regarding connected pens. The alert 1002 may be displayed as an unobtrusive non-popup box in a portion of the screen, e.g., the bottom right corner for a period of time. The alert 1002 may appear for about 1 minute, or until the user dismisses it, if the report includes insulin pen data. The alert 1002 may show the number of total sources 1004 (including both glucose and insulin sources) and the number of connected pens 1006. The alert 1002 may not be displayed if there is only merged glucose devices and no connected insulin delivery devices. The alert 1002 may indicate that the data coming in from some devices may not be included in the report. The report may only include insulin data from connected pens.

[00213] FIGS. 24A-C depict example embodiments of Insulin Summary Report GUIs 1840. Insulin Summary Report GUI 1840 may contain tabs 1842a-1842d with different time periods for which the user may select to display the daily patterns report. For example, the time period tabs 1842a-1842d may be 1 day, 7 days, 14 days, 30 days, or 90 days. The GUI 1840 may also contain the date range 1844 that is currently being displayed and a graphical representation of the total daily dose 1848, along with a legend 1846 for the graphical representation 1848. The

graphical representation 1848 may be a bar graph with time on the x-axis and total units administered on the y-axis. The graphical representation may include both rapid-acting and long-acting doses. If the time period selected is 14 days 1842b, then the units of the x-axis may be single days, with each day having a bar showing the total amount of fast-acting and rapid-acting insulin administered that day. In some embodiments, the user may select an entry for a single day by tapping it and a window with details for that day (e.g., the total number of units for fast-acting and rapid-acting insulin administered that day).

[00214] In some embodiments, the user may access a daily insulin report GUI 1860 by either tapping on details window for that day or by selecting a daily insulin report through a menu. As seen in FIG. 24B, the daily insulin GUI 1850 may have the time period of 1 day 1842a selected and may display the date 1854 of the data being displayed in the graphical representation 1858. The representation 1858 may be a bar graph with time on the x-axis and total units administered on the y-axis, with each dose amount graphed at the time it was administered. The graphical representation may include both rapid-acting and long-acting doses. In the legend 1856, below each of the rapid-acting and long-acting symbols or colors, the GUI 1850 may list the total amount of each type of insulin injected that day 1854.

[00215] FIG. 24C shows an example embodiment of an insulin usage report GUI 1870, which summarizes insulin usage for a selected time period. For example, the time period tabs 1842a-1842d may be 1 day, 7 days, 14 days, 30 days, or 90 days. The GUI 1870 may display the date range 1872 for the insulin usage being displayed. For the selected date range 1872, where the date range selected is more than one day, the GUI 1870 may also display the average total daily dose amount administered 1874, the average total rapid-acting amount administered daily 1876, and the average total long-acting amount administered daily 1878

[00216] FIGS. 18A – 18D depict exemplary embodiments of a GUI of a comparative profiles report. By leveraging dosing data from connected drug delivery devices and glucose data from continuous glucose monitors as inputs, in many embodiments, a GUI or report may include a plurality of glucose profiles over a selected time period. As seen in FIGS. 18A-18B, in some embodiments, the GUI or report may include two, alternatively two or more, alternatively three, alternatively three or more versions of a glucose profile 1010, 1012, 1014 over a selected time period.

[00217] In some embodiments, the glucose profile(s) 1010, 1012, 1014 may each be an ambulatory glucose profile (AGP) graph or portions of an AGP. As described with respect to exemplary FIG. 14, the AGP may display the hourly 5th, 25th, 50th (median), 75th, and 95th percentiles of glucose readings, presented over the "typical" 24-hour day based on all days within the selected timeframe. Alternatively, the AGP may display other percentiles, such as the hourly 10th, 25th, 50th (median), 75th, and 90th percentiles of glucose readings, presented over the "typical" 24-hour day based on all days within the selected timeframe. The AGP graph may also include two horizontal lines, which indicate the boundaries of the target range. For example, a first line may correspond to the lower boundary of the target range (e.g., 70 mg/dL) and a second line may correspond to an upper boundary of the target range (e.g., 180 mg/dL). The first and second lines may also be color-coded. The colors may correspond to the same colors used in other reports described herein, e.g., the same colors as the target range bar portion in the Time-in-Ranges portion 308 (e.g., green). Thus, the AGP graph easily illustrates the amount of time spent in (or amount of readings falling within) the target range. Other exemplary AGP graphs can be found in, e.g., US 2018/0235524, US 2014/0188400, US 2014/0350369, US 2018/0226150 all of which are expressly incorporated by reference it their entirety for all purposes.

[00218] In other embodiments, the glucose profiles may be plotted as multiple daily traces in a single graph or figure. In some embodiments, the glucose profiles may be converted into an AGP in addition to being plotted as multiple daily traces in the same graph or figure. In some embodiments, the plurality of graphs may be any type of representation of glucose data, include modal day overlays or time-series plots. These graphs may also present data, or be based on data, from other time-based analyte data or other time-based data associated with the patient, such as insulin dosing events or insulin delivery data or meal event data. Although exemplary graphs are described based on glucose data, any patient data may be represented in these exemplary formats.

[00219] The GUI or report may include a time filter that allows the user to define a time period to analyze and to display in the plurality of glucose profiles 1010, 1012, 1014. The time period may be the last 7 days, alternatively the last two weeks, alternatively the last month, alternatively the last two months, alternatively the last three months, alternatively the last 6 months, alternatively the last 9 months, alternatively the last year.

[00220] A first profile 1010 of the plurality of glucose profiles may display all of the glucose level measurements for the selected time period. See, e.g., FIG. 18C. The first profile 1010 may represent a complete set of glucose level measurements, which may include measurements taken after a glucose level-altering drug was administered and after a dose of a glucose level-altering drug was missed, or the dose information was not received by the program or application.

[00221] A second profile 1012 of the plurality of glucose profiles may display only specific data over the selected time period associated with an administered glucose-lowering medication. See, e.g., FIG. 18D. The specific data may only include glucose level measurements taken during a window of time following, or associated with, the administration of a glucose level-altering medication. The specific data associated with the administration of a glucose level-altering medication may be include glucose data or glucose level measurements taken in a window determined by a fixed time-of-day definition. The glucose data may be included from a particular window if a dose of a glucose level-altering medication is associated with that window. The window may still be associated with a dose even if the window does not occur exactly or right after the dose was administered. In some embodiments, a window may be a fixed time of day. For example, glucose levels from a fixed time window (e.g., about 7 am to about 12 pm) may be included only if a rapid-acting insulin dose was administered in that fixed time window. The length of the fixed time window may be related to the therapeutic window of the type of drug administered. For example, a basal or long-acting insulin dose may have a 24-hour fixed time window and a rapid-acting insulin may have a 5-hour fixed time window. In other embodiments, a window may be a variable time of day where a first timepoint in the variable time window is the nearest glucose value following the timestamp of the drug dose or the time of a logged dose, and the variable time window extends for a therapeutic window of the administered drug dose. For example, the therapeutic window may be about 5 hours for a rapid-acting insulin and about 24 hours for a long-acting insulin. The administration of the glucose level-altering medication may be from a connected drug delivery device. In other embodiments, the drug delivery device is not connected and a user may log a dose. The record of the medication administration may be provided by the connected drug delivery device, or by some other means such as manual entry of the medication administration event. The specific data for the

second glucose profile 1012 may not include glucose level measurements during the window of time following a missed drug administration, or measurement during the window of time associated with a drug administration. The portion or tranche of glucose level measurements after a missed dose, e.g., the glucose level measurements during the window of time following a missed drug administration or alternatively, measurements from a window that is not associated with administration of a medication, may be excised from the data set including all of the glucose level measurements for the selected time period, and the remaining glucose level measurements may be used to generate the second of the plurality of glucose profiles 1012. Thus, the second of the plurality of glucose profiles 1012 may reflect the user's glycemia when the user remembers to dose. As seen when comparing FIG. 18D to FIG. 18C, the spread or variability of the data in the AGP graph for the profile in which the insulin was dosed (FIG. 18D) is much smaller than the spread or variability of the data in the AGP for the profile containing all data (including data after missed doses).

[00222] A third profile 1014 of the plurality of glucose profiles may be a display of only specific data over the selected time period when a glucose level-altering medication was not administered, e.g., by a user or a care-giver. The specific data may be displayed in the third of the plurality of glucose profiles 1014 and may only include the glucose level measurements taken during a window of time following a missed drug administration. The third profile of the plurality of glucose profiles 1014 may contain the data that was excised from the complete data set to generate the second of the plurality of glucose profiles. The length of the portion or tranche of glucose level measurements after the missed dose that is excised may depend on the type and identity of the glucose level-altering medication. The measured glucose levels displayed in the third profile1014 may have higher glucose level measurements (e.g., a higher median) and/or higher variability as compared to the second profile and the first profile because there are no medications in the user's body to help control the glucose levels. Thus, glucose levels associated with a missed dose may result in high glucose. Moreover, the high glucose levels resulting from missed doses may mask low glucose events following administered doses when all glucose data are aggregated and plotted together. A glucose profile that displays only the data from the window of time after glucose-lowering medication doses are administered (e.g., 1012) more directly highlights the effects of those drugs on glycemia, thereby helping a trained health care professional

potentially titrate a current dose regimen. A profile that highlights the glucose levels where doses are missed (e.g., 1014) may more directly highlight the effects of poor dose concordance on a subject's glycemia.

[00223] Thus, the first profile 1010, which displays the glucose levels in which no data was removed, and the third profile 1014, which displays the glucose levels measured after missed doses, may display higher glucose level measurements (e.g., a higher median) and/or higher variability as compared to the second profile 1012, which displays the glucose levels measured after the administration of glucose-lowering medication.

[00224] In some embodiments, the plurality of glucose profiles may be presented in a conjoined display, either side-by-side (e.g., three graphs on the same row as seen in FIG. 18A) or one on top of the other (e.g., three figures in the same column as seen in FIG. 18B), that may enable an HCP to identify differences between the traces easily and quickly. In some embodiments, a transparent overlay of one glucose profile on top of the other(s) to make a single figure may be displayed. In other embodiments, problematic areas may be highlighted in the glucose profiles to demonstrate how poor concordance or current dose regimens are affecting glucose outcomes. The plurality of profiles may be presented in any order or spatial arrangement.

[00225] Connected drug delivery device data may also include dose timestamps. If the connected drug delivery device data do not present a dose to the program creating the glucose profiles, then the program may assume that a regularly scheduled dose was not taken by the user, i.e., a missed dose. In the case of a missed dose, a pre-defined portion or tranche of glucose data may be removed from a data set that contains all of the glucose level measurements (which may be used to create the first glucose profile 1010), leaving only glucose data that may be associated with an administered drug dose (which may be used to create the second glucose profile 1012). This excised portion or tranche may then be used to create the third glucose profile 1014.

[00226] The length of each excised glucose data portion or tranche (or the window of time from which the data is excluded) may be dependent on the pharmacokinetic and pharmacodynamic profiles of the user's medications. For example, if a person doses a once-daily basal insulin injection on a Monday but forgets to dose on Tuesday, data from the connected drug delivery device may show a dose timestamp on Monday, but not for

Tuesday. As a result, glucose data from Monday may be included in generating the second glucose profile 1012, but glucose data from Tuesday may not be included in the data displayed in the second glucose profile. The Tuesday data may, however, be used in the generation of the third glucose profile 1014. In this example, a day's worth of glucose data may be excluded because long-acting basal insulin has a pharmacodynamic glucose-lowering action time of about 24 hours. If instead a mealtime rapid acting insulin dose was missed, a smaller portion or tranche of glucose data may be excised from generation of the second glucose profile and used for generation of the third glucose profile. This is because rapid acting insulin has a pharmacodynamic glucose-lowering action time of about 6 hours.

[00227] In some embodiments, the plurality of graphs may include at least 2 graphs, alternatively at least 3 graphs, alternatively at least 4 graphs, alternatively at least 5 graphs, alternatively at least 6 graphs, alternatively at least 7 graphs, alternatively at least 8 graphs. Each of the plurality of graphs may display a different data set. In some embodiments, where a person has a treatment regimen that includes both basal insulin doses and bolus doses, 5 graphs may be generated and/or displayed. A first graph may be a display or presentation of all of the glucose measurements from a time period, a second graph may include glucose measurements taken during a window of time following, or associated with, the administration of basal insulin dose(s), a third graph may include glucose measurements taken during a window of time following, or associated with, missed administration(s) of basal insulin dose(s), a fourth graph may include glucose measurements taken during a window of time following, or associated with, the administration of bolus insulin dose(s), and a fifth graph may include glucose measurements taken during a window of time following, or associated with, missed administration(s) of bolus insulin dose(s).

[00228] The glucose level-altering medication may be a glucose lowering medication or a glucose-raising medication. The embodiments described herein relate to glucose-lowering medication, such as insulin, but the framework may be generalizable to glucose-raising medications, such as glucagon. The glucose level-lowering medication may be a type of insulin. Types of insulin include rapid-acting insulin, short-acting insulin, intermediate-acting insulin (e.g., NPH insulin), mixed insulin (e.g., premixed insulin), long-acting insulin, and ultra long-acting insulin. While the examples presented here are for insulin dosing, this methodology is generalizable to any glucose-altering drug with a known glucose-lowering time delivered

from a connected drug delivery device. These may include, but are not limited to, SGLT2 inhibitors, GLP1 receptor agonists, biguanides (e.g., metformin), α-glucosidase inhibitors, thiazolidinediones, DPP4 inhibitors, and combinations thereof.

[00229] The length of the portion or tranche or the window of time from which data may be excised after a missed once-daily, long-acting, or basal insulin dose may be about 1 day, alternatively between about 20 hours and about 28 hours, alternatively between about 22 hours and about 40 hours, alternatively between about 20 hours and about 38 hours, alternatively between about 20 hours and about 36 hours.

[00230] The length of the portion or tranche or the window of time from which data may be excised after a missed rapid-acting insulin dose may be about 2 hours, alternatively about 2.5 hours, alternatively about 3 hours, alternatively about 3.5 hours, alternatively about 4 hours, alternatively about 4.5 hours, alternatively about 5.0 hours, alternatively about 5.5 hours, alternatively about 6.0 hours, alternatively about 6.5 hours, alternatively about 7.0 hours, alternatively between about 2.0 hours and about 7.0 hours, alternatively between about 3.0 hours and about 7.0 hours, alternatively between about 4.0 hours and about 7.0 hours of administration of the glucose-lowering medication. In some embodiments, the length of the portion or tranche or the window of time from which data may be excised may be defined or determined by the medication, such as by the insulin action time of a prandial insulin. In some embodiments, the length of the portion or tranche or the window of time from which data may be excised may be preset or estimated by the system. In other embodiments, the length of the portion or tranche or the window of time from which data may be excised may be manually entered.

[00231] The length of the portion or tranche or the window of time from which data may be excised after a missed intermediate-acting insulin dose may be about 12 hours, alternatively between about 8 hours and about 16 hours, alternatively between about 10 hours and about 14 hours.

[00232] The length of the portion or tranche or the window of time from which data may be excised after a missed ultra-long-acting insulin dose may be about 36 hours to about 42 hours, alternatively between about 32 hours and about 44 hours.

[00233] In some embodiments, the user may use a filter to customize a GUI or report to display different sets of data. The data may be used to illustrate different types of

nonadherence. The filter may include selections to display specific data over a selected period of time when a recommended dose of a glucose level-altering medication was taken, when an under-bolused dose of a glucose level-altering medication was taken, and when an over-bolused dose of a glucose level-altering medication was taken. A graph of specific data over a selected time period when a glucose level-altering medication was under-bolused, i.e., when less than a recommended amount of the glucose level-altering medication was taken, and/or a graph of specific data over a selected time period when a glucose level-altering medication was over-bolused, i.e., when more than a recommended amount of the glucose level-altering, shown in comparison to a graph showing specific data over a selected time period when a recommended amount of a glucose-level altering medication was taken could assist an HCP in convincing a patient to follow a recommended dosing regimen, rather than altering their dose amounts.

[00234] In some embodiments, the filter may also include a selection to display specific data over a selected time period when a late meal dose, i.e., a dose was taken a period of time after a start of a meal, was taken. In some embodiments, the filter may also include a selection to display specific data over a selected time period when an extra meal dose, i.e., an additional dose was taken during the meal, was taken. Graphs of specific data over a selected time period when a glucose level-altering medication was taken a period of time after a meal start, and/or specific data over a selected time period when an additional dose of a glucose level-altering medication was taken during a meal, may help an HCP reduce a patient's fear of hypoglycemic episodes.

[00235] In addition to the other ways described herein, nonadherence may be determined if a dose is taken outside of a preset time period. For example, nonadherence of a basal dose may be determined if a dose was missed or taken outside of a time window from a prescribed dosing time. In some embodiments, the time window may be about 30 minutes, alternatively about 1 hour, alternatively about 90 minutes after the prescribed dosing time. For bolus doses, each meal may have an associated time window. For example, an associated time window for breakfast may be about 6 am to about 11 am, an associated time window for lunch may be about 11 am to about 4 pm, an associated time window for dinner may be about 4 pm to about 10 pm. A time period associated with overnight may be 10 pm to about 6 am. Doses may be determined to be correct if a recommended dose amount was given in

an associated time window. A dose may be determined to be missing if no dose was administered during an associated time window. A dose may be determined to be an extra dose if an additional dose beyond a single dose was taken during an associated time period. A dose may be determined to be non-adherent if the dose amount administered during the time period is different than the recommended dose amount. Additionally, missing and extra doses may also be determined to be non-adherent.

[00236] Meals may be identified or logged by a subject and a meal start time may be determined from the manual entry. Alternatively, meal start times may be estimated by many methods. Exemplary methods are described in U.S. Application Serial No. 16/944,736 and U.S. Application Serial No. 17/591,229; s*ee also* Harvey, R.A. et al. "Design of the Glucose Rate Increase Detector – A Meal Detection Module for the Health Monitoring System," J Diabetes Sci Techol. 2014 Mar; 8(2): 307-320, which is hereby expressly incorporated by reference in its entirety for all purposes. A late dose may be determined if a dose is determined to be taken a period of time after a meal start time, e.g., about 30 minutes, alternatively about 45 minutes, alternatively about 60 minutes, alternatively about 90 minutes after an estimated meal start. In other embodiments, a meal may be determined to have occurred if glucose levels from a CGM are > 70 mg/dl and there was a > 70 mg/dl rise within two hours. In such a case, a late meal bolus dose may be defined when glucose levels from a CGM increased >50 mg/dl from baseline prior to the insulin dose. A missed meal bolus dose may be defined when no insulin dose was taken within two hours before the start of the rise in glucose levels. In some embodiments, a missed meal dose may be defined by an 80 mg/dl glucose increase over ≤ 2 hours not preceded within 1 hour by an insulin dose.

[00237] In some embodiments, the GUI or report may also include at least some analyte metrics related to each profile of the plurality of glucose profiles. The at least some analyte metrics may include, but are not limited to, an average or median analyte level for the time period, a standard deviation (SD), a CV ([(SD of glucose)/(mean glucose)] X 100), a display of a time-in-range for the time period, a GMI index for the time period, a count of a number of high and/or low excursions or their duration below a high and/or low threshold, respectively, a count of a number of very high and/or very low excursions or their duration below a very high and/or very low threshold, respectively, a plurality of dose indicators corresponding to doses of the medication administered, as described with respect to other reports and embodiments in this

specification. In some embodiments, pattern analysis of the glucose profile may be based on various inclusions or exclusions. For example, a "low" pattern may be determined for the windows that are associated with medication administration, but not for windows that are not associated with medication delivery. Dose guidance or delivery may be based on these patterns determine only from windows associated with medication administration. In some embodiments, recommendations may be made based on the types of pattern(s) determined or detected. Further details of pattern analysis are described in WO 2021/026004, which is hereby expressly incorporated by reference in its entirety for all purposes.

[00238] The methods described herein are not limited to metrics or plots to be displayed but may also be used in processes, such as automatic insulin (or other medication) delivery processes, insulin (or other medication) dose guidance systems and therapy guidance systems. In some embodiments, data used as input or feedback in these systems may include or exclude different glucose (or analyte) readings if associated with missed medication doses as described here. For example, a therapy guidance system may provide therapy change recommendations based on glucose data that excludes glucose data associated with missed medication doses. In other embodiments, an automated insulin delivery system may utilize an adaptive model; the adaptive processing may be based on glucose data excluding glucose data where medication doses are missed.

[00239] In other embodiments, a plurality of graphs may be presented in a comparative profiles report. By leveraging dosing data of medications from, e.g., connected drug delivery devices, and analyte data from continuous analyte monitors as inputs, in many embodiments, a GUI or report may include a plurality of analyte profiles over a selected time period. As seen in FIGS. 18A-18B, in some embodiments, the GUI or report may include two, alternatively two or more, alternatively three, alternatively four, alternatively five, alternatively six, alternatively six or more versions of analyte profiles over a selected time period. The analytes may be, but are not limited to, acetyl choline, amylase, bilirubin, cholesterol, chorionic gonadotropin, glycosylated hemoglobin (HbA1c), creatine kinase (e.g., CK-MB), creatine, creatinine, DNA, fructosamine, glucose, glucose derivatives, glutamine, growth hormones, hormones, ketones, ketone bodies, lactate, peroxide, prostate-specific antigen, prothrombin, RNA, thyroid stimulating hormone, and troponin. The analyte profiles may be any

of the different types of graphs that were described with respect to other embodiments, such as the glucose profiles.

[00240] In some embodiments, the plurality of graphs may include at least 2 graphs, alternatively at least 3 graphs, alternatively at least 4 graphs, alternatively at least 5 graphs, alternatively at least 6 graphs, alternatively at least 7 graphs, alternatively at least 8 graphs. Each of the plurality of graphs may display a different data set. In some embodiments, where a person is taking multiple medications at a time, a graph may be a display or presentation of all of the data from a time period, and two graphs may be displayed for each type of medication taken. For each medication, a first graph may include analyte measurements taken during a window of time following, or associated with, the administration of the medicine and a second graph may include analyte measurements taken during a window of time following, or associated with, missed administration(s) of the medicine. Thus, for a person taking n medications, a plurality of graphs that include $2n + 1$ graphs may be presented. As explained earlier with respect to other embodiments, the window of time following, or associated with, the administration of the medicine may be determined by the duration of action of the medication(s) being administered.

Detecting if Medication is taken or not

[00241] Determination of whether a medication is delivered into the patient may be readily determined using a connected medication delivery device. For medication delivery devices (such as a syringe) that are not connected, the system may use another means of determining if a medication is delivered. The system may provide a UI in which the patient can log whenever they take a medication. In addition, the system may include a predefined time of day window when the patient usually takes the medication, and if a medication log is not made in this time window, then the system may prompt the patient to confirm whether or not they took the medication. For oral medications, connected pill boxes or similar devices may be used to determine if the medication was taken. The system may provide a combination of connected device and UI means, where if the connected device did not indicate that a medication was taken, then the system may prompt the patient to confirm that they did not (or did) take the medication.

[00242] When a medication is taken later than the typical or prescribed time of day window, the glucose data associated with that time of day may be excluded. Similarly,

glucose data associated with the time of day where the dose is taken late may also be excluded. The glucose data associated with these time-of-day periods may be included in some form of data analysis; for instance, for the purpose of showing the effect on glucose metrics when doses are taken late. In this case, the glucose during time-of-day periods associated with doses taken late may be included in the metric calculation only and may be compared to a metric calculated using glucose data from time-of-day periods only where doses are taken on time.

[00243] Various aspects of the present subject matter are set forth below, in review of, and/or in supplementation to, the embodiments described thus far, with the emphasis here being on the interrelation and interchangeability of the following embodiments. In other words, an emphasis is on the fact that each feature of the embodiments can be combined with each and every other feature unless explicitly stated otherwise or logically implausible. The embodiments described herein are restated and expanded upon in the following paragraphs without explicit reference to the figures.

[00244] In many embodiments, an analyte monitoring system includes: a sensor control device comprising an analyte sensor, wherein at least a portion of the analyte sensor is configured to be in fluid contact with a bodily fluid of subject; a medication delivery device configured to deliver an amount of medication to the subject and record the amount delivered in a log; and a reader device, comprising: a display; wireless communication circuitry configured to receive a current sensor reading from the sensor control device and the log from the medication delivery device; and one or more processors coupled to a memory that stores instruction. When executed by the one or more processors, the instructions cause the one or more processors to: output to the display an interface prompting the subject to connect the medication delivery device; output to the display an interface prompting the subject to select a type of medication delivery device; output to the display an interface prompting the subject to select a type of medication being delivered by the medication delivery device; and output to the display an interface prompting the subject to select a brand of medication being delivered by the medication delivery device.

[00245] In some embodiments, the medication delivery device is an insulin pen.

[00246] In some embodiments, the type of medication delivery device is a brand of insulin pen.

[00247] In some embodiments, the type of medication being delivered is a type of insulin. In some embodiments, the type of insulin is rapid-acting or long-acting.

[00248] In some embodiments, the instructions further cause the one or more processors to output to the display an animation demonstrating how to hold the medication delivery device relative to the reader device to transfer the log.

[00249] In some embodiments, the instructions further cause the one or more processors to output to the display an interface prompting the subject to select a color of medication delivery device.

[00250] In many embodiments, an analyte monitoring system includes: a sensor control device comprising an analyte sensor, wherein at least a portion of the analyte sensor is configured to be in fluid contact with a bodily fluid of subject; a medication delivery device configured to deliver an amount of medication to the subject and record the amount delivered in a log; and a reader device. The reader device includes a display; wireless communication circuitry configured to receive a current sensor reading from the sensor control device and the log from the medication delivery device; and one or more processors coupled to a memory, the memory storing instructions that, when executed by the one or more processors, cause the one or more processors to output to the display logbook interface, wherein the logbook interface comprises a plurality of entries comprising at least two of a dosage of a medication, a comment, an alarm, and a prime of a medication delivery device.

[00251] In some embodiments, the plurality of entries are arranged according to a time order.

[00252] In some embodiments, the medication is insulin.

[00253] In many embodiments, a system for displaying metrics relating to a subject includes: a medication delivery device; a wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to visually present information; and one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time. When executed by the one or more processors, the instructions cause the system to: display a first graph having an x-axis of time, a y-axis of glucose concentration, and a plot of a median of an average glucose concentration over the period of time; display a second graph having an x-axis of time, a y-axis of glucose

concentration, and a plot of low glucose events, wherein a low glucose event comprises a glucose level below a threshold level; display an average amount of carbohydrates consumed in a day over the period of time; and display an average amount of at least one medication delivered per day over the period of time.

[00254] In some embodiments, the memory further holds instructions to display a third graph having an x-axis of time, a y-axis of a relative amount of time that a sensor is active, and a plot of an average time that the sensor was active over the period of time.

[00255] In some embodiments, the instructions further cause the one or more processors to display an average total daily amount of the at least one medication delivered per day.

[00256] In some embodiments, the at least one medication delivered comprises a rapid-acting insulin and a long-acting insulin.

[00257] In many embodiments, a system for displaying metrics relating to a subject includes: a medication delivery device; wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to visually present information; and one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions. When executed by the one or more processors, the instructions cause the system to: display a plurality of daily graphs corresponding to each day of the period of time, each graph of the plurality of daily graphs comprising an x-axis of time, a y-axis of glucose concentration, a plot of a glucose concentration over a 24-hour period, and a plurality of dose indicators, wherein each of the plurality of dose indicators illustrate an amount of medication administered; and display a plurality of total dose indicators of an amount of the at least one medication delivered during the 24-hour day period.

[00258] In some embodiments, the plurality of total dose indicators comprises a numerical value highlighted with a first color for a first medication. In some embodiments, the plurality of total dose indicators comprises a numerical value highlighted with a second color for a second medication. In some embodiments, the plurality of dose indicators comprises a numerical value corresponding highlighted with the first color for the first medication. In some embodiments, the plurality of dose indicators comprises a numerical value highlighted with the first color for the

first medication and a numerical value highlighted with the second color for the second medication.

[00259] In some embodiments, the instructions further cause the one or more processors to display a plurality of average glucose values for at least some of the days of the period of time.

[00260] In some embodiments, the instructions further cause the one or more processors to display a plurality of values for an amount of total carbohydrates consumed for at least some of the days of the period of time.

[00261] In some embodiments, the instructions further cause the one or more processors to display a number of events in which a glucose level of the subject was below a threshold value.

[00262] In some embodiments, each graph of the plurality of daily graphs comprises a target range, and wherein an area under the curve for a portion of a plot outside of the target range is colored. In some embodiments, the area under the curve for the portion of the plot outside of the target range is colored red when the portion of the plot outside is below the target range. In some embodiments, the area under the curve for the portion of the plot outside of the target range is colored yellow when the portion of the plot outside is above the target range.

[00263] In some embodiments, each graph of the plurality of daily graphs comprises a target range, and wherein a portion of a plot outside of the target range is colored. In some embodiments, the portion of the plot outside of the target range is colored red when the portion of the plot outside is below the target range. In some embodiments, the portion of the plot outside of the target range is colored yellow when the portion of the plot outside is above the target range.

[00264] In many embodiments, a system for displaying metrics relating to a subject includes: a medication delivery device; wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to visually present information; and one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time. When executed by the one or more processors, the instructions cause the system to: display a plurality of daily graphs corresponding to each day of the period of time, each graph of the plurality of daily graphs comprising an x-axis of time, a y-axis of glucose concentration, a plot of a glucose concentration

over a 24-hour period; display a plurality of carbohydrate indicators corresponding to amounts of carbohydrates consumed during the 24-hour period, wherein each of the carbohydrate indicators is positioned in a time of day period in which the carbohydrates were consumed; and display a plurality of dose indicators corresponding to doses of at least one medication, wherein each of the plurality of dose indicators illustrate an amount of medication administered, and wherein each of the plurality of dose indicators is positioned in a time of day period in which it was administered.

[00265] In some embodiments, the plurality of dose indicators corresponds to doses for a first medication and a second medication, wherein the instructions further cause the one or more processors to display the plurality of dose indicators for the first medication in a first row and to display the plurality of dose indicators for the second medication in a second row. In some embodiments, the plurality of dose indicators for the first medication are displayed in a first color and the plurality of dose indicators for the second medication are displayed in a second color.

[00266] In some embodiments, the plurality of dose indicators comprises a total dose administered. In some embodiments, the instructions further cause the one or more processors to display a plurality of components for at least some of the plurality of dose indicators. In some embodiments, the plurality of components comprises corrections or changes.

[00267] In some embodiments, the at least one medication is insulin.

[00268] In many embodiments, a system for displaying metrics relating to a subject includes: a medication delivery device; wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to visually present information; and one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions. When executed by the one or more processors, the instructions cause the system to: display a plot of glucose readings over a 24-hour period, wherein the plot displays a median glucose trace and a plurality of traces for glucose readings at different percentiles for the period of time; display a plot of carbohydrate indicators corresponding to amounts of carbohydrates consumed during the 24-hour period, wherein each of the carbohydrate indicators is positioned in a time of day period in which the carbohydrates were consumed during the period of time; and display a plurality of

average dose amounts corresponding to doses of at least one medication administered during a time period during the 24-hour period.

[00269] In some embodiments, the instructions further cause the one or more processors to display a daily average amount of carbohydrates consumed during the period of time. In some embodiments, the instructions further cause the one or more processors to display an average amount of carbohydrates consumed during each of a plurality of time periods of the 24-hour period.

[00270] In some embodiments, the at least one medication comprises first and second medications, and wherein the instructions further cause the one or more processors to display a plurality of average dose amounts corresponding to doses of the first medication in a first row and a plurality of average dose amounts corresponding to doses of the second medication in a second row.

[00271] In some embodiments, the instructions further cause the one or more processors to display a daily average dose of at least one medication consumed during the period of time.

[00272] In some embodiments, the at least one medication is insulin.

[00273] In many embodiments, a system for displaying metrics relating to a subject includes: a medication delivery device; wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to visually present information; and one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time. When executed by the one or more processors, the instructions cause the system to: display a plurality of plots of glucose readings for different time of day periods, wherein each plot of the plurality of plots displays glucose readings during the period of time and a target range; and display a plurality of tables for the different time of day periods, wherein each table of the plurality of tables comprises glucose levels measured before and after a meal for at least some days of the period of time, and dosages of at least one medication delivered during at least some days of the period of time.

[00274] In some embodiments, the instructions further cause the one or more processors to display an average dosage of the at least one medication delivered for each period of time.

[00275] In some embodiments, the instructions further cause the one or more processors to display an average glucose level measured before and after the meal for each period of time.

[00276] In some embodiments, each table of the plurality of tables further comprises an amount of carbohydrates consumed for at least some days of the period of time. In some embodiments, the instructions further cause the one or more processors to display an average amount of carbohydrates consumed for each period of time.

[00277] In some embodiments, the at least one medication is insulin.

[00278] In many embodiments, a system for displaying metrics relating to a subject includes: a medication delivery device; wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to visually present information; and one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time. When executed by the one or more processors, the instructions cause the system to: display a plurality of settings related to analyte levels; and display a plurality of settings related to at least one medication delivery device.

[00279] In some embodiments, the settings related to analyte levels comprise a target analyte range.

[00280] In some embodiments, the settings related to analyte levels comprise alarm settings comprising a low analyte level threshold level and a high analyte level threshold.

[00281] In some embodiments, the settings related to analyte levels comprise alarm settings related to a loss of signal from sensor control device configured to measure an analyte level.

[00282] In some embodiments, the plurality of settings related to at least one medication delivery device comprises a type of medication and information relating to a last transfer of dosing data from the medication delivery device. In some embodiments, the information relating to the last transfer of dosing data comprises a date and a time of the last transfer of dosing data. In some embodiments, the plurality of settings related to at least one medication delivery device further comprises a color of the medication delivery device.

[00283] In some embodiments, the analyte data is glucose data.

[00284] In some embodiments, the at least one medication delivery device is an at least one insulin delivery device.

[00285] In some embodiments, the at least one medication delivery device is a first and a second medication delivery device.

[00286] In some embodiments, the instructions further cause the one or more processors to display information related to a sensor control device configured to measure an analyte level. In some embodiments, the information related to the sensor control device comprises a name of the sensor control device and a software version on the sensor control device.

[00287] In some embodiments, the instructions further cause the one or more processors to display information related to the at least one medication delivery device. In some embodiments, the information related to the at least one medication delivery device comprises a brand name of the at least one medication delivery device. In some embodiments, the information related to the at least one medication delivery device comprises a serial number of the at least one medication delivery device.

[00288] In many embodiments, a system for providing alerts to a subject includes: wireless communications circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to present an alert; one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions. When executed by the one or more processors, the instructions cause the one or more processors to: determine if a meal has been consumed based on an increase in an analyte level above a high threshold; determine if an insulin dose has not been recorded within a period of time since a previous insulin dose; and in response to a determination that a meal has been consumed and a determination that the insulin dose has not been recorded within the period of time since the previous insulin dose, display an alert interface relating to the missed meal dose.

[00289] In some embodiments, the high threshold is about 175 mg/dL.

[00290] In some embodiments, the period of time since the previous insulin dose is about 3 hours.

[00291] In some embodiments, the one or more processors are further configured to display the alert interface for the meal at a predetermined time selected by a user.

[00292] In some embodiments, text of the alert interface is at least partially customized by a user.

[00293] In many embodiments, a system for providing alerts to a subject includes: wireless communications circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to present an alert; one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions. When executed by the one or more processors, the instructions cause the one or more processors to: determine if an analyte level is above a high threshold after a predetermined period of time since a last insulin dose; and in response to a determination that the analyte level is above the high threshold after the predetermined period of time since the last insulin dose, display an alert interface relating to a correction dose.

[00294] In some embodiments, text of the alert interface is at least partially customized by a user.

[00295] In some embodiments, the predetermined period of time is at least about 2 hours.

[00296] In some embodiments, the high threshold is about 250 mg/dL.

[00297] In some embodiments, the high threshold is set by a user.

[00298] In many embodiments, a system for providing alerts to a subject includes: wireless communications circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to present an alert; one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions. When executed by the one or more processors, the instructions cause the one or more processors to: determine if an analyte level is below a high threshold after a predetermined period of time since a last insulin dose; and in response to a determination that the analyte level is below the high threshold after the predetermined period of time since the last insulin dose, display a message interface relating to the analyte level being within a target range.

[00299] In some embodiments, text of the message interface is at least partially customized by a user.

[00300] In some embodiments, the predetermined period of time is at least about 2 hours.

[00301] In some embodiments, the high threshold is set by a user.

[00302] In some embodiments, the instructions further cause the one or more processors to display a prompt for a user to enter a note relating to the analyte level being within the target range.

[00303] In many embodiments, a system for displaying metrics relating to a subject comprising: a medication delivery device; wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device; a display configured to visually present information; and one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time. When executed by the one or more processors, the instructions cause the system to: display a plurality of daily graphs corresponding to each day of the period of time, each graph of the plurality of daily graphs comprising an x-axis of time, a y-axis of glucose concentration, a plot of a glucose concentration over a 24-hour period; display a time in range metric for each day of the period of time, display a total amount of rapid acting insulin and a total amount of long acting insulin received by a user for each day of the period of time, display a plurality of dose indicators corresponding to doses of at least one of rapid-acting insulin or long-acting insulin, wherein each of the plurality of dose indicators illustrate an amount of the at least one of rapid-acting insulin or long-acting insulin administered, and wherein each of the plurality of dose indicators is positioned in a time of day period in which it was administered.

[00304] In some embodiments, the instructions further cause the one or more processors to display the plurality of dose indicators for the rapid-acting insulin in a first row and to display the plurality of dose indicators for the long-acting insulin in a second row. In some embodiments, the plurality of dose indicators for the rapid-acting insulin are displayed in a first color and the plurality of dose indicators for the long-acting insulin are displayed in a second color.

[00305] In some embodiments, the plurality of dose indicators comprises a total dose administered.

[00306] In some embodiments, the instructions further cause the one or more processors to display a plurality of carbohydrate indicators corresponding to amounts of carbohydrates

consumed during the 24-hour period, wherein each of the carbohydrate indicators is positioned in a time of day period in which the carbohydrates were consumed; and

[00307] In some embodiments, the medication delivery device is a connected pen or connected pen cap.

[00308] In some embodiments, the medication delivery device is an insulin pump.

[00309] In some embodiments, the instructions further cause the one or more processors to display a graph of long-acting insulin received.

[00310] In some embodiments, the instructions further cause the one or more processors to display a graphical representation of an operating state of the insulin pump. In some embodiments, the operating state comprises automated delivery, maximum delivery, and automated pause.

[00311] In many embodiments, a system for displaying metrics relating to a subject includes: wireless communications circuitry configured to receive time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time; a display configured to visually present information; and one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions, time-correlated data characterizing an analyte of the subject, and doses of a glucose level-altering medication received by the subject over a period of time. When executed by the one or more processors, the instructions cause the system to: determine a subset of time-correlated data based on a filtering criteria selected by the subject; and display a first glucose profile display and a second glucose profile on a single graphical subject interface, wherein the first glucose profile displays glucose levels associated with the time-correlated data over a first time period, and wherein the second glucose profile displays the subset of the time-correlated data over the first time period.

[00312] In some embodiments, the medication is a glucose level altering medication. In some embodiments, the glucose level altering medication is insulin.

[00313] In some embodiments, the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses. In some embodiments, the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least

one dose of medication received is the same as a recommended dose of the medication. In some embodiments, the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window. In some embodiments, the dosing window for breakfast is from about 6 am to about 11 am. In some embodiments, the dosing window for lunch is from about 11 am to about 4 pm. In some embodiments, the dosing window for dinner is from about 4 pm to about 10 pm. In some embodiments, the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time. In some embodiments, the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication. In some embodiments, the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication. In some embodiments, the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal. In some embodiments, the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

[00314] In some embodiments, the instructions, when executed by the one or more processors, further cause the system to: determine an additional subset of time-correlated data based on a second filtering criteria selected by the subject; and display a third glucose profile, wherein the third glucose profile displays the additional subset of time-correlated data over the first time period. In some embodiments, the second filtering criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

[00315] In some embodiments, the first and second glucose profiles are displayed in a horizontal arrangement.

[00316] In some embodiments, the first and second glucose profiles are displayed in a vertical arrangement.

[00317] In some embodiments, the first time period is selected by the subject.

[00318] In some embodiments, the first time period is automatically set.

[00319] In some embodiments, the filtering criteria is selected using a drop-down menu.

[00320] In many embodiments, a method for displaying comparative glucose profiles includes the steps of: receiving time-correlated data characterizing an analyte of a subject and doses of a medication received by the subject over a period of time; determining a subset of time-correlated data based on a filtering criteria selected by the subject; displaying a first glucose profile display and a second glucose profile on a single graphical user interface, wherein the first glucose profile displays glucose levels associated with the time-correlated data over a first time period, and wherein the second glucose profile displays the subset of the time-correlated data over the first time period.

[00321] In some embodiments, the medication is a glucose level altering medication. In some embodiments, the glucose level altering medication is insulin.

[00322] In some embodiments, the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses. In some embodiments, the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication. In some embodiments, the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window. In some embodiments, the dosing window for breakfast is from about 6 am to about 11 am. In some embodiments, the dosing window for lunch is from about 11 am to about 4 pm. In some embodiments, the dosing window for dinner is from about 4 pm to about 10 pm. In some embodiments, the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time. In some embodiments, the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication

received is lower than a recommended dose of the medication. In some embodiments, the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication. In some embodiments, the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal. In some embodiments, the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

[00323] In some embodiments, the method further includes the step of: determining an additional subset of time-correlated data based on a second filtering criteria selected by the subject; and displaying a third glucose profile on the single graphical user interface, wherein the third glucose profile displays the additional subset of time-correlated data over the first time period. In some embodiments, the second filtering criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

[00324] In some embodiments, the first and second glucose profiles are displayed in a horizontal arrangement.

[00325] In some embodiments, the first and second glucose profiles are displayed in a vertical arrangement.

[00326] In some embodiments, the first time period is selected by the subject.

[00327] In some embodiments, the first time period is automatically set.

[00328] In some embodiments, the filtering criteria is selected using a drop-down menu.

[00329] In many embodiments, a system for displaying metrics relating to a subject includes: wireless communications circuitry configured to receive time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time; a display configured to visually present information; and one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions, time-correlated data characterizing an analyte of the subject, and doses of a glucose level-altering medication received by the subject over a period of time, wherein the instructions, when

executed by the one or more processors, cause the system to: determine a first subset of time-correlated data based on a first filtering criteria selected by the subject and a second subset of time-correlated data based on a second filtering criteria selected by the subject; and display a first glucose profile display and a second glucose profile on a single graphical user interface, wherein the first glucose profile displays the first subset of the time-correlated data over a first time period, and wherein the second glucose profile displays the second subset of the time-correlated data over the first time period.

[00330] In some embodiments, the medication is a glucose level altering medication. In some embodiments, the glucose level altering medication is insulin.

[00331] In some embodiments, the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses. In some embodiments, the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication. In some embodiments, the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window. In some embodiments, the dosing window for breakfast is from about 6 am to about 11 am. In some embodiments, the dosing window for lunch is from about 11 am to about 4 pm. In some embodiments, the dosing window for dinner is from about 4 pm to about 10 pm. In some embodiments, the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time. In some embodiments, the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication. In some embodiments, the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication. In some embodiments, the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the

filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal. In some embodiments, the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

[00332] In some embodiments, the instructions, when executed by the one or more processors, further cause the system to: determine a third subset of time-correlated data based on a second filtering criteria selected by the subject; and display a third glucose profile, wherein the third glucose profile displays the third subset of time-correlated data over the first time period. In some embodiments, the third filtering criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

[00333] In some embodiments, the first and second glucose profiles are displayed in a horizontal arrangement.

[00334] In some embodiments, the first and second glucose profiles are displayed in a vertical arrangement.

[00335] In some embodiments, the first time period is selected by the subject.

[00336] In some embodiments, the first time period is automatically set.

[00337] In some embodiments, the first and second filtering criteria are selected using a drop-down menu.

[00338] In many embodiments, a method for displaying comparative glucose profiles, includes the steps of: receiving time-correlated data characterizing an analyte of a subject and doses of a medication received by the subject over a period of time; determining a first subset of time-correlated data based on a first filtering criteria selected by the subject and a second subset of time-correlated data based on a second filtering criteria selected by the subject; displaying a first glucose profile display and a second glucose profile on a single graphical user interface, wherein the first glucose profile displays the first subset of the time-correlated data over a first time period, and wherein the second glucose profile displays the second subset of the time-correlated data over the first time period.

[00339] In some embodiments, the medication is a glucose level altering medication. In some embodiments, the glucose level altering medication is insulin.

[00340] In some embodiments, the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses. In some embodiments, the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication. In some embodiments, the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window. In some embodiments, the dosing window for breakfast is from about 6 am to about 11 am. In some embodiments, the dosing window for lunch is from about 11 am to about 4 pm. In some embodiments, the dosing window for dinner is from about 4 pm to about 10 pm. In some embodiments, the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time. In some embodiments, the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication. In some embodiments, the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication. In some embodiments, the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal. In some embodiments, the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

[00341] In some embodiments, the method further includes the steps of: determining a third subset of time-correlated data based on a third filtering criteria selected by the subject; and displaying a third glucose profile on the single graphical user interface, wherein the third glucose profile displays the additional subset of time-correlated data over the first time period. In some

embodiments, the method further includes the step of: displaying a third glucose profile on the single graphical user interface, wherein the third glucose profile displays glucose levels associated with the time-correlated data over the first time period.

[00342] In some embodiments, the first and second glucose profiles are displayed in a horizontal arrangement.

[00343] In some embodiments, the first and second glucose profiles are displayed in a vertical arrangement.

[00344] In some embodiments, the first time period is selected by the subject.

[00345] In some embodiments, the first time period is automatically set.

[00346] In some embodiments, the first and second filtering criteria are selected using a drop-down menu.

[00347] In many embodiments, a system for displaying metrics relating to a subject includes: wireless communications circuitry configured to receive measured drug dosing data and analyte data; a display configured to visually present information; and one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a glucose level-altering medication received by the subject over a period of time, wherein the time-correlated data comprises at least one portion of analyte data associated with the at least one dose of a glucose level-altering medication that was received and at least one portion of analyte data associated with at least one dose of the glucose level-altering medication that was not received. When executed by the one or more processors, the instructions cause the system to: determine the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received; determine the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received; display a plurality of glucose profiles, wherein a first glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received and the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received, wherein a second glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication was received and does not include the at least one

portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received, and wherein a third glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received and does not include the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received.

[00348] In some embodiments, each of the first, second, and third glucose profiles comprises a plot of glucose levels determined from analyte data over the time period, wherein the plot displays a median glucose trace, and a plurality of traces for glucose levels at different percentiles.

[00349] In some embodiments, the period of time is about 1 month.

[00350] In some embodiments, the glucose level-altering medication is a glucose lowering medication. In some embodiments, the glucose level-altering medication is insulin. In some embodiments, the glucose level-altering medication is a fast-acting insulin. In some embodiments, the glucose level-altering medication is a long-acting insulin. In some embodiments, the glucose level-altering medication is an SGLT inhibitor. In some embodiments, the glucose level-altering medication is a GLP1 receptor antagonist. In some embodiments, the glucose level-altering medication is selected from the group consisting of insulin, SGLT2 inhibitors, GLP1 receptor agonists, biguanides (e.g., metformin), α-glucosidase inhibitors, thiazolidinediones, DPP4 inhibitors, and combinations thereof.

[00351] In some embodiments, a length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is dependent on a type of the glucose level-altering medication.

[00352] In some embodiments, the length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is a fixed time window related to a therapeutic window of the glucose level-altering medication.

[00353] In some embodiments, the length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is a variable time window, wherein a first time point of the variable time window is a time associated with administration of the glucose level-altering medication. In some embodiments, the time associated with administration of the glucose level-altering medication is from a timestamp from

a connected delivery device. In some embodiments, the time associated with administration of the glucose level-altering medication is from a logged dose.

[00354] In some embodiments, the glucose level-altering medication is a long-acting insulin, and wherein the length of the at least one portion of analyte data associated with the dose of glucose level-altering medication that was received is about 1 day.

[00355] In some embodiments, the glucose level-altering medication is a rapid-acting acting insulin, and wherein the length of the at least one portion of analyte data associated with the dose of glucose level-altering medication that was received is between about 4 hours and about 8 hours.

[00356] In some embodiments, the instructions further cause the one or more processors to display the plurality of glucose profiles in a side-by-side arrangement.

[00357] In some embodiments, the instructions further cause the one or more processors to display the plurality of glucose profiles in a vertical arrangement.

[00358] In some embodiments, the instructions further cause the one or more processors to display a time in ranges interface for each of the plurality of glucose profiles, wherein the time in ranges interface comprises a bar, wherein the bar comprises a plurality of bar portions, wherein each bar portion of the plurality of bar portions indicates an amount of time that a user's analyte level is within a predefined analyte range associated with each bar portion, wherein the plurality of bar portions are based on data indicative of an analyte level, and wherein the plurality of bar portions are based on the analyte data of each of the plurality of glucose profiles, respectively.

[00359] In some embodiments, the instructions further cause the one or more processors to display a GMI metric for each of the plurality of glucose profiles. In some embodiments, the GMI metric is a GMI percentage and/or a GMI value in mmol/mol.

[00360] In some embodiments, the instructions further cause the one or more processors to display a glucose statistic for each of the plurality of glucose profiles. In some embodiments, the glucose statistic is an average glucose value or a median glucose value. In some embodiments, the glucose statistic is a CV.

[00361] In some embodiments, the instructions further cause the one or more processors to display a plurality of dose indicators corresponding to the administration of the doses of the glucose level-altering medication in the first and second glucose profiles.

[00362] In many embodiments, a method for displaying comparative glucose profiles includes the steps of: receiving time-correlated data characterizing an analyte of the subject and doses of a glucose level-altering medication received by the subject over a period of time; determining at least one portion of the time-correlated data associated with at least one dose of a glucose level-altering medication that was received; determining at least one portion of the time-correlated data associated with at least one dose of the glucose level-altering medication that was not received; display a plurality of glucose profiles, wherein a first glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received and the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received, wherein a second glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received and does not include the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received, and wherein a third glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received and does not include the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received.

[00363] In some embodiments, each of the first, second, and third glucose profiles comprises a plot of glucose levels determined from analyte data over the time period, wherein the plot displays a median glucose trace, and a plurality of traces for glucose levels at different percentiles.

[00364] In some embodiments, the period of time is about 1 month.

[00365] In some embodiments, the glucose level-altering medication is a glucose lowering medication. In some embodiments, the glucose level-altering medication is insulin. In some embodiments, the glucose level-altering medication is a fast-acting insulin. In some embodiments, the glucose level-altering medication is a long-acting insulin.

[00366] In some embodiments, a length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is dependent on a type of the glucose level-altering medication. In some embodiments, the glucose level-

altering medication is a long-acting insulin, and wherein the length of the at least one portion of analyte data associated with the dose of glucose level-altering medication that was received is about 1 day. In some embodiments, the glucose level-altering medication is a rapid-acting acting insulin, and wherein the length of the at least one portion of analyte data associated with the dose of glucose level-altering medication that was received is between about 4 hours and about 8 hours. In some embodiments, the length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is a fixed time window related to a therapeutic window of the glucose level-altering medication. In some embodiments, the length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is a variable time window, wherein a first time point of the variable time window is a time associated with administration of the glucose level-altering medication. In some embodiments, the time associated with administration of the glucose level-altering medication is from a timestamp from a connected delivery device. In some embodiments, the time associated with administration of the glucose level-altering medication is from a logged dose.

[00367] In some embodiments, the plurality of glucose profiles is displayed in a side-by-side arrangement.

[00368] In some embodiments, the plurality of glucose profiles is displayed in a vertical arrangement.

[00369] In some embodiments, the method further includes the step of displaying a time in ranges interface for each of the plurality of glucose profiles, wherein the time in ranges interface for each of the plurality of glucose profiles comprises a bar, wherein the bar comprises a plurality of bar portions, wherein each bar portion of the plurality of bar portions indicates an amount of time that a user's analyte level is within a predefined analyte range associated with each bar portion, and wherein the plurality of bar portions are based on the analyte data of each of the plurality of glucose profiles, respectively.

[00370] In some embodiments, the method further includes the step of displaying a GMI metric for each of the plurality of glucose profiles. In some embodiments, the GMI metric is a GMI percentage and/or a GMI value in mmol/mol.

[00371] In some embodiments, the method further includes the step of displaying a glucose statistic for each of the plurality of glucose profiles. In some embodiments, the glucose statistic is an average glucose value or a median glucose value.

[00372] In some embodiments, the method further includes the step of displaying a plurality of dose indicators corresponding to the administration of the doses of the glucose level-altering medication in the first and second glucose profiles.

[00373] In many embodiments, a system for displaying metrics relating to a subject includes: wireless communications circuitry configured to receive measured drug dosing data and analyte data; a display configured to visually present information; and one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the time-correlated data comprises at least one portion of analyte data associated with at least one dose of a medication that was received and at least one portion of analyte data associated with the at least one dose of the medication that was not received. When executed by the one or more processors, the instructions cause the system to: determine the at least one portion of analyte data associated with the at least one dose of the medication that was received; determine the at least one portion of analyte data associated with the at least one dose of the medication that was not received; display a plurality of analyte profiles, wherein a first analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the medication that was received and the at least one portion of analyte data associated with the at least one dose of the medication that was not received, wherein a second analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the medication that was received and does not include the at least one portion of analyte data associated with the at least one dose of the medication that was not received, and wherein a third analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the medication that was not received and does not include the at least one portion of analyte data associated with the at least one dose of the medication that was received.

[00374] In some embodiments, each of the first, second, and third analyte profiles comprises a plot of analyte levels determined from analyte data over the time period, wherein the plot

displays a median analyte trace, and a plurality of traces for analyte levels at different percentiles.

[00375] In some embodiments, the period of time is about 1 month.

[00376] In some embodiments, the analyte is glucose, and wherein the medication is a glucose lowering medication. In some embodiments, the glucose lowering medication is insulin. In some embodiments, the glucose lowering medication is at least one of a fast-acting insulin, a long-acting insulin, an intermediate-acting insulin. In some embodiments, the glucose lowering medication is an SGLT inhibitor or a GLP1 receptor antagonist.

[00377] In some embodiments, a length of the at least one portion of analyte data after the at least one dose of the medication was received is dependent on a type of the medication. In some embodiments, the length of the at least one portion of analyte data associated with the at least one dose of the medication that was received is a fixed time window related to a therapeutic window of the medication. In some embodiments, the length of the at least one portion of analyte data associated with the at least one dose of the medication that was received is a variable time window, wherein a first time point of the variable time window is a time associated with administration of the medication. In some embodiments, the time associated with administration of the medication is from a timestamp from a connected delivery device. In some embodiments, the time associated with administration of the medication is from a logged dose.

[00378] In some embodiments, the instructions further cause the one or more processors to display the plurality of analyte profiles in a side-by-side arrangement.

[00379] In some embodiments, the instructions further cause the one or more processors to display the plurality of analyte profiles in a vertical arrangement.

[00380] In some embodiments, the instructions further cause the one or more processors to display an analyte metric for each of the plurality of analyte profiles.

[00381] In some embodiments, the instructions further cause the one or more processors to display an analyte statistic for each of the plurality of analyte profiles. In some embodiments, the analyte statistic is an average analyte value or a median analyte value.

[00382] In some embodiments, the instructions further cause the one or more processors to display a plurality of dose indicators corresponding to the administration of the doses of the medication in the first and second analyte profiles.

[00383] In some embodiments, the time-correlated data further comprises at least one portion of analyte data after at least one dose of a second medication was received and at least one portion of analyte data after the at least one dose of the second medication was not received, wherein the instructions, when executed by the one or more processors, further cause the system to: determine the at least one portion of analyte data after the at least one dose of the second medication was received; determine the at least one portion of analyte data after the at least one dose of the second medication was not received; display a plurality of analyte profiles, wherein the first analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication, the at least one portion of analyte data after the at least one dose of the second medication were received, the at least one portion of analyte data after the at least one portion of analyte data after the at least one dose of the medication was not received, and the at least one portion of analyte data after the at least one dose of the second medication was not received, wherein a fourth analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the second medication was received and does not include the at least one portion of analyte data after the at least one dose of the second medication was not received, and wherein a fifth analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the second medication was not received and does not include the at least one portion of analyte data after the at least one dose of the second medication was received. In some embodiments, the first medication is a long-acting insulin and the second medication is a rapid-acting insulin.

[00384] In some embodiments, the analyte is at least one of glucose, glucose derivatives, ketone, ketone bodies, or lactate.

[00385] In some embodiments, the analyte is at least one of oxygen, acetyl choline, amylase, bilirubin, cholesterol, chorionic gonadotropin, creatine kinase, creatine, DNA, fructosamine, glutamine, growth hormones, hormones, peroxide, prostate-specific antigen, prothrombin, RNA, thyroid stimulating hormone, and troponin.

[00386] In many embodiments, a method for displaying comparative analyte profiles includes the steps of: receiving time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time; determining at least one portion of

the time-correlated data after at least one dose of a medication was received; determining at least one portion of the time-correlated data after at least one dose of the medication was not received; display a plurality of analyte profiles, wherein a first analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication was received and the at least one portion of analyte data after the at least one dose of the medication was not received, wherein a second analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication was received and does not include the at least one portion of analyte data after the at least one dose of the medication was not received, and wherein a third analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication was not received and does not include the at least one portion of analyte data after the at least one dose of the medication was received.

[00387] In some embodiments, each of the first, second, and third analyte profiles comprises a plot of analyte levels determined from analyte data over the time period, wherein the plot displays a median analyte trace, and a plurality of traces for analyte levels at different percentiles.

[00388] In some embodiments, the period of time is about 1 month.

[00389] In some embodiments, the analyte is glucose, and wherein the medication is a glucose lowering medication. In some embodiments, the glucose lowering medication is insulin. In some embodiments, the glucose lowering medication is at least one of a fast-acting insulin, a long-acting insulin, an intermediate-acting insulin. In some embodiments, the glucose lowering medication is an SGLT inhibitor or a GLP1 receptor antagonist.

[00390] In some embodiments, a length of the at least one portion of analyte data after the at least one dose of the medication was received is dependent on a type of the medication. In some embodiments, the length of the at least one portion of analyte data associated with the at least one dose of the medication that was received is a fixed time window related to a therapeutic window of the medication. In some embodiments, the length of the at least one portion of analyte data associated with the at least one dose of the medication that was received is a variable time window, wherein a first time point of the variable time window is a time associated with administration of the medication. In some embodiments, the time associated with

administration of the glucose level-altering medication is from a timestamp from a connected delivery device. In some embodiments, the time associated with administration of the glucose level-altering medication is from a logged dose.

[00391] In some embodiments, the method further includes the step of displaying the plurality of analyte profiles in a side-by-side arrangement.

[00392] In some embodiments, the method further includes the step of displaying the plurality of analyte profiles in a vertical arrangement.

[00393] In some embodiments, the method further includes the step of displaying an analyte metric for each of the plurality of analyte profiles.

[00394] In some embodiments, the method further includes the step of displaying an analyte statistic for each of the plurality of analyte profiles. In some embodiments, the analyte statistic is an average analyte value or a median analyte value.

[00395] In some embodiments, the method further includes the step of displaying a plurality of dose indicators corresponding to the administration of the doses of the medication in the first and second analyte profiles.

[00396] In some embodiments, the time-correlated data further comprises at least one portion of analyte data after at least one dose of a second medication was received and at least one portion of analyte data after the at least one dose of the second medication was not received, wherein the method further comprises the steps of: determining the at least one portion of analyte data after the at least one dose of the second medication was received; determining the at least one portion of analyte data after the at least one dose of the second medication was not received; displaying the plurality of analyte profiles, wherein the plurality of analyte profiles further comprises a fourth and a fifth analyte profile, wherein the first analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication, the at least one portion of analyte data after the at least one dose of the second medication were received, the at least one portion of analyte data after the at least one portion of analyte data after the at least one dose of the medication was not received, and the at least one portion of analyte data after the at least one dose of the second medication was not received, wherein the fourth analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the second medication was received and does not include the at least one portion of

analyte data after the at least one dose of the second medication was not received, and wherein the fifth analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the second medication was not received and does not include the at least one portion of analyte data after the at least one dose of the second medication was received.

[00397] In some embodiments, the first medication is a long-acting insulin and the second medication is a rapid-acting insulin.

[00398] In some embodiments, the analyte is at least one of glucose, glucose derivatives, ketone, ketone bodies, or lactate.

[00399] In some embodiments, the analyte is at least one of oxygen, acetyl choline, amylase, bilirubin, cholesterol, chorionic gonadotropin, creatine kinase, creatine, DNA, fructosamine, glutamine, growth hormones, hormones, peroxide, prostate-specific antigen, prothrombin, RNA, thyroid stimulating hormone, and troponin.

[00400] In many embodiments, a system for displaying metrics relating to a subject includes: wireless communications circuitry configured to receive measured analyte data; a display configured to visually present information; and one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the one or more processors to: display a first time-in-range graphical representation for a first time period and a second time-in-range graphical representation for a second time period, wherein each of the first and second time-in-range graphical representations each comprise a predetermined number of portions corresponding to a plurality of concentration ranges, wherein each of the predetermined number of graph portions comprises a predetermined number of different colors equal to the predetermined number of portions; display a first glucose metrics section for the first time period and a second glucose metrics section for the second time period, wherein each of the first and second glucose metrics section comprises a glucose management indicator and average glucose level for each of the first and second time periods, respectively; display a first ambulatory glucose profile for the first time period and a second ambulatory glucose profile for the second time period; and display a first low glucose events section and a second low glucose events

section, wherein each of the first and second low glucose events sections comprise a graph of glucose levels below a low threshold for the first and second time periods, respectively.

[00401] In some embodiments, each of the first and second ambulatory glucose profiles comprises the predetermined number of portions corresponding to the plurality of concentration ranges, wherein glucose levels displayed in each of the predetermined number of portions comprise the predetermined number of different colors.

[00402] In some embodiments, each of the first and second low glucose events sections further comprises a total number of low glucose events for the first and second time periods, respectively.

[00403] In some embodiments, the predetermined number of portions comprise a very low concentration range, a low concentration range, a target range, a high concentration range, and a very high concentration range.

[00404] In some embodiments, each of the first and second glucose metrics sections further comprise a glucose variability metric for each of the first and second time periods, respectively.

[00405] In some embodiments, each of the first and second time-in-range graphical representations further comprise a percentage value corresponding to each of the predetermined number of portions.

[00406] In some embodiments, the instructions, when executed by the one or more processors, further cause the system to: display first and second sensor metrics for the first and second time periods. In some embodiments, the first and second sensor metrics each comprise an amount of time a sensor was active during the first and second time periods, respectively. In some embodiments, the first and second sensor metrics each comprise an average number of views of a glucose level by a user during the first and second time periods, respectively. In some embodiments, the first and second sensor metrics each comprise an average number of scans of a sensor by a user during the first and second time periods, respectively.

[00407] In some embodiments, each of the first and second time-in-range graphical representations are bar graphs.

[00408] In some embodiments, each of the predetermined number of portions are arranged vertically in a single column.

[00409] In some embodiments, the plurality of concentration ranges comprises five concentration ranges.

[00410] In some embodiments, the predetermined number of portions comprises up to five portions.

[00411] In many embodiments, a method for displaying comparative glucose profiles includes the steps of: receiving time-correlated data characterizing an analyte of a user over a period of time; displaying a first time-in-range graphical representation for a first time period and a second time-in-range graphical representation for a second time period on a single graphical user interface, wherein each of the first and second time-in-range graphical representations each comprise a predetermined number of portions corresponding to a plurality of concentration ranges, wherein each of the predetermined number of portions comprises a predetermined number of different colors equal to the predetermined number of portions; displaying a first glucose metrics section for the first time period and a second glucose metrics section for the second time period on the single graphical user interface, wherein each of the first and second glucose metrics section comprises a glucose management indicator and average glucose level for each of the first and second time periods, respectively; displaying a first ambulatory glucose profile for the first time period and a second ambulatory glucose profile for the second time period on the single graphical user interface; and displaying a first low glucose events section and a second low glucose events section on the single graphical user interface, wherein each of the first and second low glucose events sections comprise a graph of glucose levels below a low threshold for the first and second time periods, respectively.

[00412] In some embodiments, each of the first and second ambulatory glucose profiles comprises at least five portions corresponding to the five concentration ranges, wherein glucose levels displayed in each of the five portions comprise the five different colors.

[00413] In some embodiments, each of the first and second low glucose events sections further comprises a total number of low glucose events for the first and second time periods, respectively.

[00414] In some embodiments, the predetermined number of portions comprise a very low concentration range, a low concentration range, a target range, a high concentration range, and a very high concentration range.

[00415] In some embodiments, each of the first and second glucose metrics sections further comprise a glucose variability metric for each of the first and second time periods, respectively.

[00416] In some embodiments, each of the first and second time-in-range graphical representations further comprise a percentage value corresponding to each of the predetermined number of portions.

[00417] In some embodiments, further comprising the step of: displaying first and second sensor metrics for the first and second time periods. In some embodiments, the first and second sensor metrics each comprise an amount of time a sensor was active during the first and second time periods, respectively. In some embodiments, the first and second sensor metrics each comprise an average number of views of a glucose level by a user during the first and second time periods, respectively. In some embodiments, the first and second sensor metrics each comprise an average number of scans of a sensor by a user during the first and second time periods, respectively.

[00418] In some embodiments, each of the first and second time-in-range graphical representations are bar graphs.

[00419] In some embodiments, each of the predetermined number of portions are arranged vertically in a single column.

[00420] In some embodiments, the plurality of concentration ranges comprises five concentration ranges.

[00421] In some embodiments, the predetermined number of portions comprises up to five portions.

[00422] Systems, devices and methods are provided for incorporating a medication delivery device into an integrated management system. The integrated management system may be an integrated diabetes management system and may include a glucose monitor, a connected insulin pen, and software. The integrated management system may produce a plurality of reports that may include data related to analyte levels (e.g., glucose levels) and medication delivered (e.g., insulin delivered).

[00423] The improvements to the GUIs in the various aspects described and claimed herein produce a technical effect at least in that they assist the user of the device to operate the device more accurately, more efficiently and more safely. It will be appreciated that the information that is provided to the user on the GUI, the order in which that information is provided and the clarity with which that information is structured can have a significant effect on the way the user interacts with the system and the way the system operates. The GUI therefore guides the user in

the technical task of operating the system to take the necessary readings and/or obtain information accurately and efficiently.

[00424] It should be noted that all features, elements, components, functions, and steps described with respect to any embodiment provided herein are intended to be freely combinable and substitutable with those from any other embodiment. If a certain feature, element, component, function, or step is described with respect to only one embodiment, then it should be understood that that feature, element, component, function, or step can be used with every other embodiment described herein unless explicitly stated otherwise. This paragraph therefore serves as antecedent basis and written support for the introduction of claims, at any time, that combine features, elements, components, functions, and steps from different embodiments, or that substitute features, elements, components, functions, and steps from one embodiment with those of another, even if the following description does not explicitly state, in a particular instance, that such combinations or substitutions are possible. It is explicitly acknowledged that express recitation of every possible combination and substitution is overly burdensome, especially given that the permissibility of each and every such combination and substitution will be readily recognized by those of ordinary skill in the art.

[00425] To the extent the embodiments disclosed herein include or operate in association with memory, storage, and/or computer readable media, then that memory, storage, and/or computer readable media are non-transitory. Accordingly, to the extent that memory, storage, and/or computer readable media are covered by one or more claims, then that memory, storage, and/or computer readable media is only non-transitory.

[00426] In many instances, entities are described herein as being coupled to other entities. It should be understood that the terms “coupled” and “connected” (or any of their forms) are used interchangeably herein and, in both cases, are generic to the direct coupling of two entities (without any non-negligible (e.g., parasitic) intervening entities) and the indirect coupling of two entities (with one or more non-negligible intervening entities). Where entities are shown as being directly coupled together, or described as coupled together without description of any intervening entity, it should be understood that those entities can be indirectly coupled together as well unless the context clearly dictates otherwise.

[00427] The subject matter described herein and in the accompanying figures is done so with sufficient detail and clarity to permit the inclusion of claims, at any time, in means-plus-function

format pursuant to 35 U.S.C. section 112, part (f). However, a claim is to be interpreted as invoking this means-plus-function format only if the phrase "means for" is explicitly recited in that claim.

[00428] As used herein and in the appended claims, the singular forms "a", "an", and "the" include plural referents unless the context clearly dictates otherwise.

[00429] The publications discussed herein are provided solely for their disclosure prior to the filing date of the present application. Nothing herein is to be construed as an admission that the present disclosure is not entitled to antedate such publication by virtue of prior disclosure. Further, the dates of publication provided may be different from the actual publication dates which may need to be independently confirmed.

[00430] While the embodiments are susceptible to various modifications and alternative forms, specific examples thereof have been shown in the drawings and are herein described in detail. These embodiments are not to be limited to the particular form disclosed, but to the contrary, these embodiments are to cover all modifications, equivalents, and alternatives falling within the spirit of the disclosure. Furthermore, any features, functions, steps, or elements of the embodiments may be recited in or added to the claims, as well as negative limitations that define the scope of the claims by features, functions, steps, or elements that are not within that scope.

Clauses

Exemplary embodiments are set out in the following numbered clauses.

Clause 1. An analyte monitoring system, comprising:

a sensor control device comprising an analyte sensor, wherein at least a portion of the analyte sensor is configured to be in fluid contact with a bodily fluid of subject;

a medication delivery device configured to deliver an amount of medication to the subject and record the amount delivered in a log; and

a reader device, comprising:

a display;

wireless communication circuitry configured to receive a current sensor reading from the sensor control device and the log from the medication delivery device; and

one or more processors coupled to a memory, the memory storing instructions that, when executed by the one or more processors, cause the one or more processors to:

output to the display an interface prompting the subject to connect the medication delivery device;

output to the display an interface prompting the subject to select a type of medication delivery device;

output to the display an interface prompting the subject to select a type of medication being delivered by the medication delivery device; and

output to the display an interface prompting the subject to select a brand of medication being delivered by the medication delivery device.

Clause 2. The system of clause 1, wherein the medication delivery device is an insulin pen.

Clause 3. The system of clause 1, wherein the type of medication delivery device is a brand of insulin pen.

Clause 4. The system of clause 1, wherein the type of medication being delivered is a type of insulin.

Clause 5. The system of clause 4, wherein the type of insulin is rapid-acting or long-acting.

Clause 6. The system of clause 1, wherein the instructions further cause the one or more processors to output to the display an animation demonstrating how to hold the medication delivery device relative to the reader device to transfer the log.

Clause 7. The system of clause 1, wherein the instructions further cause the one or more processors to output to the display an interface prompting the subject to select a color of medication delivery device.

Clause 8. An analyte monitoring system, comprising:

a sensor control device comprising an analyte sensor, wherein at least a portion of the analyte sensor is configured to be in fluid contact with a bodily fluid of subject;

a medication delivery device configured to deliver an amount of medication to the subject

and record the amount delivered in a log; and

a reader device, comprising:

a display;

wireless communication circuitry configured to receive a current sensor reading from the sensor control device and the log from the medication delivery device; and

one or more processors coupled to a memory, the memory storing instructions that, when executed by the one or more processors, cause the one or more processors to output to the display logbook interface, wherein the logbook interface comprises a plurality of entries comprising at least two of a dosage of a medication, a comment, an alarm, and a prime of a medication delivery device.

Clause 9. The system of clause 8, wherein the plurality of entries are arranged according to a time order.

Clause 10. The system of clause 8, wherein the medication is insulin.

Clause 11. A system for displaying metrics relating to a subject, the system comprising:

a medication delivery device;

a wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a first graph having an x-axis of time, a y-axis of glucose concentration, and a plot of a median of an average glucose concentration over the period of time;

display a second graph having an x-axis of time, a y-axis of glucose concentration, and a plot of low glucose events, wherein a low glucose event comprises a glucose level below a threshold level;

display an average amount of carbohydrates consumed in a day over the period of time; and

display an average amount of at least one medication delivered per day over the period of time.

Clause 12. The system of clause 11, wherein the memory further holds instructions to display a third graph having an x-axis of time, a y-axis of a relative amount of time that a sensor is active, and a plot of an average time that the sensor was active over the period of time.

Clause 13. The system of clause 11, wherein the instructions further cause the one or more processors to display an average total daily amount of the at least one medication delivered per day.

Clause 14. The system of clause 11, wherein the at least one medication delivered comprises a rapid-acting insulin and a long-acting insulin.

Clause 15. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plurality of daily graphs corresponding to each day of the period of time, each graph of the plurality of daily graphs comprising an x-axis of time, a y-axis of glucose concentration, a plot of a glucose concentration over a 24-hour period, and a plurality of dose indicators, wherein each of the plurality of dose indicators illustrate an amount of medication administered; and

display a plurality of total dose indicators of an amount of the at least one medication delivered during the 24-hour day period.

Clause 16. The system of clause 15, wherein the plurality of total dose indicators comprises a numerical value highlighted with a first color for a first medication.

Clause 17. The system of clause 16, wherein the plurality of total dose indicators comprises a numerical value highlighted with a second color for a second medication.

Clause 18. The system of clause 16, wherein the plurality of dose indicators comprises a numerical value corresponding highlighted with the first color for the first medication.

Clause 19. The system of clause 17, wherein the plurality of dose indicators comprises a numerical value highlighted with the first color for the first medication and a numerical value highlighted with the second color for the second medication.

Clause 20. The system of clause 15, wherein the instructions further cause the one or more processors to display a plurality of average glucose values for at least some of the days of the period of time.

Clause 21. The system of clause 15, wherein the instructions further cause the one or more processors to display a plurality of values for an amount of total carbohydrates consumed for at least some of the days of the period of time.

Clause 22. The system of clause 15, wherein the instructions further cause the one or more processors to display a number of events in which a glucose level of the subject was below a threshold value.

Clause 23. The system of clause 15, wherein each graph of the plurality of daily graphs comprises a target range, and wherein an area under the curve for a portion of a plot outside of the target range is colored.

Clause 24. The system of clause 23, wherein the area under the curve for the portion of the plot outside of the target range is colored red when the portion of the plot outside is below the target range.

Clause 25. The system of clause 23, wherein the area under the curve for the portion of the plot outside of the target range is colored yellow when the portion of the plot outside is above the target range.

Clause 26. The system of clause 15, wherein each graph of the plurality of daily graphs comprises a target range, and wherein a portion of a plot outside of the target range is colored.

Clause 27. The system of clause 26, wherein the portion of the plot outside of the target range is colored red when the portion of the plot outside is below the target range.

Clause 28. The system of clause 26, wherein the portion of the plot outside of the target range is colored yellow when the portion of the plot outside is above the target range.

Clause 29. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plurality of daily graphs corresponding to each day of the period of time, each graph of the plurality of daily graphs comprising an x-axis of time, a y-axis of glucose concentration, a plot of a glucose concentration over a 24-hour period;

display a plurality of carbohydrate indicators corresponding to amounts of carbohydrates consumed during the 24-hour period, wherein each of the carbohydrate indicators is positioned in a time of day period in which the carbohydrates were consumed; and

display a plurality of dose indicators corresponding to doses of at least one medication, wherein each of the plurality of dose indicators illustrate an amount of

medication administered, and wherein each of the plurality of dose indicators is positioned in a time of day period in which it was administered.

Clause 30. The system of clause 29, wherein the plurality of dose indicators corresponds to doses for a first medication and a second medication, wherein the instructions further cause the one or more processors to display the plurality of dose indicators for the first medication in a first row and to display the plurality of dose indicators for the second medication in a second row.

Clause 31. The system of clause 30, wherein the plurality of dose indicators for the first medication are displayed in a first color and the plurality of dose indicators for the second medication are displayed in a second color.

Clause 32. The system of clause 29, wherein the plurality of dose indicators comprises a total dose administered.

Clause 33. The system of clause 32, wherein the instructions further cause the one or more processors to display a plurality of components for at least some of the plurality of dose indicators.

Clause 34. The system of clause 33, wherein the plurality of components comprises corrections or changes.

Clause 35. The system of clause 29, wherein the at least one medication is insulin.

Clause 36. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the

instructions, when executed by the one or more processors, cause the system to:

display a plot of glucose readings over a 24-hour period, wherein the plot displays a median glucose trace and a plurality of traces for glucose readings at different percentiles for the period of time;

display a plot of carbohydrate indicators corresponding to amounts of carbohydrates consumed during the 24-hour period, wherein each of the carbohydrate indicators is positioned in a time of day period in which the carbohydrates were consumed during the period of time; and

display a plurality of average dose amounts corresponding to doses of at least one medication administered during a time period during the 24-hour period.

Clause 37. The system of clause 36, the instructions further cause the one or more processors to display a daily average amount of carbohydrates consumed during the period of time.

Clause 38. The system of clause 37, the instructions further cause the one or more processors to display an average amount of carbohydrates consumed during each of a plurality of time periods of the 24-hour period.

Clause 39. The system of clause 36, wherein the at least one medication comprises first and second medications, and wherein the instructions further cause the one or more processors to display a plurality of average dose amounts corresponding to doses of the first medication in a first row and a plurality of average dose amounts corresponding to doses of the second medication in a second row.

Clause 40. The system of clause 36, the instructions further cause the one or more processors to display a daily average dose of at least one medication consumed during the period of time.

Clause 41. The system of clause 36, wherein the at least one medication is insulin.

Clause 42. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug

dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plurality of plots of glucose readings for different time of day periods, wherein each plot of the plurality of plots displays glucose readings during the period of time and a target range; and

display a plurality of tables for the different time of day periods, wherein each table of the plurality of tables comprises glucose levels measured before and after a meal for at least some days of the period of time, and dosages of at least one medication delivered during at least some days of the period of time.

Clause 43. The system of clause 42, the instructions further cause the one or more processors to display an average dosage of the at least one medication delivered for each period of time.

Clause 44. The system of clause 42, the instructions further cause the one or more processors to display an average glucose level measured before and after the meal for each period of time.

Clause 45. The system of clause 42, wherein each table of the plurality of tables further comprises an amount of carbohydrates consumed for at least some days of the period of time.

Clause 46. The system of clause 45, wherein the instructions further cause the one or more processors to display an average amount of carbohydrates consumed for each period of time.

Clause 47. The system of clause 42, wherein the at least one medication is insulin.

Clause 48. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plurality of settings related to analyte levels; and

display a plurality of settings related to at least one medication delivery device.

Clause 49. The system of clause 48, wherein the settings related to analyte levels comprise a target analyte range.

Clause 50. The system of clause 48, wherein the settings related to analyte levels comprise alarm settings comprising a low analyte level threshold level and a high analyte level threshold.

Clause 51. The system of clause 48, wherein the settings related to analyte levels comprise alarm settings related to a loss of signal from sensor control device configured to measure an analyte level.

Clause 52. The system of clause 48, wherein the plurality of settings related to at least one medication delivery device comprises a type of medication and information relating to a last transfer of dosing data from the medication delivery device.

Clause 53. The system of clause 52, wherein the information relating to the last transfer of dosing data comprises a date and a time of the last transfer of dosing data.

Clause 54. The system of clause 52, wherein the plurality of settings related to at least one medication delivery device further comprises a color of the medication delivery device.

Clause 55. The system of clause 48, wherein the analyte data is glucose data.

Clause 56. The system of clause 48, wherein the at least one medication delivery device is an at least one insulin delivery device.

Clause 57. The system of clause 48, wherein the at least one medication delivery device is a first and a second medication delivery device.

Clause 58. The system of clause 48, wherein the instructions further cause the one or more processors to display information related to a sensor control device configured to measure an analyte level.

Clause 59. The system of clause 58, wherein the information related to the sensor control device comprises a name of the sensor control device and a software version on the sensor control device.

Clause 60. The system of clause 48, wherein the instructions further cause the one or more processors to display information related to the at least one medication delivery device.

Clause 61. The system of clause 60, wherein the information related to the at least one medication delivery device comprises a brand name of the at least one medication delivery device.

Clause 62. The system of clause 60, wherein the information related to the at least one medication delivery device comprises a serial number of the at least one medication delivery device.

Clause 63. A system comprising:

wireless communications circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to present an alert;

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions, wherein the instructions, when executed by the one or more processors, cause the one or more processors to:

determine if a meal has been consumed based on an increase in an analyte level above a high threshold;

determine if an insulin dose has not been recorded within a period of time since a previous insulin dose; and

in response to a determination that a meal has been consumed and a determination that the insulin dose has not been recorded within the period of time since the previous insulin dose, display an alert interface relating to the missed meal dose.

Clause 64. The system of clause 63, wherein the high threshold is about 175 mg/dL.

Clause 65. The system of clause 63, wherein the period of time since the previous insulin dose is about 3 hours.

Clause 66. The system of clause 63, wherein the one or more processors are further configured to display the alert interface for the meal at a predetermined time selected by a user.

Clause 67. The system of clause 63, wherein text of the alert interface is at least partially customized by a user.

Clause 68. A system comprising:

wireless communications circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to present an alert;

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions, wherein the instructions, when executed by the one or more processors, cause the one or more processors to:

determine if an analyte level is above a high threshold after a predetermined period of time since a last insulin dose; and

in response to a determination that the analyte level is above the high threshold after the predetermined period of time since the last insulin dose, display an alert interface relating to a correction dose.

Clause 69. The system of clause 68, wherein text of the alert interface is at least partially customized by a user.

Clause 70. The system of clause 68, wherein the predetermined period of time is at least about 2 hours.

Clause 71. The system of clause 68, wherein the high threshold is about 250 mg/dL.

Clause 72. The system of clause 68, wherein the high threshold is set by a user.

Clause 73. A system comprising:

wireless communications circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to present an alert;

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions, wherein the instructions, when executed by the one or more processors, cause the one or more processors to:

determine if an analyte level is below a high threshold after a predetermined period of time since a last insulin dose; and

in response to a determination that the analyte level is below the high threshold after the predetermined period of time since the last insulin dose, display a message interface relating to the analyte level being within a target range.

Clause 74. The system of clause 73, wherein text of the message interface is at least partially customized by a user.

Clause 75. The system of clause 73, wherein the predetermined period of time is at least about 2 hours.

Clause 76. The system of clause 73, wherein the high threshold is set by a user.

Clause 77. The system of clause 73, wherein the instructions further cause the one or more processors to display a prompt for a user to enter a note relating to the analyte level being within the target range.

Clause 78. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plurality of daily graphs corresponding to each day of the period of time, each graph of the plurality of daily graphs comprising an x-axis of time, a y-axis of glucose concentration, a plot of a glucose concentration over a 24-hour period;

display a time in range metric for each day of the period of time,

display a total amount of rapid acting insulin and a total amount of long acting insulin received by a user for each day of the period of time, and

display a plurality of dose indicators corresponding to doses of at least one of rapid-acting insulin or long-acting insulin, wherein each of the plurality of dose indicators illustrate an amount of the at least one of rapid-acting insulin or long-acting insulin administered, and wherein each of the plurality of dose indicators is positioned in a time of day period in which it was administered.

Clause 79. The system of clause 78, wherein the instructions further cause the one or more processors to display the plurality of dose indicators for the rapid-acting insulin in a first row and to display the plurality of dose indicators for the long-acting insulin in a second row.

Clause 80. The system of clause 79, wherein the plurality of dose indicators for the rapid-acting insulin are displayed in a first color and the plurality of dose indicators for the long-acting insulin are displayed in a second color.

Clause 81. The system of clause 78, wherein the plurality of dose indicators comprises a total dose administered.

Clause 82. The system of clause 78, wherein the instructions further cause the one or more processors to display a plurality of carbohydrate indicators corresponding to amounts of carbohydrates consumed during the 24-hour period, wherein each of the carbohydrate indicators is positioned in a time of day period in which the carbohydrates were consumed; and

Clause 83. The system of clause 78, wherein the medication delivery device is a connected pen or connected pen cap.

Clause 84. The system of clause 78, wherein the medication delivery device is an insulin pump.

Clause 85. The system of clause 84, wherein the instructions further cause the one or more processors to display a graph of long-acting insulin received.

Clause 86. The system of clause 84, wherein the instructions further cause the one or more processors to display a graphical representation of an operating state of the insulin pump.

Clause 87. The system of clause 86, wherein the operating state comprises automated delivery, maximum delivery, and automated pause.

Clause 88. A system comprising:

wireless communications circuitry configured to receive time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time;

a display configured to visually present information; and

one or more processors coupled with the wireless communications circuitry, the display, and

a memory storing instructions, time-correlated data characterizing an analyte of the subject, and doses of a glucose level-altering medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

determine a subset of time-correlated data based on a filtering criteria selected by the subject; and

display a first glucose profile display and a second glucose profile on a single

graphical subject interface, wherein the first glucose profile displays glucose levels associated with the time-correlated data over a first time period, and wherein the second glucose profile displays the subset of the time-correlated data over the first time period.

Clause 89. The system of clause 88, wherein the medication is a glucose level altering medication.

Clause 90. The system of clause 89, wherein the glucose level altering medication is insulin.

Clause 91. The system of clause 88, wherein the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

Clause 92. The system of clause 91, wherein the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication.

Clause 93. The system of clause 91, wherein the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window.

Clause 94. The system of clause 93, wherein the dosing window for breakfast is from about 6 am to about 11 am.

Clause 95. The system of clause 93, wherein the dosing window for lunch is from about 11 am to about 4 pm.

Clause 96. The system of clause 93, wherein the dosing window for dinner is from about 4 pm to about 10 pm.

Clause 97. The system of clause 93, wherein the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time.

Clause 98. The system of clause 91, wherein the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication.

Clause 99. The system of clause 91, wherein the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication.

Clause 100. The system of clause 91, wherein the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal.

Clause 101. The system of clause 91, wherein the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

Clause 102. The system of clause 88, wherein the instructions, when executed by the one or more processors, further cause the system to:

determine an additional subset of time-correlated data based on a second filtering criteria selected by the subject; and

display a third glucose profile, wherein the third glucose profile displays the additional subset of time-correlated data over the first time period.

Clause 103. The system of clause 102, wherein the second filtering criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

Clause 104. The system of clause 88, wherein the first and second glucose profiles are

displayed in a horizontal arrangement.

Clause 105. The system of clause 88, wherein the first and second glucose profiles are displayed in a vertical arrangement.

Clause 106. The system of clause 88, wherein the first time period is selected by the subject.

Clause 107. The system of clause 88, wherein the first time period is automatically set.

Clause 108. The system of clause 88, wherein the filtering criteria is selected using a drop-down menu.

Clause 109. A method comprising the steps of:

receiving time-correlated data characterizing an analyte of a subject and doses of a medication received by the subject over a period of time;

determining a subset of time-correlated data based on a filtering criteria selected by the subject;

displaying a first glucose profile display and a second glucose profile on a single graphical user interface, wherein the first glucose profile displays glucose levels associated with the time-correlated data over a first time period, and wherein the second glucose profile displays the subset of the time-correlated data over the first time period.

Clause 110. The method of clause 109, wherein the medication is a glucose level altering medication.

Clause 111. The method of clause 110, wherein the glucose level altering medication is insulin.

Clause 112. The method of clause 109, wherein the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

Clause 113. The method of clause 112, wherein the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises

analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication.

Clause 114. The method of clause 112, wherein the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window.

Clause 115. The method of clause 114, wherein the dosing window for breakfast is from about 6 am to about 11 am.

Clause 116. The method of clause 114, wherein the dosing window for lunch is from about 11 am to about 4 pm.

Clause 117. The method of clause 114, wherein the dosing window for dinner is from about 4 pm to about 10 pm.

Clause 118. The method of clause 114, wherein the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time.

Clause 119. The method of clause 112, wherein the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication.

Clause 120. The method of clause 112, wherein the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication.

Clause 121. The method of clause 112, wherein the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte

data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal.

Clause 122. The method of clause 112, wherein the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

Clause 123. The method of clause 109, further comprising the step of:

determining an additional subset of time-correlated data based on a second filtering criteria selected by the subject;

displaying a third glucose profile on the single graphical user interface, wherein the third glucose profile displays the additional subset of time-correlated data over the first time period.

Clause 124. The method of clause 123, wherein the second filtering criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

Clause 125. The method of clause 109, wherein the first and second glucose profiles are displayed in a horizontal arrangement.

Clause 126. The method of clause 109, wherein the first and second glucose profiles are displayed in a vertical arrangement.

Clause 127. The method of clause 109, wherein the first time period is selected by the subject.

Clause 128. The method of clause 109, wherein the first time period is automatically set.

Clause 129. The method of clause 109, wherein the filtering criteria is selected using a drop-down menu.

Clause 130. A system comprising:

wireless communications circuitry configured to receive time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time;

a display configured to visually present information; and

one or more processors coupled with the wireless communications circuitry, the display, and

a memory storing instructions, time-correlated data characterizing an analyte of the subject, and doses of a glucose level-altering medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

determine a first subset of time-correlated data based on a first filtering criteria selected by the subject and a second subset of time-correlated data based on a second filtering criteria selected by the subject; and

display a first glucose profile display and a second glucose profile on a single graphical user interface, wherein the first glucose profile displays the first subset of the time-correlated data over a first time period, and wherein the second glucose profile displays the second subset of the time-correlated data over the first time period.

Clause 131. The system of clause 130, wherein the medication is a glucose level altering medication.

Clause 132. The system of clause 131, wherein the glucose level altering medication is insulin.

Clause 133. The system of clause 130, wherein the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

Clause 134. The system of clause 133, wherein the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication.

Clause 135. The system of clause 133, wherein the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window.

Clause 136. The system of clause 135, wherein the dosing window for breakfast is from about 6 am to about 11 am.

Clause 137. The system of clause 135, wherein the dosing window for lunch is from about 11 am to about 4 pm.

Clause 138. The system of clause 135, wherein the dosing window for dinner is from about 4 pm to about 10 pm.

Clause 139. The system of clause 135, wherein the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time.

Clause 140. The system of clause 133, wherein the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication.

Clause 141. The system of clause 133, wherein the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication.

Clause 142. The system of clause 133, wherein the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal.

Clause 143. The system of clause 133, wherein the filtering criteria is extra meal doses,

and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

Clause 144. The system of clause 130, wherein the instructions, when executed by the one or more processors, further cause the system to:

determine a third subset of time-correlated data based on a second filtering criteria selected by the subject; and

display a third glucose profile, wherein the third glucose profile displays the third subset of time-correlated data over the first time period.

Clause 145. The system of clause 144, wherein the third filtering criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

Clause 146. The system of clause 130, wherein the first and second glucose profiles are displayed in a horizontal arrangement.

Clause 147. The system of clause 130, wherein the first and second glucose profiles are displayed in a vertical arrangement.

Clause 148. The system of clause 130, wherein the first time period is selected by the subject.

Clause 149. The system of clause 130, wherein the first time period is automatically set.

Clause 150. The system of clause 130, wherein the first and second filtering criteria are selected using a drop-down menu.

Clause 151. A method comprising the steps of:

receiving time-correlated data characterizing an analyte of a subject and doses of a medication received by the subject over a period of time;

determining a first subset of time-correlated data based on a first filtering criteria selected by the subject and a second subset of time-correlated data based on a second filtering criteria

selected by the subject;

displaying a first glucose profile display and a second glucose profile on a single graphical user interface, wherein the first glucose profile displays the first subset of the time-correlated data over a first time period, and wherein the second glucose profile displays the second subset of the time-correlated data over the first time period.

Clause 152. The method of clause 151, wherein the medication is a glucose level altering medication.

Clause 153. The method of clause 152, wherein the glucose level altering medication is insulin.

Clause 154. The method of clause 151, wherein the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

Clause 155. The method of clause 154, wherein the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication.

Clause 156. The method of clause 155, wherein the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window.

Clause 157. The method of clause 156, wherein the dosing window for breakfast is from about 6 am to about 11 am.

Clause 158. The method of clause 156, wherein the dosing window for lunch is from about 11 am to about 4 pm.

Clause 159. The method of clause 156, wherein the dosing window for dinner is from about 4 pm to about 10 pm.

Clause 160. The method of clause 156, wherein the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time.

Clause 161. The method of clause 155, wherein the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication.

Clause 162. The method of clause 155, wherein the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication.

Clause 163. The method of clause 155, wherein the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal.

Clause 164. The method of clause 155, wherein the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

Clause 165. The method of clause 155, further comprising the step of:

determining a third subset of time-correlated data based on a third filtering criteria selected by the subject; and

displaying a third glucose profile on the single graphical user interface, wherein the third glucose profile displays the additional subset of time-correlated data over the first time period.

Clause 166. The method of clause 155, further comprising the step of:

displaying a third glucose profile on the single graphical user interface, wherein the

third glucose profile displays glucose levels associated with the time-correlated data over the first time period.

Clause 167. The method of clause 151, wherein the first and second glucose profiles are displayed in a horizontal arrangement.

Clause 168. The method of clause 151, wherein the first and second glucose profiles are displayed in a vertical arrangement.

Clause 169. The method of clause 151, wherein the first time period is selected by the subject.

Clause 170. The method of clause 151, wherein the first time period is automatically set.

Clause 171. The method of clause 151, wherein the first and second filtering criteria are selected using a drop-down menu.

Clause 172. A system comprising:

wireless communications circuitry configured to receive measured drug dosing data and analyte data;

a display configured to visually present information; and

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a glucose level-altering medication received by the subject over a period of time, wherein the time-correlated data comprises at least one portion of analyte data associated with the at least one dose of a glucose level-altering medication that was received and at least one portion of analyte data associated with at least one dose of the glucose level-altering medication that was not received, wherein the instructions, when executed by the one or more processors, cause the system to:

determine the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received;

determine the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received;

display a plurality of glucose profiles,

wherein a first glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received and the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received,

wherein a second glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication was received and does not include the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received, and

wherein a third glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received and does not include the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received.

Clause 173. The system of clause 172, wherein each of the first, second, and third glucose profiles comprises a plot of glucose levels determined from analyte data over the time period, wherein the plot displays a median glucose trace, and a plurality of traces for glucose levels at different percentiles.

Clause 174. The system of clause 172, wherein the period of time is about 1 month.

Clause 175. The system of clause 172, wherein the glucose level-altering medication is a glucose lowering medication.

Clause 176. The system of clause 172, wherein the glucose level-altering medication is insulin.

Clause 177. The system of clause 172, wherein the glucose level-altering medication is a fast-acting insulin.

Clause 178. The system of clause 172, wherein the glucose level-altering medication is

a long-acting insulin.

Clause 179. The system of clause 172, wherein the glucose level-altering medication is an SGLT inhibitor.

Clause 180. The system of clause 172, wherein the glucose level-altering medication is a GLP1 receptor antagonist.

Clause 181. The system of clause 172, wherein the glucose level-altering medication is selected from the group consisting of insulin, SGLT2 inhibitors, GLP1 receptor agonists, biguanides (e.g., metformin), α-glucosidase inhibitors, thiazolidinediones, DPP4 inhibitors, and combinations thereof.

Clause 182. The system of clause 172, wherein a length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is dependent on a type of the glucose level-altering medication.

Clause 183. The system of clause 182, wherein the length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is a fixed time window related to a therapeutic window of the glucose level-altering medication.

Clause 184. The system of clause 182, wherein the length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is a variable time window, wherein a first time point of the variable time window is a time associated with administration of the glucose level-altering medication.

Clause 185. The system of clause 184, wherein the time associated with administration of the glucose level-altering medication is from a timestamp from a connected delivery device.

Clause 186. The system of clause 184, wherein the time associated with administration of the glucose level-altering medication is from a logged dose.

Clause 187. The system of clause 182, wherein the glucose level-altering medication is a long-acting insulin, and wherein the length of the at least one portion of analyte data associated

with the dose of glucose level-altering medication that was received is about 1 day.

Clause 188. The system of clause 182, wherein the glucose level-altering medication is a rapid-acting acting insulin, and wherein the length of the at least one portion of analyte data associated with the dose of glucose level-altering medication that was received is between about 4 hours and about 8 hours.

Clause 189. The system of clause 172, wherein the instructions further cause the one or more processors to display the plurality of glucose profiles in a side-by-side arrangement.

Clause 190. The system of clause 172, wherein the instructions further cause the one or more processors to display the plurality of glucose profiles in a vertical arrangement.

Clause 191. The system of clause 172, wherein the instructions further cause the one or more processors to display a time in ranges interface for each of the plurality of glucose profiles, wherein the time in ranges interface comprises a bar, wherein the bar comprises a plurality of bar portions, wherein each bar portion of the plurality of bar portions indicates an amount of time that a user's analyte level is within a predefined analyte range associated with each bar portion, wherein the plurality of bar portions are based on data indicative of an analyte level, and wherein the plurality of bar portions are based on the analyte data of each of the plurality of glucose profiles, respectively.

Clause 192. The system of clause 172, wherein the instructions further cause the one or more processors to display a GMI metric for each of the plurality of glucose profiles.

Clause 193. The system of clause 192, wherein the GMI metric is a GMI percentage and/or a GMI value in mmol/mol.

Clause 194. The system of clause 172, wherein the instructions further cause the one or more processors to display a glucose statistic for each of the plurality of glucose profiles.

Clause 195. The system of clause 194, wherein the glucose statistic is an average glucose value or a median glucose value.

Clause 196. The system of clause 194, wherein the glucose statistic is a CV.

Clause 197. The system of clause 172, wherein the instructions further cause the one or more processors to display a plurality of dose indicators corresponding to the administration of the doses of the glucose level-altering medication in the first and second glucose profiles.

Clause 198. A method comprising the steps of:

receiving time-correlated data characterizing an analyte of the subject and doses of a glucose level-altering medication received by the subject over a period of time;

determining at least one portion of the time-correlated data associated with at least one dose of a glucose level-altering medication that was received;

determining at least one portion of the time-correlated data associated with at least one dose of the glucose level-altering medication that was not received;

display a plurality of glucose profiles,

wherein a first glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received and the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received,

wherein a second glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received and does not include the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received, and

wherein a third glucose profile displays glucose levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was not received and does not include the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received.

Clause 199. The method of clause 198, wherein each of the first, second, and third glucose profiles comprises a plot of glucose levels determined from analyte data over the time period, wherein the plot displays a median glucose trace, and a plurality of traces for glucose levels at different percentiles.

Clause 200. The method of clause 198, wherein the period of time is about 1 month.

Clause 201. The method of clause 198, wherein the glucose level-altering medication is a glucose lowering medication.

Clause 202. The method of clause 198, wherein the glucose level-altering medication is insulin.

Clause 203. The method of clause 198, wherein the glucose level-altering medication is a fast-acting insulin.

Clause 204. The method of clause 198, wherein the glucose level-altering medication is a long-acting insulin.

Clause 205. The method of clause 198, wherein a length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is dependent on a type of the glucose level-altering medication.

Clause 206. The method of clause 205, wherein the glucose level-altering medication is a long-acting insulin, and wherein the length of the at least one portion of analyte data associated with the dose of glucose level-altering medication that was received is about 1 day.

Clause 207. The method of clause 205, wherein the glucose level-altering medication is a rapid-acting acting insulin, and wherein the length of the at least one portion of analyte data associated with the dose of glucose level-altering medication that was received is between about 4 hours and about 8 hours.

Clause 208. The method of clause 205, wherein the length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is a fixed time window related to a therapeutic window of the glucose level-altering medication.

Clause 209. The method of clause 205, wherein the length of the at least one portion of analyte data associated with the at least one dose of the glucose level-altering medication that was received is a variable time window, wherein a first time point of the variable time window is

a time associated with administration of the glucose level-altering medication.

Clause 210. The method of clause 209, wherein the time associated with administration of the glucose level-altering medication is from a timestamp from a connected delivery device.

Clause 211. The method of clause 209, wherein the time associated with administration of the glucose level-altering medication is from a logged dose.

Clause 212. The method of clause 198, wherein the plurality of glucose profiles is displayed in a side-by-side arrangement.

Clause 213. The method of clause 198, wherein the plurality of glucose profiles is displayed in a vertical arrangement.

Clause 214. The method of clause 198, further comprising the step of displaying a time in ranges interface for each of the plurality of glucose profiles, wherein the time in ranges interface for each of the plurality of glucose profiles comprises a bar, wherein the bar comprises a plurality of bar portions, wherein each bar portion of the plurality of bar portions indicates an amount of time that a user's analyte level is within a predefined analyte range associated with each bar portion, and wherein the plurality of bar portions are based on the analyte data of each of the plurality of glucose profiles, respectively.

Clause 215. The method of clause 198, further comprising the step of displaying a GMI metric for each of the plurality of glucose profiles.

Clause 216. The method of clause 215, wherein the GMI metric is a GMI percentage and/or a GMI value in mmol/mol.

Clause 217. The method of clause 198, further comprising the step of displaying a glucose statistic for each of the plurality of glucose profiles.

Clause 218. The method of clause 217, wherein the glucose statistic is an average glucose value or a median glucose value.

Clause 219. The method of clause 198, further comprising the step of displaying a plurality of dose indicators corresponding to the administration of the doses of the glucose level-altering medication in the first and second glucose profiles.

Clause 220. A system comprising:

wireless communications circuitry configured to receive measured drug dosing data and analyte data;

a display configured to visually present information; and

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the time-correlated data comprises at least one portion of analyte data associated with at least one dose of a medication that was received and at least one portion of analyte data associated with the at least one dose of the medication that was not received, wherein the instructions, when executed by the one or more processors, cause the system to:

determine the at least one portion of analyte data associated with the at least one dose of the medication that was received;

determine the at least one portion of analyte data associated with the at least one dose of the medication that was not received;

display a plurality of analyte profiles,

wherein a first analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the medication that was received and the at least one portion of analyte data associated with the at least one dose of the medication that was not received,

wherein a second analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data associated with the at least one dose of the medication that was received and does not include the at least one portion of analyte data associated with the at least one dose of the medication that was not received, and

wherein a third analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data associated with the

at least one dose of the medication that was not received and does not include the at least one portion of analyte data associated with the at least one dose of the medication that was received.

Clause 221. The system of clause 220, wherein each of the first, second, and third analyte profiles comprises a plot of analyte levels determined from analyte data over the time period, wherein the plot displays a median analyte trace, and a plurality of traces for analyte levels at different percentiles.

Clause 222. The system of clause 220, wherein the period of time is about 1 month.

Clause 223. The system of clause 220, wherein the analyte is glucose, and wherein the medication is a glucose lowering medication.

Clause 224. The system of clause 223, wherein the glucose lowering medication is insulin.

Clause 225. The system of clause 224, wherein the glucose lowering medication is at least one of a fast-acting insulin, a long-acting insulin, an intermediate-acting insulin.

Clause 226. The system of clause 224, wherein the glucose lowering medication is an SGLT inhibitor or a GLP1 receptor antagonist.

Clause 227. The system of clause 220, wherein a length of the at least one portion of analyte data after the at least one dose of the medication was received is dependent on a type of the medication.

Clause 228. The system of clause 227, wherein the length of the at least one portion of analyte data associated with the at least one dose of the medication that was received is a fixed time window related to a therapeutic window of the medication.

Clause 229. The system of clause 227, wherein the length of the at least one portion of analyte data associated with the at least one dose of the medication that was received is a variable time window, wherein a first time point of the variable time window is a time associated with administration of the medication.

Clause 230. The system of clause 229, wherein the time associated with administration of the medication is from a timestamp from a connected delivery device.

Clause 231. The system of clause 229, wherein the time associated with administration of the medication is from a logged dose.

Clause 232. The system of clause 220, wherein the instructions further cause the one or more processors to display the plurality of analyte profiles in a side-by-side arrangement.

Clause 233. The system of clause 220, wherein the instructions further cause the one or more processors to display the plurality of analyte profiles in a vertical arrangement.

Clause 234. The system of clause 220, wherein the instructions further cause the one or more processors to display an analyte metric for each of the plurality of analyte profiles.

Clause 235. The system of clause 220, wherein the instructions further cause the one or more processors to display an analyte statistic for each of the plurality of analyte profiles.

Clause 236. The system of clause 235, wherein the analyte statistic is an average analyte value or a median analyte value.

Clause 237. The system of clause 220, wherein the instructions further cause the one or more processors to display a plurality of dose indicators corresponding to the administration of the doses of the medication in the first and second analyte profiles.

Clause 238. The system of clause 220, wherein the time-correlated data further comprises at least one portion of analyte data after at least one dose of a second medication was received and at least one portion of analyte data after the at least one dose of the second medication was not received, wherein the instructions, when executed by the one or more processors, further cause the system to:

determine the at least one portion of analyte data after the at least one dose of the second medication was received;

determine the at least one portion of analyte data after the at least one dose of the second medication was not received;

display a plurality of analyte profiles,

wherein the first analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication, the at least one portion of analyte data after the at least one dose of the second medication were received, the at least one portion of analyte data after the at least one portion of analyte data after the at least one dose of the medication was not received, and the at least one portion of analyte data after the at least one dose of the second medication was not received,

wherein a fourth analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the second medication was received and does not include the at least one portion of analyte data after the at least one dose of the second medication was not received, and

wherein a fifth analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the second medication was not received and does not include the at least one portion of analyte data after the at least one dose of the second medication was received.

Clause 239. The system of clause 238, wherein the first medication is a long-acting insulin and the second medication is a rapid-acting insulin.

Clause 240. The system of clause 220, wherein the analyte is at least one of glucose, glucose derivatives, ketone, ketone bodies, or lactate.

Clause 241. The system of clause 220, wherein the analyte is at least one of oxygen, acetyl choline, amylase, bilirubin, cholesterol, chorionic gonadotropin, creatine kinase, creatine, DNA, fructosamine, glutamine, growth hormones, hormones, peroxide, prostate-specific antigen, prothrombin, RNA, thyroid stimulating hormone, and troponin.

Clause 242. A method comprising the steps of:

receiving time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time;

determining at least one portion of the time-correlated data after at least one dose of a medication was received;

determining at least one portion of the time-correlated data after at least one dose of the

medication was not received;

display a plurality of analyte profiles,

wherein a first analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication was received and the at least one portion of analyte data after the at least one dose of the medication was not received,

wherein a second analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication was received and does not include the at least one portion of analyte data after the at least one dose of the medication was not received, and

wherein a third analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication was not received and does not include the at least one portion of analyte data after the at least one dose of the medication was received.

Clause 243. The method of clause 242, wherein each of the first, second, and third analyte profiles comprises a plot of analyte levels determined from analyte data over the time period, wherein the plot displays a median analyte trace, and a plurality of traces for analyte levels at different percentiles.

Clause 244. The method of clause 242, wherein the period of time is about 1 month.

Clause 245. The method of clause 242, wherein the analyte is glucose, and wherein the medication is a glucose lowering medication.

Clause 246. The method of clause 245, wherein the glucose lowering medication is insulin.

Clause 247. The method of clause 246, wherein the glucose lowering medication is at least one of a fast-acting insulin, a long-acting insulin, an intermediate-acting insulin.

Clause 248. The method of clause 246, wherein the glucose lowering medication is an SGLT inhibitor or a GLP1 receptor antagonist.

Clause 249. The method of clause 242, wherein a length of the at least one portion of analyte data after the at least one dose of the medication was received is dependent on a type of the medication.

Clause 250. The method of clause 249, wherein the length of the at least one portion of analyte data associated with the at least one dose of the medication that was received is a fixed time window related to a therapeutic window of the medication.

Clause 251. The method of clause 249, wherein the length of the at least one portion of analyte data associated with the at least one dose of the medication that was received is a variable time window, wherein a first time point of the variable time window is a time associated with administration of the medication.

Clause 252. The method of clause 251, wherein the time associated with administration of the glucose level-altering medication is from a timestamp from a connected delivery device.

Clause 253. The method of clause 251, wherein the time associated with administration of the glucose level-altering medication is from a logged dose.

Clause 254. The method of clause 242, further comprising the step of displaying the plurality of analyte profiles in a side-by-side arrangement.

Clause 255. The method of clause 242, further comprising the step of displaying the plurality of analyte profiles in a vertical arrangement.

Clause 256. The method of clause 242, further comprising the step of displaying an analyte metric for each of the plurality of analyte profiles.

Clause 257. The method of clause 242, further comprising the step of displaying an analyte statistic for each of the plurality of analyte profiles.

Clause 258. The method of clause 257, wherein the analyte statistic is an average analyte value or a median analyte value.

Clause 259. The method of clause 242, further comprising the step of displaying a plurality of dose indicators corresponding to the administration of the doses of the medication in the first and second analyte profiles.

Clause 260. The method of clause 109, wherein the time-correlated data further comprises at least one portion of analyte data after at least one dose of a second medication was received and at least one portion of analyte data after the at least one dose of the second medication was not received, wherein the method further comprises the steps of:

determining the at least one portion of analyte data after the at least one dose of the second medication was received;

determining the at least one portion of analyte data after the at least one dose of the second medication was not received;

displaying the plurality of analyte profiles, wherein the plurality of analyte profiles further comprises a fourth and a fifth analyte profile,

wherein the first analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the medication, the at least one portion of analyte data after the at least one dose of the second medication were received, the at least one portion of analyte data after the at least one portion of analyte data after the at least one dose of the medication was not received, and the at least one portion of analyte data after the at least one dose of the second medication was not received,

wherein the fourth analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the second medication was received and does not include the at least one portion of analyte data after the at least one dose of the second medication was not received, and

wherein the fifth analyte profile displays analyte levels determined from analyte data comprising the at least one portion of analyte data after the at least one dose of the second medication was not received and does not include the at least one portion of analyte data after the at least one dose of the second medication was received.

Clause 261. The method of clause 260, wherein the first medication is a long-acting insulin and the second medication is a rapid-acting insulin.

Clause 262. The method of clause 242, wherein the analyte is at least one of glucose, glucose derivatives, ketone, ketone bodies, or lactate.

Clause 263. The method of clause 242, wherein the analyte is at least one of oxygen, acetyl choline, amylase, bilirubin, cholesterol, chorionic gonadotropin, creatine kinase, creatine, DNA, fructosamine, glutamine, growth hormones, hormones, peroxide, prostate-specific antigen, prothrombin, RNA, thyroid stimulating hormone, and troponin.

Clause 264. A system comprising:

wireless communications circuitry configured to receive measured analyte data;

a display configured to visually present information; and

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the one or more processors to:

display a first time-in-range graphical representation for a first time period and a second time-in-range graphical representation for a second time period, wherein each of the first and second time-in-range graphical representations each comprise a predetermined number of portions corresponding to a plurality of concentration ranges, wherein each of the predetermined number of graph portions comprises a predetermined number of different colors equal to the predetermined number of portions;

display a first glucose metrics section for the first time period and a second glucose metrics section for the second time period, wherein each of the first and second glucose metrics section comprises a glucose management indicator and average glucose level for each of the first and second time periods, respectively;

display a first ambulatory glucose profile for the first time period and a second ambulatory glucose profile for the second time period; and

display a first low glucose events section and a second low glucose events section, wherein each of the first and second low glucose events sections comprise a graph of glucose levels below a low threshold for the first and second time periods, respectively.

Clause 265. The system of clause 264, wherein each of the first and second ambulatory glucose profiles comprises the predetermined number of portions corresponding to the plurality

of concentration ranges, wherein glucose levels displayed in each of the predetermined number of portions comprise the predetermined number of different colors.

Clause 266. The system of clause 264, wherein each of the first and second low glucose events sections further comprises a total number of low glucose events for the first and second time periods, respectively.

Clause 267. The system of clause 264, wherein the predetermined number of portions comprise a very low concentration range, a low concentration range, a target range, a high concentration range, and a very high concentration range.

Clause 268. The system of clause 264, wherein each of the first and second glucose metrics sections further comprise a glucose variability metric for each of the first and second time periods, respectively.

Clause 269. The system of clause 264, wherein each of the first and second time-in-range graphical representations further comprise a percentage value corresponding to each of the predetermined number of portions.

Clause 270. The system of clause 264, wherein the instructions, when executed by the one or more processors, further cause the system to:

display first and second sensor metrics for the first and second time periods.

Clause 271. The system of clause 270, wherein the first and second sensor metrics each comprise an amount of time a sensor was active during the first and second time periods, respectively.

Clause 272. The system of clause 270, wherein the first and second sensor metrics each comprise an average number of views of a glucose level by a user during the first and second time periods, respectively.

Clause 273. The system of clause 270, wherein the first and second sensor metrics each comprise an average number of scans of a sensor by a user during the first and second time periods, respectively.

Clause 274. The system of clause 264, wherein each of the first and second time-in-range graphical representations are bar graphs.

Clause 275. The system of clause 264, wherein each of the predetermined number of portions are arranged vertically in a single column.

Clause 276. The system of clause 264, wherein the plurality of concentration ranges comprises five concentration ranges.

Clause 277. The system of clause 264, wherein the predetermined number of portions comprises up to five portions.

Clause 278. A method comprising the steps of:

receiving time-correlated data characterizing an analyte of a user over a period of time;

displaying a first time-in-range graphical representation for a first time period and a second time-in-range graphical representation for a second time period on a single graphical user interface, wherein each of the first and second time-in-range graphical representations each comprise a predetermined number of portions corresponding to a plurality of concentration ranges, wherein each of the predetermined number of portions comprises a predetermined number of different colors equal to the predetermined number of portions;

displaying a first glucose metrics section for the first time period and a second glucose metrics section for the second time period on the single graphical user interface, wherein each of the first and second glucose metrics section comprises a glucose management indicator and average glucose level for each of the first and second time periods, respectively;

displaying a first ambulatory glucose profile for the first time period and a second ambulatory glucose profile for the second time period on the single graphical user interface; and

displaying a first low glucose events section and a second low glucose events section on the single graphical user interface, wherein each of the first and second low glucose events sections comprise a graph of glucose levels below a low threshold for the first and second time periods, respectively.

Clause 279. The method of clause 278, wherein each of the first and second

ambulatory glucose profiles comprises at least five portions corresponding to the five concentration ranges, wherein glucose levels displayed in each of the five portions comprise the five different colors.

Clause 280. The method of clause 278, wherein each of the first and second low glucose events sections further comprises a total number of low glucose events for the first and second time periods, respectively.

Clause 281. The method of clause 278, wherein the predetermined number of portions comprise a very low concentration range, a low concentration range, a target range, a high concentration range, and a very high concentration range.

Clause 282. The method of clause 278, wherein each of the first and second glucose metrics sections further comprise a glucose variability metric for each of the first and second time periods, respectively.

Clause 283. The method of clause 278, wherein each of the first and second time-in-range graphical representations further comprise a percentage value corresponding to each of the predetermined number of portions.

Clause 284. The method of clause 278, further comprising the step of:

displaying first and second sensor metrics for the first and second time periods.

Clause 285. The method of clause 284, wherein the first and second sensor metrics each comprise an amount of time a sensor was active during the first and second time periods, respectively.

Clause 286. The method of clause 284, wherein the first and second sensor metrics each comprise an average number of views of a glucose level by a user during the first and second time periods, respectively.

Clause 287. The method of clause 284, wherein the first and second sensor metrics each comprise an average number of scans of a sensor by a user during the first and second time periods, respectively.

Clause 288. The method of clause 278, wherein each of the first and second time-in-range graphical representations are bar graphs.

Clause 289. The method of clause 278, wherein each of the predetermined number of portions are arranged vertically in a single column.

Clause 290. The method of clause 278, wherein the plurality of concentration ranges comprises five concentration ranges.

Clause 291. The method of clause 278, wherein the predetermined number of portions comprises up to five portions.

CLAIMS

What is claimed is:

1. An analyte monitoring system, comprising:

a sensor control device comprising an analyte sensor, wherein at least a portion of the analyte sensor is configured to be in fluid contact with a bodily fluid of subject;

a medication delivery device configured to deliver an amount of medication to the subject and record the amount delivered in a log; and

a reader device, comprising:

a display;

wireless communication circuitry configured to receive a current sensor reading from the sensor control device and the log from the medication delivery device; and

one or more processors coupled to a memory, the memory storing instructions that, when executed by the one or more processors, cause the one or more processors to:

output to the display an interface prompting the subject to connect the medication delivery device;

output to the display an interface prompting the subject to select a type of medication delivery device;

output to the display an interface prompting the subject to select a type of medication being delivered by the medication delivery device; and

output to the display an interface prompting the subject to select a brand of medication being delivered by the medication delivery device.

2. The system of claim 1, wherein the medication delivery device is an insulin pen.

3. The system of claim 1, wherein the type of medication delivery device is a brand of insulin pen.

4. The system of claim 1, wherein the type of medication being delivered is a type of insulin.

5. The system of claim 4, wherein the type of insulin is rapid-acting or long-acting.

6. The system of claim 1, wherein the instructions further cause the one or more processors to output to the display an animation demonstrating how to hold the medication delivery device relative to the reader device to transfer the log.

7. The system of claim 1, wherein the instructions further cause the one or more processors to output to the display an interface prompting the subject to select a color of medication delivery device.

8. An analyte monitoring system, comprising:

a sensor control device comprising an analyte sensor, wherein at least a portion of the analyte sensor is configured to be in fluid contact with a bodily fluid of subject;

a medication delivery device configured to deliver an amount of medication to the subject and record the amount delivered in a log; and

a reader device, comprising:

a display;

wireless communication circuitry configured to receive a current sensor reading from the sensor control device and the log from the medication delivery device; and

one or more processors coupled to a memory, the memory storing instructions that, when executed by the one or more processors, cause the one or more processors to output to the display logbook interface, wherein the logbook interface comprises a plurality of entries comprising at least two of a dosage of a medication, a comment, an alarm, and a prime of a medication delivery device.

9. The system of claim 8, wherein the plurality of entries are arranged according to a time order.

10. The system of claim 8, wherein the medication is insulin.

11. A system comprising:

a medication delivery device;

a wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a first graph having an x-axis of time, a y-axis of glucose concentration, and a plot of a median of an average glucose concentration over the period of time;

display a second graph having an x-axis of time, a y-axis of glucose concentration, and a plot of low glucose events, wherein a low glucose event comprises a glucose level below a threshold level;

display an average amount of carbohydrates consumed in a day over the period of time; and

display an average amount of at least one medication delivered per day over the period of time.

12. The system of claim 11, wherein the memory further holds instructions to display a third graph having an x-axis of time, a y-axis of a relative amount of time that a sensor is active, and a plot of an average time that the sensor was active over the period of time.

13. The system of claim 11, wherein the instructions further cause the one or more processors to display an average total daily amount of the at least one medication delivered per day.

14. The system of claim 11, wherein the at least one medication delivered comprises a rapid-acting insulin and a long-acting insulin.

15. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display,

and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plurality of daily graphs corresponding to each day of the period of time, each graph of the plurality of daily graphs comprising an x-axis of time, a y-axis of glucose concentration, a plot of a glucose concentration over a 24-hour period, and a plurality of dose indicators, wherein each of the plurality of dose indicators illustrate an amount of medication administered; and

display a plurality of total dose indicators of an amount of the at least one medication delivered during the 24-hour day period.

16. The system of claim 15, wherein the plurality of total dose indicators comprises a numerical value highlighted with a first color for a first medication.

17. The system of claim 16, wherein the plurality of total dose indicators comprises a numerical value highlighted with a second color for a second medication.

18. The system of claim 16, wherein the plurality of dose indicators comprises a numerical value corresponding highlighted with the first color for the first medication.

19. The system of claim 17, wherein the plurality of dose indicators comprises a numerical value highlighted with the first color for the first medication and a numerical value highlighted with the second color for the second medication.

20. The system of claim 15, wherein the instructions further cause the one or more processors to display a plurality of average glucose values for at least some of the days of the period of time.

21. The system of claim 15, wherein the instructions further cause the one or more processors to display a plurality of values for an amount of total carbohydrates consumed for at least some of the days of the period of time.

22. The system of claim 15, wherein the instructions further cause the one or more processors to display a number of events in which a glucose level of the subject was below a threshold value.

23. The system of claim 15, wherein each graph of the plurality of daily graphs comprises a target range, and wherein an area under the curve for a portion of a plot outside of the target range is colored.

24. The system of claim 23, wherein the area under the curve for the portion of the plot outside of the target range is colored red when the portion of the plot outside is below the target range.

25. The system of claim 23, wherein the area under the curve for the portion of the plot outside of the target range is colored yellow when the portion of the plot outside is above the target range.

26. The system of claim 15, wherein each graph of the plurality of daily graphs comprises a target range, and wherein a portion of a plot outside of the target range is colored.

27. The system of claim 26, wherein the portion of the plot outside of the target range is colored red when the portion of the plot outside is below the target range.

28. The system of claim 26, wherein the portion of the plot outside of the target range is colored yellow when the portion of the plot outside is above the target range.

29. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the

instructions, when executed by the one or more processors, cause the system to:

display a plurality of daily graphs corresponding to each day of the period of time, each graph of the plurality of daily graphs comprising an x-axis of time, a y-axis of glucose concentration, a plot of a glucose concentration over a 24-hour period;

display a plurality of carbohydrate indicators corresponding to amounts of carbohydrates consumed during the 24-hour period, wherein each of the carbohydrate indicators is positioned in a time of day period in which the carbohydrates were consumed; and

display a plurality of dose indicators corresponding to doses of at least one medication, wherein each of the plurality of dose indicators illustrate an amount of medication administered, and wherein each of the plurality of dose indicators is positioned in a time of day period in which it was administered.

30. The system of claim 29, wherein the plurality of dose indicators corresponds to doses for a first medication and a second medication, wherein the instructions further cause the one or more processors to display the plurality of dose indicators for the first medication in a first row and to display the plurality of dose indicators for the second medication in a second row.

31. The system of claim 30, wherein the plurality of dose indicators for the first medication are displayed in a first color and the plurality of dose indicators for the second medication are displayed in a second color.

32. The system of claim 29, wherein the plurality of dose indicators comprises a total dose administered.

33. The system of claim 32, wherein the instructions further cause the one or more processors to display a plurality of components for at least some of the plurality of dose indicators.

34. The system of claim 33, wherein the plurality of components comprises corrections or changes.

35. The system of claim 29, wherein the at least one medication is insulin.

36. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plot of glucose readings over a 24-hour period, wherein the plot displays a median glucose trace and a plurality of traces for glucose readings at different percentiles for the period of time;

display a plot of carbohydrate indicators corresponding to amounts of carbohydrates consumed during the 24-hour period, wherein each of the carbohydrate indicators is positioned in a time of day period in which the carbohydrates were consumed during the period of time; and

display a plurality of average dose amounts corresponding to doses of at least one medication administered during a time period during the 24-hour period.

37. The system of claim 36, the instructions further cause the one or more processors to display a daily average amount of carbohydrates consumed during the period of time.

38. The system of claim 37, the instructions further cause the one or more processors to display an average amount of carbohydrates consumed during each of a plurality of time periods of the 24-hour period.

39. The system of claim 36, wherein the at least one medication comprises first and second medications, and wherein the instructions further cause the one or more processors to display a plurality of average dose amounts corresponding to doses of the first medication in a first row and a plurality of average dose amounts corresponding to doses of the second medication in a second row.

40. The system of claim 36, the instructions further cause the one or more processors to display a daily average dose of at least one medication consumed during the period of time.

41. The system of claim 36, wherein the at least one medication is insulin.

42. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plurality of plots of glucose readings for different time of day periods, wherein each plot of the plurality of plots displays glucose readings during the period of time and a target range; and

display a plurality of tables for the different time of day periods, wherein each table of the plurality of tables comprises glucose levels measured before and after a meal for at least some days of the period of time, and dosages of at least one medication delivered during at least some days of the period of time.

43. The system of claim 42, the instructions further cause the one or more processors to display an average dosage of the at least one medication delivered for each period of time.

44. The system of claim 42, the instructions further cause the one or more processors to display an average glucose level measured before and after the meal for each period of time.

45. The system of claim 42, wherein each table of the plurality of tables further comprises an amount of carbohydrates consumed for at least some days of the period of time.

46. The system of claim 45, wherein the instructions further cause the one or more processors to display an average amount of carbohydrates consumed for each period of time.

47. The system of claim 42, wherein the at least one medication is insulin.

48. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plurality of settings related to analyte levels; and

display a plurality of settings related to at least one medication delivery device.

49. The system of claim 48, wherein the settings related to analyte levels comprise a target analyte range.

50. The system of claim 48, wherein the settings related to analyte levels comprise alarm settings comprising a low analyte level threshold level and a high analyte level threshold.

51. The system of claim 48, wherein the settings related to analyte levels comprise alarm settings related to a loss of signal from sensor control device configured to measure an analyte level.

52. The system of claim 48, wherein the plurality of settings related to at least one medication delivery device comprises a type of medication and information relating to a last transfer of dosing data from the medication delivery device.

53. The system of claim 52, wherein the information relating to the last transfer of dosing data comprises a date and a time of the last transfer of dosing data.

54. The system of claim 52, wherein the plurality of settings related to at least one medication delivery device further comprises a color of the medication delivery device.

55. The system of claim 48, wherein the analyte data is glucose data.

56. The system of claim 48, wherein the at least one medication delivery device is an at least one insulin delivery device.

57. The system of claim 48, wherein the at least one medication delivery device is a first and a second medication delivery device.

58. The system of claim 48, wherein the instructions further cause the one or more processors to display information related to a sensor control device configured to measure an analyte level.

59. The system of claim 58, wherein the information related to the sensor control device comprises a name of the sensor control device and a software version on the sensor control device.

60. The system of claim 48, wherein the instructions further cause the one or more processors to display information related to the at least one medication delivery device.

61. The system of claim 60, wherein the information related to the at least one medication delivery device comprises a brand name of the at least one medication delivery device.

62. The system of claim 60, wherein the information related to the at least one medication delivery device comprises a serial number of the at least one medication delivery device.

63. A system comprising:

wireless communications circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to present an alert;

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions, wherein the instructions, when executed by the one or more processors, cause the one or more processors to:

determine if a meal has been consumed based on an increase in an analyte level above a high threshold;

determine if an insulin dose has not been recorded within a period of time since a previous insulin dose; and

in response to a determination that a meal has been consumed and a determination that the insulin dose has not been recorded within the period of time since the previous insulin dose, display an alert interface relating to the missed meal dose.

64. The system of claim 63, wherein the high threshold is about 175 mg/dL.

65. The system of claim 63, wherein the period of time since the previous insulin dose is about 3 hours.

66. The system of claim 63, wherein the one or more processors are further configured to display the alert interface for the meal at a predetermined time selected by a user.

67. The system of claim 63, wherein text of the alert interface is at least partially customized by a user.

68. A system comprising:

wireless communications circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to present an alert;

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions, wherein the instructions, when executed by the one or more processors, cause the one or more processors to:

determine if an analyte level is above a high threshold after a predetermined period of time since a last insulin dose; and

in response to a determination that the analyte level is above the high threshold after the predetermined period of time since the last insulin dose, display an alert interface relating to a correction dose.

69. The system of claim 68, wherein text of the alert interface is at least partially customized by a user.

70. The system of claim 68, wherein the predetermined period of time is at least about 2 hours.

71. The system of claim 68, wherein the high threshold is about 250 mg/dL.

72. The system of claim 68, wherein the high threshold is set by a user.

73. A system comprising:

wireless communications circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to present an alert;

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions, wherein the instructions, when executed by the one or more processors, cause the one or more processors to:

determine if an analyte level is below a high threshold after a predetermined period of time since a last insulin dose; and

in response to a determination that the analyte level is below the high threshold after the predetermined period of time since the last insulin dose, display a message interface relating to the analyte level being within a target range.

74. The system of claim 73, wherein text of the message interface is at least partially customized by a user.

75. The system of claim 73, wherein the predetermined period of time is at least about 2 hours.

76. The system of claim 73, wherein the high threshold is set by a user.

77. The system of claim 73, wherein the instructions further cause the one or more processors to display a prompt for a user to enter a note relating to the analyte level being within the target range.

78. A system comprising:

a medication delivery device;

wireless communication circuitry configured to receive measured analyte data and drug dosing data, wherein the drug dosing data is received automatically from the medication delivery device;

a display configured to visually present information; and

one or more processors coupled with the wireless communication circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

display a plurality of daily graphs corresponding to each day of the period of time, each graph of the plurality of daily graphs comprising an x-axis of time, a y-axis of glucose concentration, a plot of a glucose concentration over a 24-hour period;

display a time in range metric for each day of the period of time,

display a total amount of rapid acting insulin and a total amount of long acting insulin received by a user for each day of the period of time, and

display a plurality of dose indicators corresponding to doses of at least one of rapid-acting insulin or long-acting insulin, wherein each of the plurality of dose indicators illustrate an amount of the at least one of rapid-acting insulin or long-acting insulin administered, and wherein each of the plurality of dose indicators is positioned in a time of day period in which it was administered.

79. The system of claim 78, wherein the instructions further cause the one or more processors to display the plurality of dose indicators for the rapid-acting insulin in a first row and to display the plurality of dose indicators for the long-acting insulin in a second row.

80. The system of claim 79, wherein the plurality of dose indicators for the rapid-acting insulin are displayed in a first color and the plurality of dose indicators for the long-acting insulin are displayed in a second color.

81. The system of claim 78, wherein the plurality of dose indicators comprises a total dose administered.

82. The system of claim 78, wherein the instructions further cause the one or more processors to display a plurality of carbohydrate indicators corresponding to amounts of carbohydrates consumed during the 24-hour period, wherein each of the carbohydrate indicators is positioned in a time-of-day period in which the carbohydrates were consumed; and

83. The system of claim 78, wherein the medication delivery device is a connected pen or connected pen cap.

84. The system of claim 78, wherein the medication delivery device is an insulin pump.

85. The system of claim 84, wherein the instructions further cause the one or more processors to display a graph of long-acting insulin received.

86. The system of claim 84, wherein the instructions further cause the one or more processors to display a graphical representation of an operating state of the insulin pump.

87. The system of claim 86, wherein the operating state comprises automated delivery, maximum delivery, and automated pause.

88. A system comprising:

wireless communications circuitry configured to receive time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time;

a display configured to visually present information; and

one or more processors coupled with the wireless communications circuitry, the display, and

a memory storing instructions, time-correlated data characterizing an analyte of the subject, and doses of a glucose level-altering medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system to:

determine a subset of time-correlated data based on a filtering criteria selected by the subject; and

display a first glucose profile display and a second glucose profile on a single

graphical subject interface, wherein the first glucose profile displays glucose levels associated with the time-correlated data over a first time period, and wherein the second glucose profile displays the subset of the time-correlated data over the first time period.

89. The system of claim 88, wherein the medication is a glucose level altering medication.

90. The system of claim 89, wherein the glucose level altering medication is insulin.

91. The system of claim 88, wherein the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

92. The system of claim 91, wherein the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication.

93. The system of claim 91, wherein the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window.

94. The system of claim 93, wherein the dosing window for breakfast is from about 6 am to about 11 am.

95. The system of claim 93, wherein the dosing window for lunch is from about 11 am to about 4 pm.

96. The system of claim 93, wherein the dosing window for dinner is from about 4 pm to about 10 pm.

97. The system of claim 93, wherein the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time.

98. The system of claim 91, wherein the filtering criteria is under-bolused doses, and

wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication.

99. The system of claim 91, wherein the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication.

100. The system of claim 91, wherein the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal.

101. The system of claim 91, wherein the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

102. The system of claim 88, wherein the instructions, when executed by the one or more processors, further cause the system to:

determine an additional subset of time-correlated data based on a second filtering criteria selected by the subject; and

display a third glucose profile, wherein the third glucose profile displays the additional subset of time-correlated data over the first time period.

103. The system of claim 102, wherein the second filtering criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

104. The system of claim 88, wherein the first and second glucose profiles are displayed in a horizontal arrangement.

105. The system of claim 88, wherein the first and second glucose profiles are displayed in a vertical arrangement.

106. The system of claim 88, wherein the first time period is selected by the subject.

107. The system of claim 88, wherein the first time period is automatically set.

108. The system of claim 88, wherein the filtering criteria is selected using a drop-down menu.

109. A method comprising the steps of:

receiving time-correlated data characterizing an analyte of a subject and doses of a medication received by the subject over a period of time;

determining a subset of time-correlated data based on a filtering criteria selected by the subject;

displaying a first glucose profile display and a second glucose profile on a single graphical user interface, wherein the first glucose profile displays glucose levels associated with the time-correlated data over a first time period, and wherein the second glucose profile displays the subset of the time-correlated data over the first time period.

110. The method of claim 109, wherein the medication is a glucose level altering medication.

111. The method of claim 110, wherein the glucose level altering medication is insulin.

112. The method of claim 109, wherein the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

113. The method of claim 112, wherein the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication.

114. The method of claim 112, wherein the filtering criteria is missed doses, and

wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window.

115. The method of claim 114, wherein the dosing window for breakfast is from about 6 am to about 11 am.

116. The method of claim 114, wherein the dosing window for lunch is from about 11 am to about 4 pm.

117. The method of claim 114, wherein the dosing window for dinner is from about 4 pm to about 10 pm.

118. The method of claim 114, wherein the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time.

119. The method of claim 112, wherein the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication.

120. The method of claim 112, wherein the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication.

121. The method of claim 112, wherein the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal.

122. The method of claim 112, wherein the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of

the medication was received during a dosing window.

123. The method of claim 109, further comprising the step of:

determining an additional subset of time-correlated data based on a second filtering criteria selected by the subject;

displaying a third glucose profile on the single graphical user interface, wherein the third glucose profile displays the additional subset of time-correlated data over the first time period.

124. The method of claim 123, wherein the second filtering criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

125. The method of claim 109, wherein the first and second glucose profiles are displayed in a horizontal arrangement.

126. The method of claim 109, wherein the first and second glucose profiles are displayed in a vertical arrangement.

127. The method of claim 109, wherein the first time period is selected by the subject.

128. The method of claim 109, wherein the first time period is automatically set.

129. The method of claim 109, wherein the filtering criteria is selected using a drop-down menu.

130. A system comprising:

wireless communications circuitry configured to receive time-correlated data characterizing an analyte of the subject and doses of a medication received by the subject over a period of time;

a display configured to visually present information; and

one or more processors coupled with the wireless communications circuitry, the display, and

a memory storing instructions, time-correlated data characterizing an analyte of the subject, and doses of a glucose level-altering medication received by the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the system

to:

determine a first subset of time-correlated data based on a first filtering criteria selected by the subject and a second subset of time-correlated data based on a second filtering criteria selected by the subject; and

display a first glucose profile display and a second glucose profile on a single graphical user interface, wherein the first glucose profile displays the first subset of the time-correlated data over a first time period, and wherein the second glucose profile displays the second subset of the time-correlated data over the first time period.

131. The system of claim 130, wherein the medication is a glucose level altering medication.

132. The system of claim 131, wherein the glucose level altering medication is insulin.

133. The system of claim 130, wherein the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

134. The system of claim 133, wherein the filtering criteria is recommended doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication.

135. The system of claim 133, wherein the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window.

136. The system of claim 135, wherein the dosing window for breakfast is from about 6 am to about 11 am.

137. The system of claim 135, wherein the dosing window for lunch is from about 11 am to about 4 pm.

138. The system of claim 135, wherein the dosing window for dinner is from about 4 pm to about 10 pm.

139. The system of claim 135, wherein the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time.

140. The system of claim 133, wherein the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication.

141. The system of claim 133, wherein the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication.

142. The system of claim 133, wherein the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal.

143. The system of claim 133, wherein the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

144. The system of claim 130, wherein the instructions, when executed by the one or more processors, further cause the system to:

determine a third subset of time-correlated data based on a second filtering criteria selected by the subject; and

display a third glucose profile, wherein the third glucose profile displays the third subset of time-correlated data over the first time period.

145. The system of claim 144, wherein the third filtering criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or

extra meal doses.

146. The system of claim 130, wherein the first and second glucose profiles are displayed in a horizontal arrangement.

147. The system of claim 130, wherein the first and second glucose profiles are displayed in a vertical arrangement.

148. The system of claim 130, wherein the first time period is selected by the subject.

149. The system of claim 130, wherein the first time period is automatically set.

150. The system of claim 130, wherein the first and second filtering criteria are selected using a drop-down menu.

151. A method comprising the steps of:

receiving time-correlated data characterizing an analyte of a subject and doses of a medication received by the subject over a period of time;

determining a first subset of time-correlated data based on a first filtering criteria selected by the subject and a second subset of time-correlated data based on a second filtering criteria selected by the subject;

displaying a first glucose profile display and a second glucose profile on a single graphical user interface, wherein the first glucose profile displays the first subset of the time-correlated data over a first time period, and wherein the second glucose profile displays the second subset of the time-correlated data over the first time period.

152. The method of claim 151, wherein the medication is a glucose level altering medication.

153. The method of claim 152, wherein the glucose level altering medication is insulin.

154. The method of claim 151, wherein the filter criteria is one of recommended doses, missed doses, under-bolused doses, over-bolused doses, late meal doses, or extra meal doses.

155. The method of claim 154, wherein the filtering criteria is recommended doses,

and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the same as a recommended dose of the medication.

156. The method of claim 155, wherein the filtering criteria is missed doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was not received during a dosing window.

157. The method of claim 156, wherein the dosing window for breakfast is from about 6 am to about 11 am.

158. The method of claim 156, wherein the dosing window for lunch is from about 11 am to about 4 pm.

159. The method of claim 156, wherein the dosing window for dinner is from about 4 pm to about 10 pm.

160. The method of claim 156, wherein the dosing window for a basal dose is about 1 hour from a prescribed basal dosing time.

161. The method of claim 155, wherein the filtering criteria is under-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is lower than a recommended dose of the medication.

162. The method of claim 155, wherein the filtering criteria is over-bolused doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one dose of medication that was received during a dosing window, wherein an amount of the at least one dose of medication received is the higher than a recommended dose of the medication.

163. The method of claim 155, wherein the filtering criteria is late meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data

associated with at least one dose of medication that was received after a predetermined period of time after a start of a meal.

164. The method of claim 155, wherein the filtering criteria is extra meal doses, and wherein the subset of time-correlated data based on the filtering criteria comprises analyte data associated with at least one additional dose of medication that was received after a first dose of the medication was received during a dosing window.

165. The method of claim 155, further comprising the step of:

determining a third subset of time-correlated data based on a third filtering criteria selected by the subject; and

displaying a third glucose profile on the single graphical user interface, wherein the third glucose profile displays the additional subset of time-correlated data over the first time period.

166. The method of claim 155, further comprising the step of:

displaying a third glucose profile on the single graphical user interface, wherein the third glucose profile displays glucose levels associated with the time-correlated data over the first time period.

167. The method of claim 151, wherein the first and second glucose profiles are displayed in a horizontal arrangement.

168. The method of claim 151, wherein the first and second glucose profiles are displayed in a vertical arrangement.

169. The method of claim 151, wherein the first time period is selected by the subject.

170. The method of claim 151, wherein the first time period is automatically set.

171. The method of claim 151, wherein the first and second filtering criteria are selected using a drop-down menu.

172. A system comprising:

wireless communications circuitry configured to receive measured analyte data;

a display configured to visually present information; and

one or more processors coupled with the wireless communications circuitry, the display, and a memory storing instructions and time-correlated data characterizing an analyte of the subject over a period of time, wherein the instructions, when executed by the one or more processors, cause the one or more processors to:

display a first time-in-range graphical representation for a first time period and a second time-in-range graphical representation for a second time period, wherein each of the first and second time-in-range graphical representations each comprise a predetermined number of portions corresponding to a plurality of concentration ranges, wherein each of the predetermined number of graph portions comprises a predetermined number of different colors equal to the predetermined number of portions;

display a first glucose metrics section for the first time period and a second glucose metrics section for the second time period, wherein each of the first and second glucose metrics section comprises a glucose management indicator and average glucose level for each of the first and second time periods, respectively;

display a first ambulatory glucose profile for the first time period and a second ambulatory glucose profile for the second time period; and

display a first low glucose events section and a second low glucose events section, wherein each of the first and second low glucose events sections comprise a graph of glucose levels below a low threshold for the first and second time periods, respectively.

173. The system of claim 172, wherein each of the first and second ambulatory glucose profiles comprises the predetermined number of portions corresponding to the plurality of concentration ranges, wherein glucose levels displayed in each of the predetermined number of portions comprise the predetermined number of different colors.

174. The system of claim 172, wherein each of the first and second low glucose events sections further comprises a total number of low glucose events for the first and second time periods, respectively.

175. The system of claim 172, wherein the predetermined number of portions comprise a very low concentration range, a low concentration range, a target range, a high concentration range, and a very high concentration range.

176. The system of claim 172, wherein each of the first and second glucose metrics sections further comprise a glucose variability metric for each of the first and second time periods, respectively.

177. The system of claim 172, wherein each of the first and second time-in-range graphical representations further comprise a percentage value corresponding to each of the predetermined number of portions.

178. The system of claim 172, wherein the instructions, when executed by the one or more processors, further cause the system to:

display first and second sensor metrics for the first and second time periods.

179. The system of claim 178, wherein the first and second sensor metrics each comprise an amount of time a sensor was active during the first and second time periods, respectively.

180. The system of claim 178, wherein the first and second sensor metrics each comprise an average number of views of a glucose level by a user during the first and second time periods, respectively.

181. The system of claim 178, wherein the first and second sensor metrics each comprise an average number of scans of a sensor by a user during the first and second time periods, respectively.

182. The system of claim 172, wherein each of the first and second time-in-range graphical representations are bar graphs.

183. The system of claim 172, wherein each of the predetermined number of portions are arranged vertically in a single column.

184. The system of claim 172, wherein the plurality of concentration ranges comprises five concentration ranges.

185. The system of claim 172, wherein the predetermined number of portions comprises up to five portions.

186. A method comprising the steps of:

receiving time-correlated data characterizing an analyte of a user over a period of time;

displaying a first time-in-range graphical representation for a first time period and a second time-in-range graphical representation for a second time period on a single graphical user interface, wherein each of the first and second time-in-range graphical representations each comprise a predetermined number of portions corresponding to a plurality of concentration ranges, wherein each of the predetermined number of portions comprises a predetermined number of different colors equal to the predetermined number of portions;

displaying a first glucose metrics section for the first time period and a second glucose metrics section for the second time period on the single graphical user interface, wherein each of the first and second glucose metrics section comprises a glucose management indicator and average glucose level for each of the first and second time periods, respectively;

displaying a first ambulatory glucose profile for the first time period and a second ambulatory glucose profile for the second time period on the single graphical user interface; and

displaying a first low glucose events section and a second low glucose events section on the single graphical user interface, wherein each of the first and second low glucose events sections comprise a graph of glucose levels below a low threshold for the first and second time periods, respectively.

187. The method of claim 186, wherein each of the first and second ambulatory glucose profiles comprises at least five portions corresponding to the five concentration ranges, wherein glucose levels displayed in each of the five portions comprise the five different colors.

188. The method of claim 186, wherein each of the first and second low glucose events sections further comprises a total number of low glucose events for the first and second time periods, respectively.

189. The method of claim 186, wherein the predetermined number of portions comprise a very low concentration range, a low concentration range, a target range, a high concentration range, and a very high concentration range.

190. The method of claim 186, wherein each of the first and second glucose metrics sections further comprise a glucose variability metric for each of the first and second time

periods, respectively.

191. The method of claim 186, wherein each of the first and second time-in-range graphical representations further comprise a percentage value corresponding to each of the predetermined number of portions.

192. The method of claim 186, further comprising the step of:
displaying first and second sensor metrics for the first and second time periods.

193. The method of claim 192, wherein the first and second sensor metrics each comprise an amount of time a sensor was active during the first and second time periods, respectively.

194. The method of claim 192, wherein the first and second sensor metrics each comprise an average number of views of a glucose level by a user during the first and second time periods, respectively.

195. The method of claim 192, wherein the first and second sensor metrics each comprise an average number of scans of a sensor by a user during the first and second time periods, respectively.

196. The method of claim 186, wherein each of the first and second time-in-range graphical representations are bar graphs.

197. The method of claim 186, wherein each of the predetermined number of portions are arranged vertically in a single column.

198. The method of claim 186, wherein the plurality of concentration ranges comprises five concentration ranges.

199. The method of claim 186, wherein the predetermined number of portions comprises up to five portions.

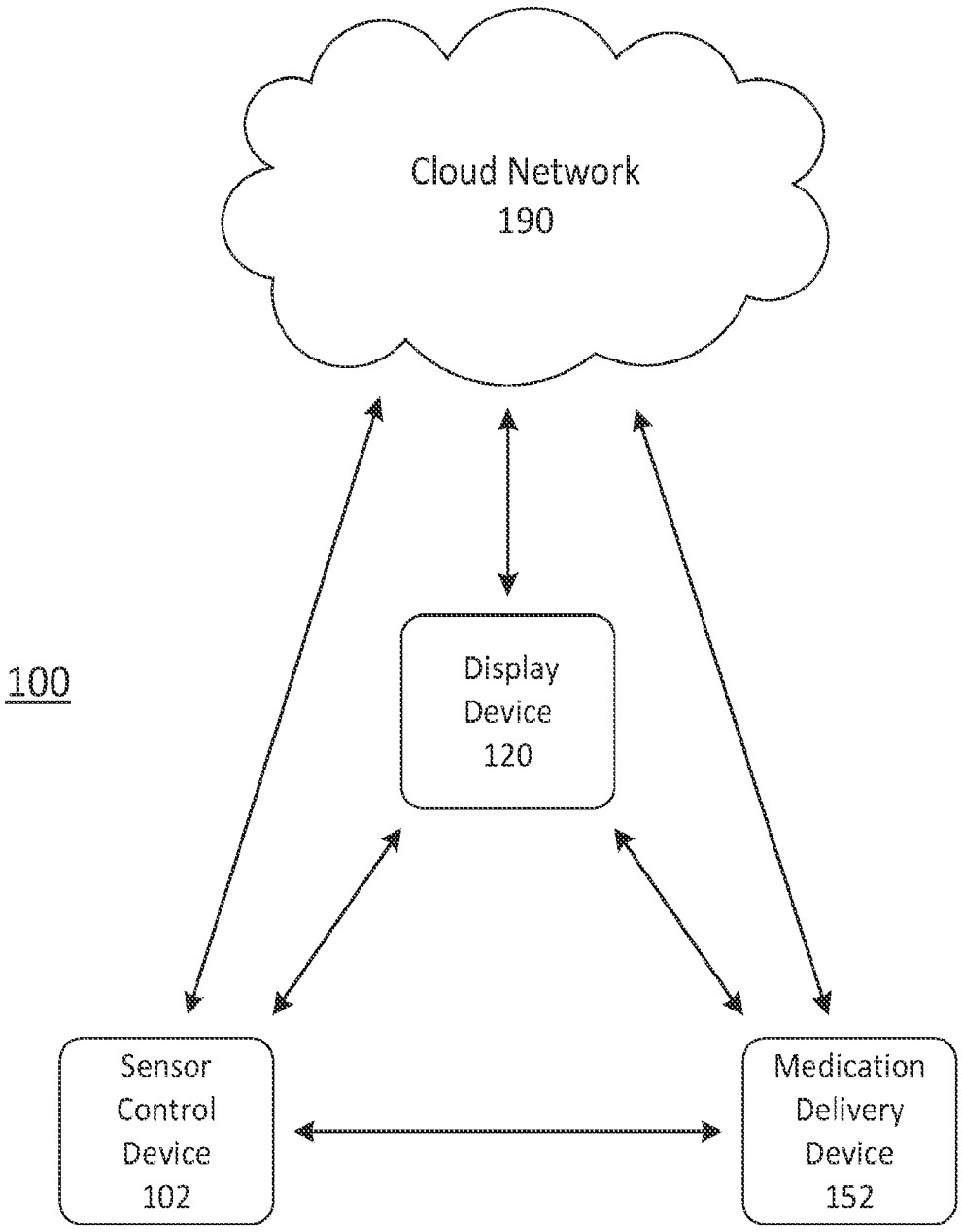

Cloud Network
190
100
Display
Device
120
Sensor
Control
Device
102
Medication
Delivery
Device
152

FIG. 1A

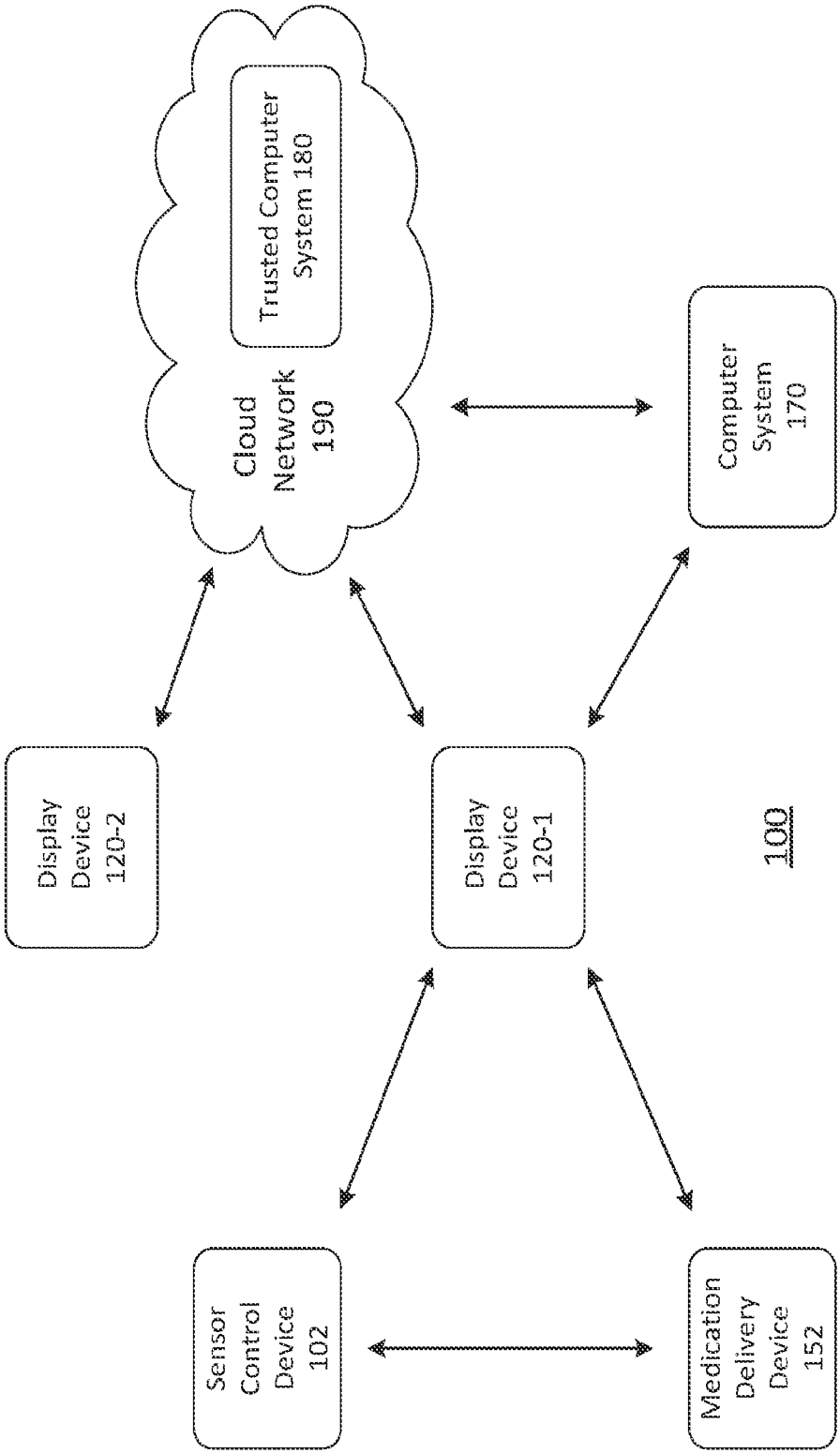

Trusted Computer System 180
Cloud Network 190
Computer System 170
Display Device 120-2
Display Device 120-1
100
Sensor Control Device 102
Medication Delivery Device 152

FIG. 1B

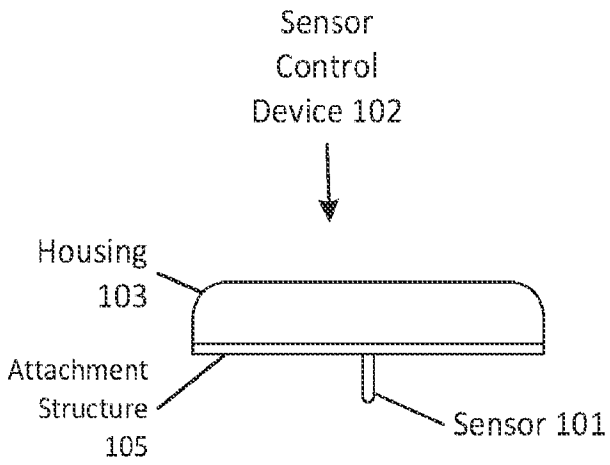

Sensor
Control
Device 102
Housing
103
Attachment
Structure
105
Sensor 101

FIG. 2A

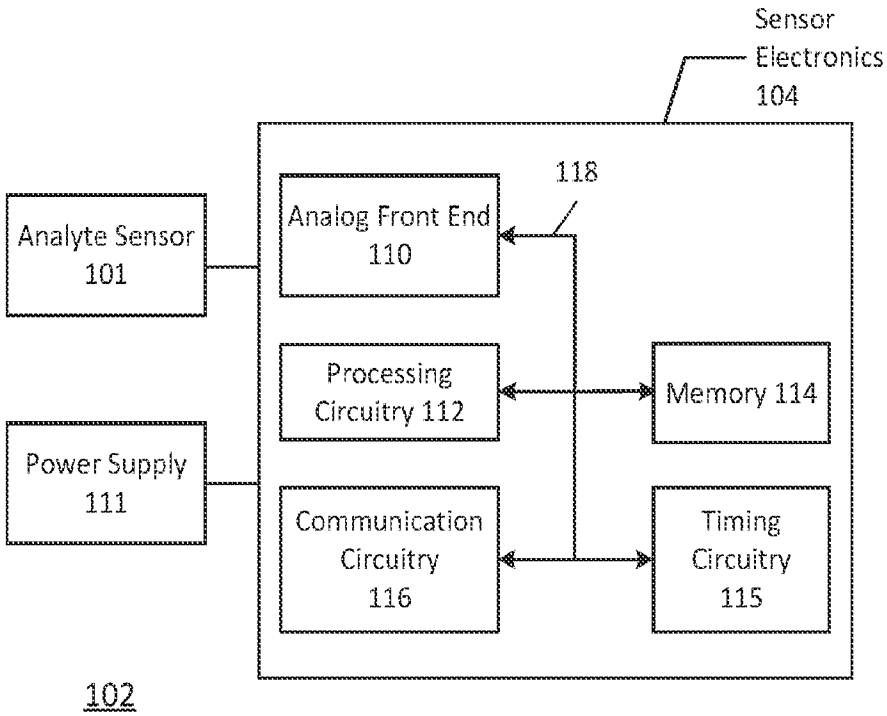

Sensor
Electronics
104
118
Analyte Sensor
101
Analog Front End
110
Processing
Circuitry 112
Memory 114
Power Supply
111
Communication
Circuitry
116
Timing
Circuitry
115
102

FIG. 2B

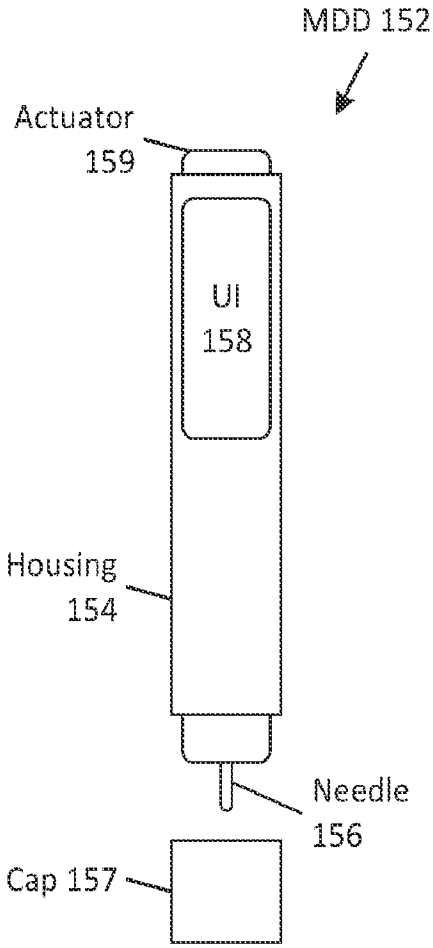

MDD 152
Actuator
159
UI
158
Housing
154
Needle
156
Cap 157

FIG. 3A

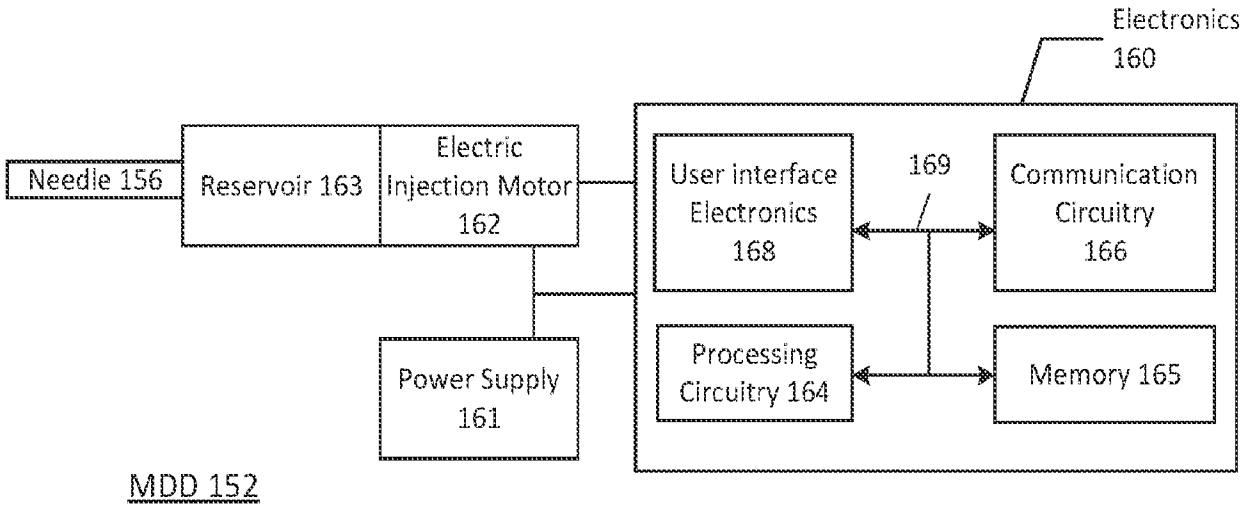

Electronics
160
Needle 156
Reservoir 163
Electric
Injection Motor
162
User interface
Electronics
168
169
Communication
Circuitry
166
Processing
Circuitry 164
Memory 165
Power Supply
161
MDD 152

FIG. 3B

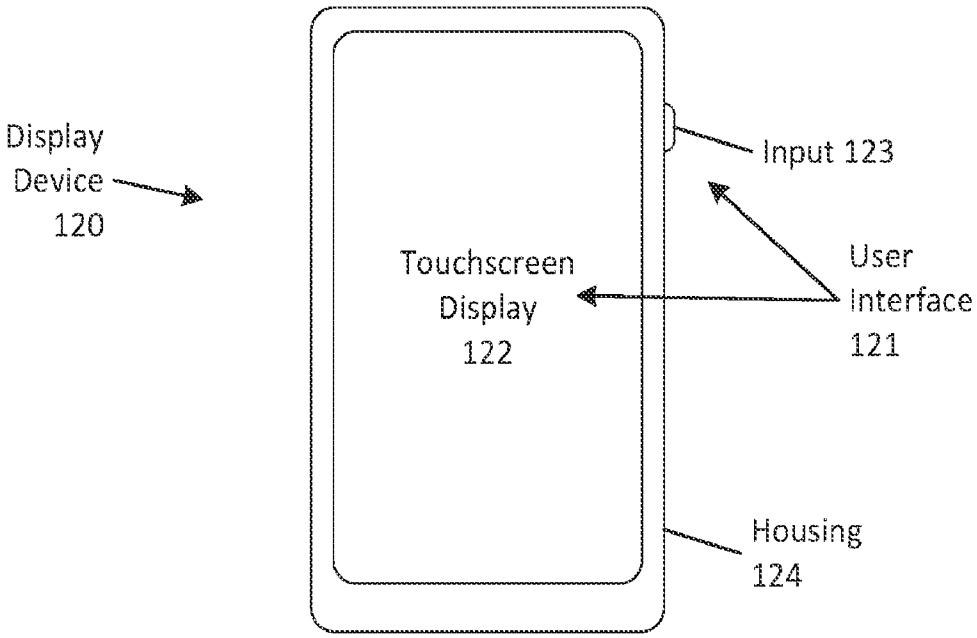

Display
Device
120
Touchscreen
Display
122
Input 123
User
Interface
121
Housing
124

FIG. 4A

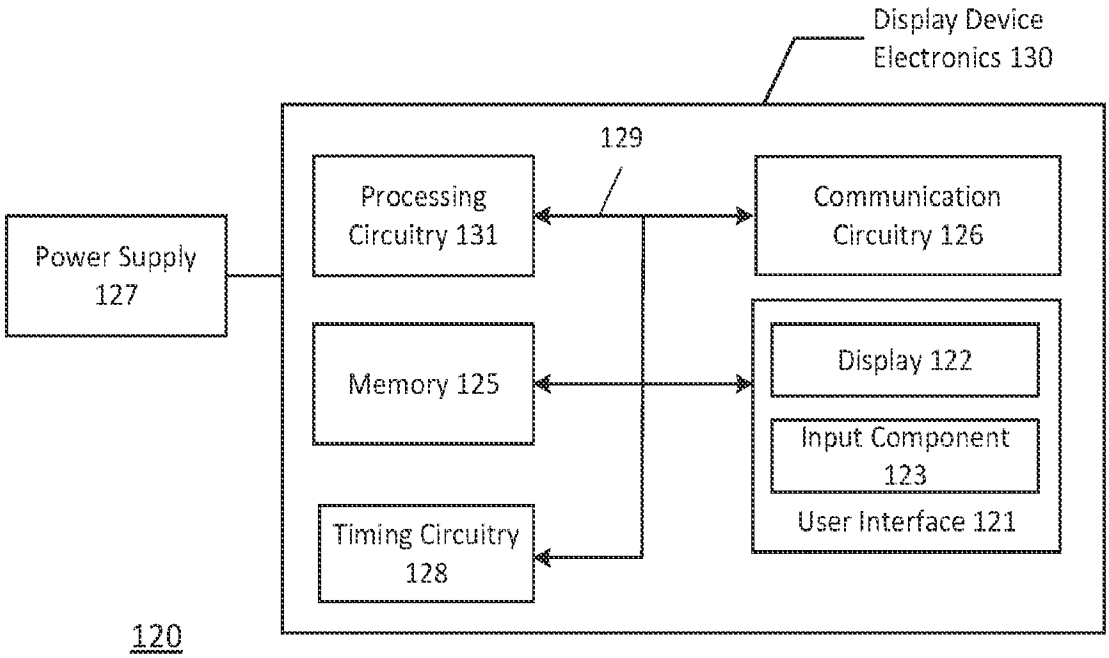

Display Device
Electronics 130
129
Processing
Circuitry 131
Communication
Circuitry 126
Power Supply
127
Memory 125
Display 122
Input Component
123
User Interface 121
Timing Circuitry
128
120

FIG. 4B

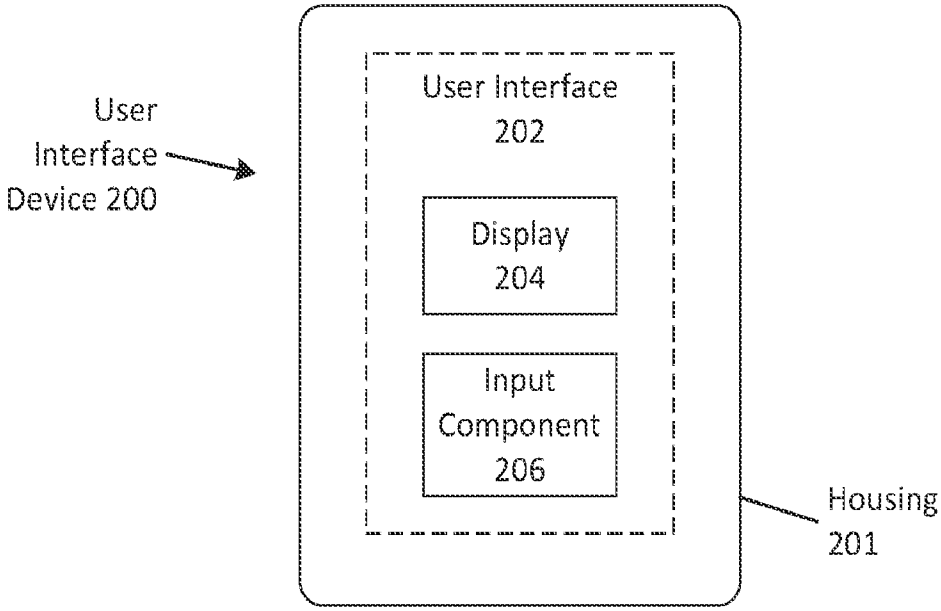

User
Interface
Device 200
User Interface
202
Display
204
Input
Component
206
Housing
201

FIG. 5

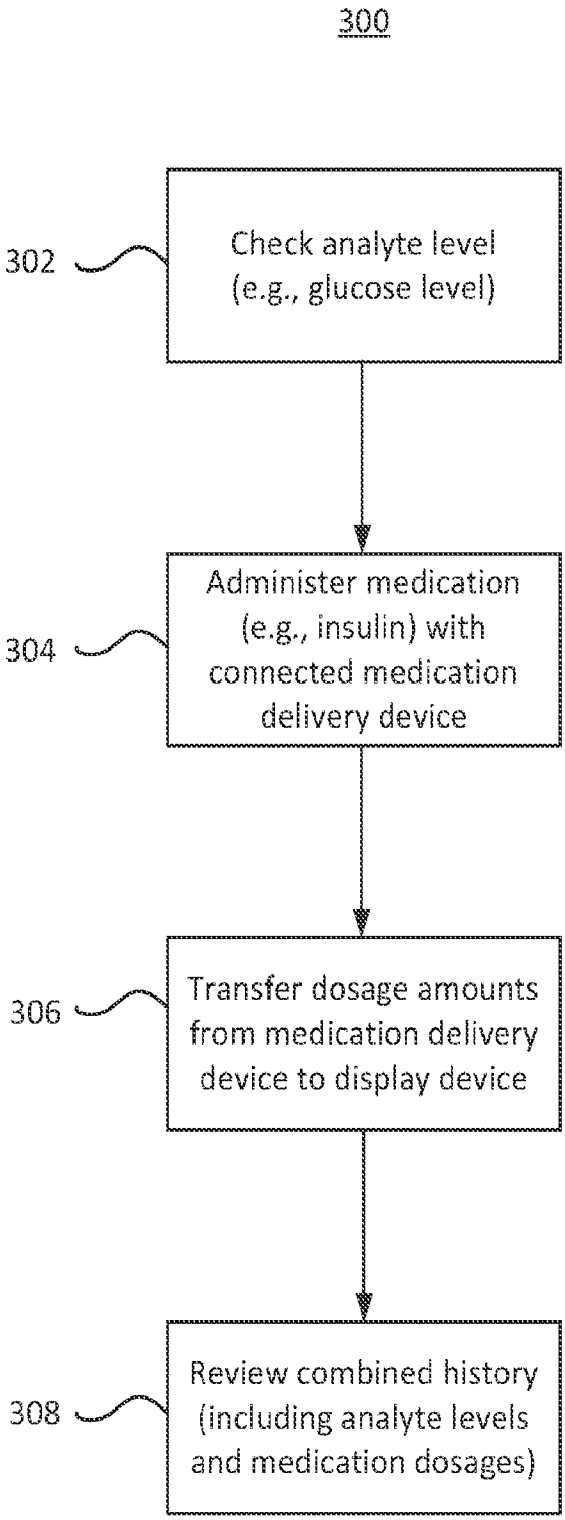

300
302
Check analyte level (e.g., glucose level)
304
Administer medication (e.g., insulin) with connected medication delivery device
306
Transfer dosage amounts from medication delivery device to display device
308
Review combined history (including analyte levels and medication dosages)

FIG. 6

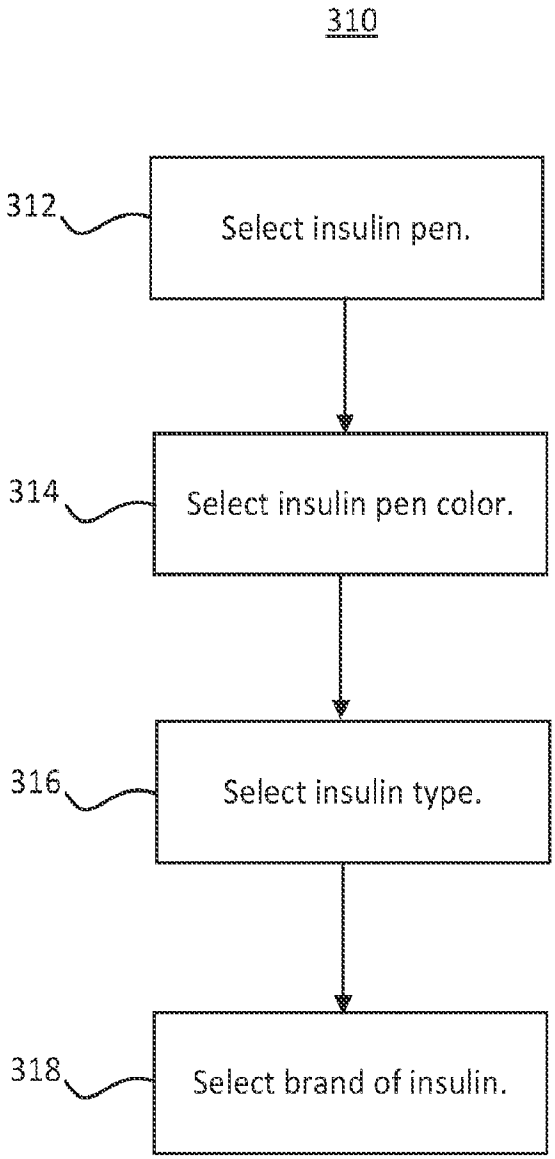

310
312
Select insulin pen.
314
Select insulin pen color.
316
Select insulin type.
318
Select brand of insulin.

FIG. 7

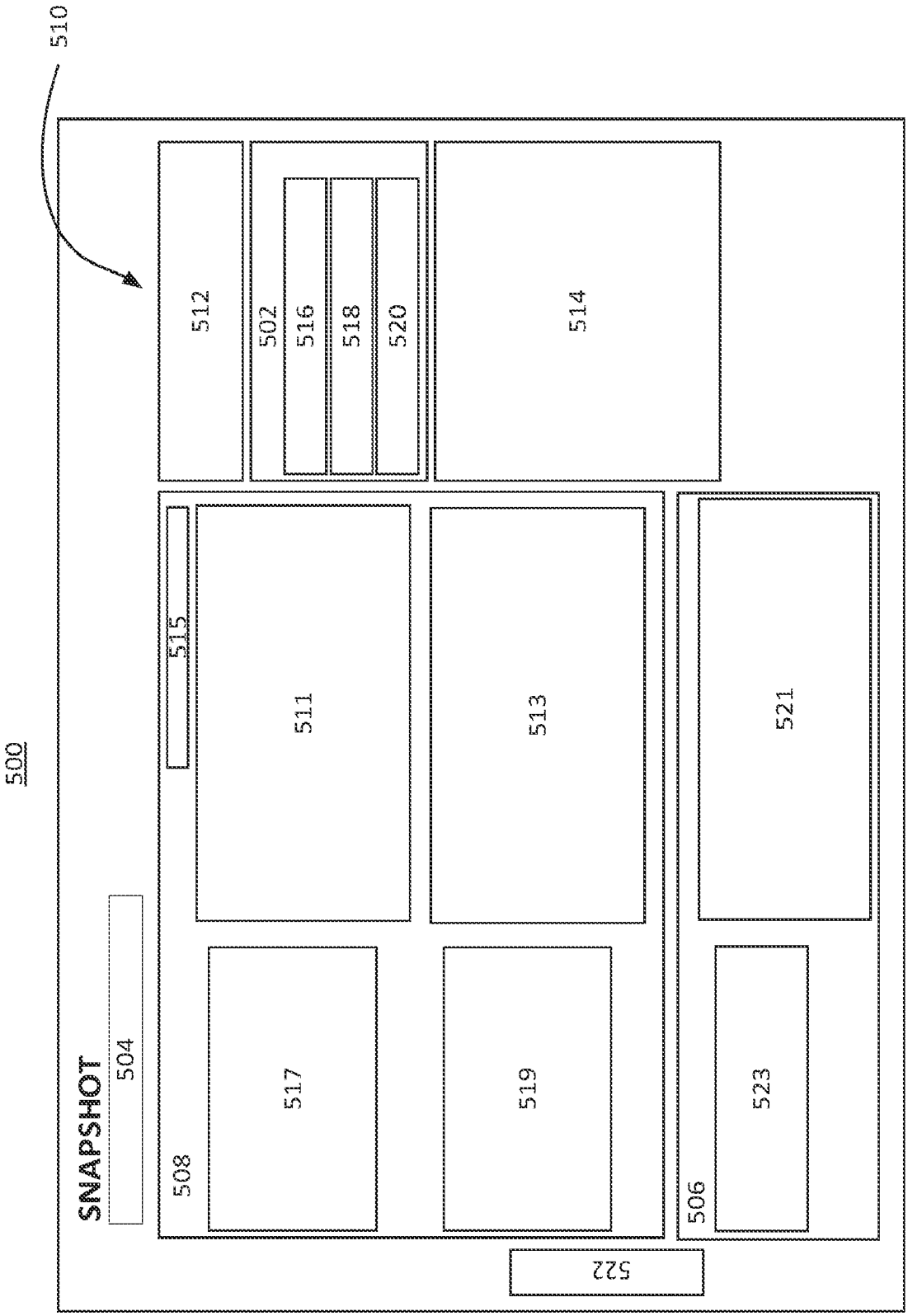
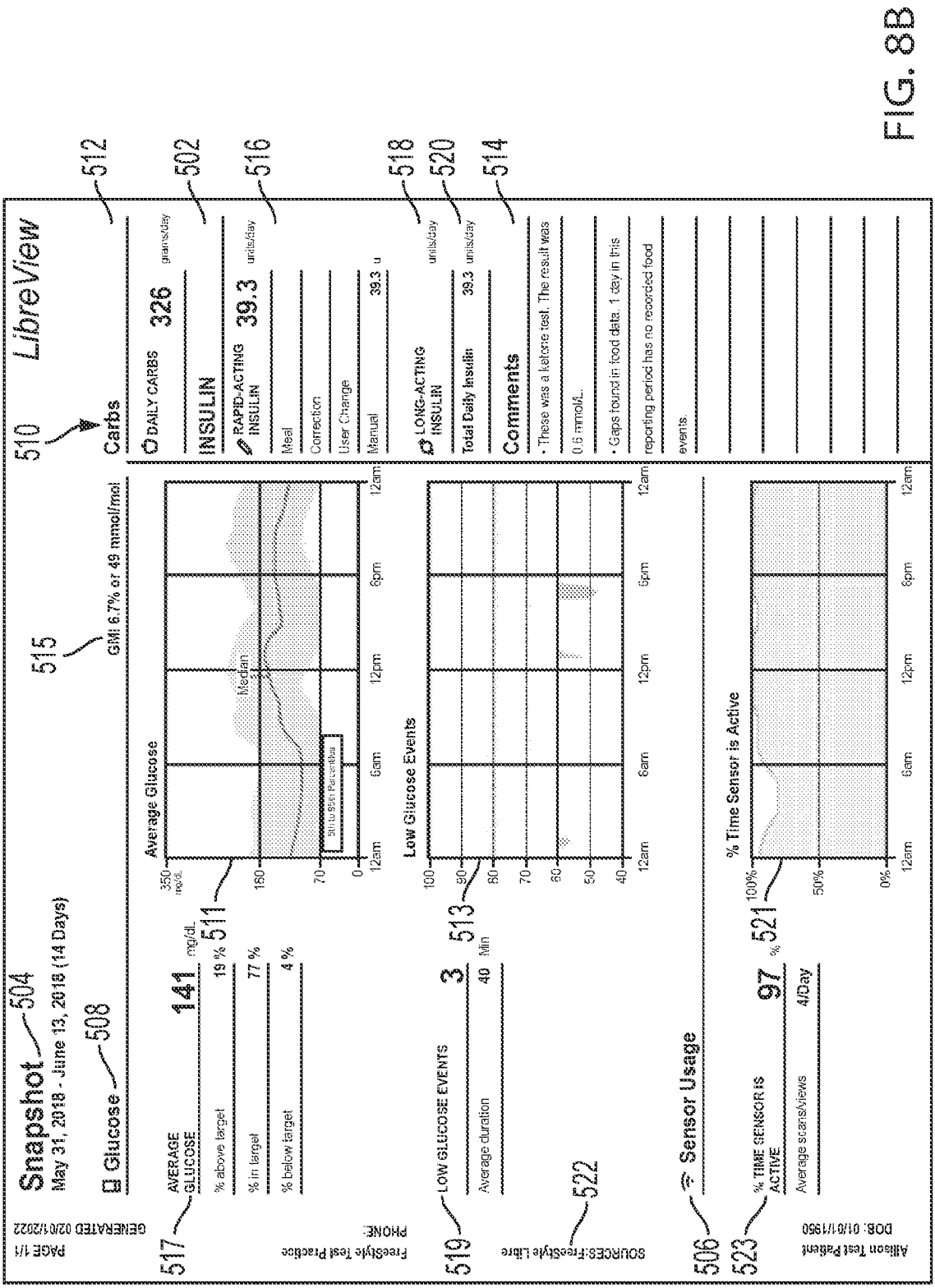

500
510
512
502
516
518
520
514
515
511
513
521
SNAPSHOT
504
508
517
519
506
523
522

FIG. 8A


500
LibreView
510
512
Snapshot
504
May 31, 2018 - June 13, 2018 (14 Days)
515
GMI 6.7% or 49 mmol/mol
Glucose
508
Carbs
DAILY CARBS 326 grams/day
502
INSULIN
RAPID-ACTING INSULIN 39.3 units/day
516
Meal
Correction
User Change
Manual 39.3 u
518
LONG-ACTING INSULIN units/day
520
Total Daily Insulin 39.3 units/day
514
Comments
• These was a ketone test. The result was
0.6 mmol/L.
• Gaps found in food data. 1 day in this
reporting period has no recorded food
events.
Average Glucose
Median
511
517
AVERAGE GLUCOSE 141 mg/dL
% above target 19 %
% in target 77 %
% below target 4 %
Glucose Percentiles
12am 6am 12pm 6pm 12am
350 180 70 0
FreeStyle Test Practice
PHONE:
Low Glucose Events
513
519
LOW GLUCOSE EVENTS 3
Average duration 40 Min
100 90 80 70 60 50 40
SOURCES:FreeStyle Libre
522
Sensor Usage
% Time Sensor is Active
521
506
523
% TIME SENSOR IS ACTIVE 97 %
Average scans/views 4/Day
100% 50% 0%
Allison Test Patient
DOB: 01/01/1960
GENERATED 02/01/2022
PAGE 1/1
FIG. 8B

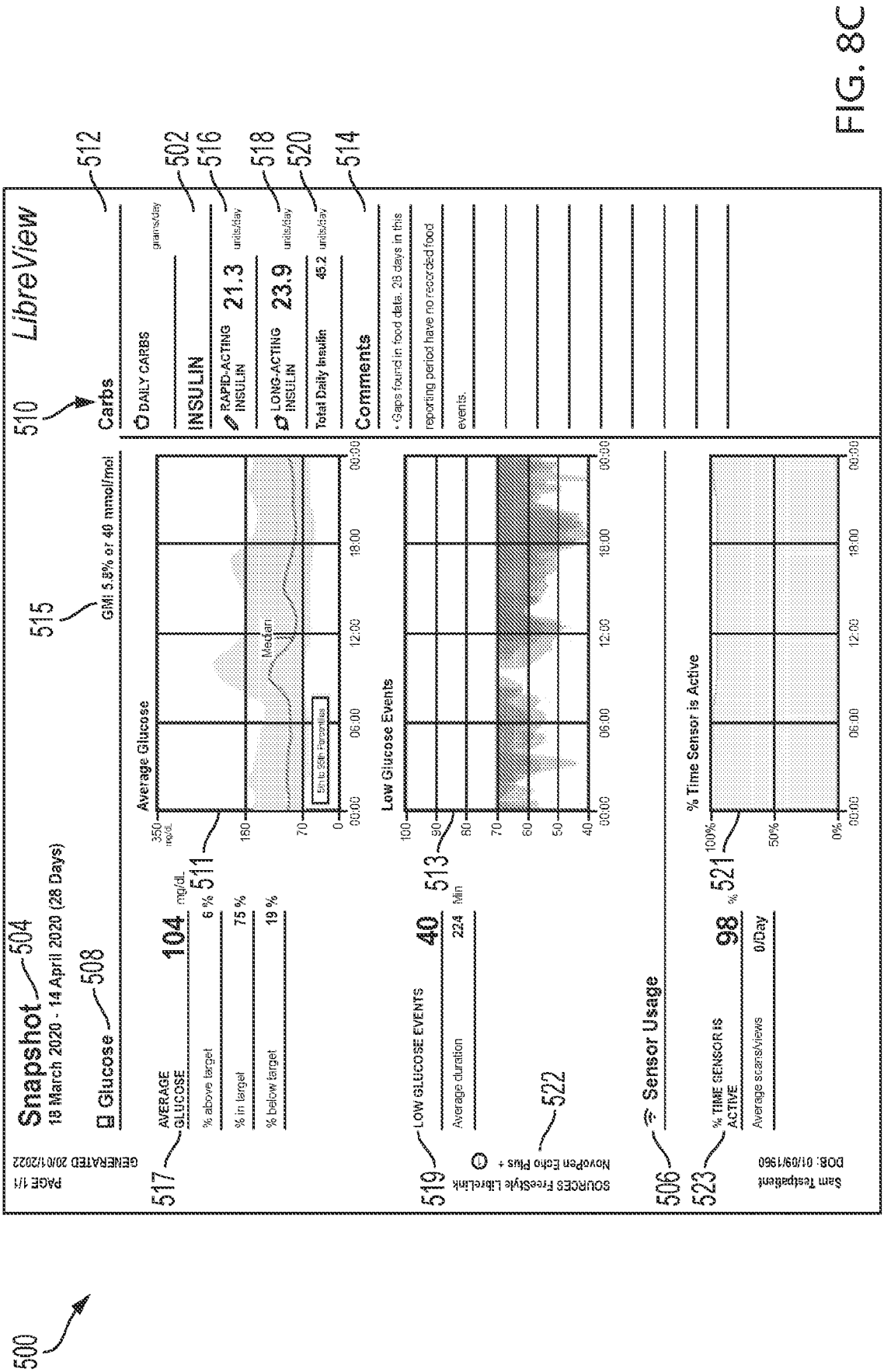

500
LibreView
510
Snapshot
504
18 March 2020 - 14 April 2020 (28 Days)
Glucose
508
GENERATED 20/01/2022
PAGE 1/1
GMI 5.8% or 40 mmol/mol
515
Carbs
512
DAILY CARBS
grams/day
502
INSULIN
RAPID-ACTING INSULIN
21.3
units/day
516
LONG-ACTING INSULIN
23.9
units/day
518
Total Daily Insulin
45.2
units/day
520
Comments
514
• Gaps found in food data. 28 days in this reporting period have no recorded food events.
AVERAGE GLUCOSE
104
mg/dL
517
% above target
6 %
% in target
75 %
% below target
19 %
Average Glucose
511
Median
5th to 95th Percentiles
LOW GLUCOSE EVENTS
40
519
Average duration
224
Min
Low Glucose Events
513
SOURCES FreeStyle Libre link
NovoPen Echo Plus +
522
Sensor Usage
506
% TIME SENSOR IS ACTIVE
98
%
523
Average scans/views
0/Day
% Time Sensor is Active
521
Sam Testpatient
DOB: 01/09/1960

FIG. 8C

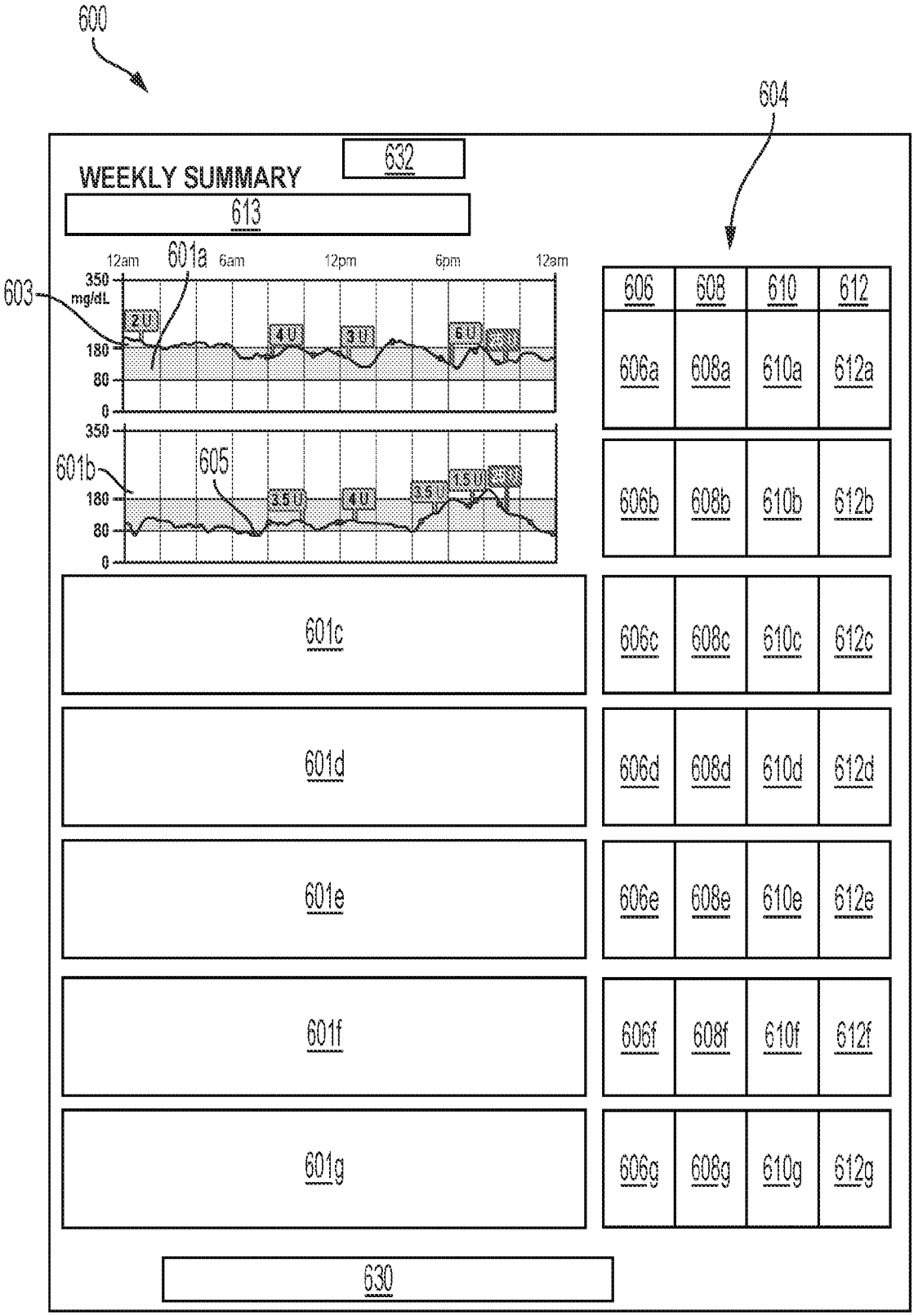

600
604
632
WEEKLY SUMMARY
613
603
601a
12am
6am
12pm
6pm
12am
350
mg/dL
180
80
0
2 U
4 U
3 U
6 U
601b
605
3.5 U
4 U
3.5 U
1.5 U
606
608
610
612
606a
608a
610a
612a
606b
608b
610b
612b
601c
606c
608c
610c
612c
601d
606d
608d
610d
612d
601e
606e
608e
610e
612e
601f
606f
608f
610f
612f
601g
606g
608g
610g
612g
630

FIG. 9A

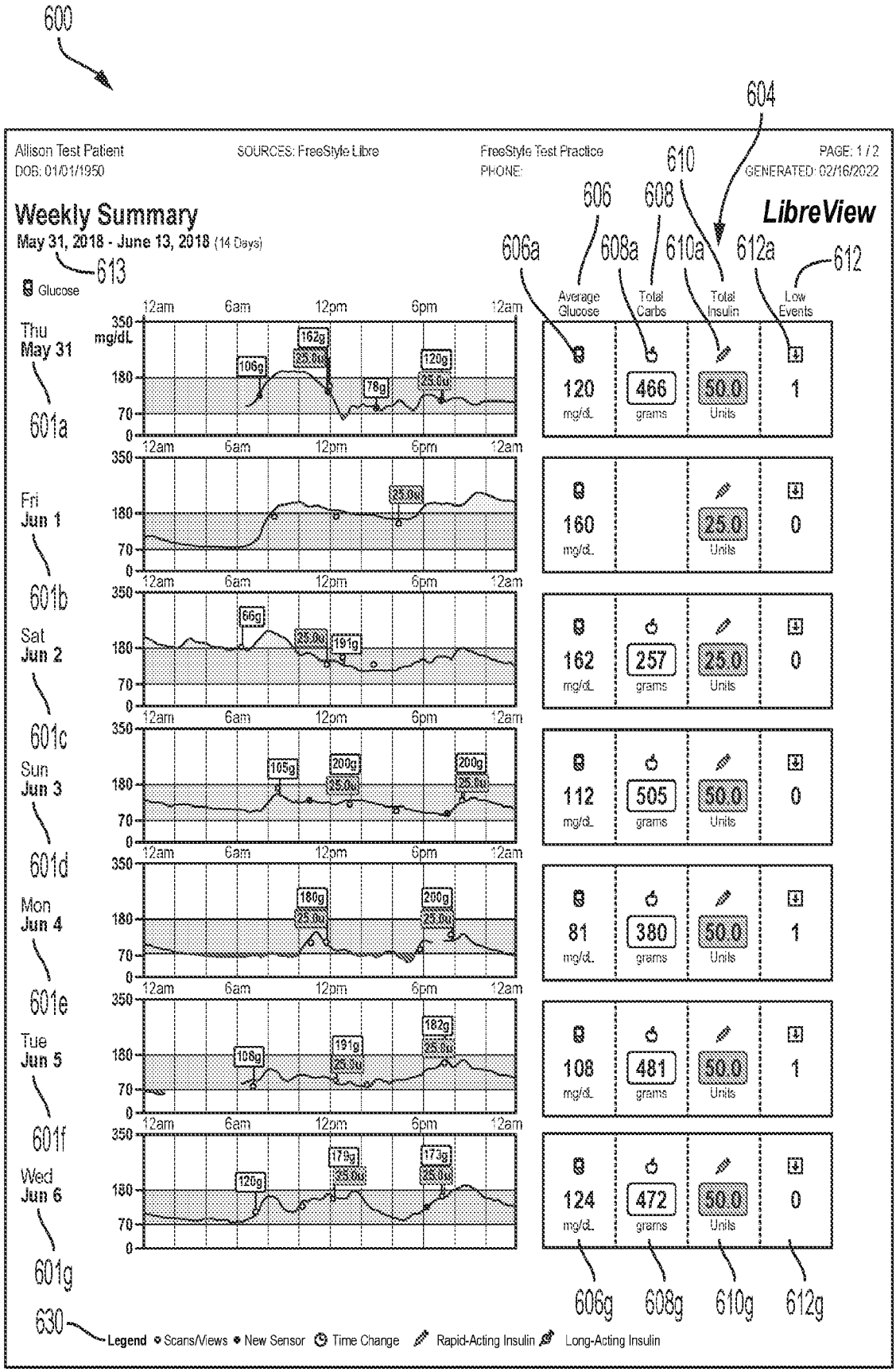

600
604
Allison Test Patient
DOB: 01/01/1950
SOURCES: FreeStyle Libre
FreeStyle Test Practice
PHONE:
PAGE: 1 / 2
GENERATED: 02/16/2022
610
606
608
LibreView
Weekly Summary
May 31, 2018 - June 13, 2018 (14 Days)
606a
608a
610a
612a
612
613
Glucose
Average Glucose
Total Carbs
Total Insulin
Low Events
12am 6am 12pm 6pm 12am
350 mg/dL 180 70 0
Thu May 31
601a
120 mg/dL
466 grams
50.0 Units
1
Fri Jun 1
601b
160 mg/dL
25.0 Units
0
Sat Jun 2
601c
162 mg/dL
257 grams
25.0 Units
0
Sun Jun 3
601d
112 mg/dL
505 grams
50.0 Units
0
Mon Jun 4
601e
81 mg/dL
380 grams
50.0 Units
1
Tue Jun 5
601f
108 mg/dL
481 grams
50.0 Units
1
Wed Jun 6
601g
124 mg/dL
472 grams
50.0 Units
0
606g
608g
610g
612g
630
Legend
Scans/Views
New Sensor
Time Change
Rapid-Acting Insulin
Long-Acting Insulin

FIG. 9B

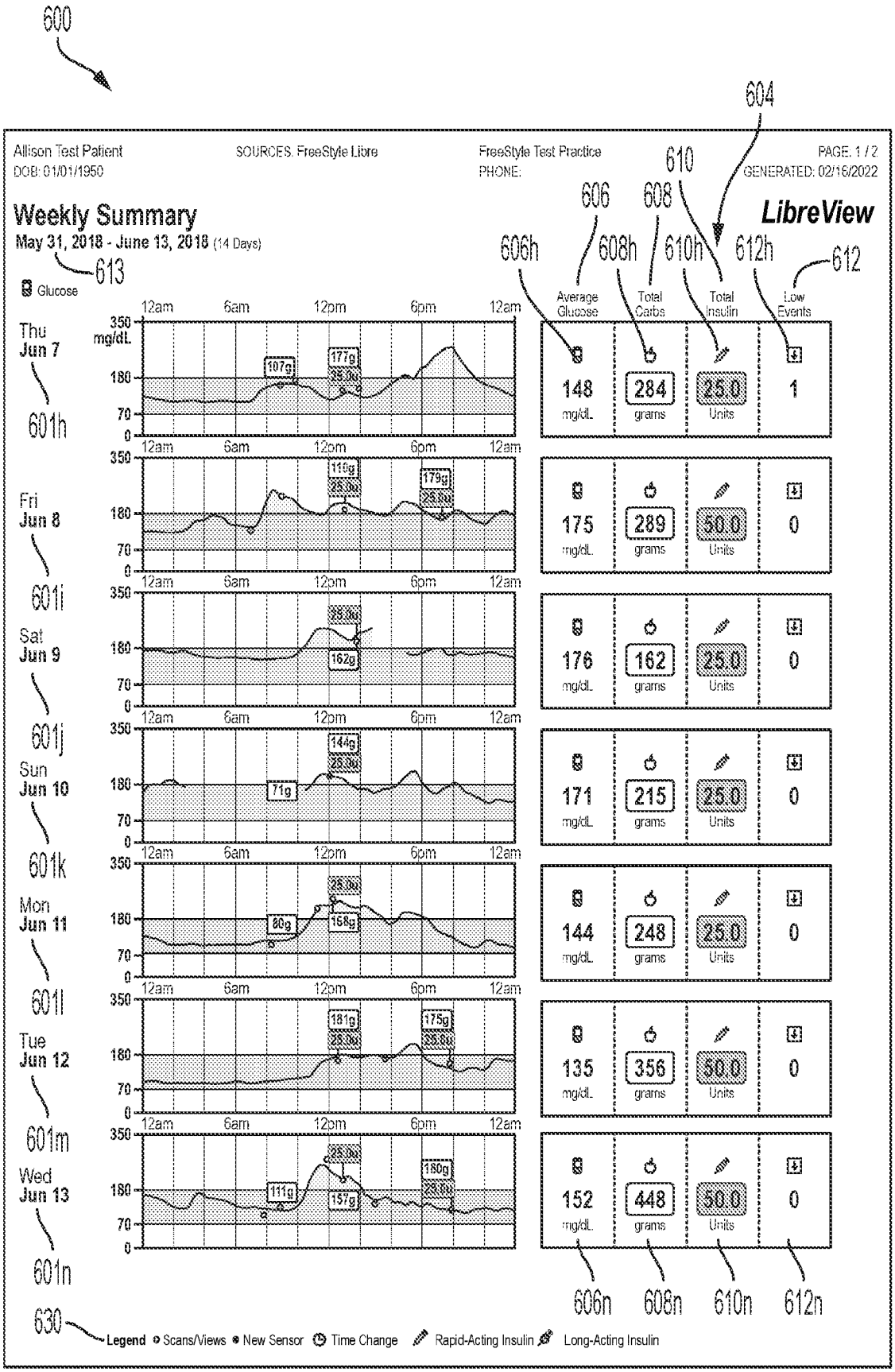

600
604
Allison Test Patient
DOB: 01/01/1950
SOURCES: FreeStyle Libre
FreeStyle Test Practice
PHONE:
PAGE: 1 / 2
GENERATED: 02/16/2022
610
606
608
Weekly Summary
May 31, 2018 - June 13, 2018 (14 Days)
LibreView
606h
608h
610h
612h
612
613
Glucose
Average Glucose
Total Carbs
Total Insulin
Low Events
12am
6am
12pm
6pm
12am
350
mg/dL
180
70
0
Thu Jun 7
601h
107g
177g
148 mg/dL
284 grams
25.0 Units
1
Fri Jun 8
601i
110g
179g
175 mg/dL
289 grams
50.0 Units
0
Sat Jun 9
601j
162g
176 mg/dL
162 grams
25.0 Units
0
Sun Jun 10
601k
144g
71g
171 mg/dL
215 grams
25.0 Units
0
Mon Jun 11
601l
80g
168g
144 mg/dL
248 grams
25.0 Units
0
Tue Jun 12
601m
181g
175g
135 mg/dL
356 grams
50.0 Units
0
Wed Jun 13
601n
111g
157g
180g
152 mg/dL
448 grams
50.0 Units
0
606n
608n
610n
612n
630
Legend
Scans/Views
New Sensor
Time Change
Rapid-Acting Insulin
Long-Acting Insulin

FIG. 9C

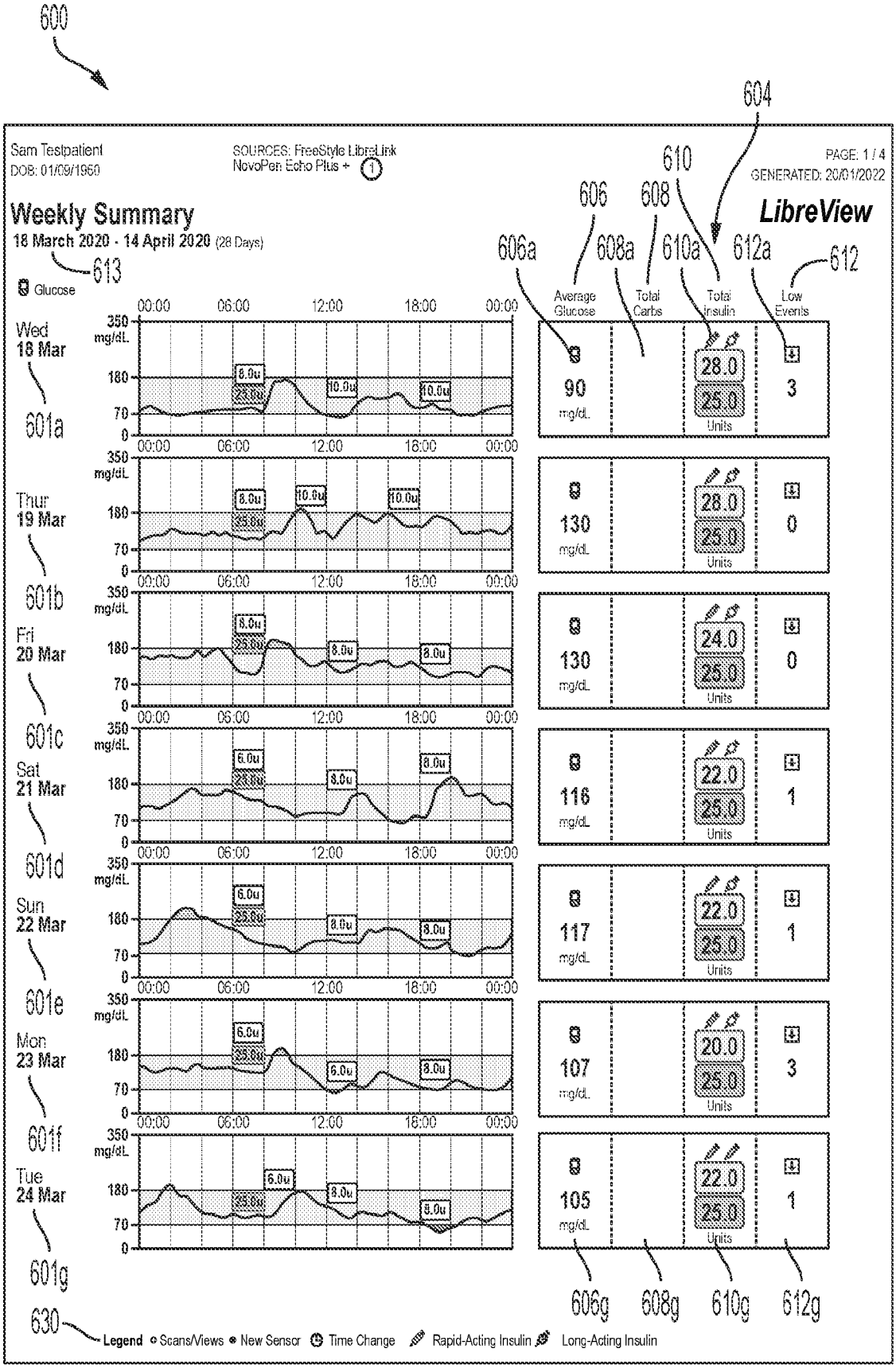

600
604
610
606
608
606a
608a
610a
612a
612
Sam Testpatient
DOB: 01/09/1960
SOURCES: FreeStyle LibreLink
NovoPen Echo Plus +
PAGE: 1 / 4
GENERATED: 20/01/2022
Weekly Summary
18 March 2020 - 14 April 2020 (28 Days)
LibreView
613
Glucose
Average Glucose
Total Carbs
Total Insulin
Low Events
Wed 18 Mar
601a
90 mg/dL
28.0
25.0
Units
3
Thur 19 Mar
601b
130 mg/dL
28.0
25.0
Units
0
Fri 20 Mar
601c
130 mg/dL
24.0
25.0
Units
0
Sat 21 Mar
601d
116 mg/dL
22.0
25.0
Units
1
Sun 22 Mar
601e
117 mg/dL
22.0
25.0
Units
1
Mon 23 Mar
601f
107 mg/dL
20.0
25.0
Units
3
Tue 24 Mar
601g
105 mg/dL
22.0
25.0
Units
1
606g
608g
610g
612g
630
Legend
Scans/Views
New Sensor
Time Change
Rapid-Acting Insulin
Long-Acting Insulin

FIG. 9D

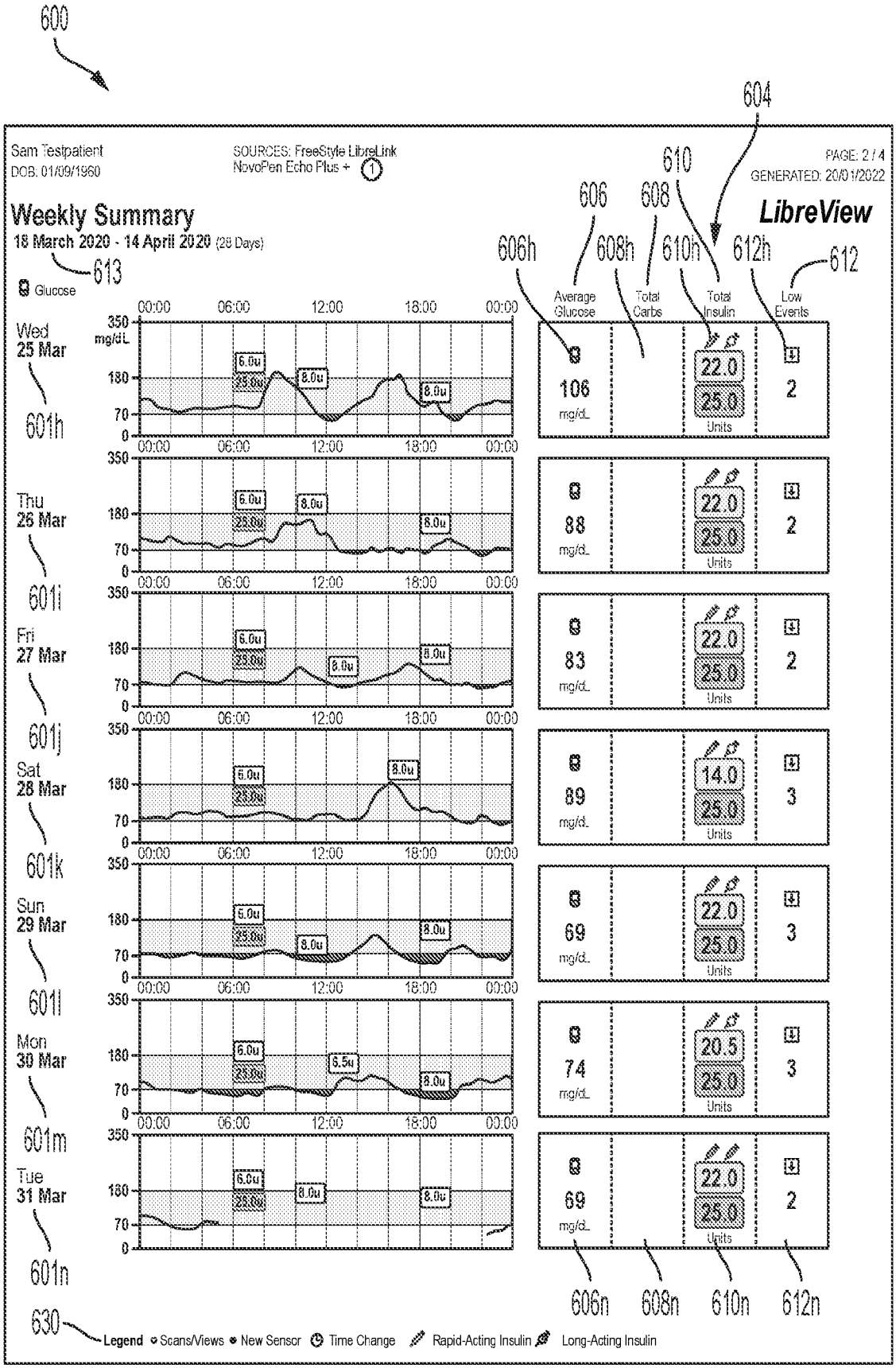

600
604
Sam Testpatient
DOB: 01/09/1960
SOURCES: FreeStyle LibreLink
NovoPen Echo Plus + 1
PAGE: 2 / 4
GENERATED: 20/01/2022
Weekly Summary
18 March 2020 - 14 April 2020 (28 Days)
LibreView
613
Glucose
606
608
610
606h
608h
610h
612h
612
Average Glucose
Total Carbs
Total Insulin
Low Events
Wed 25 Mar
601h
106 mg/dL
22.0
25.0
Units
2
Thu 26 Mar
601i
88 mg/dL
22.0
25.0
Units
2
Fri 27 Mar
601j
83 mg/dL
22.0
25.0
Units
2
Sat 28 Mar
601k
89 mg/dL
14.0
25.0
Units
3
Sun 29 Mar
601l
69 mg/dL
22.0
25.0
Units
3
Mon 30 Mar
601m
74 mg/dL
20.5
25.0
Units
3
Tue 31 Mar
601n
69 mg/dL
22.0
25.0
Units
2
606n
608n
610n
612n
630
Legend
Scans/Views
New Sensor
Time Change
Rapid-Acting Insulin
Long-Acting Insulin

FIG. 9E

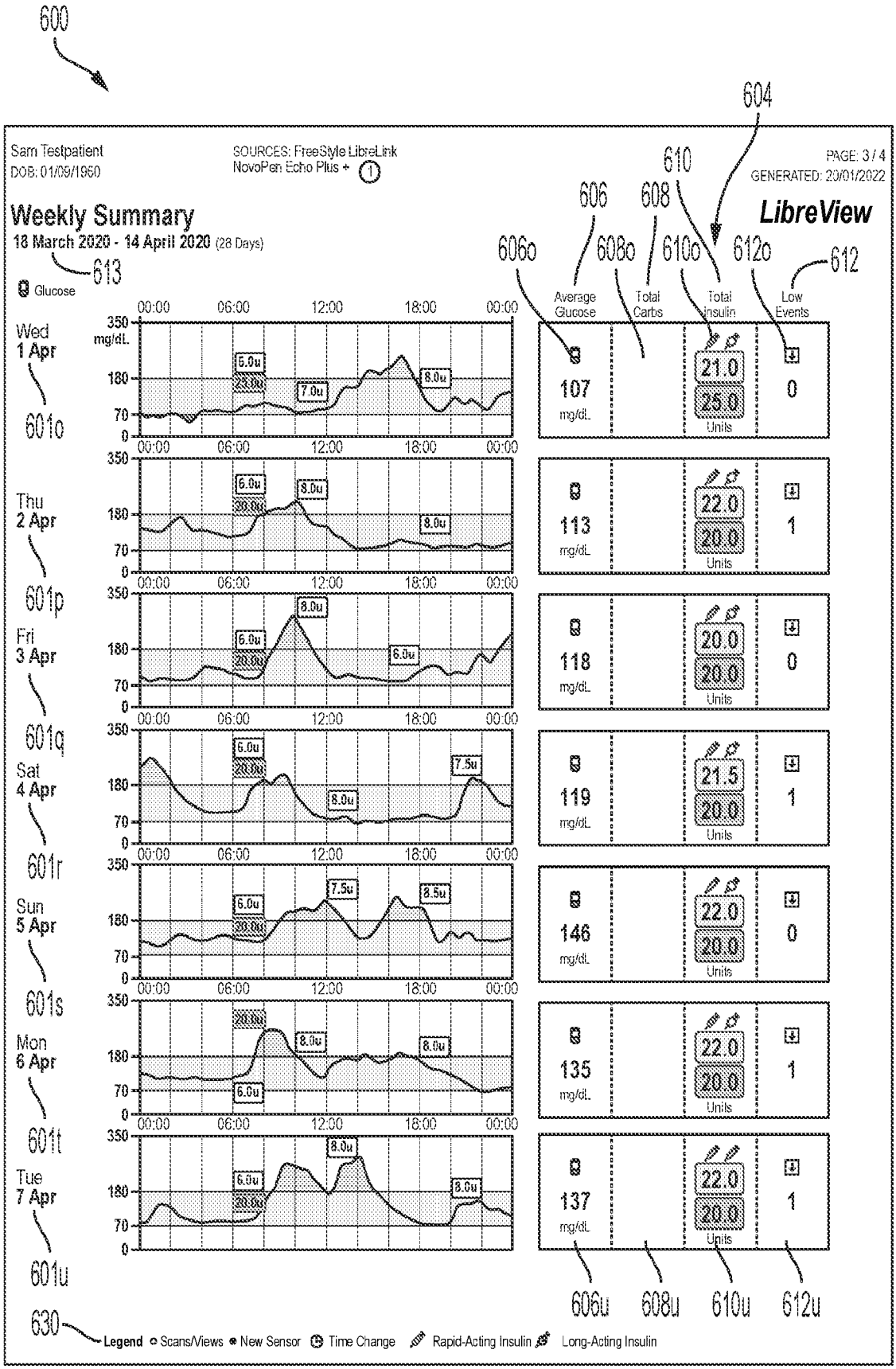

600
604
610
606
608
606o
608o
610o
612o
612
613
Sam Testpatient
DOB: 01/09/1960
SOURCES: FreeStyle LibreLink
NovoPen Echo Plus +
PAGE: 3 / 4
GENERATED: 20/01/2022
Weekly Summary
LibreView
13 March 2020 - 14 April 2020 (28 Days)
Glucose
Average Glucose
Total Carbs
Total Insulin
Low Events
Wed 1 Apr
601o
107 mg/dL
21.0
25.0
Units
0
Thu 2 Apr
601p
113 mg/dL
22.0
20.0
Units
1
Fri 3 Apr
601q
118 mg/dL
20.0
20.0
Units
0
Sat 4 Apr
601r
119 mg/dL
21.5
20.0
Units
1
Sun 5 Apr
601s
146 mg/dL
22.0
20.0
Units
0
Mon 6 Apr
601t
135 mg/dL
22.0
20.0
Units
1
Tue 7 Apr
601u
137 mg/dL
22.0
20.0
Units
1
606u
608u
610u
612u
630
Legend
Scans/Views
New Sensor
Time Change
Rapid-Acting Insulin
Long-Acting Insulin

FIG. 9F

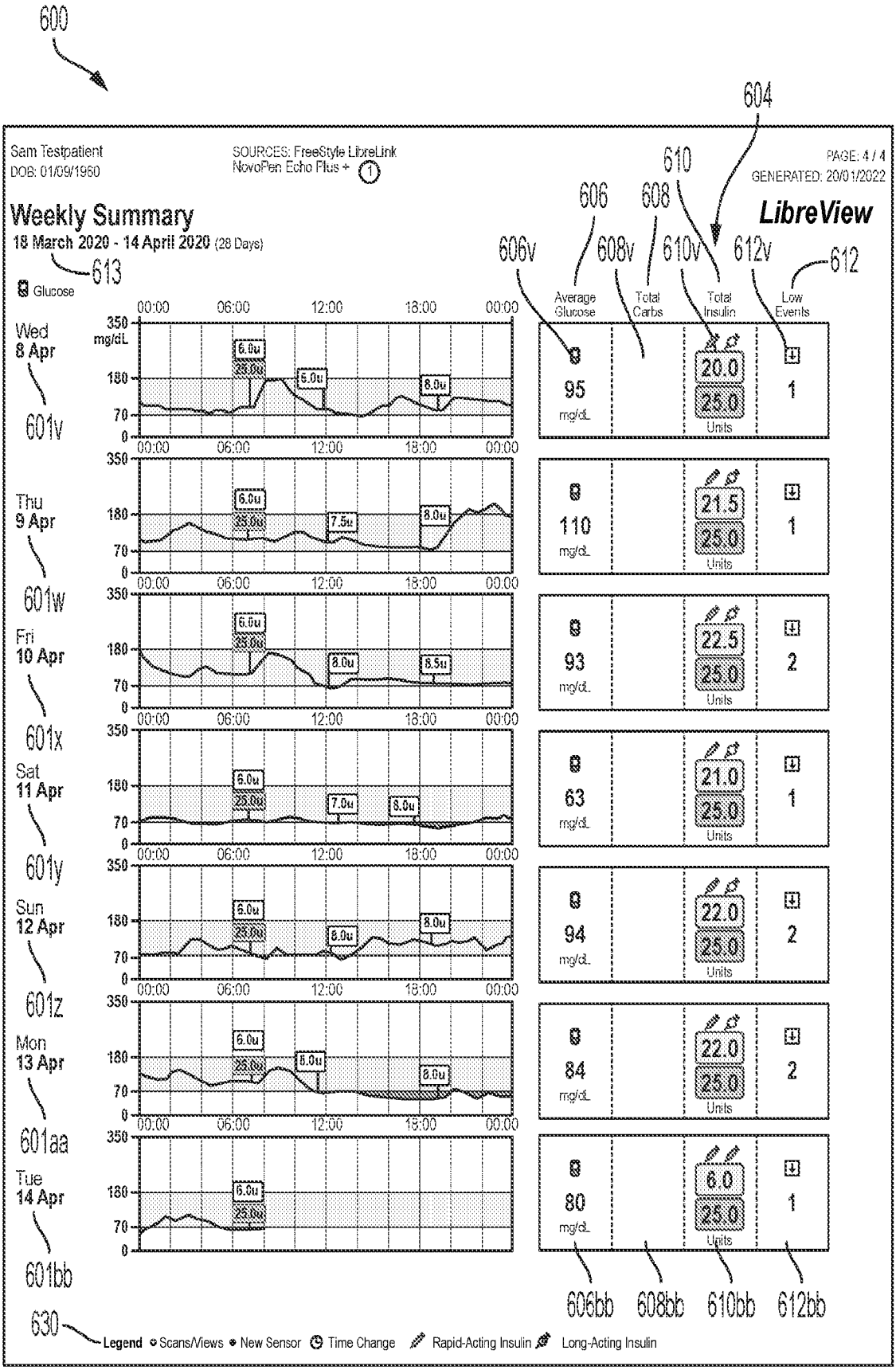

600
604
Sam Testpatient
DOB: 01/09/1960
SOURCES: FreeStyle LibreLink
NovoPen Echo Plus +
PAGE: 4 / 4
GENERATED: 20/01/2022
Weekly Summary
18 March 2020 - 14 April 2020 (28 Days)
LibreView
606
608
610
606v
608v
610v
612v
612
613
Glucose
Average Glucose
Total Carbs
Total Insulin
Low Events
Wed 8 Apr
601v
95 mg/dL
20.0
25.0
Units
1
Thu 9 Apr
601w
110 mg/dL
21.5
25.0
Units
1
Fri 10 Apr
601x
93 mg/dL
22.5
25.0
Units
2
Sat 11 Apr
601y
63 mg/dL
21.0
25.0
Units
1
Sun 12 Apr
601z
94 mg/dL
22.0
25.0
Units
2
Mon 13 Apr
601aa
84 mg/dL
22.0
25.0
Units
2
Tue 14 Apr
601bb
80 mg/dL
6.0
25.0
Units
1
606bb
608bb
610bb
612bb
630
Legend
Scans/Views
New Sensor
Time Change
Rapid-Acting Insulin
Long-Acting Insulin

FIG. 9G

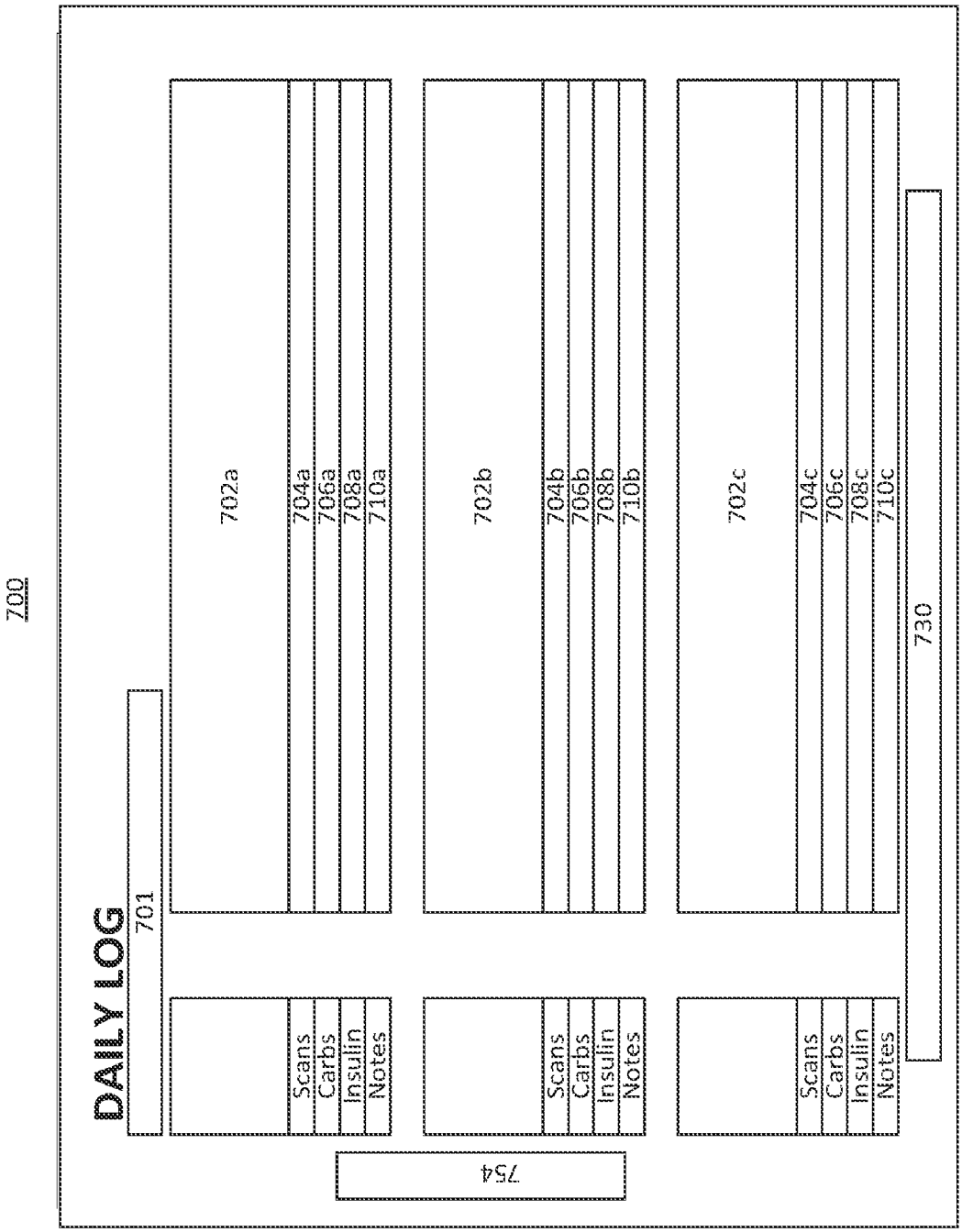

700
DAILY LOG
701
702a
704a
706a
708a
710a
702b
704b
706b
708b
710b
702c
704c
706c
708c
710c
730
Scans
Carbs
Insulin
Notes
754

FIG. 10A

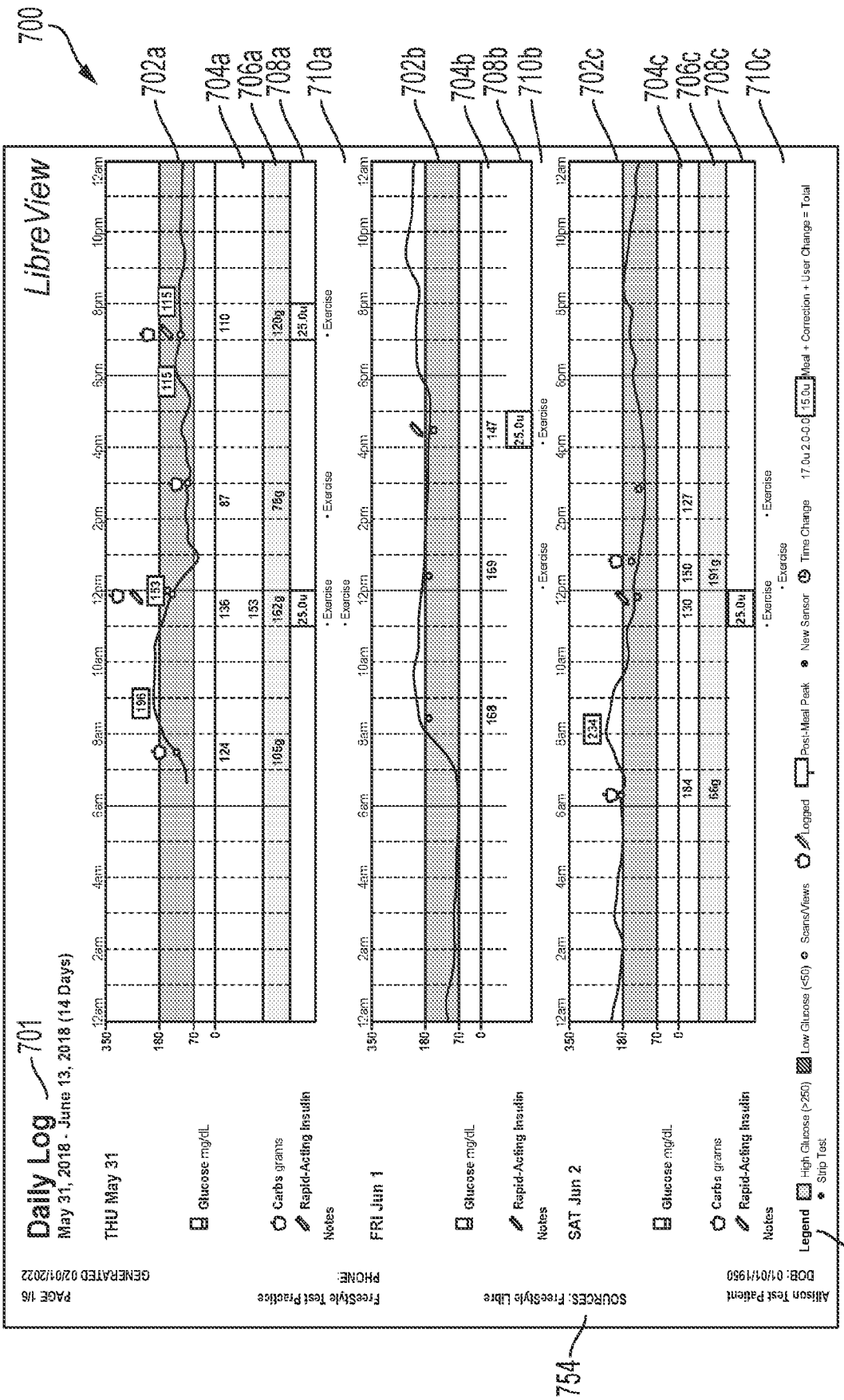

700
LibreView
Daily Log
701
May 31, 2018 - June 13, 2018 (14 Days)
Allison Test Patient
DOB: 01/01/1980
FreeStyle Test Practice
PHONE:
SOURCES: FreeStyle Libre
GENERATED 02/01/2022
PAGE 1/6
THU May 31
FRI Jun 1
SAT Jun 2
Glucose mg/dL
Carbs grams
Rapid-Acting Insulin
Notes
Exercise
Legend
High Glucose (>250)
Low Glucose (<50)
Scans/Views
Logged
Post-Meal Peak
New Sensor
Time Change
Strip Test
Meal + Correction + User Change = Total
702a
704a
706a
708a
710a
702b
704b
708b
710b
702c
704c
706c
708c
710c
730
754

FIG. 10B

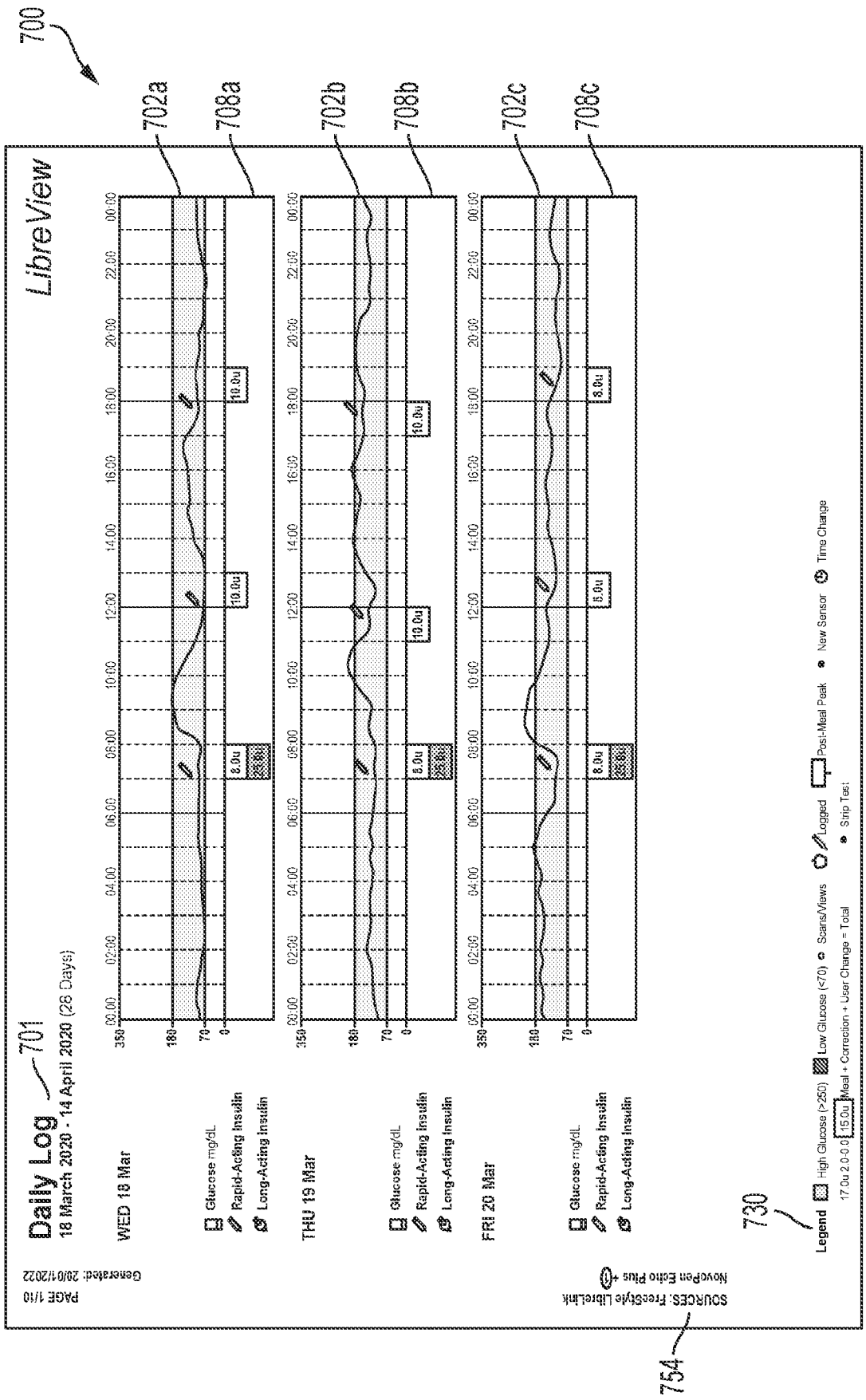

700
LibreView
Daily Log
701
18 March 2020 - 14 April 2020 (26 Days)
PAGE 1/10
Generated: 20/04/2022
WED 18 Mar
THU 19 Mar
FRI 20 Mar
Glucose mg/dL
Rapid-Acting Insulin
Long-Acting Insulin
702a
708a
702b
708b
702c
708c
SOURCES: FreeStyle Libre link
NovoPen Echo Plus
754
730
Legend
High Glucose (>250)
Low Glucose (<70)
Scans/Views
Logged
Post-Meal Peak
New Sensor
Time Change
Meal + Correction + User Change = Total
Strip Test

FIG. 10C

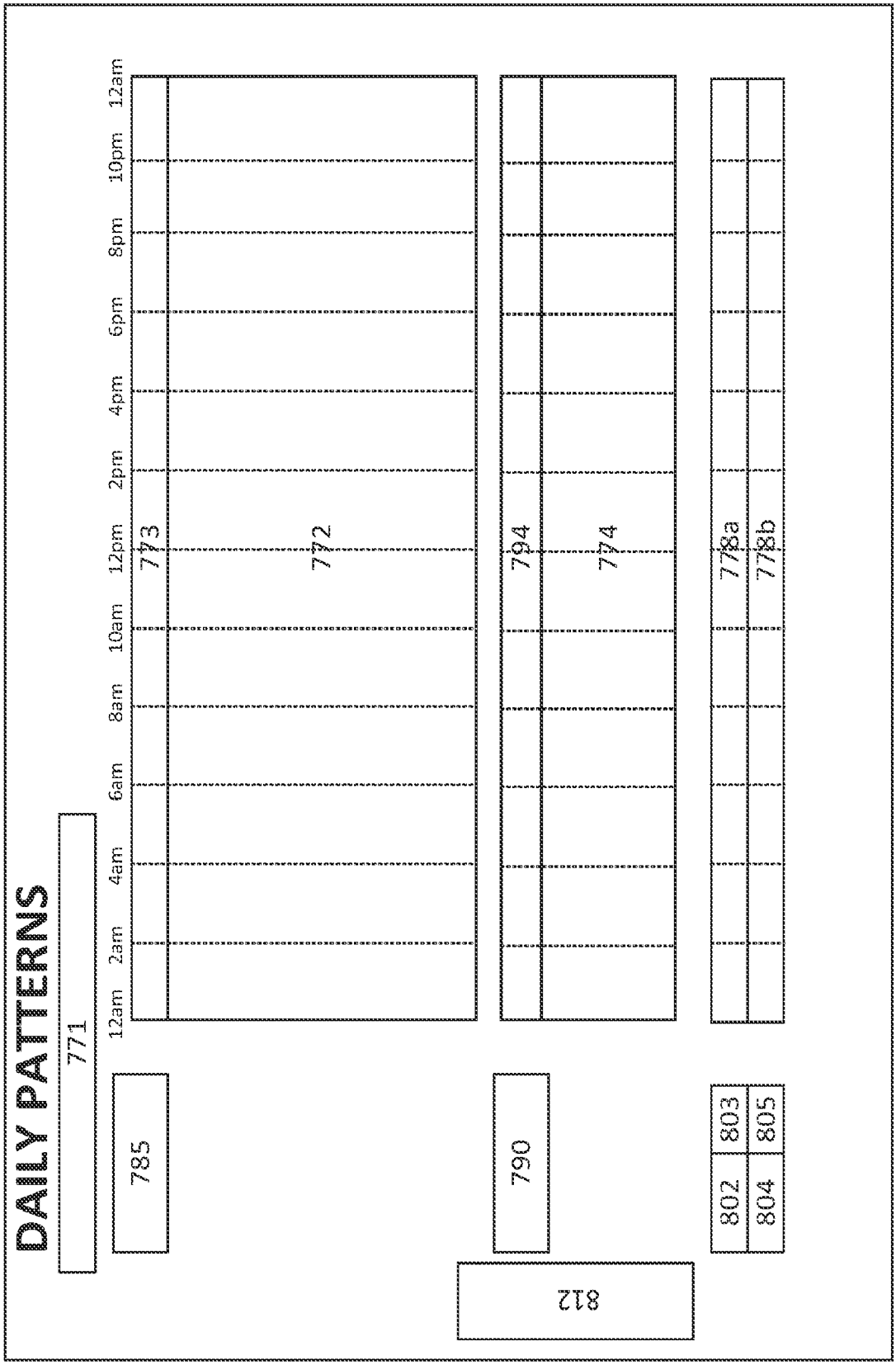

770
DAILY PATTERNS
771
12am
2am
4am
6am
8am
10am
12pm
2pm
4pm
6pm
8pm
10pm
12am
773
772
794
774
778a
778b
785
790
812
802
803
804
805

FIG. 11A

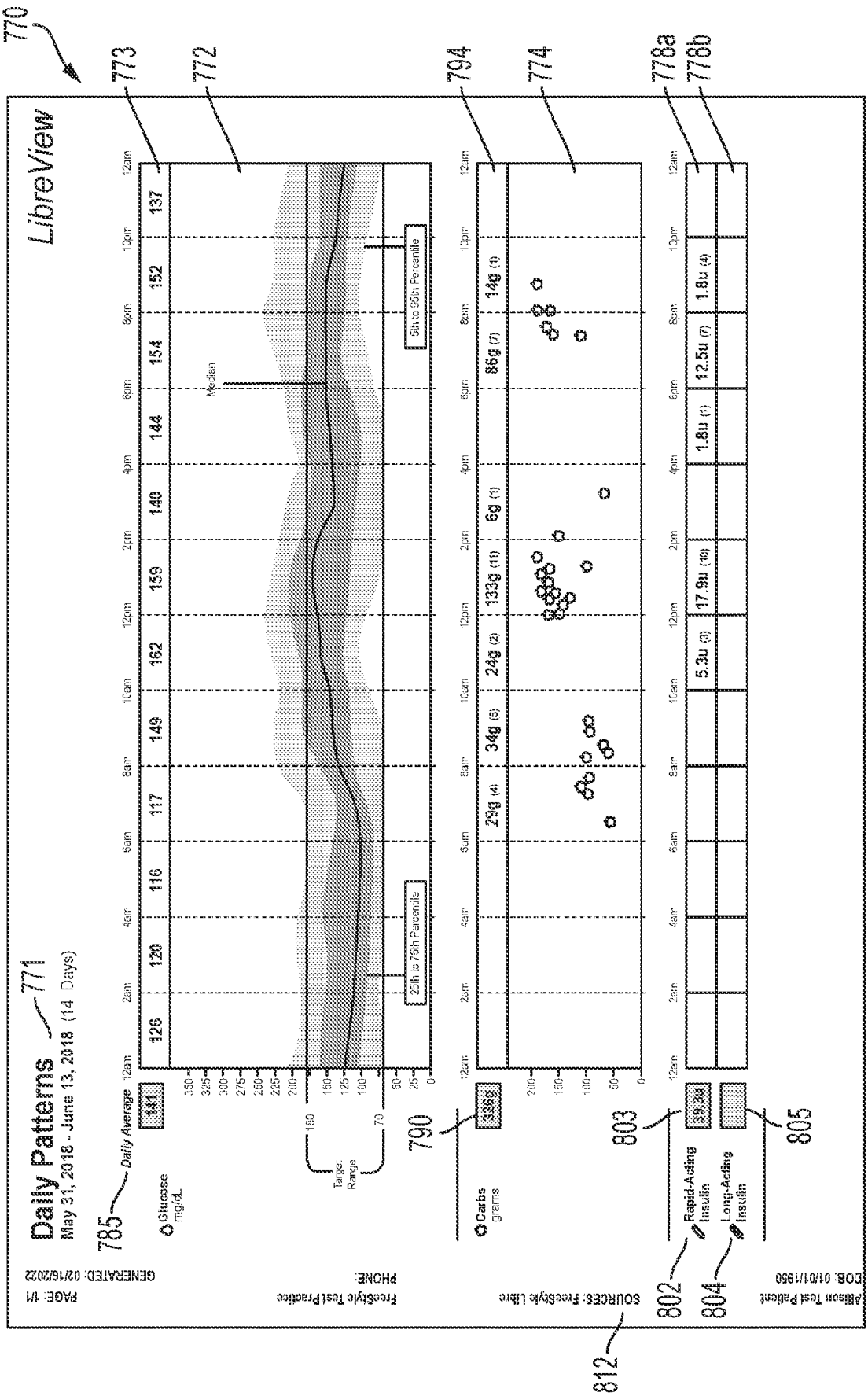

770
LibreView
Daily Patterns
771
May 31, 2018 - June 13, 2018 (14 Days)
773
772
794
774
778a
778b
785
Daily Average
141
126
120
116
117
149
162
159
140
144
154
152
137
Median
5th to 95th Percentile
25th to 75th Percentile
Glucose mg/dL
Target Range
790
Carbs grams
803
Rapid-Acting Insulin
Long-Acting Insulin
805
802
804
812
SOURCES: FreeStyle Libre
FreeStyle Test Practice
PHONE:
Allison Test Patient
DOB: 01/01/1950
GENERATED: 02/16/2022
PAGE: 1/1

FIG. 11B

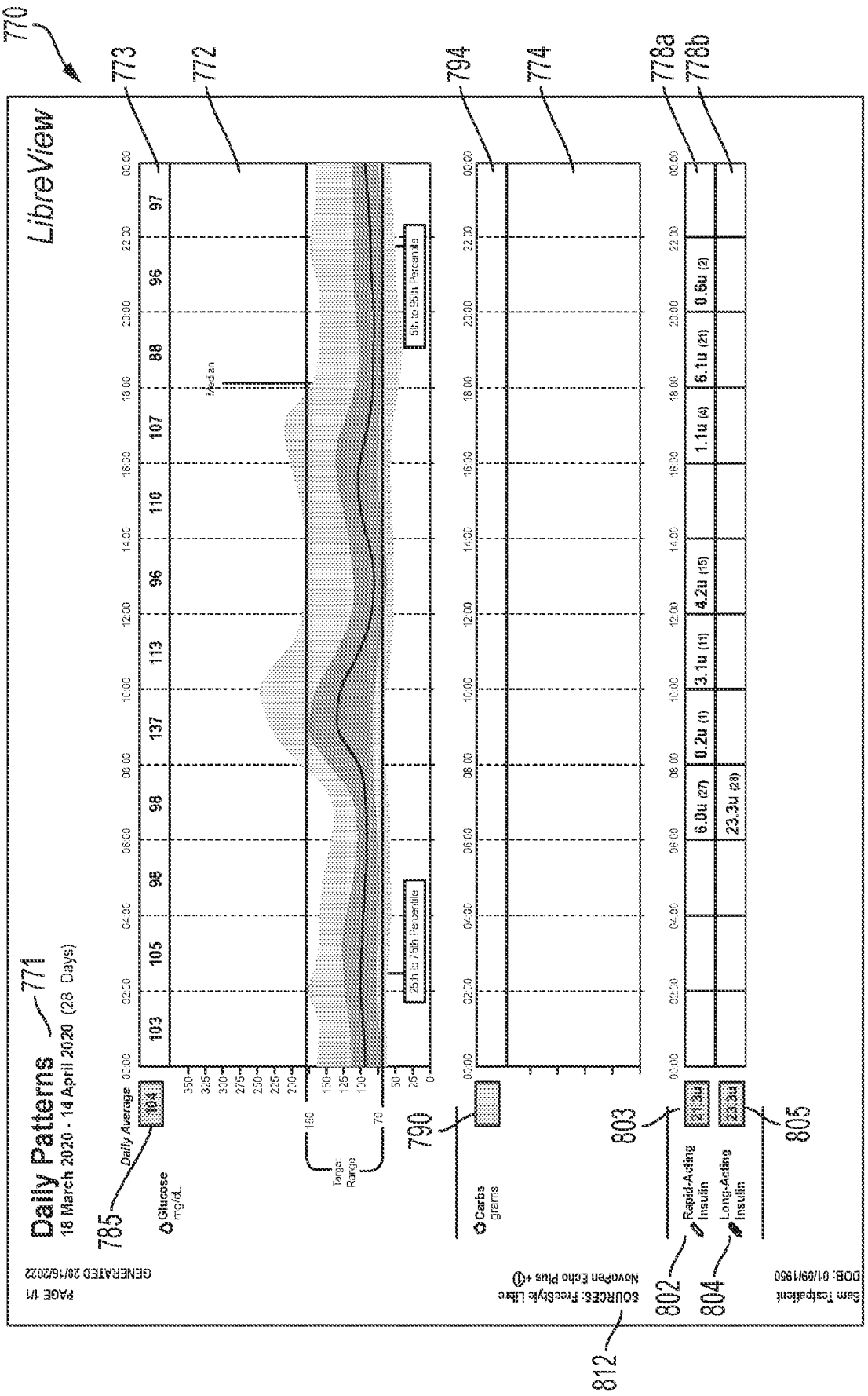
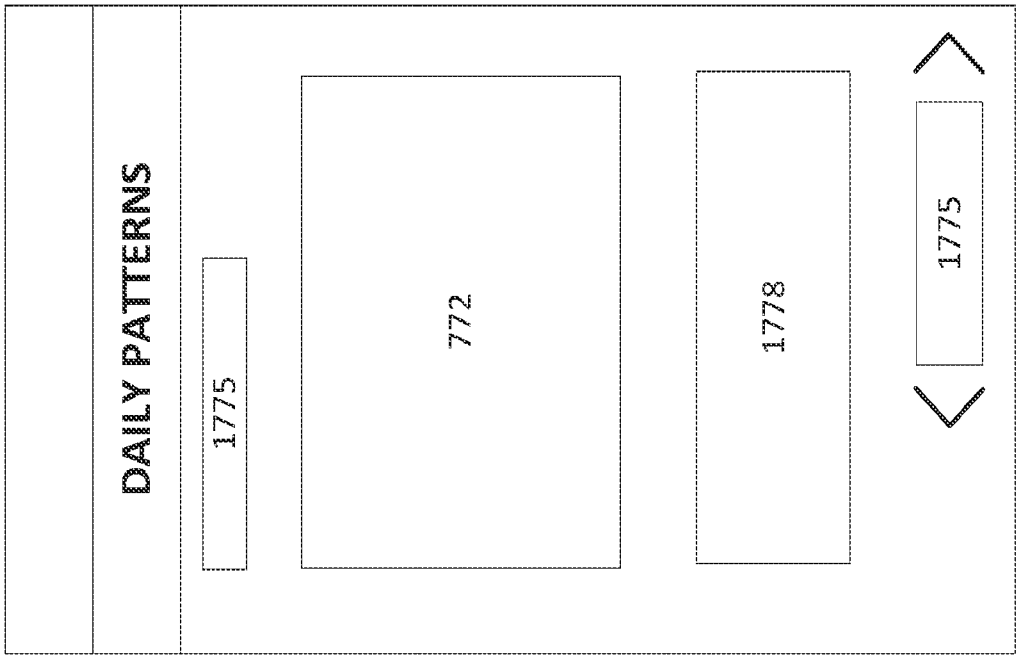

770
LibreView
Daily Patterns
771
18 March 2020 - 14 April 2020 (28 Days)
GENERATED 20/16/2022
PAGE 1/1
Sam Testpatient
DOB: 01/09/1960
SOURCES: FreeStyle Libre
NovoPen Echo Plus
773
772
794
774
778a
778b
Daily Average
Glucose mg/dL
Target Range
25th to 75th Percentile
5th to 95th Percentile
Median
Carbs grams
Rapid-Acting Insulin
Long-Acting Insulin
785
790
803
805
802
804
812

FIG. 11C


DAILY PATTERNS
1775
772
1778
1775
1720

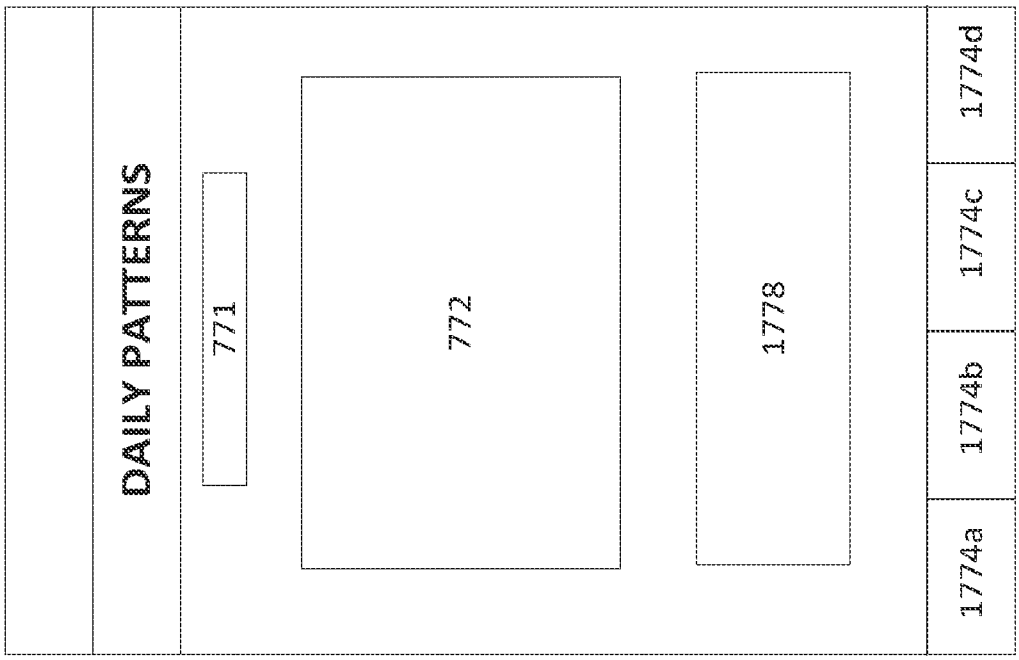

DAILY PATTERNS
771
772
1778
1774a
1774b
1774c
1774d
1700

FIG. 11D

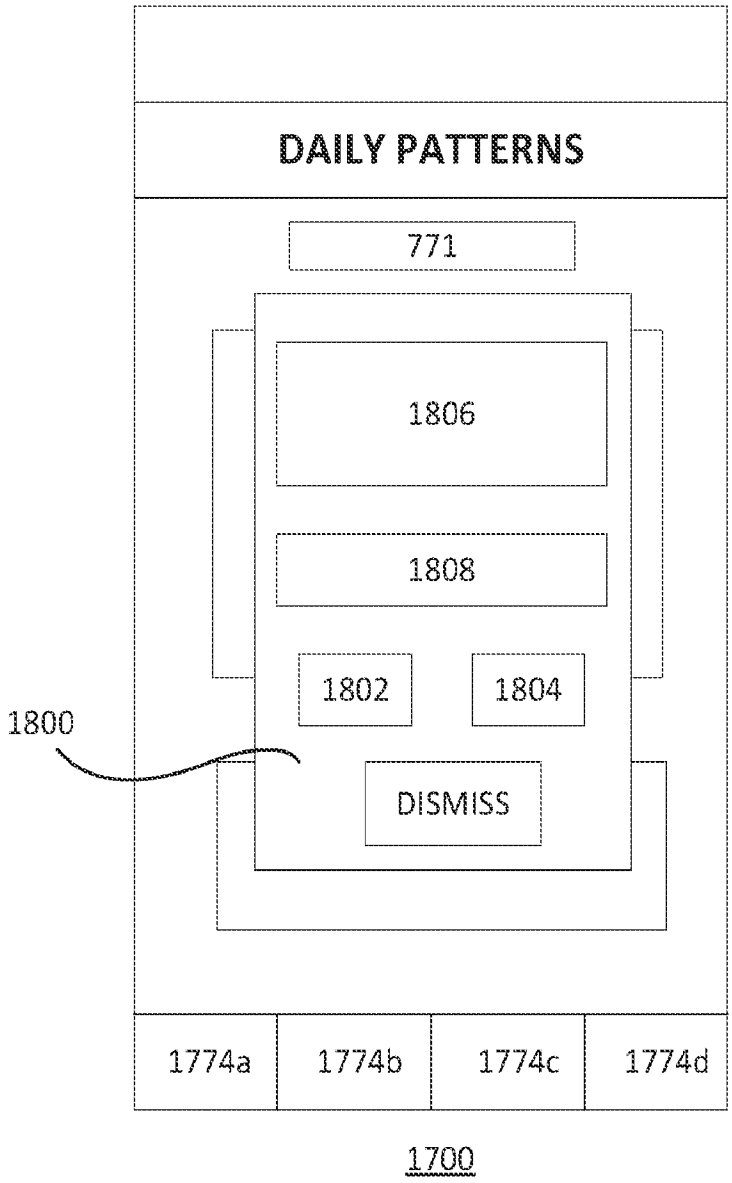

DAILY PATTERNS
771
1806
1808
1802
1804
1800
DISMISS
1774a
1774b
1774c
1774d
1700

FIG. 11E

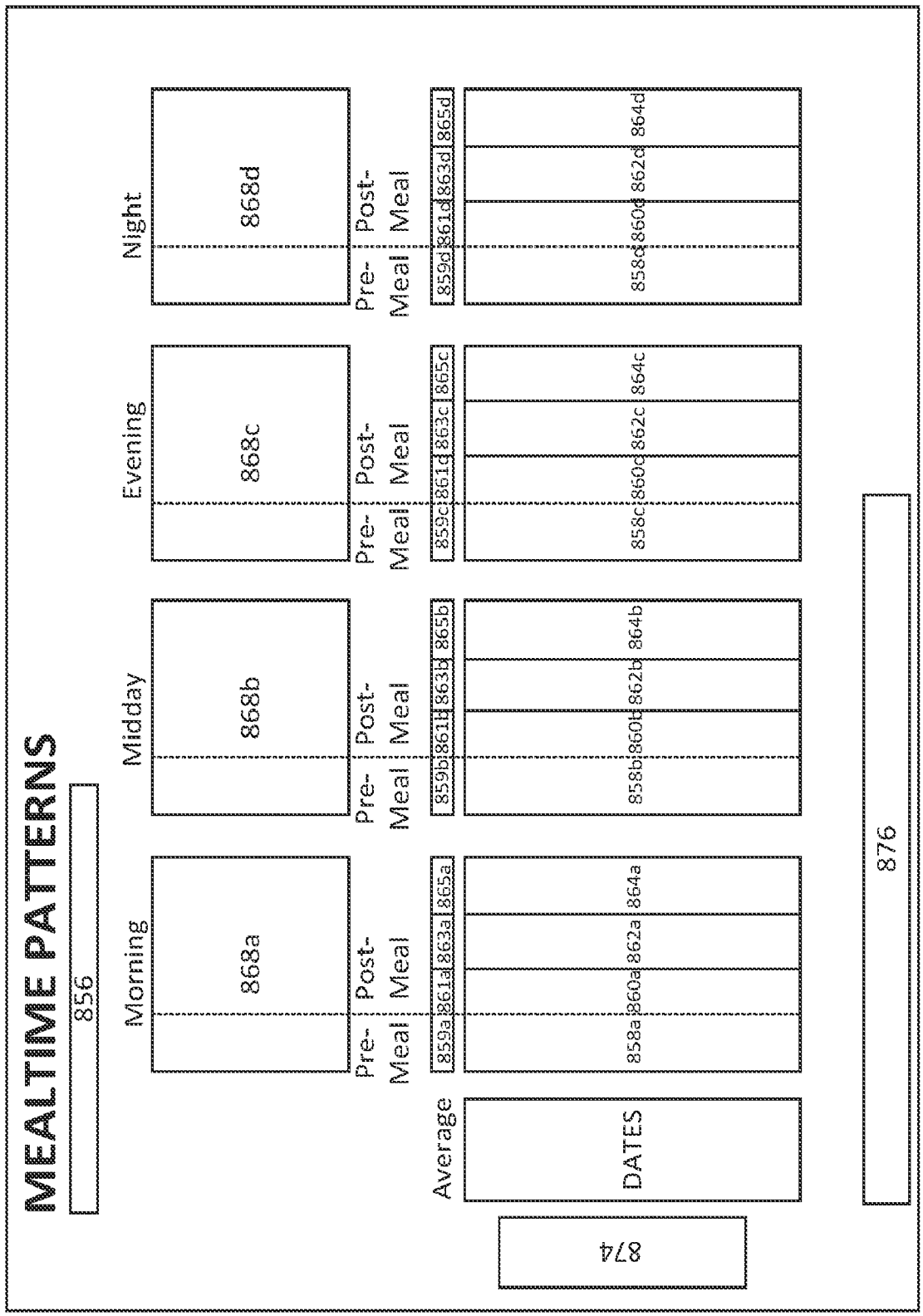

850
MEALTIME PATTERNS
856
Morning
868a
Midday
868b
Evening
868c
Night
868d
Pre-Meal
Post-Meal
Average
DATES
874
876
859a
861a
863a
865a
858a
860a
862a
864a
859b
861b
863b
865b
858b
860b
862b
864b
859c
861c
863c
865c
858c
860c
862c
864c
859d
861d
863d
865d
858d
860d
862d
864d

FIG. 12A

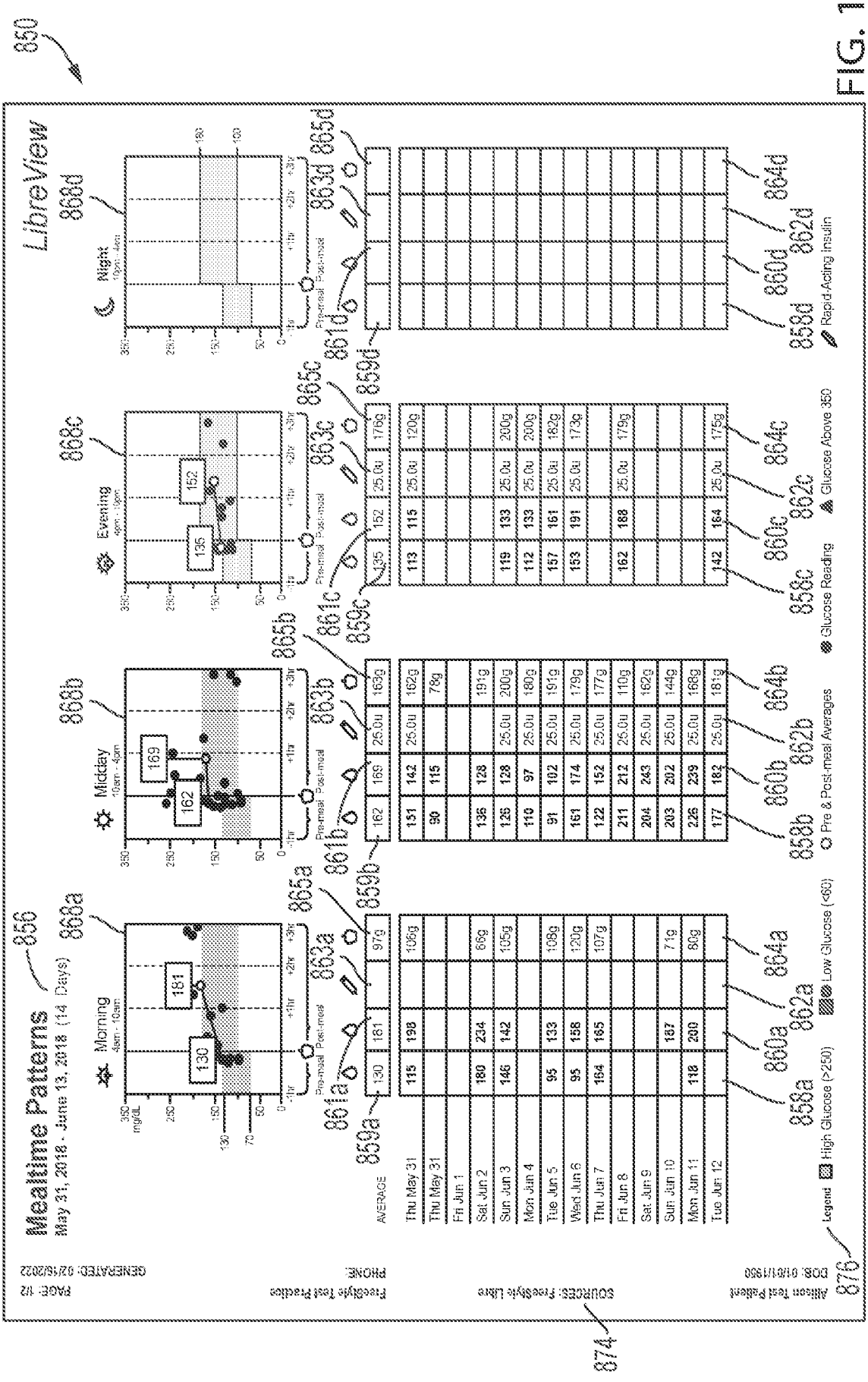

850
LibreView
Mealtime Patterns
May 31, 2018 - June 13, 2018 (14 Days)
856
Morning
Midday
Evening
Night
868a
868b
868c
868d
Pre-meal
Post-meal
Rapid-Acting Insulin
Legend
High Glucose (>250)
Low Glucose (<60)
Pre & Post-meal Averages
Glucose Reading
Glucose Above 350
876
874
SOURCE: FreeStyle Libre

FIG. 12B

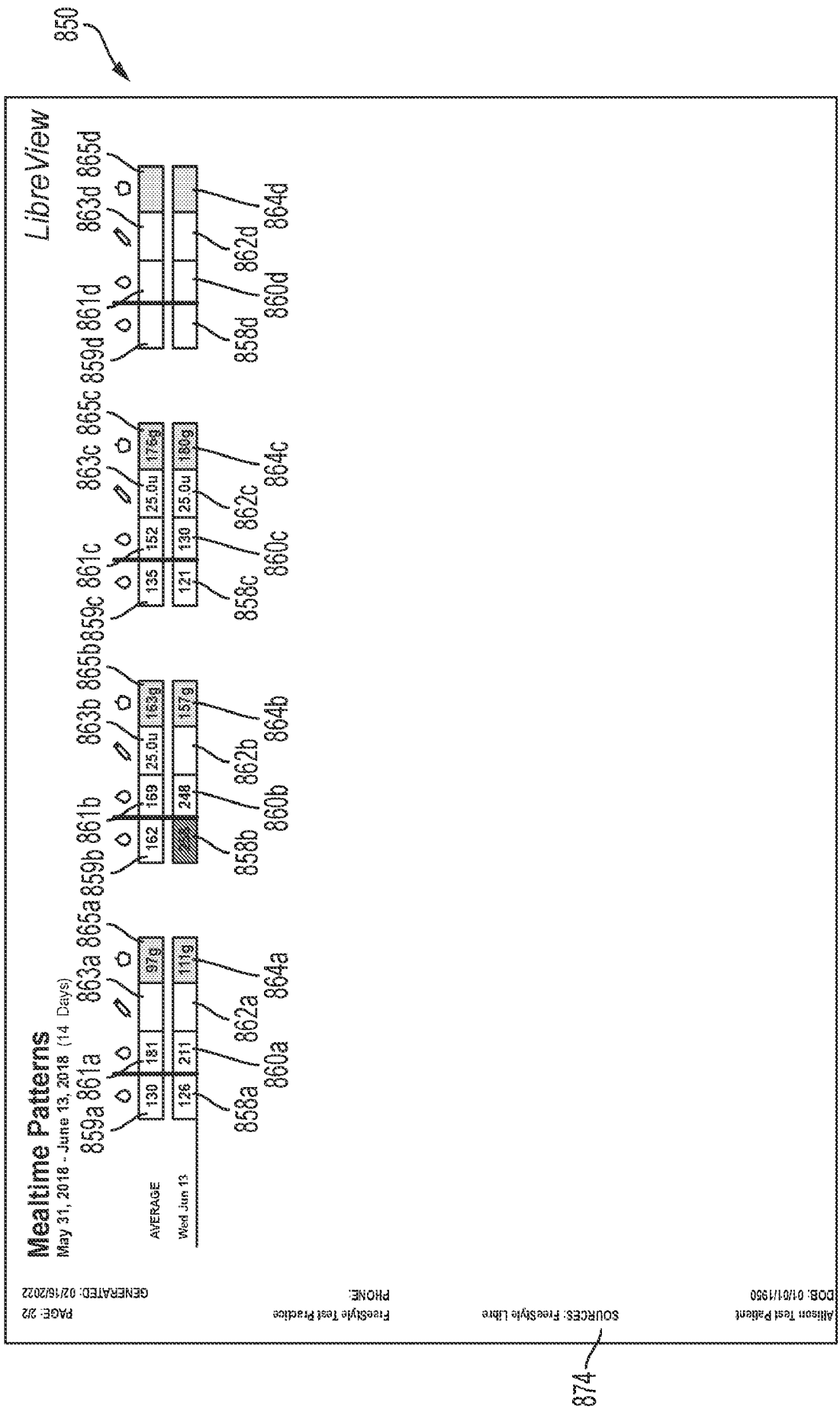

850
LibreView
Mealtime Patterns
May 31, 2018 - June 13, 2018 (14 Days)
AVERAGE
Wed Jun 13
130 181 97g
126 211 111g
162 169 25.0u 163g
248 187g
135 152 25.0u 175g
121 130 25.0u 180g
859a 861a 863a 865a 862a 864a 860a 858a
859b 861b 863b 865b 862b 864b 860b 858b
859c 861c 863c 865c 862c 864c 860c 858c
859d 861d 863d 865d 862d 864d 860d 858d
Allison Test Patient
DOB: 01-01-1960
SOURCES: FreeStyle Libre
874
FreeStyle Test Practice
PHONE:
PAGE: 2/2
GENERATED: 02/16/2022

FIG. 12C

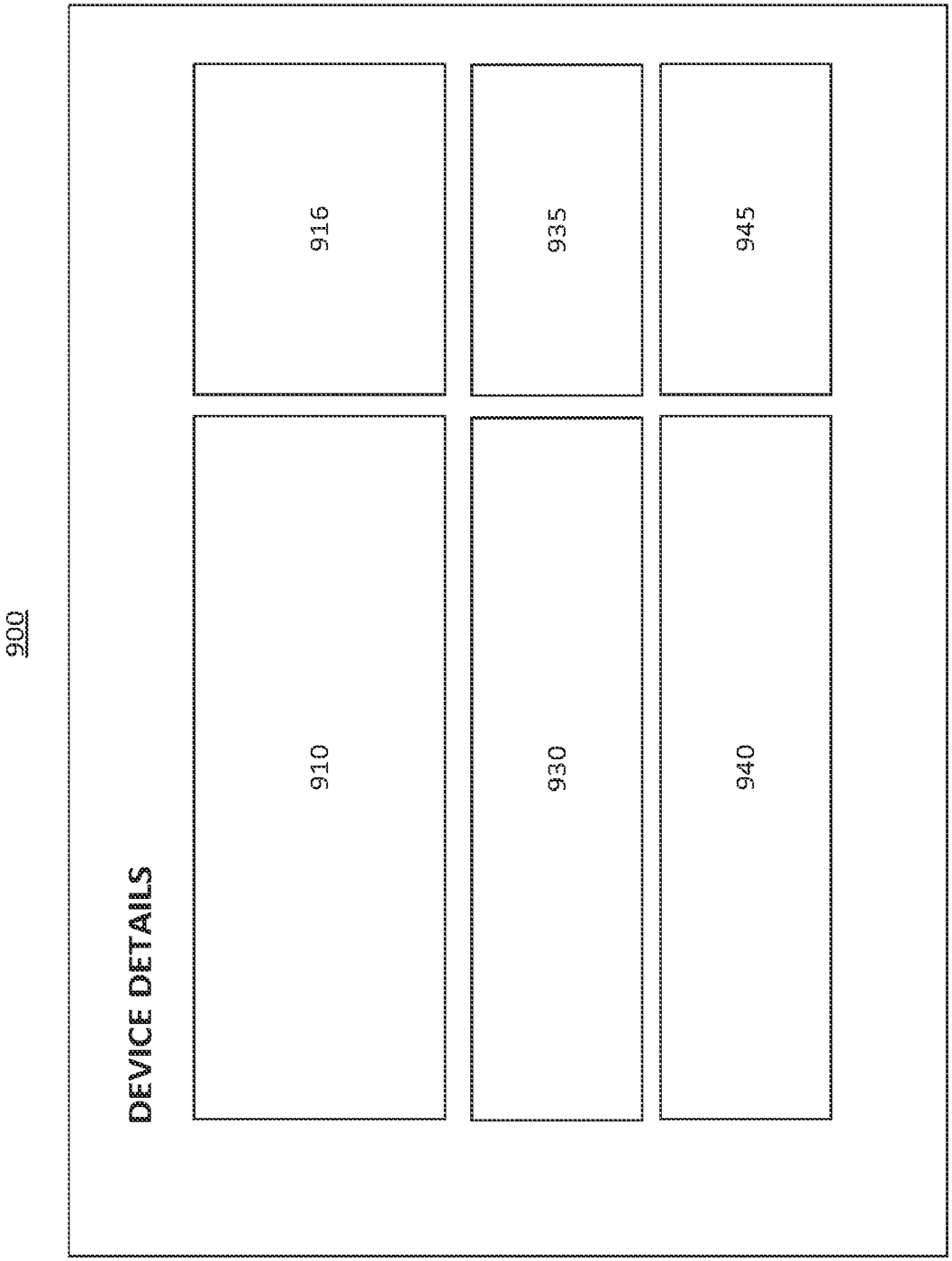


FIG. 13A

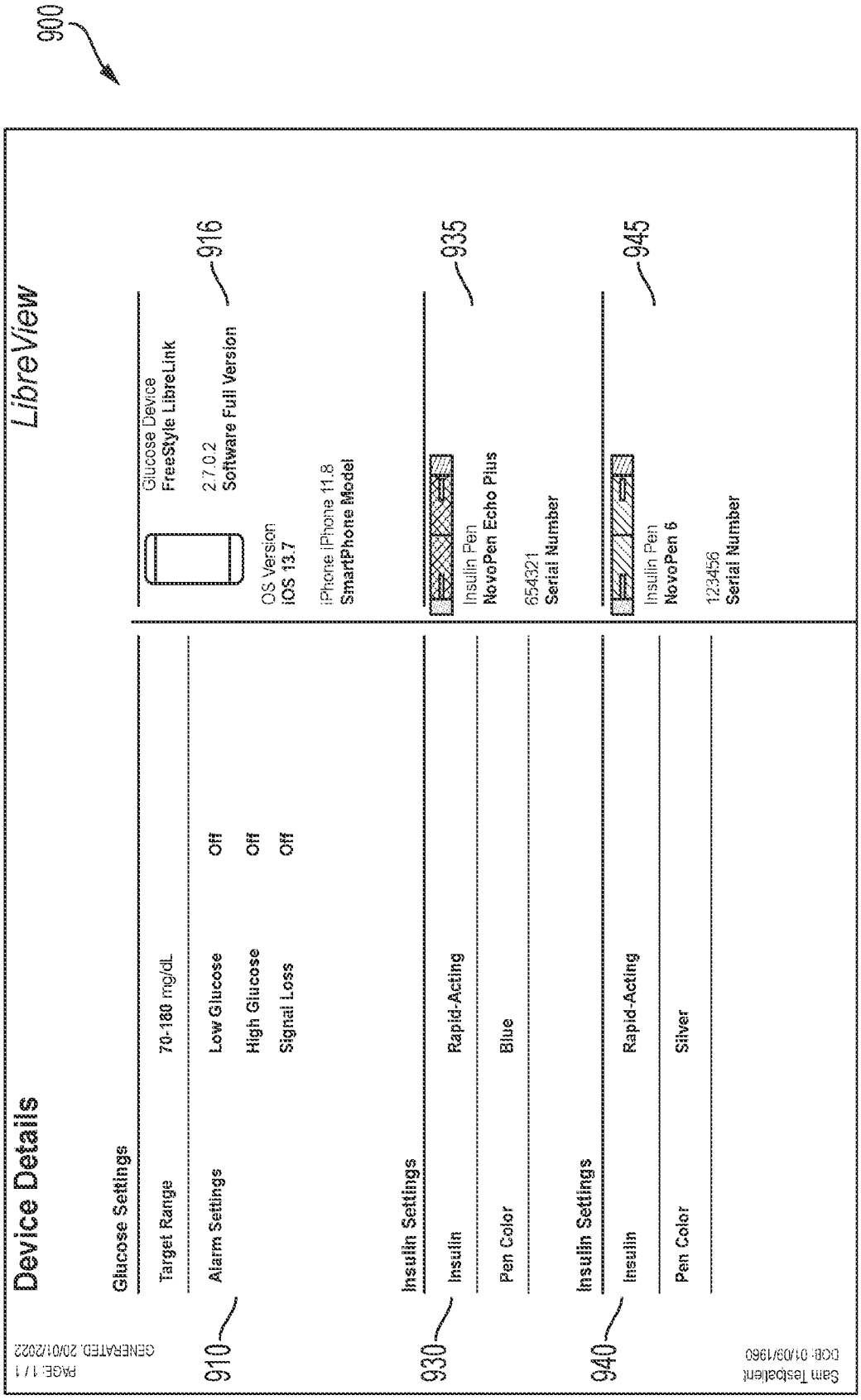

900
LibreView
Device Details
PAGE: 1 / 1
GENERATED: 20/01/2022
Sam Testpatient
DOB: 01/09/1960
Glucose Settings
Target Range
70-180 mg/dL
Alarm Settings
Low Glucose
Off
High Glucose
Off
Signal Loss
Off
910
Insulin Settings
Insulin
Rapid-Acting
Pen Color
Blue
930
Insulin Settings
Insulin
Rapid-Acting
Pen Color
Silver
940
Glucose Device
FreeStyle LibreLink
2.7.0.2
Software Full Version
916
OS Version
iOS 13.7
iPhone iPhone 11.8
SmartPhone Model
Insulin Pen
NovoPen Echo Plus
654321
Serial Number
935
Insulin Pen
NovoPen 6
123456
Serial Number
945

FIG. 13B

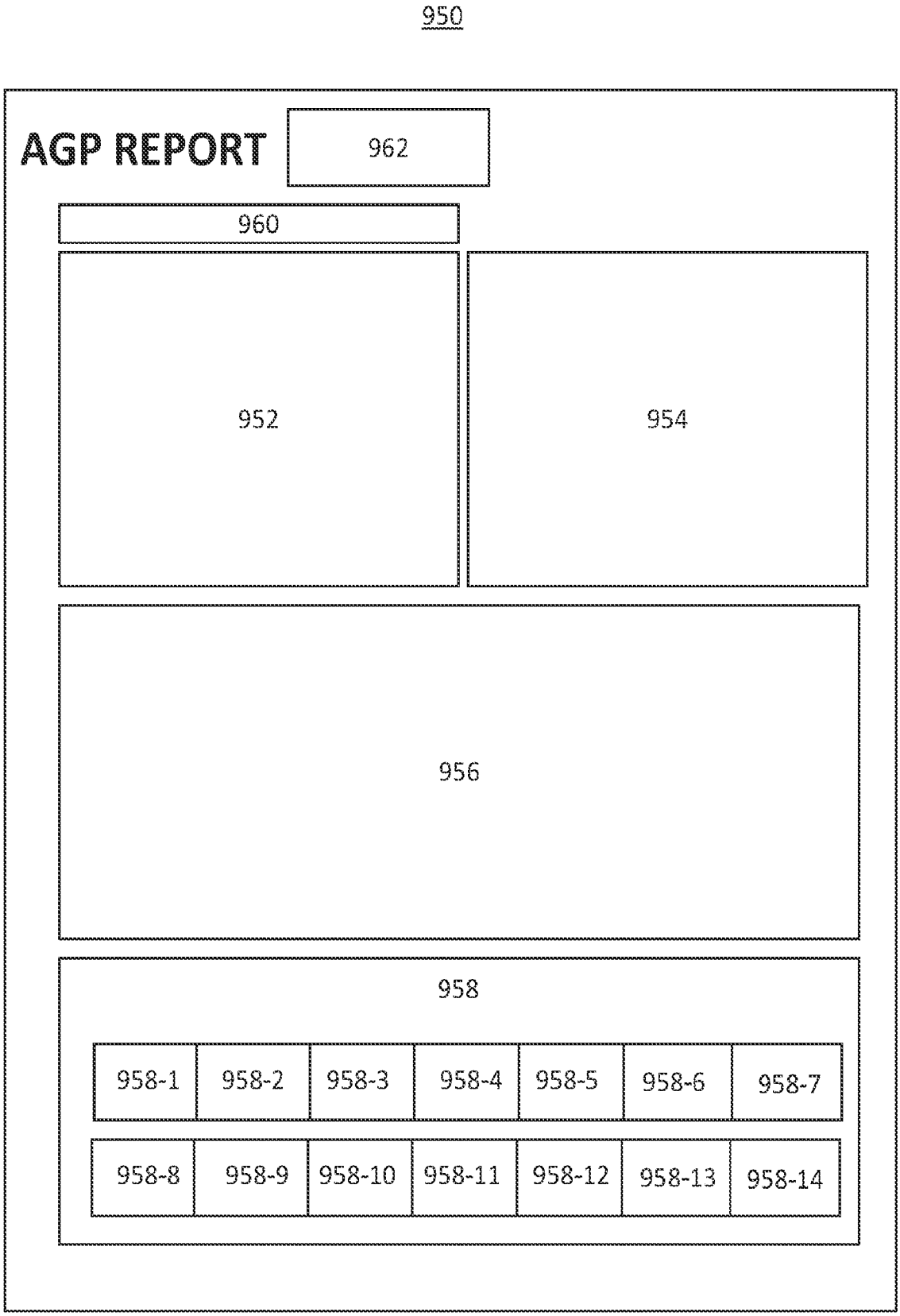

950
AGP REPORT
962
960
952
954
956
958
958-1
958-2
958-3
958-4
958-5
958-6
958-7
958-8
958-9
958-10
958-11
958-12
958-13
958-14

FIG. 14

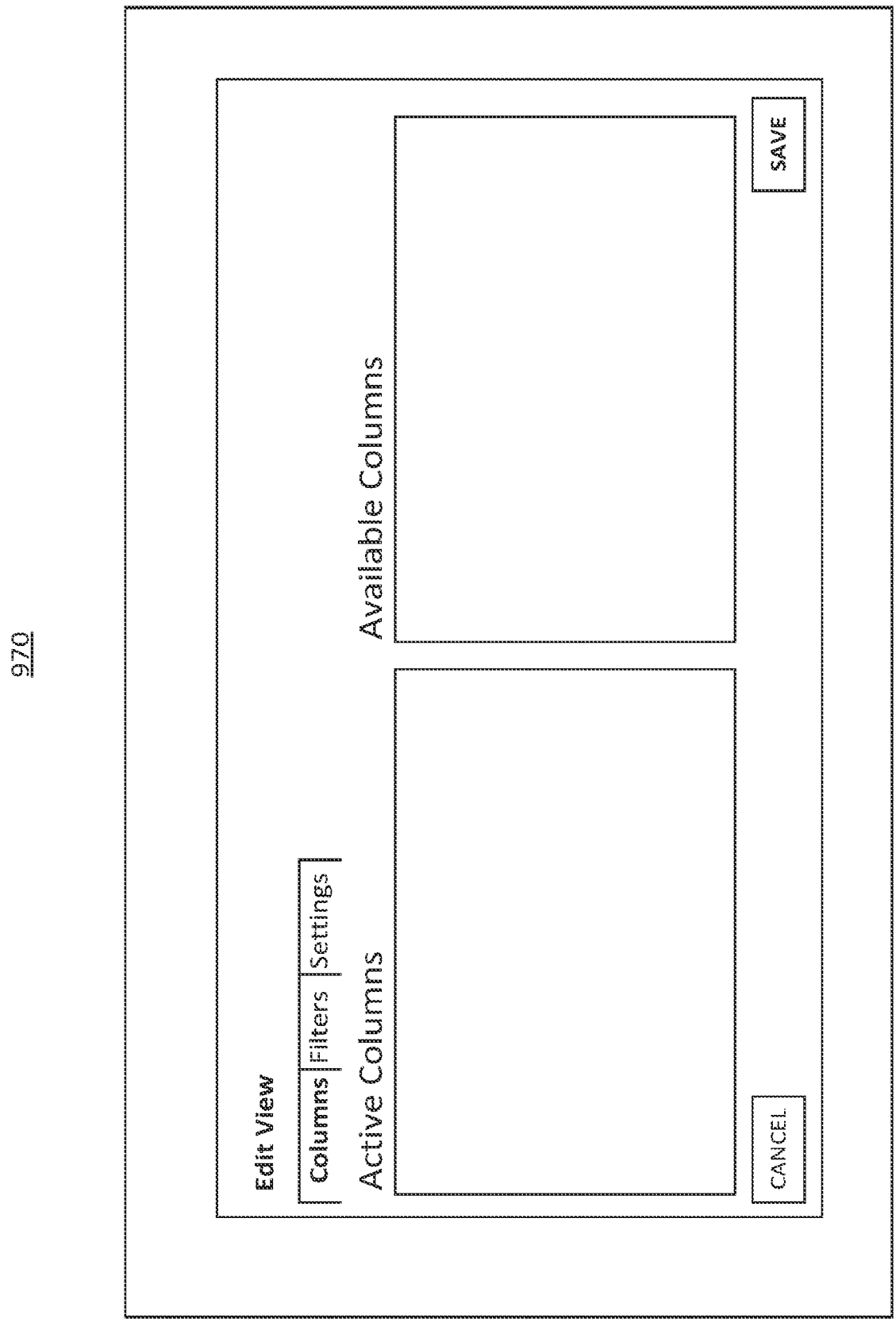

970
Edit View
Columns
Filters
Settings
Active Columns
Available Columns
CANCEL
SAVE

FIG. 15A

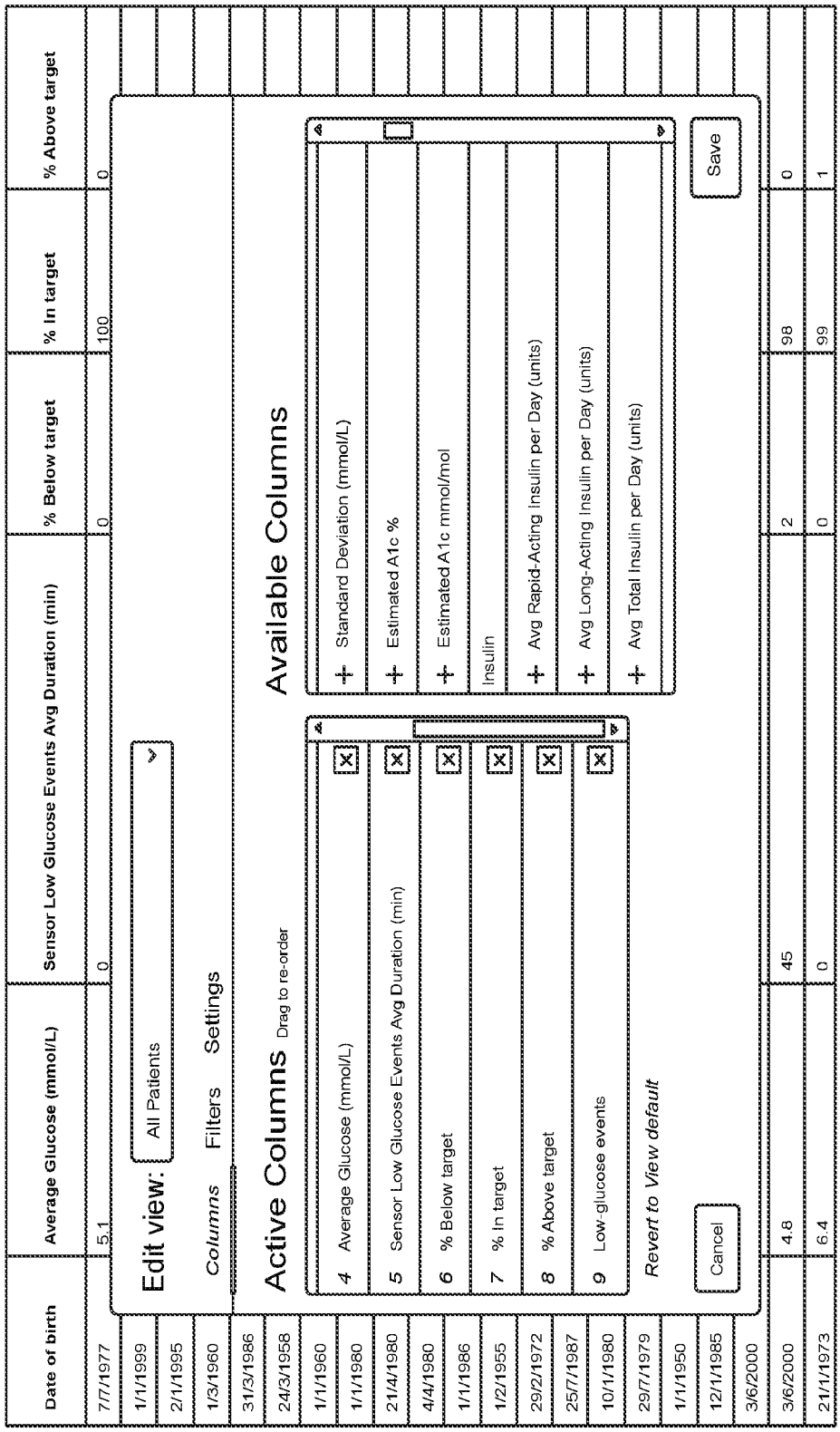

Date of birth
Average Glucose (mmol/L)
Sensor Low Glucose Events Avg Duration (min)
% Below target
% In target
% Above target
7/7/1977 5.1 0 0 100 0
1/1/1999
2/1/1995
1/3/1960
31/3/1986
24/3/1958
1/1/1960
1/1/1980
21/4/1980
4/4/1980
1/1/1986
1/2/1955
29/2/1972
25/7/1987
10/1/1980
29/7/1979
1/1/1950
12/1/1985
3/6/2000
3/6/2000 4.8 45 2 98 0
21/1/1973 6.4 0 0 99 1
Edit view:
All Patients
Columns
Filters
Settings
Active Columns
Drag to re-order
4 Average Glucose (mmol/L)
5 Sensor Low Glucose Events Avg Duration (min)
6 % Below target
7 % In target
8 % Above target
9 Low-glucose events
Revert to View default
Cancel
Available Columns
Standard Deviation (mmol/L)
Estimated A1c %
Estimated A1c mmol/mol
Insulin
Avg Rapid-Acting Insulin per Day (units)
Avg Long-Acting Insulin per Day (units)
Avg Total Insulin per Day (units)
Save

FIG. 15B

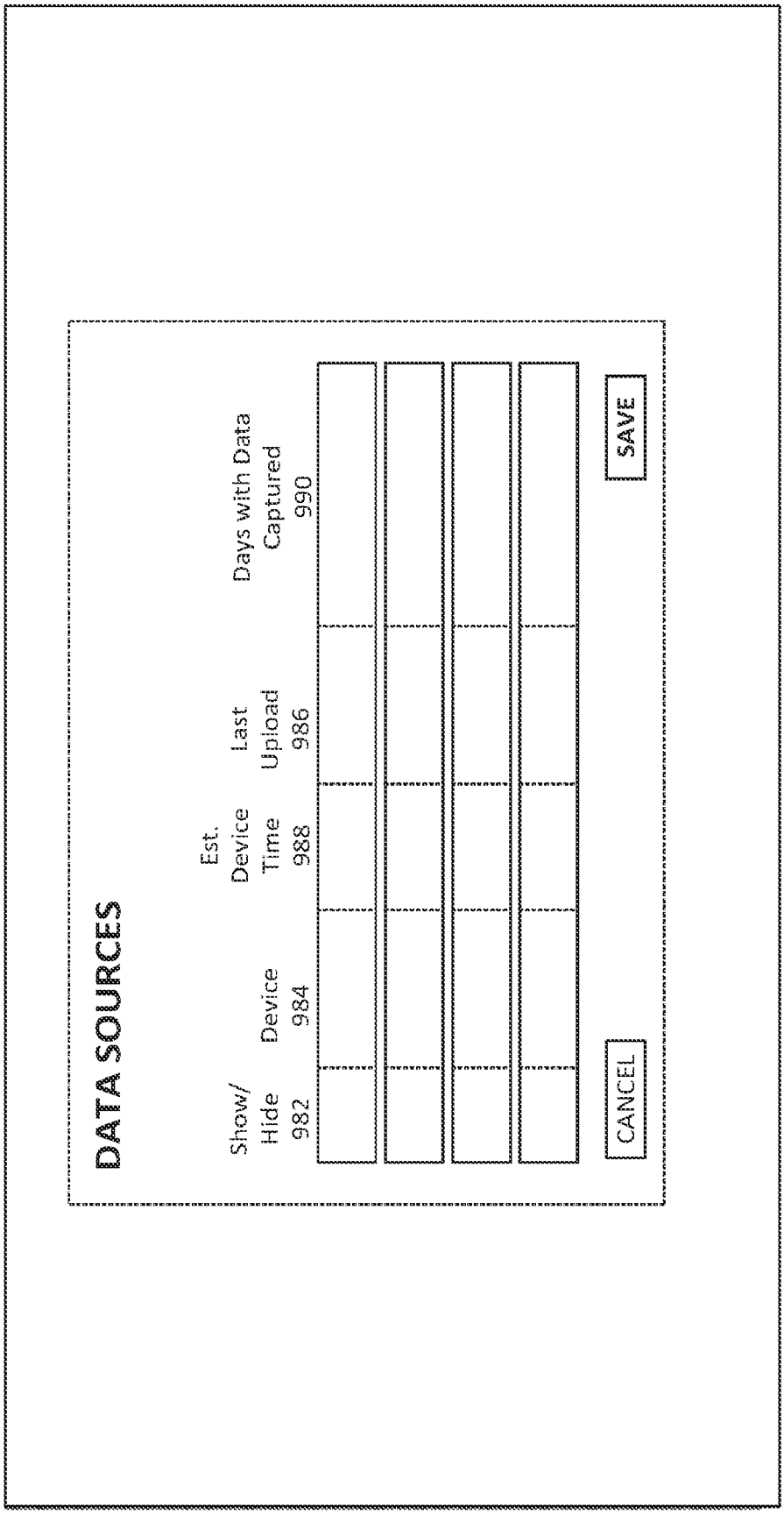

980
DATA SOURCES
Show/ Hide 982
Device 984
Est. Device Time 988
Last Upload 986
Days with Data Captured 990
CANCEL
SAVE

FIG. 16A

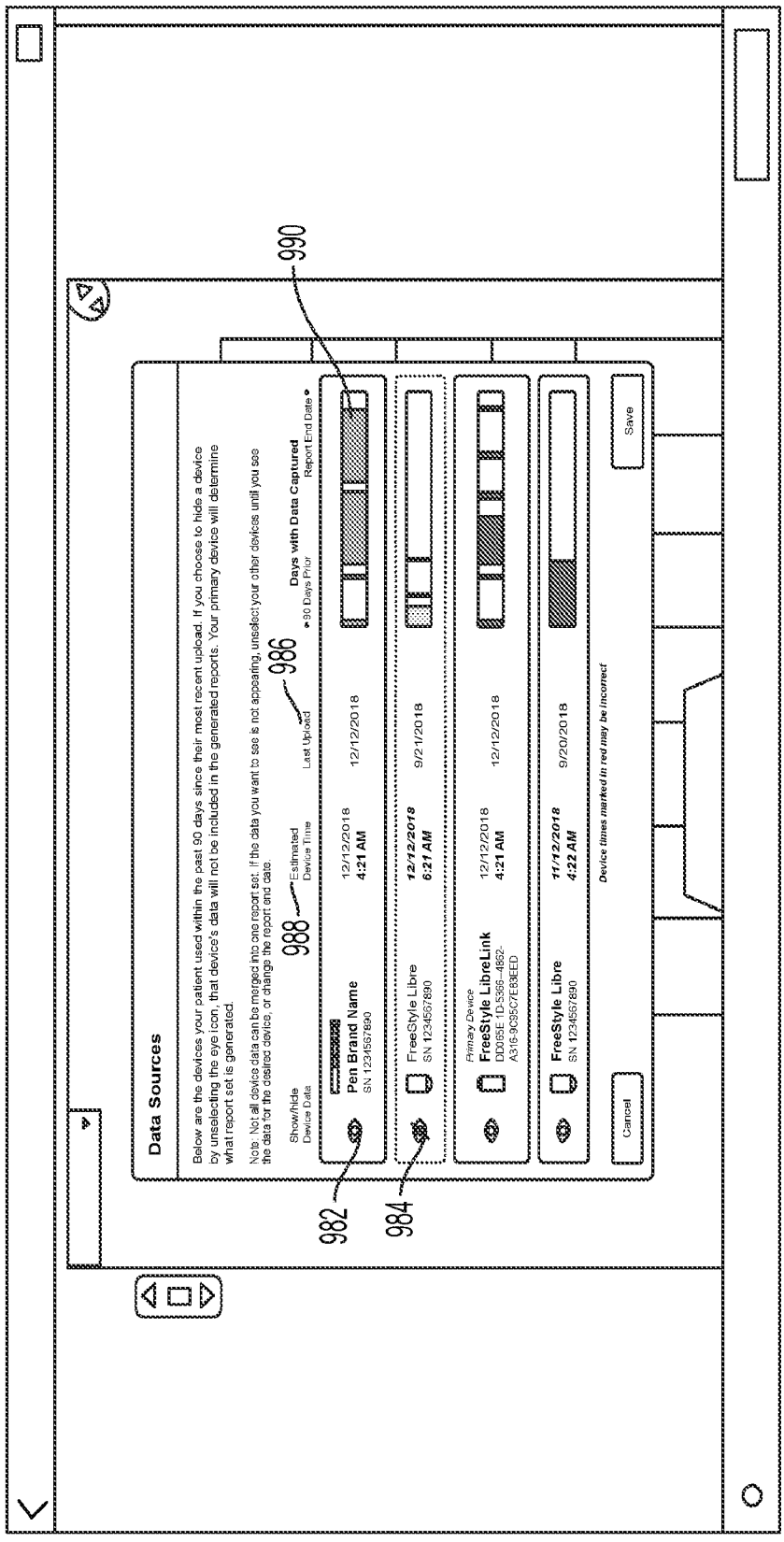

980
990
Data Sources
Below are the devices your patient used within the past 90 days since their most recent upload. If you choose to hide a device by unselecting the eye icon, that device's data will not be included in the generated reports. Your primary device will determine what report set is generated.
Note: Not all device data can be merged into one report set. If the data you want to see is not appearing, unselect your other devices until you see the data for the desired device, or change the report end date.
Show/hide Device Data
988
Estimated Device Time
Last Upload
986
Days with Data Captured
• 90 Days Prior
Report End Date •
Pen Brand Name
SN 1234567890
12/12/2018 4:21 AM
12/12/2018
FreeStyle Libre
SN 1234567890
12/12/2018 6:21 AM
9/21/2018
Primary Device
FreeStyle LibreLink
DD085E1D-5366-4862-A316-9C95C7E83EED
12/12/2018 4:21 AM
12/12/2018
FreeStyle Libre
SN 1234567890
11/12/2018 4:22 AM
9/20/2018
Device times marked in red may be incorrect
Cancel
Save
982
984

FIG. 16B

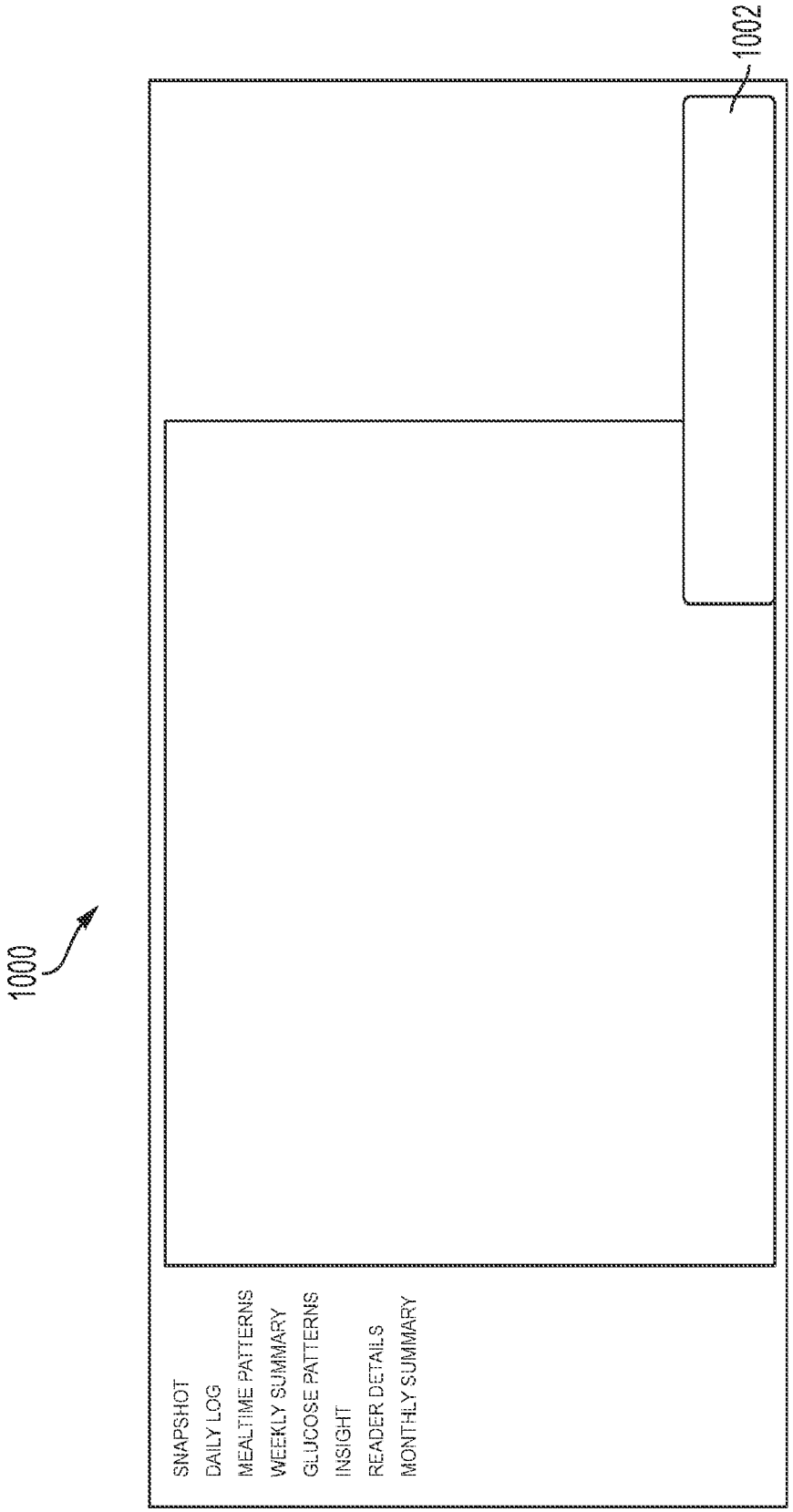

1000
1002
SNAPSHOT
DAILY LOG
MEALTIME PATTERNS
WEEKLY SUMMARY
GLUCOSE PATTERNS
INSIGHT
READER DETAILS
MONTHLY SUMMARY

FIG. 17A

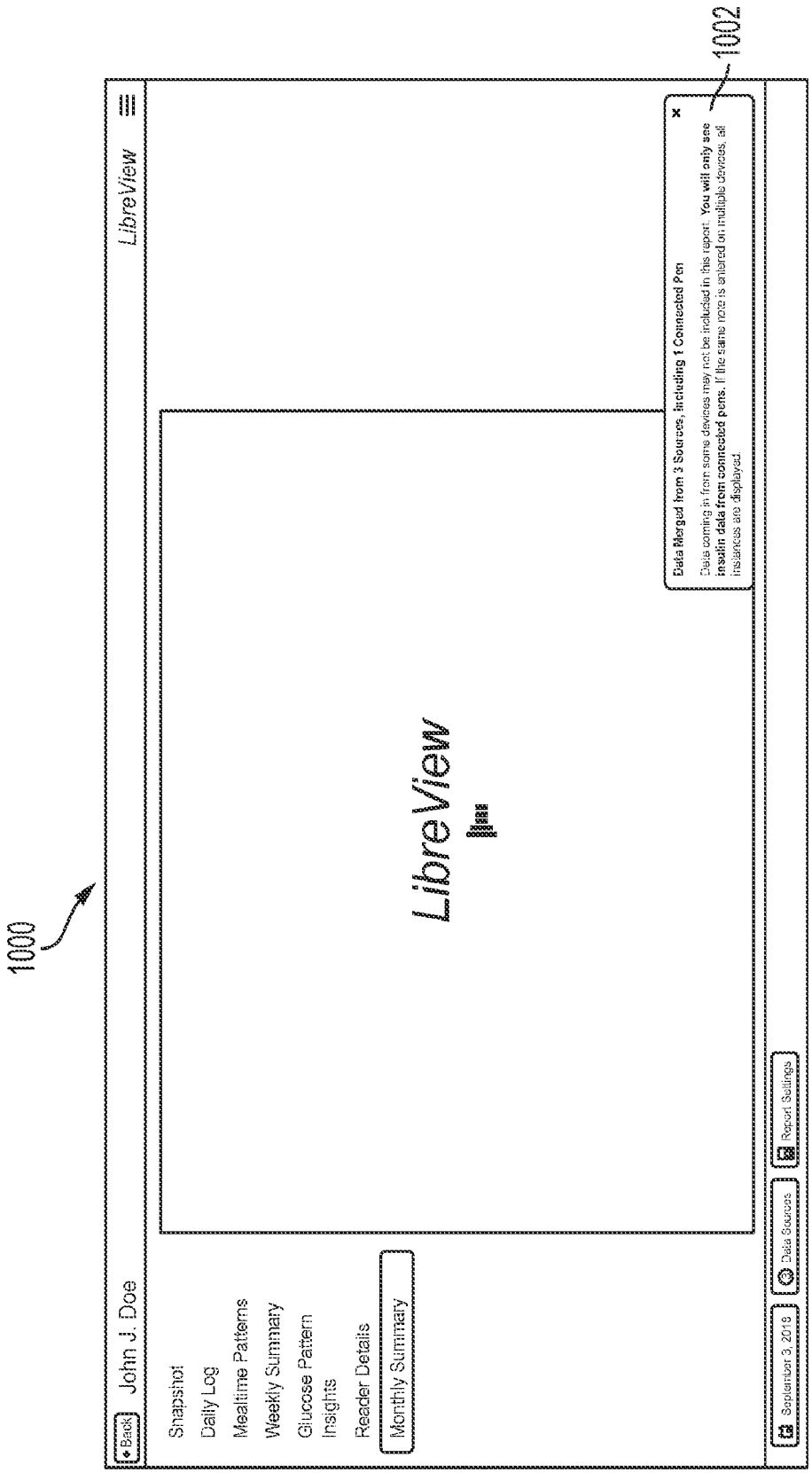

1000
1002
LibreView
Back
John J. Doe
LibreView
Snapshot
Daily Log
Mealtime Patterns
Weekly Summary
Glucose Pattern Insights
Reader Details
Monthly Summary
LibreView
Data Merged from 3 Sources, including 1 Connected Pen
Data coming in from some devices may not be included in this report. You will only see insulin data from connected pens. If the same note is entered on multiple devices, all instances are displayed.
September 9, 2019
Data Sources
Report Settings

FIG. 17B

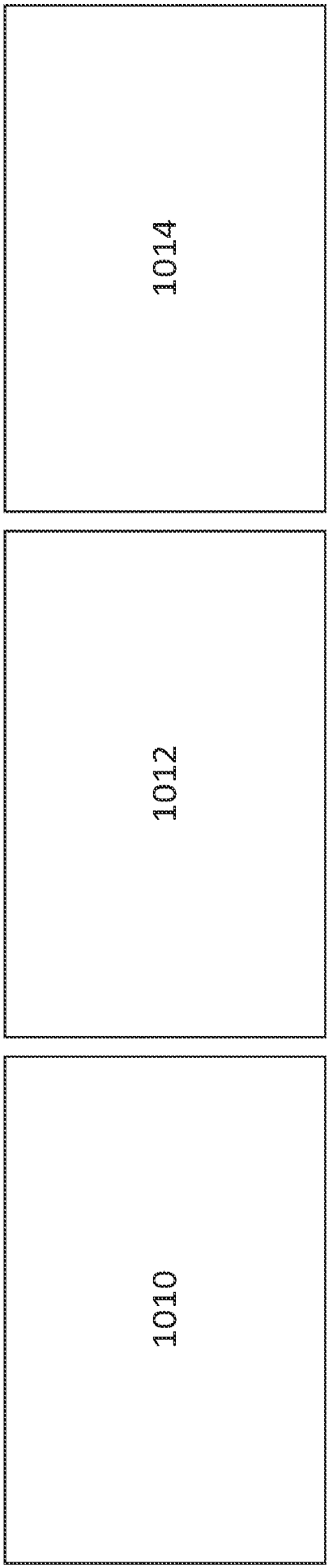


FIG. 18A

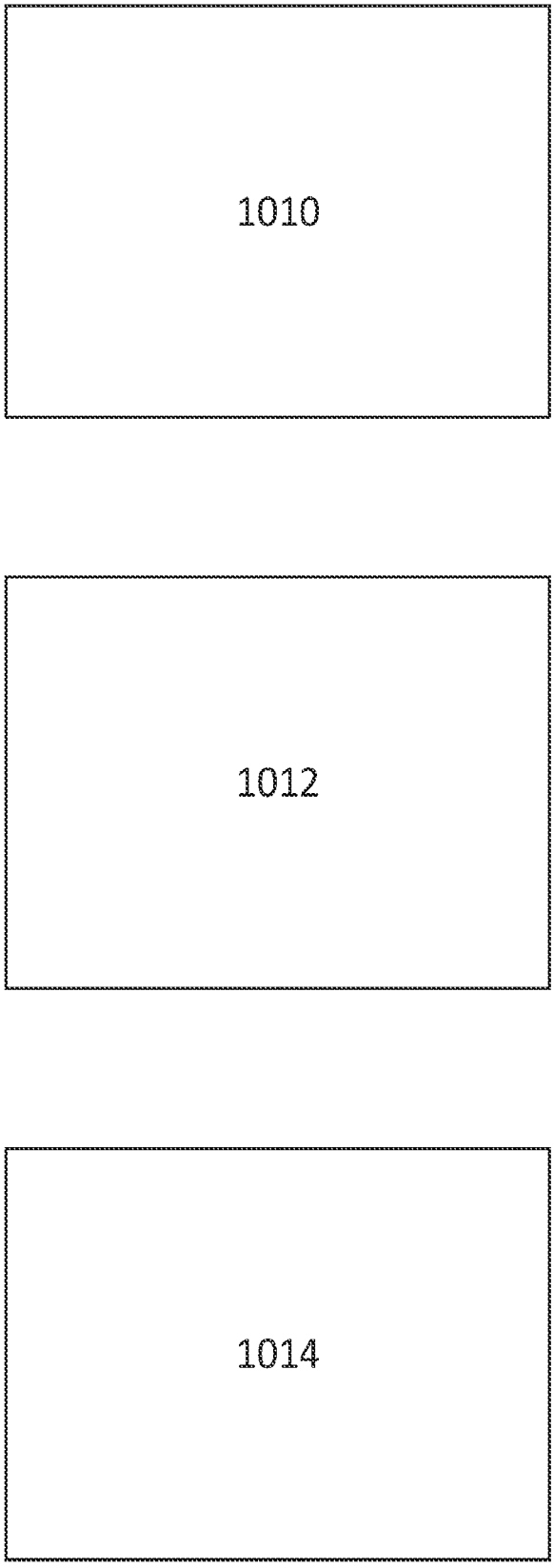


FIG. 18B

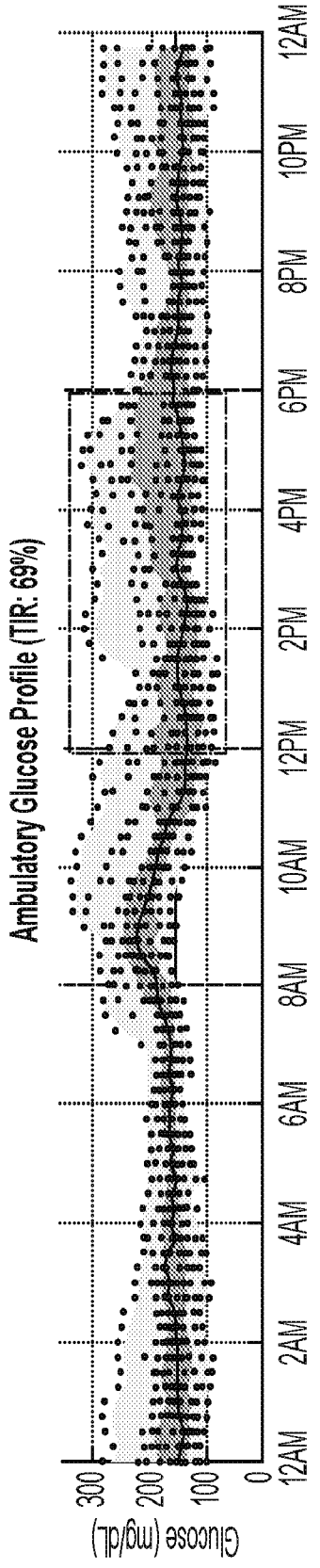


FIG. 18C

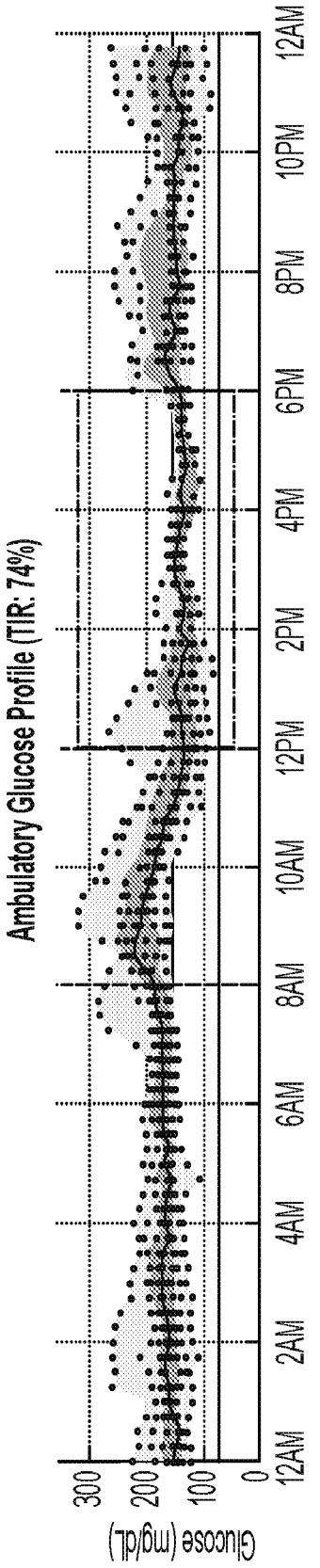


FIG. 18D

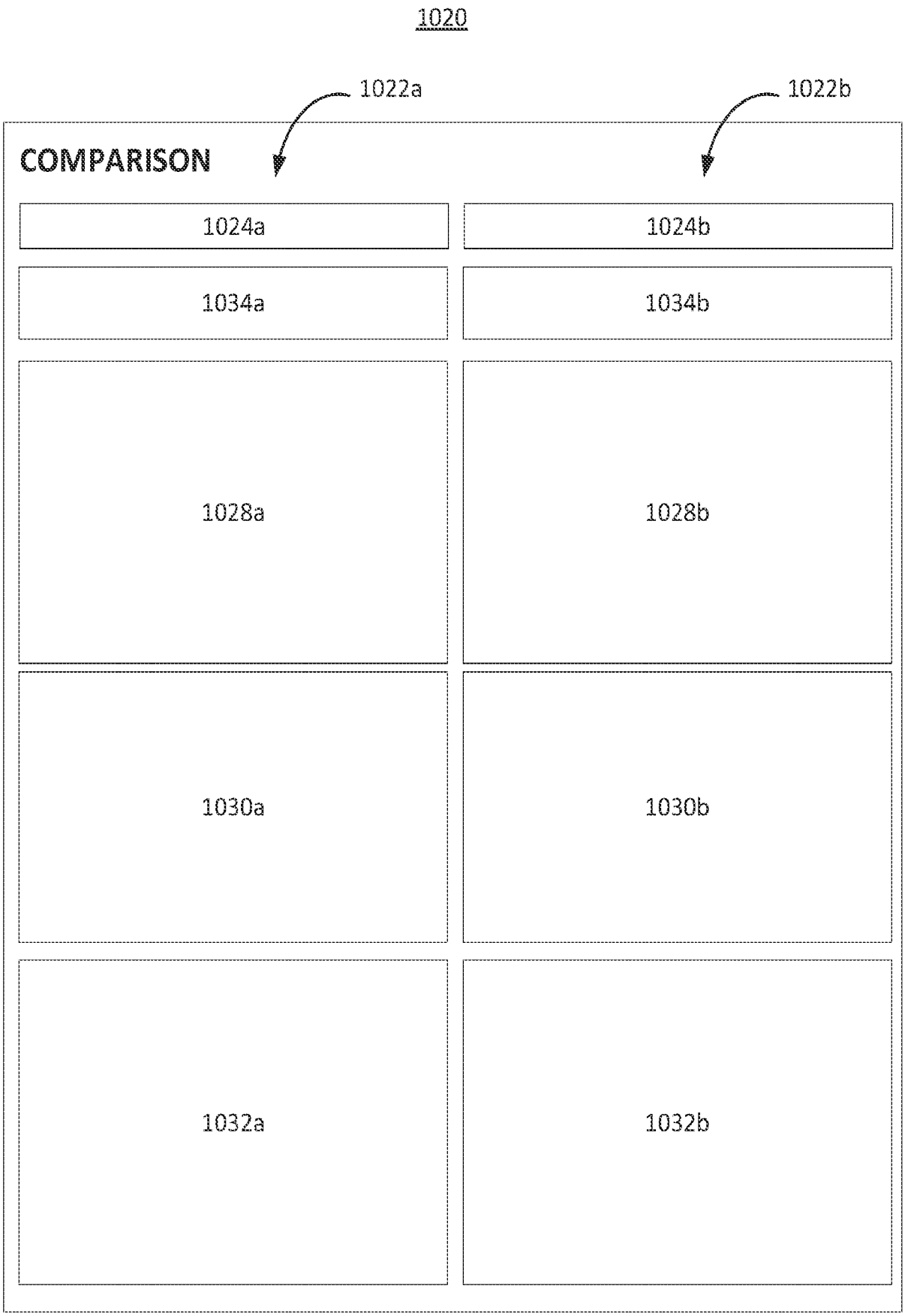

1020
1022a
1022b
COMPARISON
1024a
1024b
1034a
1034b
1028a
1028b
1030a
1030b
1032a
1032b

FIG. 19

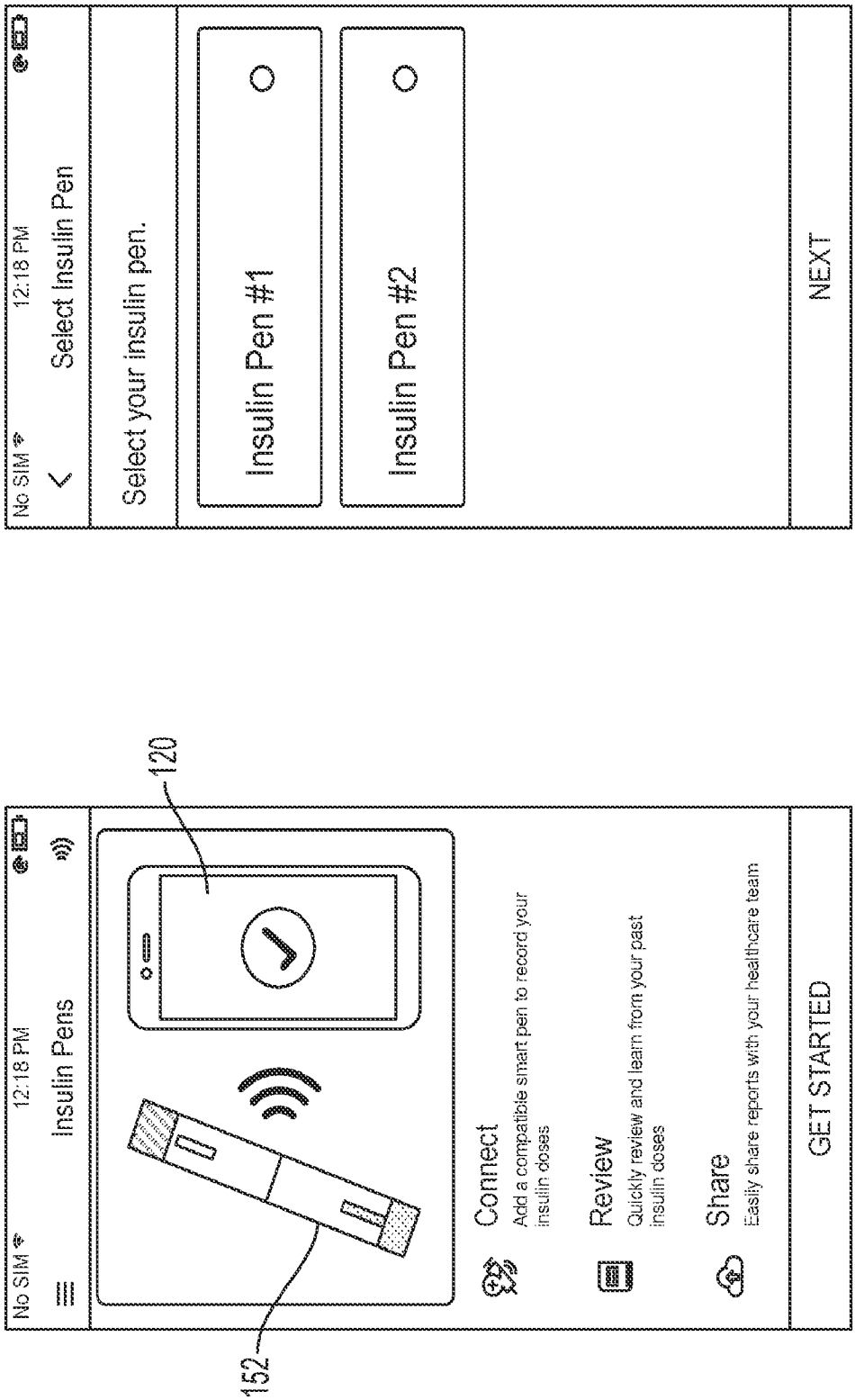
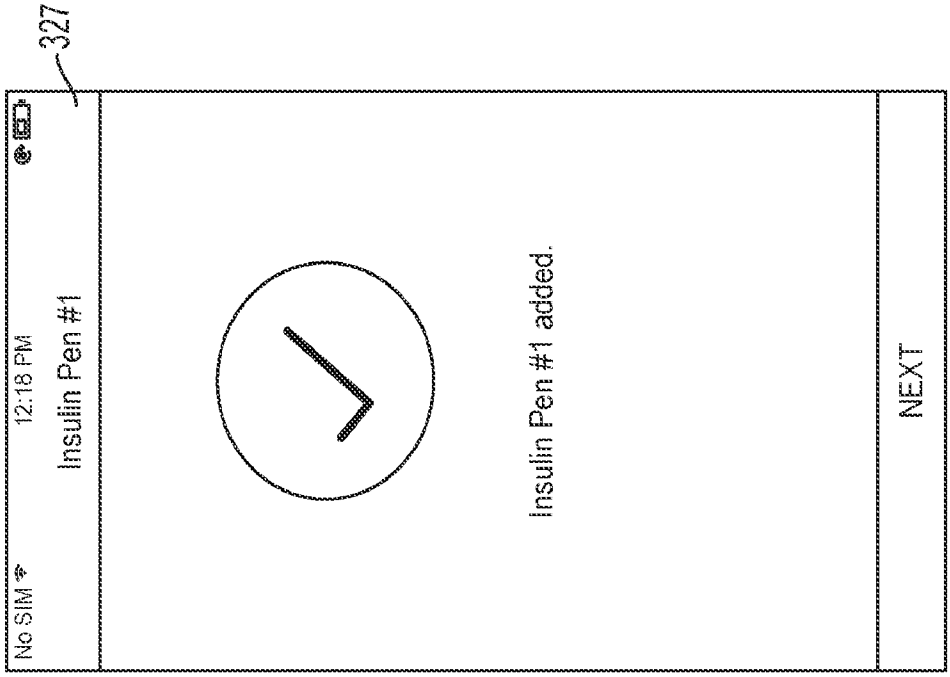

No SIM
12:18 PM
Insulin Pens
120
152
Connect
Add a compatible smart pen to record your insulin doses
Review
Quickly review and learn from your past insulin doses
Share
Easily share reports with your healthcare team
GET STARTED
322
No SIM
12:18 PM
Select Insulin Pen
Select your insulin pen.
Insulin Pen #1
Insulin Pen #2
NEXT
324

FIG. 20A


No SIM
12:18 PM
Insulin Pen #1
Insulin Pen #1 added.
NEXT
327
328

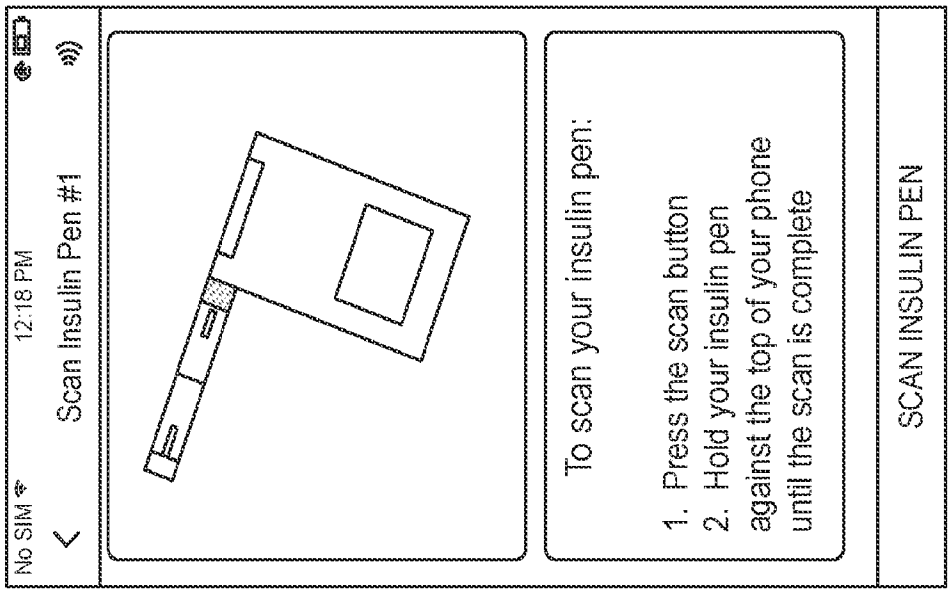

No SIM
12:18 PM
Scan Insulin Pen #1
To scan your insulin pen:
1. Press the scan button
2. Hold your insulin pen against the top of your phone until the scan is complete
SCAN INSULIN PEN
326

FIG. 20B

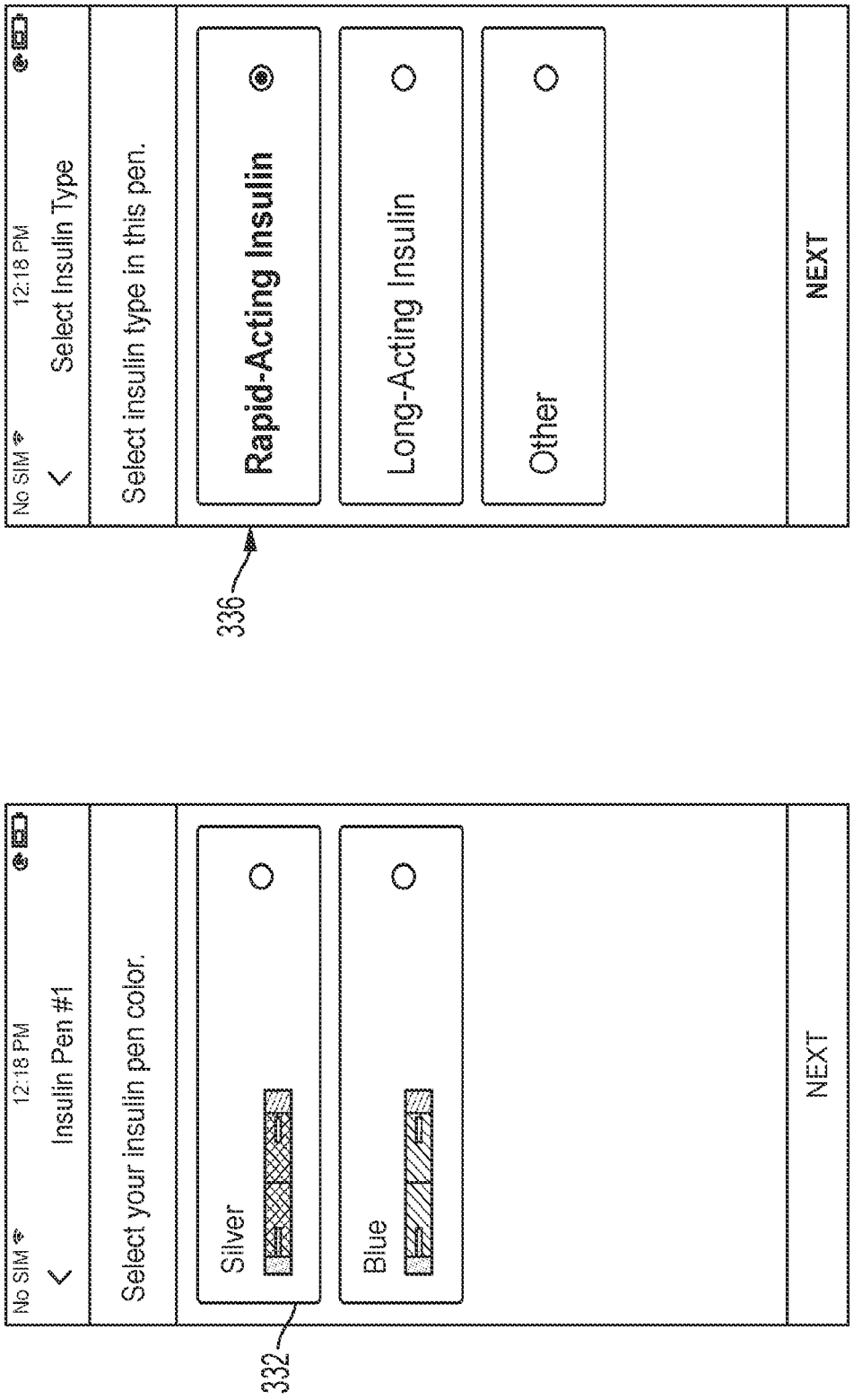

No SIM
12:18 PM
Insulin Pen #1
Select your insulin pen color.
Silver
Blue
NEXT
330
332
No SIM
12:18 PM
Select Insulin Type
Select insulin type in this pen.
Rapid-Acting Insulin
Long-Acting Insulin
Other
NEXT
334
336

FIG. 20C

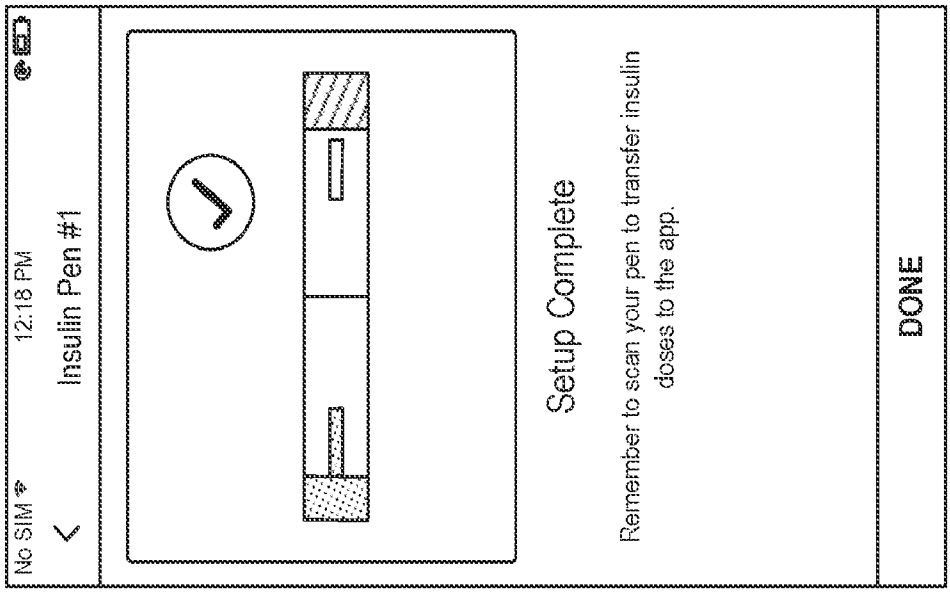

No SIM
12:18 PM
Insulin Pen #1
Setup Complete
Remember to scan your pen to transfer insulin doses to the app.
DONE
342
No SIM
12:18 PM
Rapid-Acting Insulin
Select the insulin in this pen.
Brand Name #1
Brand Name #2
Brand Name #3
Not Listed
NEXT
338
340

FIG. 20D

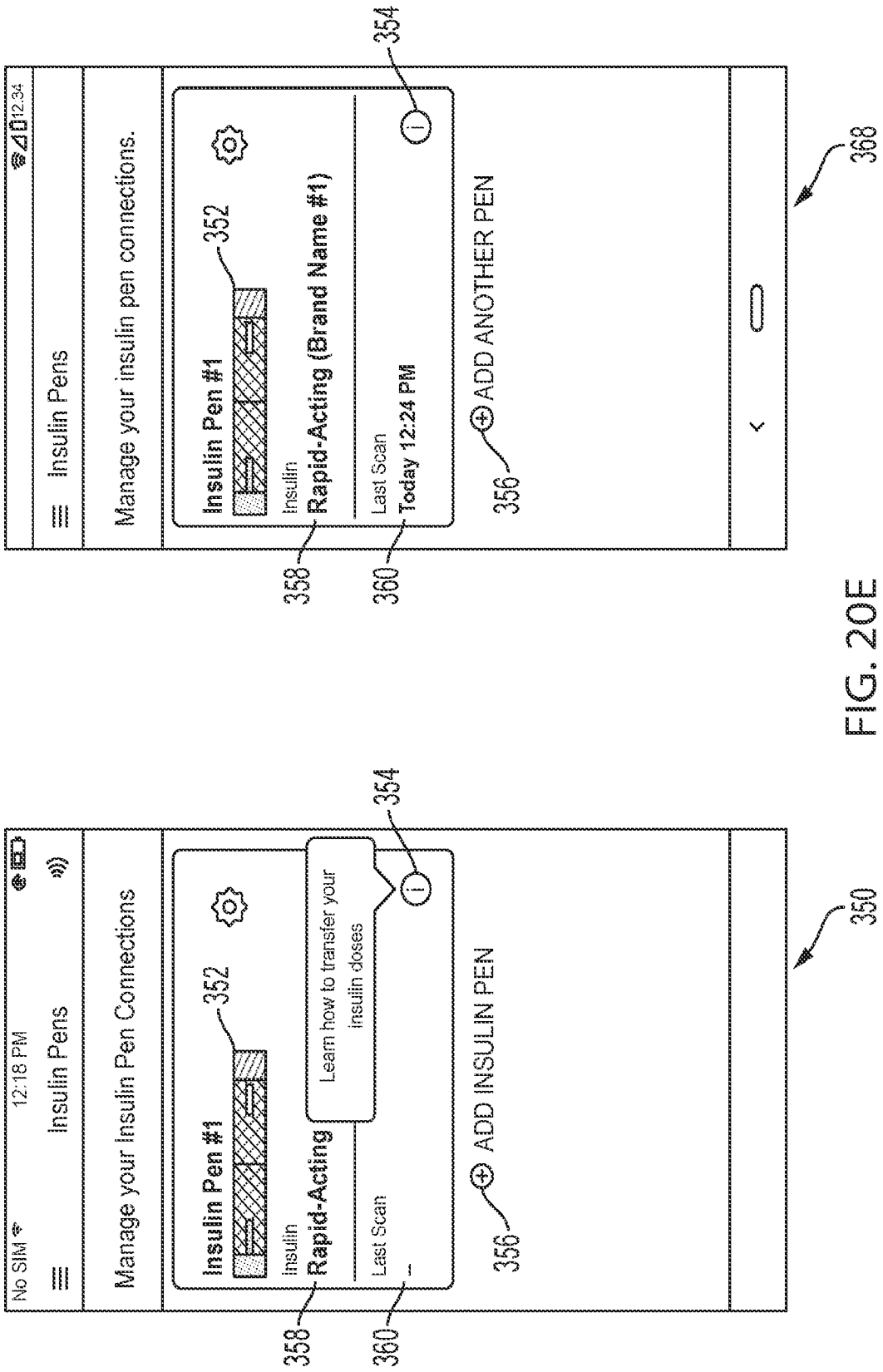

12:34
Insulin Pens
Manage your insulin pen connections.
Insulin Pen #1
352
Insulin
Rapid-Acting (Brand Name #1)
Last Scan
Today 12:24 PM
354
ADD ANOTHER PEN
356
358
360
368
No SIM
12:18 PM
Insulin Pens
Manage your Insulin Pen Connections
Insulin Pen #1
352
Insulin
Rapid-Acting
Learn how to transfer your insulin doses
Last Scan
-
354
ADD INSULIN PEN
356
358
360
350

FIG. 20E

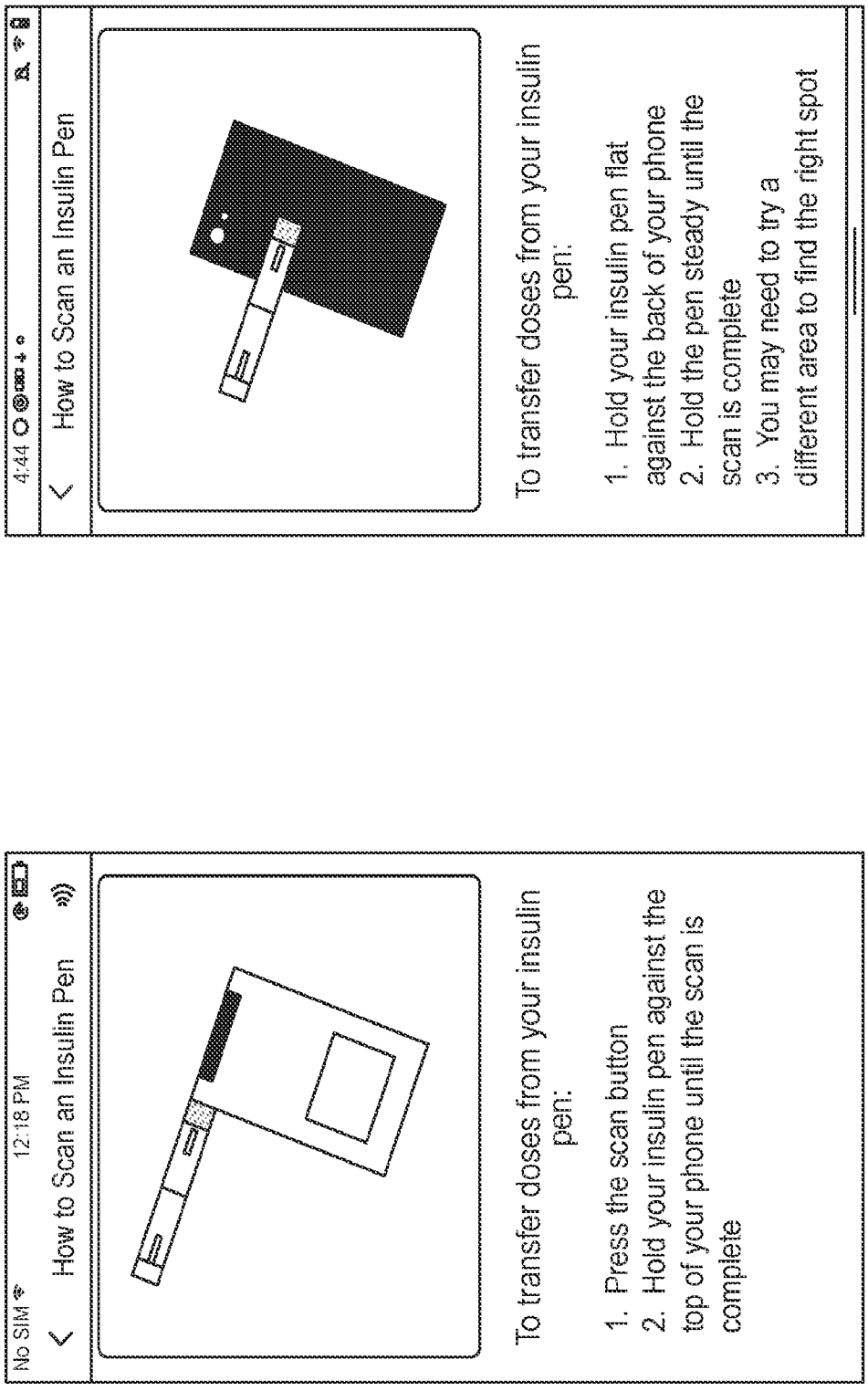

No SIM
12:18 PM
How to Scan an Insulin Pen
To transfer doses from your insulin pen:
1. Press the scan button
2. Hold your insulin pen against the top of your phone until the scan is complete
364a
4:44
How to Scan an Insulin Pen
To transfer doses from your insulin pen:
1. Hold your insulin pen flat against the back of your phone
2. Hold the pen steady until the scan is complete
3. You may need to try a different area to find the right spot
364b

FIG. 20F

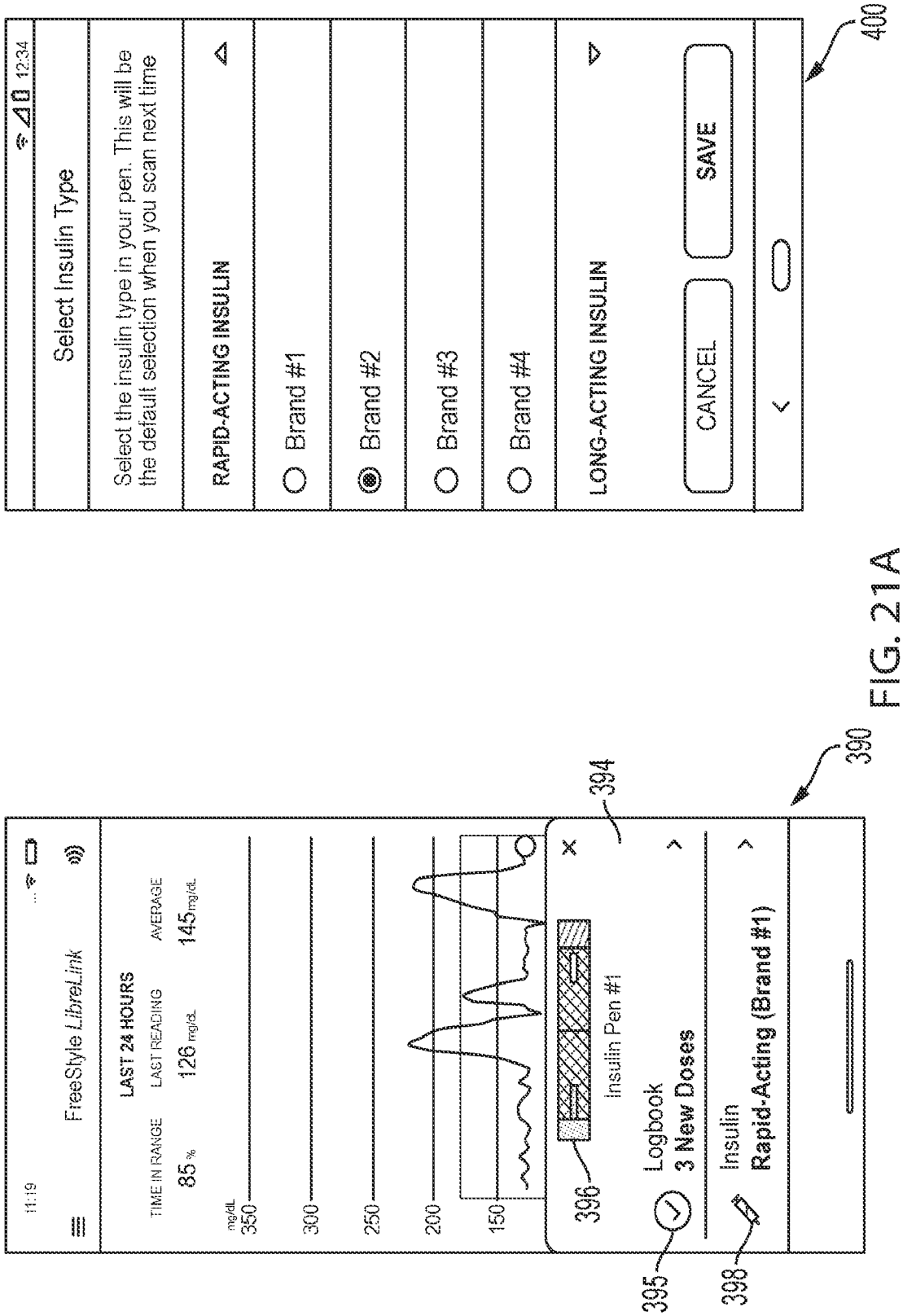

11:19
FreeStyle LibreLink
LAST 24 HOURS
TIME IN RANGE
85 %
LAST READING
126 mg/dL
AVERAGE
145 mg/dL
mg/dL
350
300
250
200
150
Insulin Pen #1
Logbook
3 New Doses
Insulin
Rapid-Acting (Brand #1)
390
394
396
395
398
12:34
Select Insulin Type
Select the insulin type in your pen. This will be the default selection when you scan next time
RAPID-ACTING INSULIN
Brand #1
Brand #2
Brand #3
Brand #4
LONG-ACTING INSULIN
CANCEL
SAVE
400

FIG. 21A

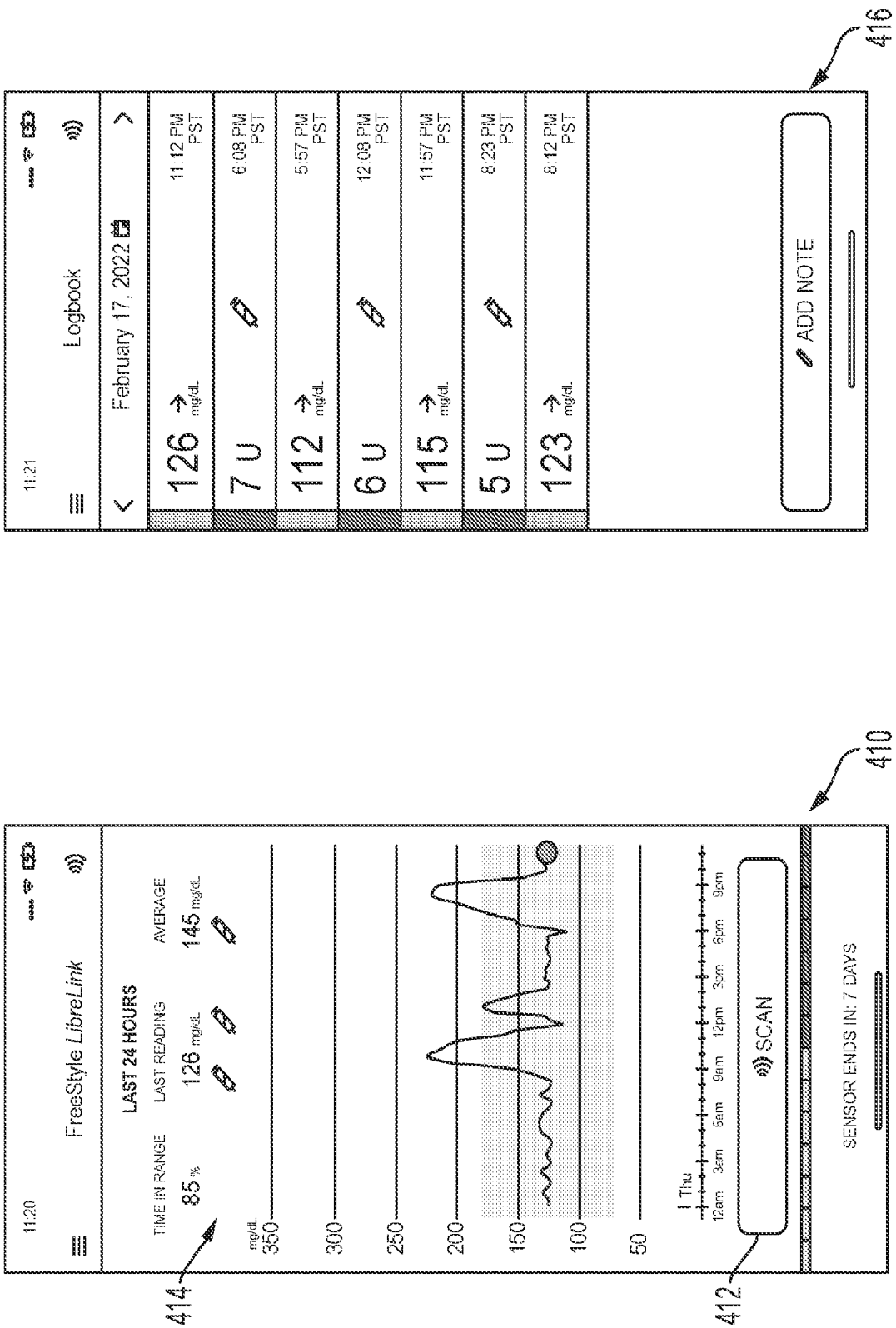

11:20
FreeStyle LibreLink
LAST 24 HOURS
TIME IN RANGE
85 %
LAST READING
126 mg/dL
AVERAGE
145 mg/dL
mg/dL
350
300
250
200
150
100
50
Thu
12am
3am
6am
9am
12pm
3pm
6pm
9pm
SCAN
SENSOR ENDS IN: 7 DAYS
414
412
410
11:21
Logbook
February 17, 2022
126 mg/dL 11:12 PM PST
7 U
112 mg/dL 5:57 PM PST
6 U
115 mg/dL 12:08 PM PST
5 U
123 mg/dL 11:57 PM PST
8:23 PM PST
8:12 PM PST
ADD NOTE
416

FIG. 21B

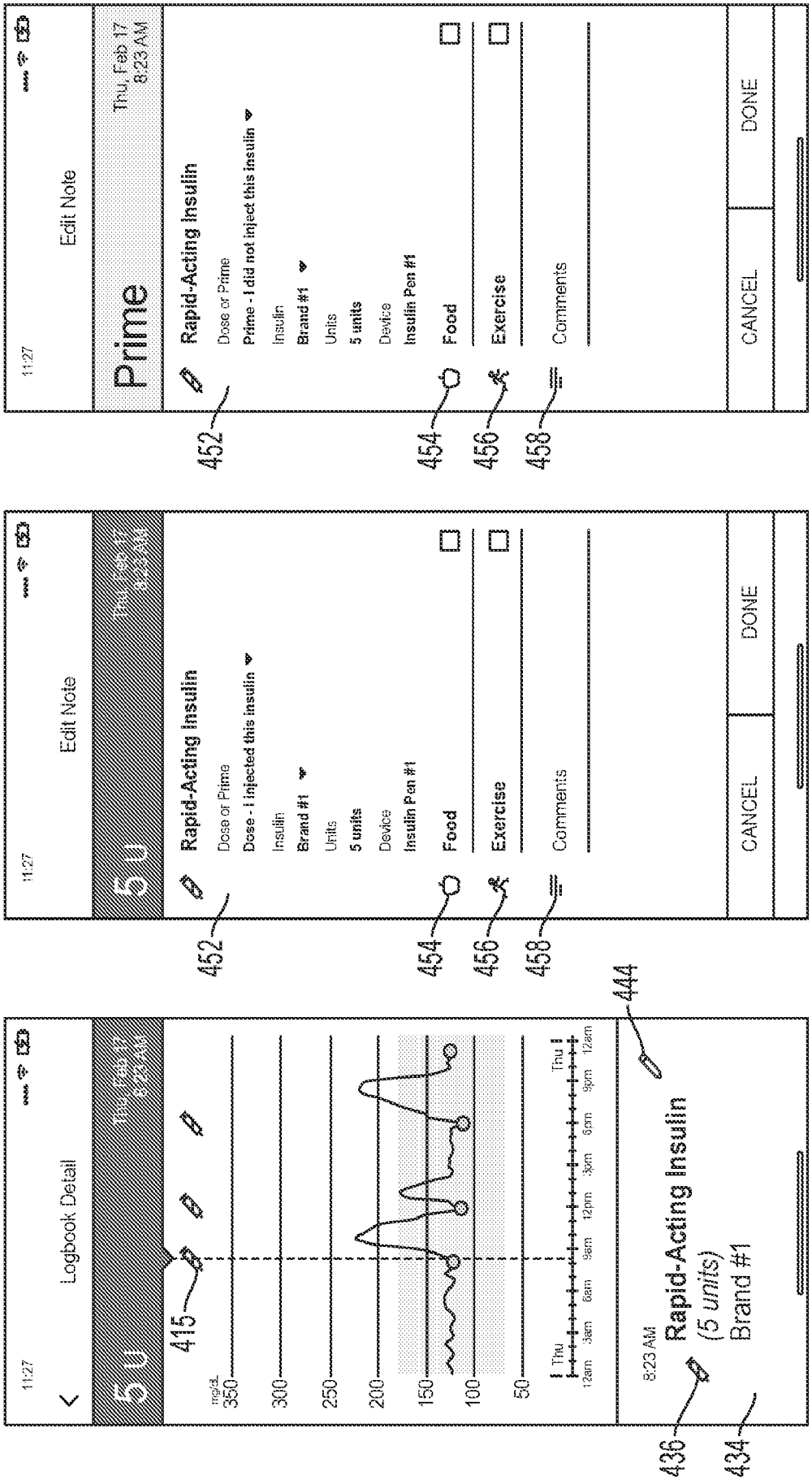

11:27
Logbook Detail
5 U
Thu, Feb 17
8:23 AM
415
mg/dL
350
300
250
200
150
100
50
Thu
12am 3am 6am 9am 12pm 3pm 6pm 9pm 12am
444
8:23 AM
Rapid-Acting Insulin
(5 units)
Brand #1
436
434
430
11:27
Edit Note
5 U
Thu, Feb 17
8:23 AM
Rapid-Acting Insulin
Dose or Prime
Dose - I injected this insulin
Insulin
Brand #1
Units
5 units
Device
Insulin Pen #1
Food
Exercise
Comments
CANCEL
DONE
452
454
456
458
450
11:27
Edit Note
Prime
Thu, Feb 17
8:23 AM
Rapid-Acting Insulin
Dose or Prime
Prime - I did not inject this insulin
Insulin
Brand #1
Units
5 units
Device
Insulin Pen #1
Food
Exercise
Comments
CANCEL
DONE
452
454
456
458
460

FIG. 21C

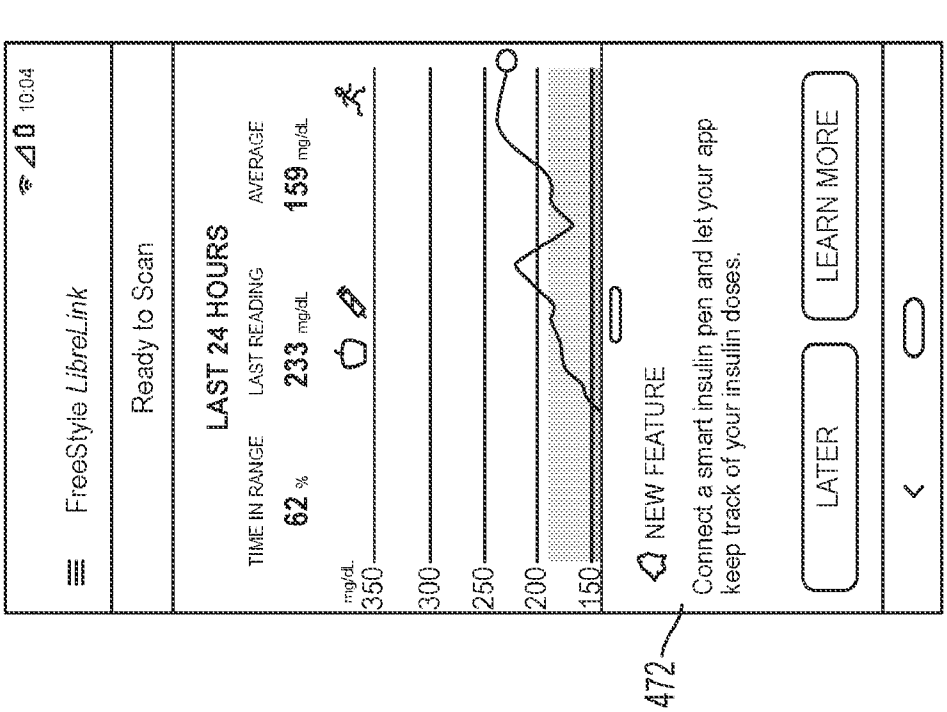

10:04
FreeStyle LibreLink
Ready to Scan
LAST 24 HOURS
TIME IN RANGE
62 %
LAST READING
233 mg/dL
AVERAGE
159 mg/dL
mg/dL
350
300
250
200
150
NEW FEATURE
Connect a smart insulin pen and let your app keep track of your insulin doses.
LATER
LEARN MORE
470
472

FIG. 21D

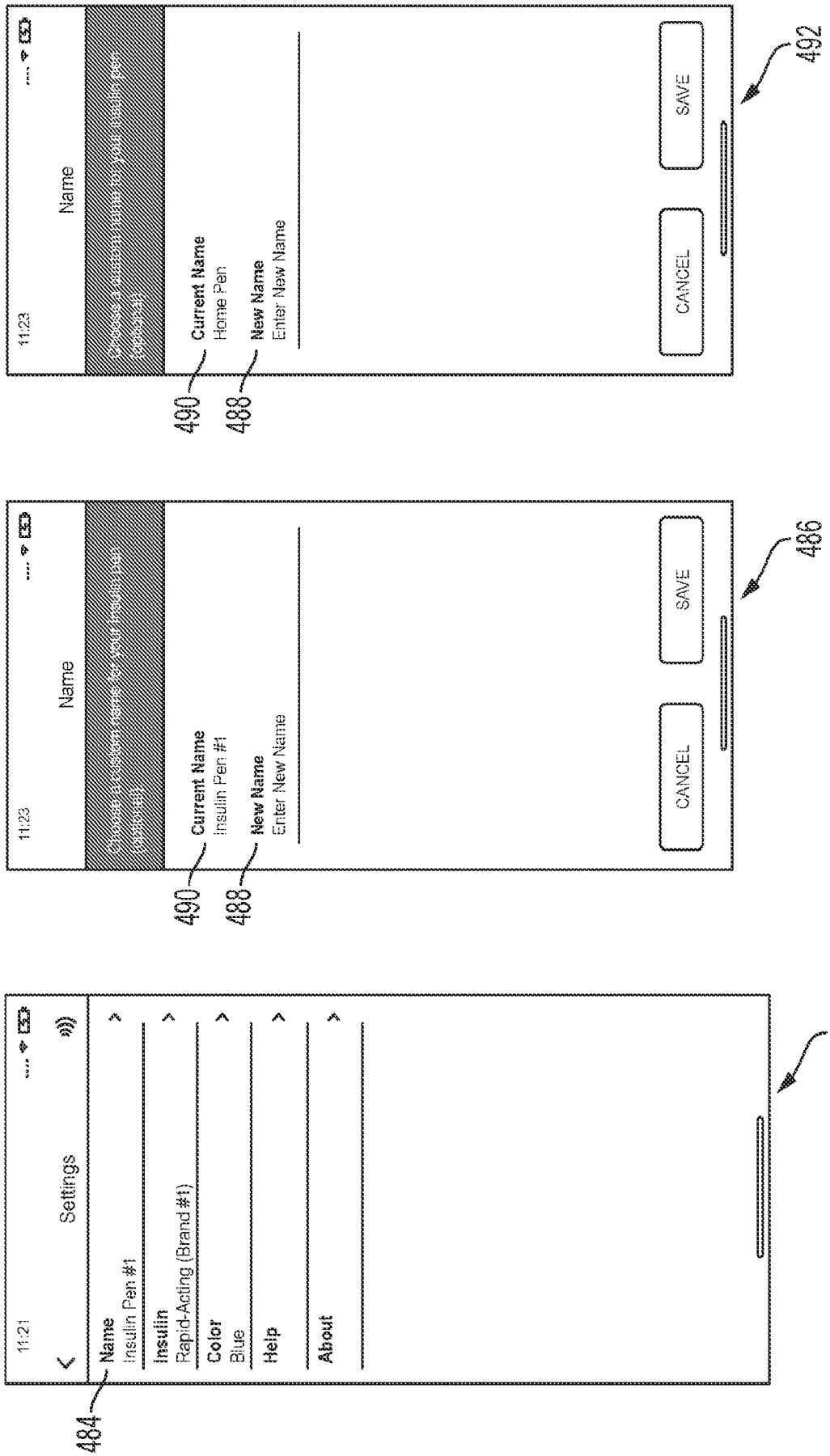

11:21
Settings
Name
Insulin Pen #1
Insulin
Rapid-Acting (Brand #1)
Color
Blue
Help
About
484
480
11:23
Name
Current Name
Insulin Pen #1
New Name
Enter New Name
CANCEL
SAVE
490
488
486
11:23
Name
Current Name
Home Pen
New Name
Enter New Name
CANCEL
SAVE
490
488
492

FIG. 22

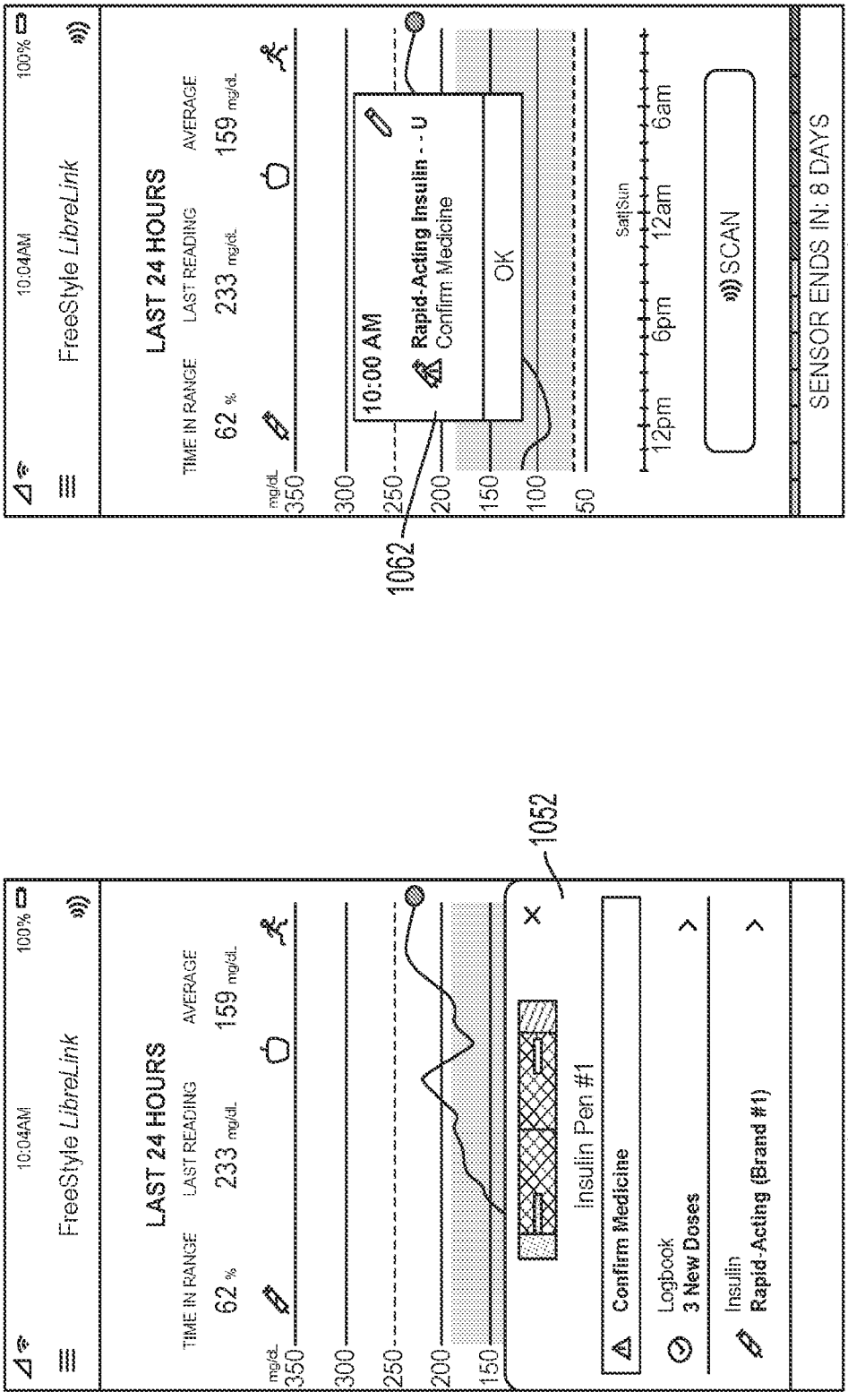

10:04AM
100%
FreeStyle LibreLink
LAST 24 HOURS
TIME IN RANGE
62 %
LAST READING
233 mg/dL
AVERAGE
159 mg/dL
mg/dL
350
300
250
200
150
100
50
10:00 AM
Rapid-Acting Insulin - - U
Confirm Medicine
OK
Sat|Sun
12pm
6pm
12am
6am
SCAN
SENSOR ENDS IN: 8 DAYS
1060
1062
1052
Insulin Pen #1
Confirm Medicine
Logbook
3 New Doses
Insulin
Rapid-Acting (Brand #1)
1050

FIG. 23A

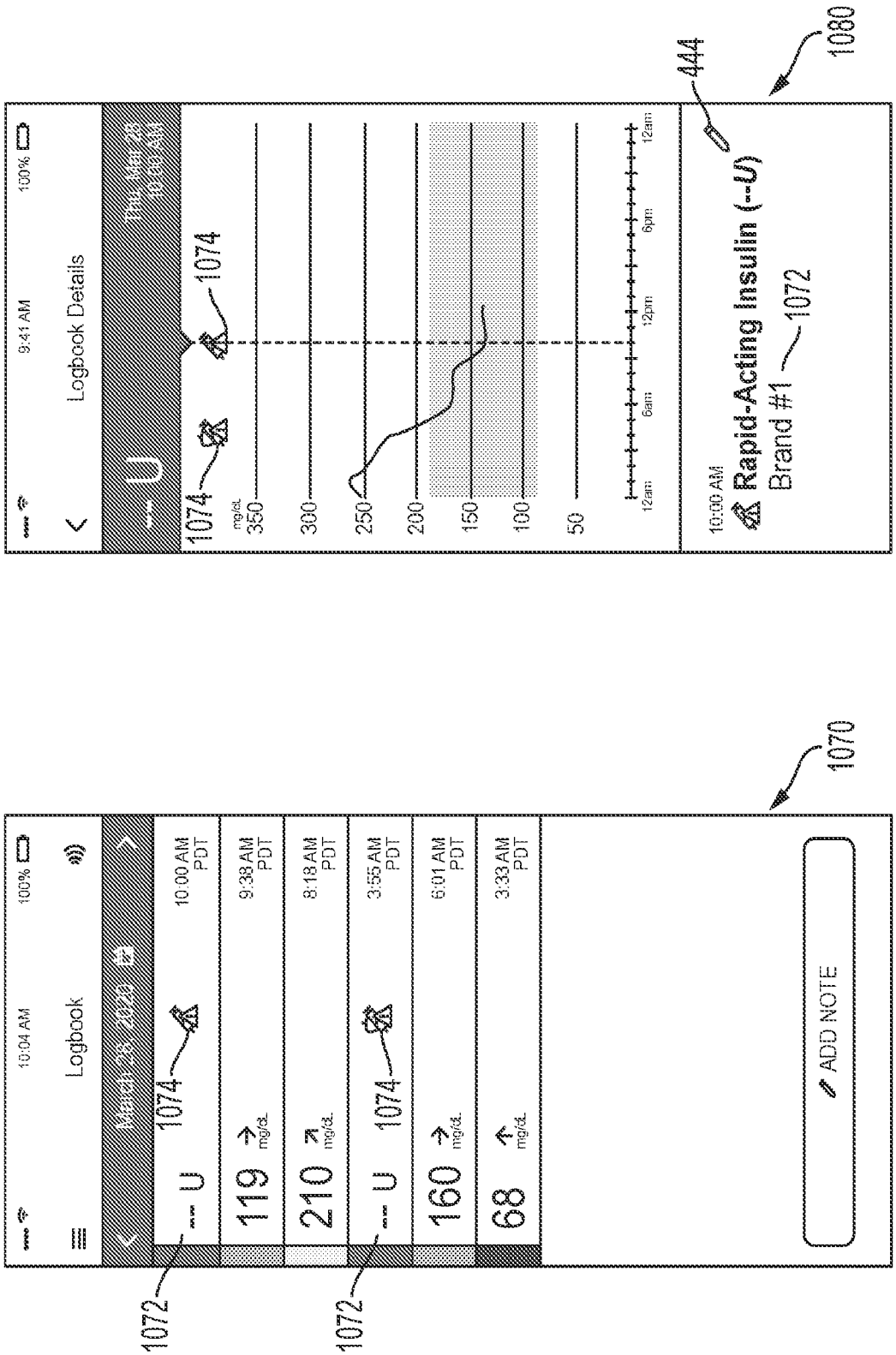

10:04 AM
100%
Logbook
March 23, 2020
-- U
10:00 AM PDT
119
9:38 AM PDT
210
8:18 AM PDT
-- U
3:55 AM PDT
160
6:01 AM PDT
68
3:33 AM PDT
ADD NOTE
1070
1072
1074
9:41 AM
100%
Logbook Details
Thu, Mar 26
-- U
mg/dL
350
300
250
200
150
100
50
12am
6am
12pm
6pm
12am
10:00 AM
Rapid-Acting Insulin (--U)
Brand #1
444
1080

FIG. 23B

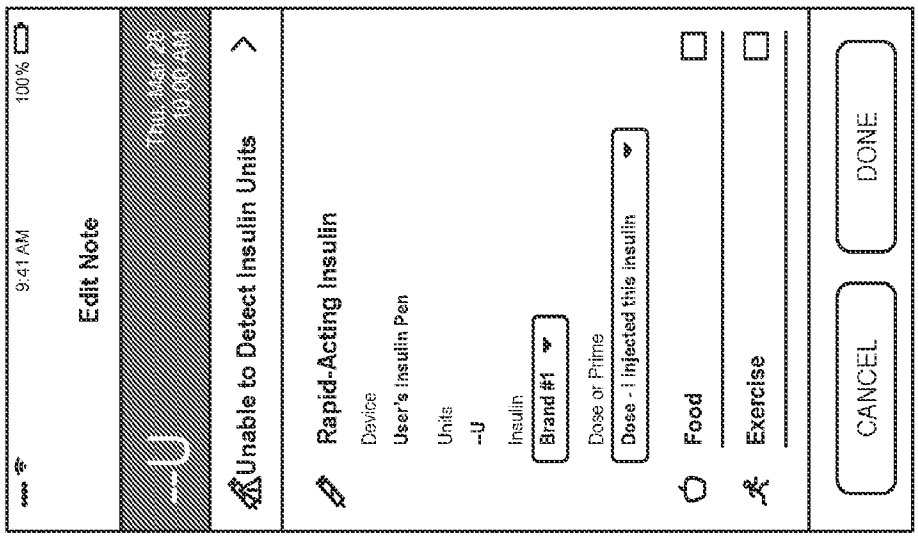

9:41 AM
100%
Edit Note
-U
Unable to Detect Insulin Units
Rapid-Acting Insulin
Device
User's Insulin Pen
Units
-U
Insulin
Brand #1
Dose or Prime
Dose - I injected this insulin
Food
Exercise
CANCEL
DONE
1090

FIG. 23C

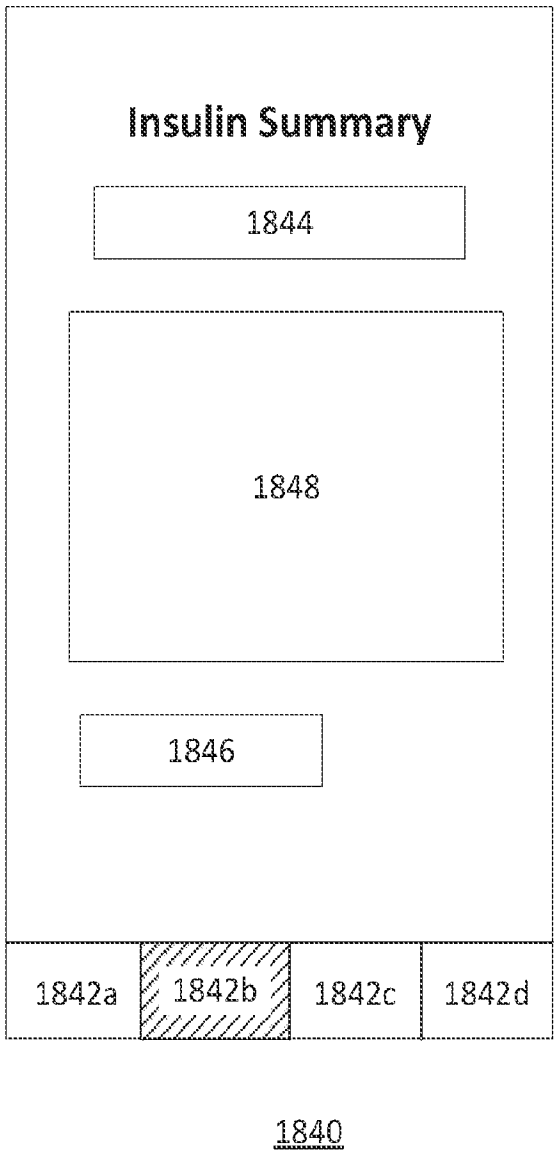

Insulin Summary
1844
1848
1846
1842a
1842b
1842c
1842d
1840

FIG. 24A

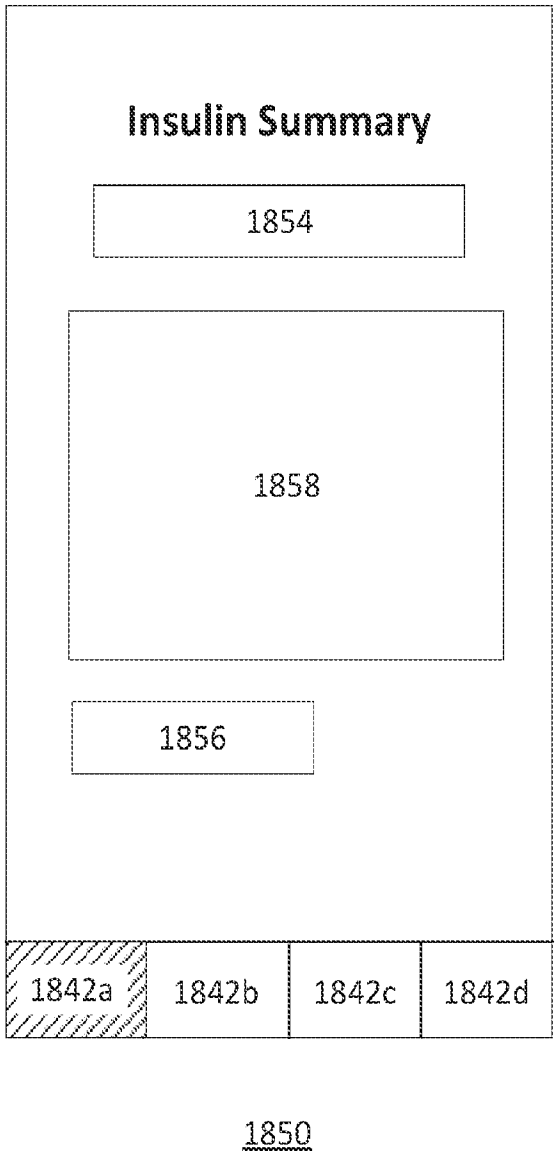

Insulin Summary
1854
1858
1856
1842a
1842b
1842c
1842d
1850

FIG. 24B

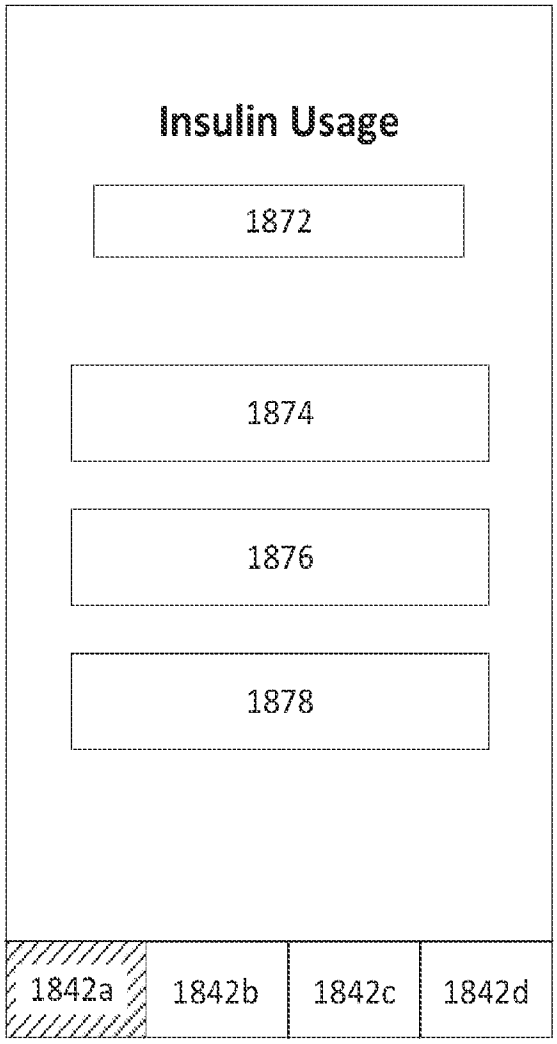

Insulin Usage
1872
1874
1876
1878
1842a
1842b
1842c
1842d
1870

FIG. 24C

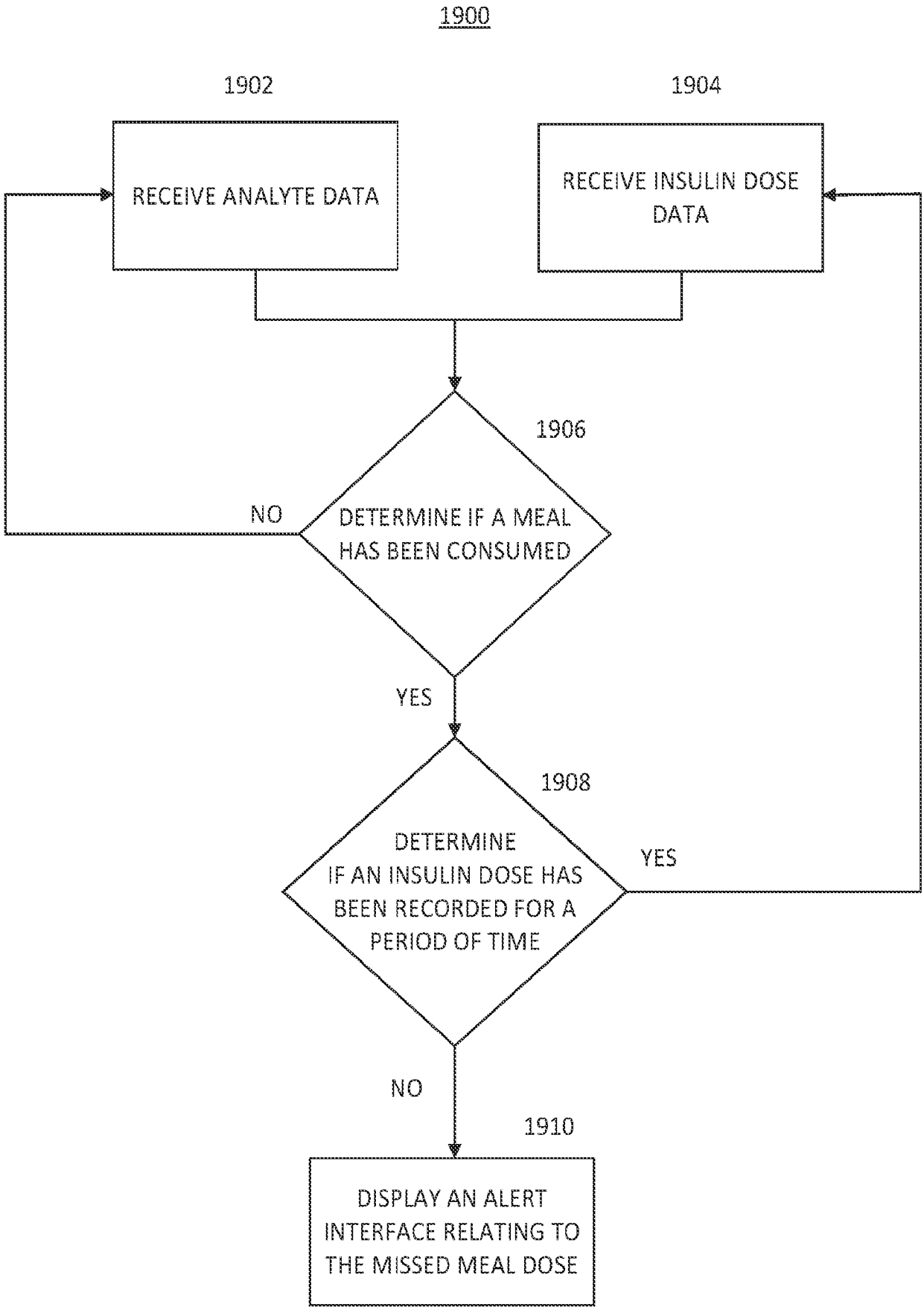

1900
1902
1904
RECEIVE ANALYTE DATA
RECEIVE INSULIN DOSE DATA
1906
DETERMINE IF A MEAL HAS BEEN CONSUMED
NO
YES
1908
DETERMINE IF AN INSULIN DOSE HAS BEEN RECORDED FOR A PERIOD OF TIME
YES
NO
1910
DISPLAY AN ALERT INTERFACE RELATING TO THE MISSED MEAL DOSE

FIG. 25

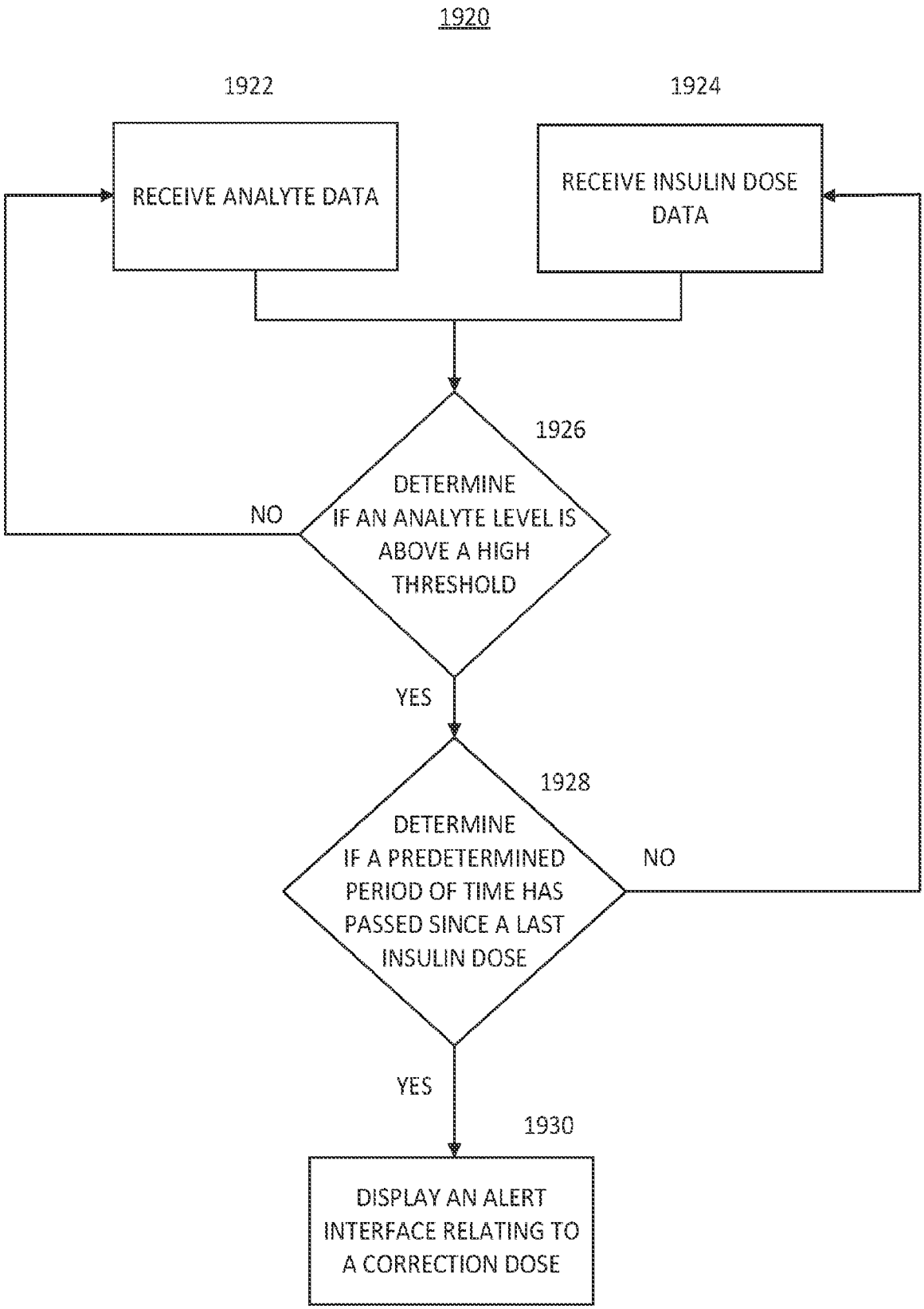

1920
1922
1924
RECEIVE ANALYTE DATA
RECEIVE INSULIN DOSE DATA
1926
DETERMINE IF AN ANALYTE LEVEL IS ABOVE A HIGH THRESHOLD
NO
YES
1928
DETERMINE IF A PREDETERMINED PERIOD OF TIME HAS PASSED SINCE A LAST INSULIN DOSE
NO
YES
1930
DISPLAY AN ALERT INTERFACE RELATING TO A CORRECTION DOSE

FIG. 26

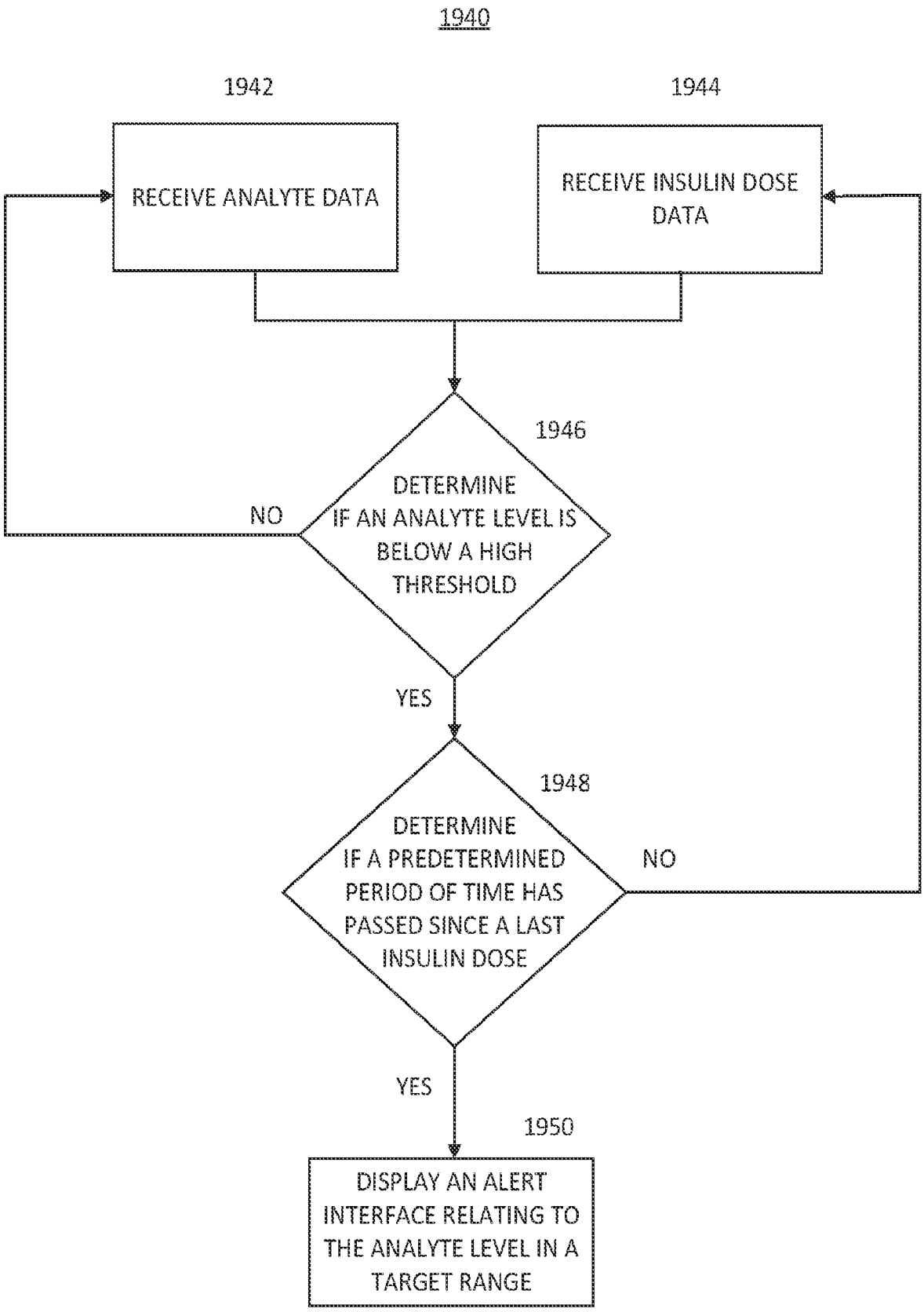

1940
1942
RECEIVE ANALYTE DATA
1944
RECEIVE INSULIN DOSE DATA
1946
DETERMINE IF AN ANALYTE LEVEL IS BELOW A HIGH THRESHOLD
NO
YES
1948
DETERMINE IF A PREDETERMINED PERIOD OF TIME HAS PASSED SINCE A LAST INSULIN DOSE
NO
YES
1950
DISPLAY AN ALERT INTERFACE RELATING TO THE ANALYTE LEVEL IN A TARGET RANGE

FIG. 27

2000

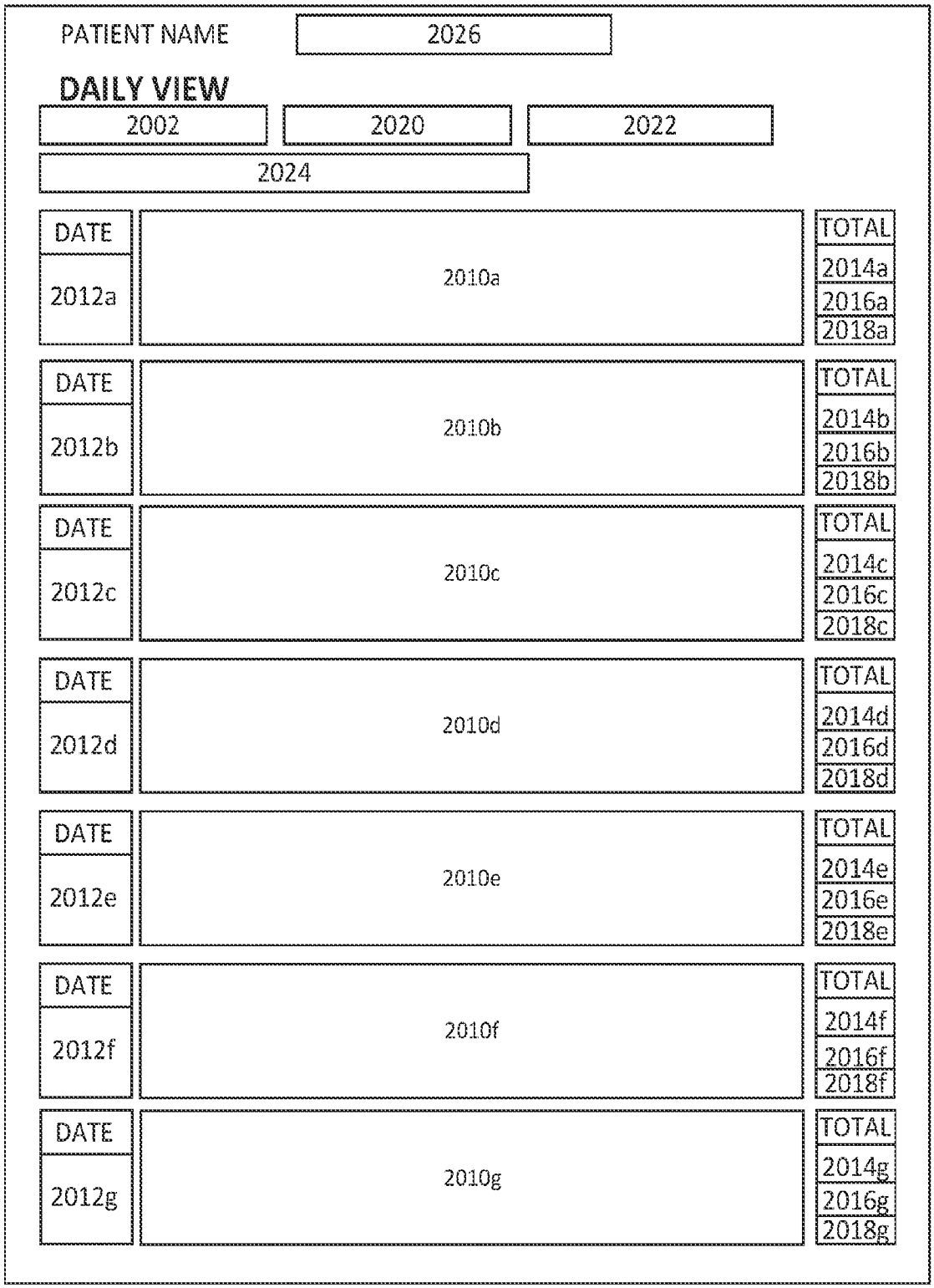

PATIENT NAME
2026
DAILY VIEW
2002
2020
2022
2024
DATE
2012a
2010a
TOTAL
2014a
2016a
2018a
DATE
2012b
2010b
TOTAL
2014b
2016b
2018b
DATE
2012c
2010c
TOTAL
2014c
2016c
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2010d
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2014d
2016d
2018d
DATE
2012e
2010e
TOTAL
2014e
2016e
2018e
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2014f
2016f
2018f
DATE
2012g
2010g
TOTAL
2014g
2016g
2018g

FIG. 28A

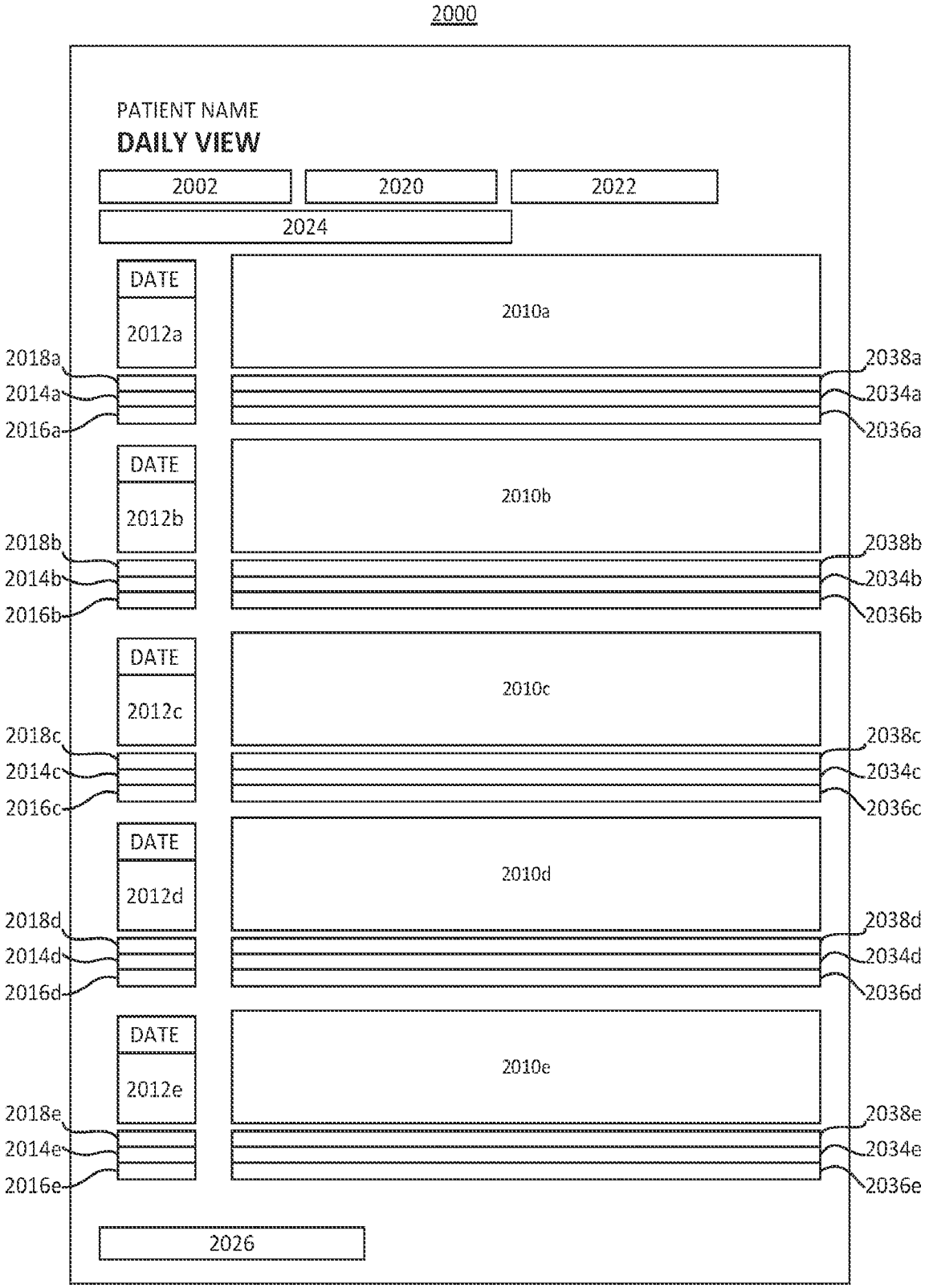

2000
PATIENT NAME
DAILY VIEW
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2024
DATE
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2034a
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2014b
2016b
2038b
2034b
2036b
DATE
2012c
2010c
2018c
2014c
2016c
2038c
2034c
2036c
DATE
2012d
2010d
2018d
2014d
2016d
2038d
2034d
2036d
DATE
2012e
2010e
2018e
2014e
2016e
2038e
2034e
2036e
2026

FIG. 28B

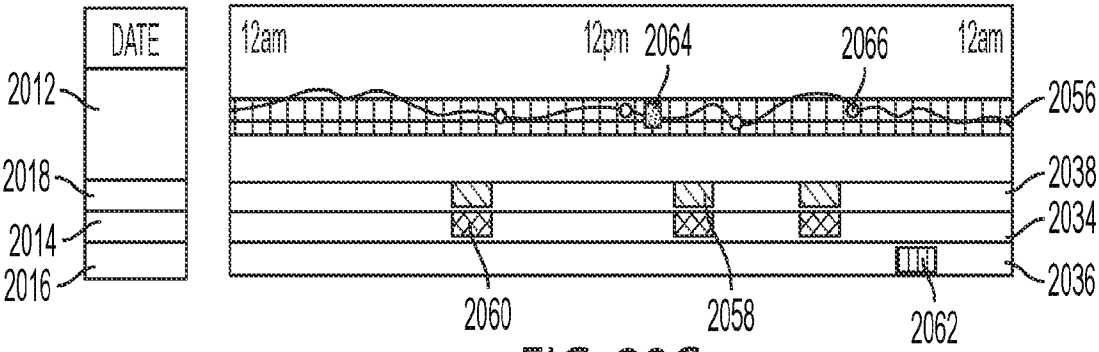


FIG. 28C

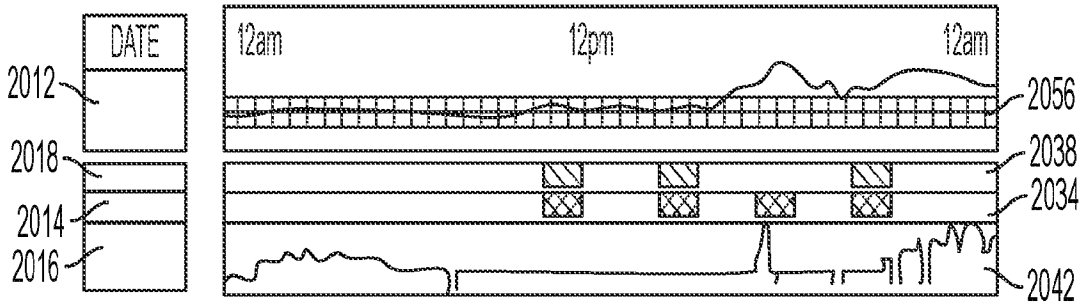


FIG. 28D

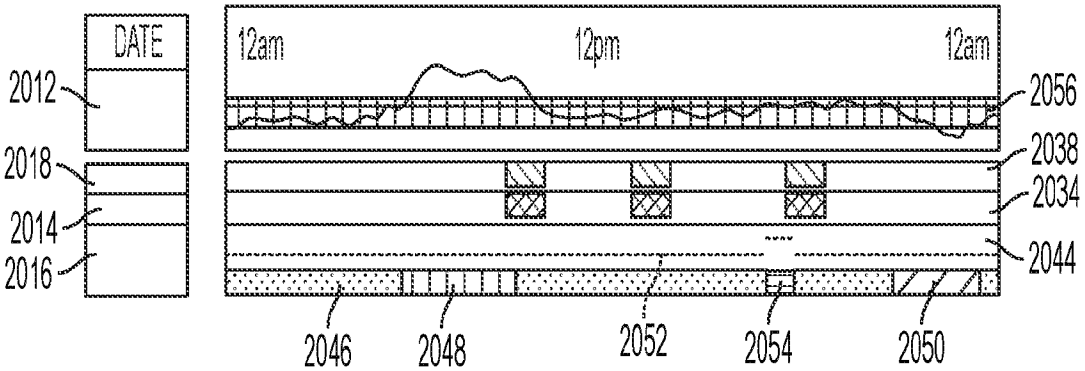


FIG. 28E

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2022/025557

A. CLASSIFICATION OF SUBJECT MATTER
INV. G16H20/17 G16H15/00 G16H20/10
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G16H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2019/175841 A1 (SJOLUND JOHN [US] ET AL) 13 June 2019 (2019-06-13) paragraph [0027] - paragraph [0028] paragraph [0032] paragraph [0168] - paragraph [0171] paragraph [0119] - paragraph [0123] paragraph [0196] - paragraph [0199] paragraph [0072] paragraph [0334] paragraph [0100] paragraph [0245] paragraph [0048]	1-7

-/--

[x] Further documents are listed in the continuation of Box C.

[x] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 July 2022	09/08/2022

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Eichenauer, Lars

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Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Anonymous: "AndroidAPS Component Overview", AndroidAPS documentation, 12 November 2020 (2020-11-12), pages 1-4, XP055894821, Retrieved from the Internet: URL:https://github.com/openaps/AndroidAPSdocs/blob/199ef86a900adf4b3d9c32f605eb11047bd3d62f/docs/EN/Module/module.rst [retrieved on 2022-02-23] section "Phone" section "BG Source" section "Nightscout" section "Insulin pump" -----	1-7
Y	Anonymous: "AndroidAPSdocs/Config-Builder.md at 1560f620adaf6b6e06b92f18c6917afe2af69728 . openaps/AndroidAPSdocs . GitHub", Github, 6 February 2021 (2021-02-06), pages 1-15, XP055945950, Retrieved from the Internet: URL:https://github.com/openaps/AndroidAPSdocs/blob/1560f620adaf6b6e06b92f18c6917afe2af69728/docs/EN/Configuration/Config-Builder.md [retrieved on 2022-07-25] section "Insulin" -----	1-7
Y	Anonymous: "AndroidAPS screens", AndroidAPS documentation, 4 October 2020 (2020-10-04), pages 1-12, XP055894824, Retrieved from the Internet: URL:https://github.com/openaps/AndroidAPSdocs/blob/25d8acf8b28262b411b34f416f173ac0814d7e14/docs/EN/Getting-Started/Screenshots.md [retrieved on 2022-02-23] the whole document ----- -/--	1-7

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Anonymous: "AndroidAPSdocs/Sample-Setup.md at 90387f2c2f0999e9b4c02638a0d8e741451bfae1 . openaps/AndroidAPSdocs . GitHub", Github, 6 February 2021 (2021-02-06), pages 1-5, XP055946721, Retrieved from the Internet: URL:https://github.com/openaps/AndroidAPSdocs/blob/90387f2c2f0999e9b4c02638a0d8e741451bfae1/docs/EN/Getting-Started/Sample-Setup.md [retrieved on 2022-07-27] the whole document	1-7
A	US 2016/220754 A1 (SHAANAN GAD [US] ET AL) 4 August 2016 (2016-08-04) paragraph [0022] - paragraph [0023] paragraph [0061]	6
X	Anonymous: "SiDiary - Successful work with continuous glucose monitoring systems (CGMS)", , 1 January 2019 (2019-01-01), pages 1-9, XP055947185, Retrieved from the Internet: URL:https://www.sidiary.org/DownloadM/manuals/SiDiaryCGMS-EN.pdf [retrieved on 2022-07-28] page 1 page 8	186-199
X	TEMILOLUWA PRIOLEAU ET AL: "Understanding Reflection Needs for Personal Health Data in Diabetes", ARXIV.ORG, CORNELL UNIVERSITY LIBRARY, 201 OLIN LIBRARY CORNELL UNIVERSITY ITHACA, NY 14853, 24 July 2020 (2020-07-24), XP081726995, figure 5 page 4, left-hand column; figure 2	186, 197-199
A	US 2014/200426 A1 (TAUB MARC BARRY [US] ET AL) 17 July 2014 (2014-07-17) paragraph [0412] - paragraph [0420]; figure 21A paragraph [0598] - paragraph [0603]; figure 57 paragraph [0646] - paragraph [0649]; figures 76-78 paragraph [0718] - paragraph [0720]	192-195

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2022/025557

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 8-185
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims;; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2022/025557

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2019175841 A1	13-06-2019	AU 2018383731 A1	23-07-2020
		AU 2018383743 A1	23-07-2020
		CA 3084378 A1	20-06-2019
		CA 3084613 A1	20-06-2019
		CN 111788635 A	16-10-2020
		CN 112041936 A	04-12-2020
		EP 3724888 A1	21-10-2020
		EP 3724889 A2	21-10-2020
		EP 3724891 A1	21-10-2020
		IL 275301 A	30-07-2020
		JP 2021507430 A	22-02-2021
		US 2019175841 A1	13-06-2019
		US 2019184091 A1	20-06-2019
		US 2019184107 A1	20-06-2019
		US 2019184109 A1	20-06-2019
		US 2021290853 A1	23-09-2021
		US 2021369970 A1	02-12-2021
		US 2022040414 A1	10-02-2022
		US 2022072236 A1	10-03-2022
		WO 2019118531 A2	20-06-2019
		WO 2019118532 A1	20-06-2019
		WO 2019118537 A1	20-06-2019
US 2016220754 A1	04-08-2016	AU 2013323433 A1	23-04-2015
		CA 2808738 A1	15-05-2013
		CA 2885825 A1	03-04-2014
		CN 104755117 A	01-07-2015
		EP 2900300 A1	05-08-2015
		JP 2015536696 A	24-12-2015
		KR 20150065737 A	15-06-2015
		US 2015190577 A1	09-07-2015
		US 2016220754 A1	04-08-2016
		WO 2014052676 A1	03-04-2014
US 2014200426 A1	17-07-2014	US 2014200426 A1	17-07-2014
		US 2019183393 A1	20-06-2019
		US 2022110551 A1	14-04-2022

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 8-185

Claims 1, 8, 11, 15, 29, 36, 42, 48, 63, 68, 78, 88, 130, and 172 have been drafted as separate independent system claims, and claims 109, 151, and 186 have been drafted as separate independent method claims. There is no clear distinction between the independent claims because of overlapping scope or a clearly common subject-matter. There are so many claims, and they are drafted in such a way that the claims as a whole are not in compliance with the provisions of clarity and conciseness of Article 6 PCT, as it is particularly burdensome for a skilled person to establish the subject-matter for which protection is sought. The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search (PCT Guidelines 9.19 and 9.25). In response to a clarification request, the search was based on the subject-matter that, as far as can be understood, could reasonably be expected to be claimed later in the procedure, and the corresponding claims, namely independent claims 1 and 186 and their dependent claims.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) PCT declaration be overcome.