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(54) **Title**: BLOOD GLUCOSE MANAGEMENT DEVICE FOR CALCULATING BOLUS INSULIN

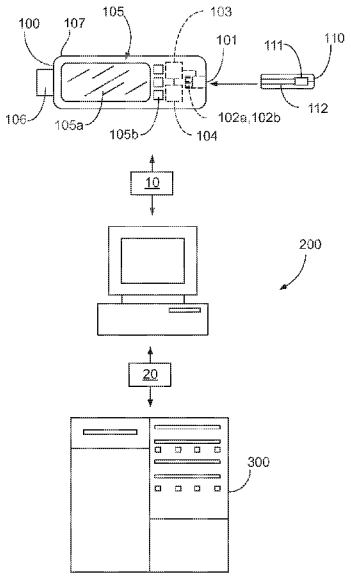


FIG. 1

(57) **Abstract**: A method of operating a glucose management device. The glucose management device includes one or more processing components, a housing, a user interface including a display and a user-input mechanism, and a memory. The method includes displaying on the display a prompt for initiating a carbohydrate factor determination sequence via the user- input mechanism and displaying on the display at least one query, the at least one query including a query associated with a user's type of diabetes. The method further includes receiving the user's response to the at least one query via the user-input mechanism and determining, via the at least one processing component, the carbohydrate factor using the user's response to the at least one query and information stored in the memory.

WO 2016/181351 A1

BLOOD GLUCOSE MANAGEMENT DEVICE FOR CALCULATING BOLUS INSULIN

CROSS REFERENCE TO RELATED APPLICATION(S)

[0001] This application claims the benefit of and priority to U.S. Provisional Patent Application No. 62/160,892, filed on May 13, 2015, which is herein incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] The present invention relates generally to a method and system for managing glucose and insulin delivery levels. More specifically, the present invention relates to apparatus and methods for assisting in determining a carbohydrate factor and/or a correction factor used for determining an amount of bolus insulin required to maintain or return a user's blood glucose to a desired range.

BACKGROUND

[0003] The quantitative determination of analytes in body fluids is of great importance in the diagnosis and maintenance of certain physiological conditions. For example, individuals with diabetes frequently check the glucose level in their bodily fluids. The results of such tests can be used to regulate the glucose intake in their diets and/or to determine whether insulin or other medication needs to be administered.

[0004] Diagnostic systems, such as blood-glucose monitoring systems, may employ an instrument, such as a meter, to calculate the glucose concentration value in a fluid sample from an individual. Such instruments operate by measuring an output, such as current or light, from a reaction with the glucose in the sample. The test results typically are displayed and stored by the meter. Basic systems allow the user to access the test results directly from the meter via a display and a keypad or other interactive component.

[0005] Bolus dosing algorithms or calculators, often included in existing more sophisticated instruments, assist diabetic individuals in determining the amount of bolus insulin needed to return their blood glucose levels to, or maintain within, a desired range. To accurately calculate the bolus dosage, two types of information are generally required to be input into the instrument: (1) short-term parameters that depend on the individual's current carbohydrate level, exercise status, and insulin levels; and (2) user-specific parameters that describe how the individual's body processes carbohydrates, exercise, and insulin. User-specific parameters may include a carbohydrate factor, an exercise adjustment factor, and a correction factor. The carbohydrate factor, sometimes known as a carb-to-insulin ratio, refers

to the amount of carbohydrates affected by one unit of insulin. The correction factor, sometimes referred to as insulin sensitivity, is the amount a user's blood glucose level drops per one unit of insulin.

[0006] The user-specific parameters (e.g., the carbohydrate factor and the correction factor) may be determined either by examining the individual's blood glucose response over time or by estimating using a series of equations. These equations can, for example, estimate the carbohydrate factor and the correction factor using a combination of the individual's weight and diabetes type, whether the individual uses an insulin pump, and his or her daily dose of insulin.

[0007] The user-specific parameters are generally defined by the individual during, for example, an initial bolus calculator setup. If the values associated with the individual's user-specific parameters are known, the values may be entered directly into the instrument. However, if the individual does not know these values, they must be calculated. If the equations that can be used to calculate the user-specific parameter values are known, a calculator – or at least a paper and pencil to assist with the math – is often needed to do the calculations. If the equations are not known, they generally need to be looked up externally. Thus, existing methods of calculating user-specific parameters can be time consuming, inconvenient, and prone to error.

[0008] Thus, there is a need for an apparatus and method that helps simplify bolus calculations.

SUMMARY

[0009] According to one embodiment, a method of operating a glucose management device is disclosed. The glucose management device includes one or more processing components, a housing, a user interface including a display and a user-input mechanism, and a memory. The method comprises displaying on the display a prompt for initiating a carbohydrate factor determination sequence via the user-input mechanism and displaying on the display at least one query, the at least one query including a query associated with a user's type of diabetes. The method further comprises receiving the user's response to the at least one query via the user-input mechanism and determining, via the at least one processing component, the carbohydrate factor using the user's response to the at least one query and information stored in the memory.

[0010] According to another embodiment, a method of operating a glucose management device is disclosed. The glucose management device includes one or more processing

components, a housing, a user interface including a display and a user-input mechanism, and a memory. The method comprises displaying on the display a prompt for initiating a correction factor determination sequence via the user-input mechanism and displaying on the display at least one query, the at least one query being including a query associated with a user's type of diabetes and a query associated with the user's insulin pump usage. The method further comprises receiving the user's response to the at least one query via the user-input mechanism and determining, via the at least one processing component, the correction factor using the user's response to the at least one query and information stored in the memory.

[0011] According to another embodiment, a glucose management device for managing a user's blood glucose level is disclosed. The glucose management device comprises a housing, a user interface including a display and a user-input mechanism, a memory device for storing programmed instructions, and a processing component, the processing component configured to cause the display to display a prompt for initiating a carbohydrate factor determination sequence or a correction factor determination sequence in response to input received via the user-input mechanism. The processing component is further configured to cause the display to display at least one query, the at least one query being associated with a user's type of diabetes, the user's weight, the user's total daily dose of insulin, whether the user uses an insulin pump, or combinations thereof. The processing component is further configured to receive the user's response to the at least one query via the user-input mechanism and determine the carbohydrate factor or the correction factor using the user's response to the at least one query and information stored in the memory device.

[0012] Still other aspects, features, and advantages of the present invention are readily apparent from the following detailed description, by illustrating a number of exemplary embodiments and implementations, including the best mode contemplated for carrying out the present invention. The present invention is also capable of other and different embodiments, and its several details can be modified in various respects, all without departing from the spirit and scope of the present invention. Accordingly, the drawings and descriptions are to be regarded as illustrative in nature, and not as restrictive. The invention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the concepts disclosed herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Exemplary embodiments are illustrated in referenced figures. It is intended that the

embodiments and figures disclosed herein are to be considered illustrative rather than restrictive.

[0014] FIG. 1 illustrates an exemplary system, including an exemplary meter, which is described to demonstrate aspects of the present invention.

[0015] FIG. 2 is a flowchart of an exemplary method for determining a carbohydrate factor, according to an embodiment of the present invention.

[0016] FIG. 3 is a flowchart of an exemplary method for determining a correction factor, according to an embodiment of the present invention.

[0017] FIGs. 4a-4d illustrate exemplary interface screens of the meter of FIG. 1.

[0018] FIG. 5 illustrates an exemplary interface screen of the meter of FIG. 1.

[0019] While a given embodiment is susceptible to various modifications and alternative forms, specific embodiments have been shown by way of example in the drawings and will be described in detail herein. It should be understood, however, that the invention is not intended to be limited to the particular forms disclosed. Rather, the spirit and scope of the invention, the protection of which is defined by the appended claims, are intended to cover all modifications, equivalents, and alternatives of the details described herein.

DESCRIPTION OF ILLUSTRATED EMBODIMENTS

[0020] Existing medical device systems and glucose management devices including insulin bolus calculators suffer from a number of significant limitations. In particular, for example, such systems require diabetic individuals to input user-specific parameters such as a carbohydrate factor, an exercise adjustment factor, and a correction factor. Often, however, a diabetic individual and/or the healthcare professionals may not know the individual's carbohydrate factor and/or the correction factor. If they know the equations to calculate those factors, they can do so (often with the assistance of a calculator). However, if they do not know the equations to determine the factors, they will have to look up the equations externally and then determine the factors, which can be time consuming, inconvenient, and prone to error.

[0021] According to aspects of the present disclosure, systems, and methods are described for improving insulin bolus calculations. The described systems and methods assist with simplifying and/or removing certain steps required for determining a bolus calculation. In particular, aspects of the present invention assist in determining a carbohydrate factor, a correction factor, or both based on the individual's response to several lifestyle questions, the

answers to which are generally known/memorized by the individual (and, as such, generally do not require any looking up or researching the answers).

[0022] Referring to FIG. 1, a blood glucose meter 100 is described to illustrate aspects of the present invention. As shown in FIG. 1, the meter 100 includes a housing 107 having a test sensor port or opening 101 formed therein. A test sensor 110 is received into the test sensor port 101. The test sensor 110 is configured to receive a fluid (e.g., blood) sample, which has an analyte (e.g., glucose) that is to be analyzed by the meter 100. In turn, the meter 100 provides point-in-time measurements of blood glucose concentrations in blood samples received on the test sensor 110.

[0023] The test sensors described herein may be electrochemical test sensors or optical test sensors. The test sensor 110 shown in FIG. 1 is an electrochemical test sensor. As such, the test sensor 110 includes a receiving area 111 that contains a reagent that reacts with the sample to provide information relating to an analyte in the sample, i.e., blood glucose concentration. Specifically, the reagent converts the glucose in the sample into a chemical species that is electrochemically measurable and reflects the glucose concentration in the sample. The test sensor 110 also includes a plurality of electrodes 112 that transmits the measurable electrical signal from the electrochemical reaction.

[0024] Correspondingly, the meter 100 includes contacts 102a, 102b that contact the electrodes 112 on the test sensor 110 to receive the electrical signal from the electrodes 112. The meter 100 employs a processing component 103 to process the electrical signal and determine a glucose concentration measurement. The processing component 103, for example, may include an analog front end that interfaces with the contacts 102a, 102b to receive an analog signal from the test sensor 110 and a back end digital engine to digitally process the signal. The processing component 103 includes one or more computer processors that execute programmed instructions according to a measurement algorithm. The programmed instructions are stored in, and read from, at least one memory 104. The memory 104, for example, may include any type or combination of computer readable and writable storage devices. For example, the memory 104 may be a non-volatile memory, such as flash memory, or the like.

[0025] In general, the processing component 103 may execute programmed instructions stored as data on the memory 104. The programmed instructions provide various functions for the meter 100 and control various aspects of the operation of the meter 100. For example, the housing 107 of the meter 100 includes a user interface 105. The user interface 105 includes a display 105a and a user-input mechanism 105b. As discussed in more detail

below, the display 105a may present information relating to the test results, the testing procedure, etc., as well as other responses to user inputs, etc. The display 105a may be a graphic liquid crystal display (LCD), an organic light-emitting diode (OLED), segment LCD, or the like. Accordingly, the processing component 103 may execute programmed instructions to show information on the display 105a. The display 105a may be a high-resolution, rich viewing display, which may present both static and moving text and images to the user. However, other types of displays, including, for example, lower resolution, monochromatic LCD displays, may be employed. In general, a range of display types, from a low-cost basic display to a fully functional display, may be employed. The display 105a may be of any suitable size. In some cases, the display 105a may cover one entire side of the instrument 100. Moreover, the display 105a may include a touchscreen. In addition, the user interface 105 may provide advanced graphical user display and audio capabilities available directly on the instrument 100 or via a communications interface with the instrument 100. The user-input mechanism 105b allows the user to interact with the instrument 100 and may include push buttons, a scroll wheel, touch-screen elements, or any combinations thereof.

[0026] The memory 104 may also store program parameters, constants, lookup tables, etc., that are employed by the processing component 103 when executing the programmed instructions. The program parameters, for example, may alter operation of the meter 100 according to geographical or market considerations. In general, the memory 104 stores software, firmware, and other data that are used for the operation of the meter 100.

[0027] As shown in FIG. 1, the meter 100 can be communicatively coupled to an external computing device 200 via a wired or wireless connection 10. The computing device 200 may be a desktop or laptop personal computer, a handheld or pocket personal computer, a computer tablet, a smart phone/device, a personal data assistant (PDA), or any other device that includes processing capabilities and other features that can be employed with the meter 100. Although the meter 100 can run a testing procedure to produce test results and present related information on the display 105a, the computing device 200 can provide more advanced functionality for managing, processing, and displaying test results and related information. For example, the computing device 200 has the necessary processing power, program memory (e.g., RAM), and display capabilities to execute health data management software that provides more advanced analysis and presentation of the test results measured by the meter 100. For instance, the computing device 200 may download test results from the meter 100, perform complex statistical analysis on the test results, and display the statistical analysis as graphs on a high-resolution display provided by the computing device 200.

Alternatively, the meter 100 may be integrated with the computing device 200 to create a single device (not shown) that has the capabilities of both, such as for use in hospitals and other sophisticated environments, in which the benefits of the feature-rich functionality offset the increased costs of a more complex handheld device. Both meter 100 and computing device 200 can be characterized as a glucose management device.

[0028] Aspects of the invention assist with calculating an amount of insulin bolus for returning a user's blood glucose levels to within a desired range , or maintaining it within the desired range. In one embodiment, the processing component 103 executes programmed instructions pertaining to a bolus calculator stored on the memory 104. To calculate the bolus, the display 105a prompts the user to input short-term parameters that depend on the user's current levels of carbohydrates and insulin and his or her exercise status. The display 105a also prompts the user to (1) input user-specific parameters, including an exercise adjustment factor, a carbohydrate ("carb") factor, and a correction factor or (2) select the option for using the meter 100 to assist in calculating one or more of the user-specific parameters. If the user chooses the latter option, the processing component 103 causes the display 105a to display a series of questions (stored in the memory 104), the answers to which are commonly known to a person with diabetes and/or the person's healthcare professional. The bolus calculation also utilizes the user's insulin type (e.g., rapid-acting insulin, regular insulin, etc.), which the user is also required to input into the instrument 100.

[0029] FIG. 2 is a flowchart of an exemplary method of determining a carb factor, according to one embodiment. The instrument 100 may display on the display 105a a prompt for the user to, via the user-input mechanism 105b, (1) input the user's carb factor or (2) initiate a carb factor determination sequence to obtain assistance from the meter 100 in determining the user's carb factor. At step 350, using the user-input mechanism 105b, the user selects the option for assistance in determining the carb factor. In response thereto, the processing component 103 causes the instrument 100 to run programmed instructions stored in the memory 104 pertaining to a carb factor determination sequence. The programmed instructions include causing the display 105a to display at least one query. The at least one query may include a prompt for the user to input his or her diabetes type, i.e., Type 1 or Type 2, at step 352. In other embodiments, the user's diabetes type may have been previously input by the user and stored in the memory 104.

[0030] If the user has Type 2 diabetes, the processor may determine the carb factor, via the at least one processing component 103, using information (e.g., data, an equation, or an algorithm) stored in the memory 104. The carb factor may optionally be displayed on the

display 105a. In the illustrated example of FIG. 2, the carb factor is 10.8 g/U, as shown in step 354. However, this value may vary, as it is generally unique to the individual. In one embodiment, the value may range from about 1 to about 200. In another embodiment, the value may range from about 6 to about 30.

[0031] If, the user has Type 1 diabetes, the at least one query further includes a query associated with the user's total daily doses (TDD) of basal insulin and bolus insulin, a query associated with the user's weight, or the combination thereof. Basal insulin doses are baseline amounts of insulin needed to keep blood glucose levels at consistent levels during periods of fasting. Bolus insulin doses are amounts of insulin needed to process digested sugars and carbohydrates due to the increased need for insulin after meals. Referring back to FIG. 2, the display 105a displays a prompt for the user to enter the user's TDD at step 356. The display 105a may then display a prompt for the user to enter his or her weight at step 358. It is contemplated that the weight prompt (step 358) may come before the TDD prompt (step 356) or that the user's weight may have been previously entered and stored in the memory 104. The processing component 103 may then determine the carb factor at step 360 using information (e.g., data, an equation, or an algorithm) stored in the memory 104. The carb factor may optionally be displayed on the display 105a. In the illustrated embodiment, the carb factor is (2.6 x weight (lb))/TDD or (5.7 x weight (kg))/TDD. In another non-limiting embodiment, the equation for calculating the carb factor is 500/TDD. It is contemplated, however, that other equations may be used.

[0032] FIG. 3 is a flowchart of an exemplary method for determining a correction factor, according to one embodiment. It is contemplated that the correction factor determination sequence of FIG. 3 may be displayed and run prior to, instead of, or after the carbohydrate factor determination sequence of FIG. 2. The instrument 100 may display on the display 105a a prompt for the user to, via the user-input mechanism 105b, (1) input the user's correction factor or (2) initiate a correction factor determination sequence to obtain assistance from the meter 100 in determining the user's correction factor. At step 450, using the user-input mechanism 105b, the user selects the option for assistance in determining the correction factor. In response thereto, the processing component 103 causes the instrument 100 to run programmed instructions stored in the memory 104 pertaining to a correction factor determination sequence. The programmed instructions include causing the display 105a to display at least one query. The at least one query may include a prompt for the user to input the user's diabetes type (i.e., Type 1 or Type 2), the user's insulin pump usage, or the like. In step 452 of FIG. 3, the user is prompted to enter the user's diabetes type. In other

embodiments, the user's diabetes type may have been previously input and stored in the memory 104. If the user inputs that the user has Type 1 diabetes, the display 105a displays a query associated with the user's total daily doses (TDD_1) of basal insulin and bolus insulin. At step 454, the display 105a queries the user to enter the user's TDD_1.

[0033] At step 456, the display 105a queries the user to input whether or not the user uses an insulin pump. In other embodiments, information regarding whether the user uses an insulin pump may have been previously entered and stored in the memory 104, in which case step 456 may be omitted. In the illustrated embodiment, if an insulin pump is used (step 458), the processing component 103 may determine the correction factor using information (e.g., data, an equation, or an algorithm) stored in the memory 104. In the illustrated embodiment, the correction factor is determined to be (1960 mg/dL)/TDD_1, which may optionally be displayed on the display 105a. It is contemplated, however, that other equations may be used.

[0034] If an insulin pump is not used, the processing component 103 checks for the type of insulin injected by the user (step 460), which may be stored by the memory 104. In some embodiments, the user is prompted to enter the type of insulin used during the correction factor determination sequence shown in FIG. 3. If the insulin type is rapid-acting insulin (e.g., insulin that begins to work about 15 minutes after injection, peaks after about 1 hour, and is effective for about 2-4 hours) (step 462), the correction factor is determined using data, an algorithm, and/or an equation stored in the memory. In the illustrated embodiment, the processing component 103 has determined the correction factor to be (1800 mg/dL)/TDD_1. It is contemplated, however, that other equations may be used. If the insulin type is regular insulin (e.g., insulin that usually reaches the bloodstream within about 30 minutes after injection, peaks between 2-3 hours after injection, and is effective for about 3-6 hours) (step 464), the correction factor is determined using data, an algorithm, and/or an equation stored in the memory 104. In the illustrated embodiment, the processing component 103 has determined the correction factor to be (1500 mg/dL)/TDD_1. It is contemplated, however, that other equations may be used.

[0035] If the user has Type 2 diabetes, the display 105a may display a prompt for the user to enter the user's weight at step 470. It is contemplated that user's weight may have been previously stored in the memory 104, in which case step 470 may be omitted. The processing component 103 then determines, at step 472, the effective total daily doses (TDD_2) of basal insulin and bolus insulin at step 472. In the illustrated embodiment, the TDD_2 is (0.24 x weight (lbs)) or (0.53 x weight (kg)). It is contemplated, however, that other equations may be used. At step 474, the display 105a displays a prompt for the user to input whether or not

the user uses an insulin pump. In other embodiments, information regarding whether the user uses an insulin pump was previously entered and is stored in the memory 104, in which case step 474 may be omitted. In the illustrated embodiment, if an insulin pump is used (step 476), the processing component 103 determines the correction factor to be (1960 mg/dL)/TDD_2. As discussed above, it is contemplated that other equations may be used. If an insulin pump is not used, the processing component 103 checks for the type of insulin injected by the user (step 478), which may be stored by the memory 104. In some embodiments, the user is prompted to enter the type of insulin used during the correction factor determination sequence shown in FIG. 3. In the illustrated embodiment, if the insulin type is rapid-acting insulin (step 480), the correction factor is determined by the processing component 103 as (1800 mg/dL)/TDD_2. In the illustrated embodiment, if the insulin type is regular insulin (step 482), the correction factor is determined by the processing component 103 as (1500 mg/dL)/TDD_2. As discussed above, it is contemplated that other equations may be used.

[0036] Referring to FIGs. 4a-d, interface screens, displayed on the display 105a, associated with a carb factor determination are shown according to one embodiment. The interface screens shown and described herein may also or alternatively appear, for example, on the computing device 200. As shown in FIG. 4a, the user is prompted, via the interface screen 400, to enter the user's carb factor, i.e., how many grams of carbohydrates one unit of insulin helps the user to metabolize. The user may make a selection from a series of carbohydrate amounts provided on a segment 402 of the interface screen 400 using a scrolling feature, touching/swiping the display 105a, or the like. In other embodiments, the user may manually enter the appropriate amount of carbohydrates via the user-input mechanism 105b. If the carb factor is unknown, the user may select the "Help me calculate this" option 404 (see step 350 of FIG. 2). In FIG. 4b, a subsequent (or, in other embodiments, preceding) interface screen 402 displays the query "What type of diabetes to you have?" corresponding with step 352 of FIG. 2. The user may select from "Type 1" (404) or "Type 2" (405). In FIG. 4c, in response to a user selecting Type 1 (404), a subsequent interface screen 408 displays the query "What is your total daily dose (TDD)? Add your total basal dose plus your meal doses," corresponding with step 356 of FIG. 2. The user may select the appropriate TDD and then select "Continue" (409). FIG. 4d illustrates an interface screen 410 prompting the user to enter the user's weight, corresponding with step 358 of FIG. 2.

[0037] FIG. 5 illustrates one example of an interface screen 420 corresponding with the correction factor determination (see FIG. 3). The interface screen 420 corresponds with step 456 or step 474 of FIG. 3 and queries, "Do you use an insulin pump?"

[0038] It is contemplated that the exemplary methods shown in FIGs. 2 and 3 may be modified as appropriate. For example, the order of the queries displayed on the display may be altered. It is contemplated that more or other information may be queried of the user and that, accordingly, interface screens other than those shown in FIGs. 4a-4d and 5 may be displayed on the display 105a. It is also contemplated that less information may be queried of a user, especially if certain information has already been entered by the user and stored in the meter memory 104.

[0039] The carbohydrate factor and/or the correction factor ascertained by the meter according to the embodiments discussed herein may then be used to calculate an amount of bolus insulin needed by the user to return his or her blood glucose to within a normal range. The bolus insulin amount is determined using the user's current blood glucose value, carbohydrate amount, amount of exercise, insulin amount, target blood glucose value/range, carb factor, correction factor, and exercise factor.

[0040] While the invention is susceptible to various modifications and alternative forms, specific embodiments and methods thereof have been shown by way of example in the drawings and are described in detail herein. It should be understood, however, that it is not intended to limit the invention to the particular forms or methods disclosed, but, to the contrary, the intention is to cover all modifications, equivalents and alternatives falling within the spirit and scope of the invention.

WHAT WE CLAIM IS:

1. A method of operating a glucose management device, the glucose management device including one or more processing components, a housing, a user interface including a display and a user-input mechanism, and a memory, the method comprising:

displaying on the display a prompt for initiating a carbohydrate factor determination sequence via the user-input mechanism;

displaying on the display at least one query, the at least one query including a query associated with a user's type of diabetes;

receiving the user's response to the at least one query via the user-input mechanism; and

determining, via the at least one processing component, the carbohydrate factor using the user's response to the at least one query and information stored in the memory.

2. The method of claim 1, wherein the information stored in the memory is at least one equation or algorithm.

3. The method of claim 1, wherein the information stored in the memory includes the user's weight.

4. The method of claim 1, further comprising determining an amount of bolus insulin using the carbohydrate factor.

5. The method of claim 4, wherein the determining the amount of bolus insulin further includes using a correction factor, an exercise factor, and short-term parameters input into the user-input mechanism, the short-term parameters including current carbohydrate levels, exercise levels, insulin levels, or combinations thereof.

6. The method of claim 1, wherein the user's response to the at least one query indicates that the user has Type 1 diabetes, the at least one query further including a query associated with the user's total daily doses of basal insulin and bolus insulin, a query associated with the user's weight, or the combination thereof.

7. A method of operating a glucose management device, the glucose management device including one or more processing components, a housing, a user interface including a display and a user-input mechanism, and a memory, the method comprising:

displaying on the display a prompt for initiating a correction factor determination sequence via the user-input mechanism;

displaying on the display at least one query, the at least one query being including a query associated with a user's type of diabetes and a query associated with the user's insulin pump usage;

receiving the user's response to the at least one query via the user-input mechanism; and

determining, via the at least one processing component, the correction factor using the user's response to the at least one query and information stored in the memory.

8. The method of claim 7, wherein the information stored in the memory is at least one equation or algorithm.

9. The method of claim 7, wherein the information stored in the memory includes a type of insulin used by the user.

10. The method of claim 9, wherein the type of insulin includes rapid-acting insulin or regular insulin.

11. The method of claim 7, further comprising determining an amount of bolus insulin using the correction factor.

12. The method of claim 11, wherein the determining the amount of bolus insulin further includes using short-term parameters input into the user-input mechanism, the short-term parameters including current carbohydrate levels, exercise levels, insulin levels, or combinations thereof.

13. The method of claim 7, wherein the user's response to the at least one query indicates that the user has Type 1 diabetes, the at least one query further including a query associated with the user's total daily doses of basal insulin and bolus insulin.

14. The method of claim 7, wherein the user's response to the at least one query indicates that the user has Type 2 diabetes, the at least one query further including a query associated with the user's weight.

15. The method of claim 7, wherein the user's response to the at least one query indicates that the user has Type 2 diabetes, the information stored in the memory including the user's weight, a type of insulin used by the user, or the combination thereof.

16. A glucose management device for managing a user's blood glucose level, the glucose management device comprising:

a housing;

a user interface including a display and a user-input mechanism;

a memory device for storing programmed instructions; and

a processing component, the processing component configured to

cause the display to display a prompt for initiating a carbohydrate factor determination sequence or a correction factor determination sequence in response to input received via the user-input mechanism;

cause the display to display at least one query, the at least one query being associated with a user's type of diabetes, the user's weight, the user's total daily dose of insulin, whether the user uses an insulin pump, or combinations thereof;

receive the user's response to the at least one query via the user-input mechanism; and

determine the carbohydrate factor or the correction factor using the user's response to the at least one query and information stored in the memory device.

17. The device of claim 16, wherein the information stored in the memory device is at least one equation or algorithm.

18. The device of claim 16, wherein the information stored in the memory includes a type of insulin used by the user.

19. The device of claim 16, wherein the processing component is further configured to determine an amount of bolus insulin using the carbohydrate factor or the correction factor.

20. The device of claim 16, wherein the at least one query associated with the carbohydrate factor includes

a user's total daily doses of basal insulin and bolus insulin; and

the user's weight.

21. The device of claim 16, wherein the at least one query associated with the correction factor includes

a total daily dose of basal doses and bolus doses; and

whether an insulin pump is used by the user.

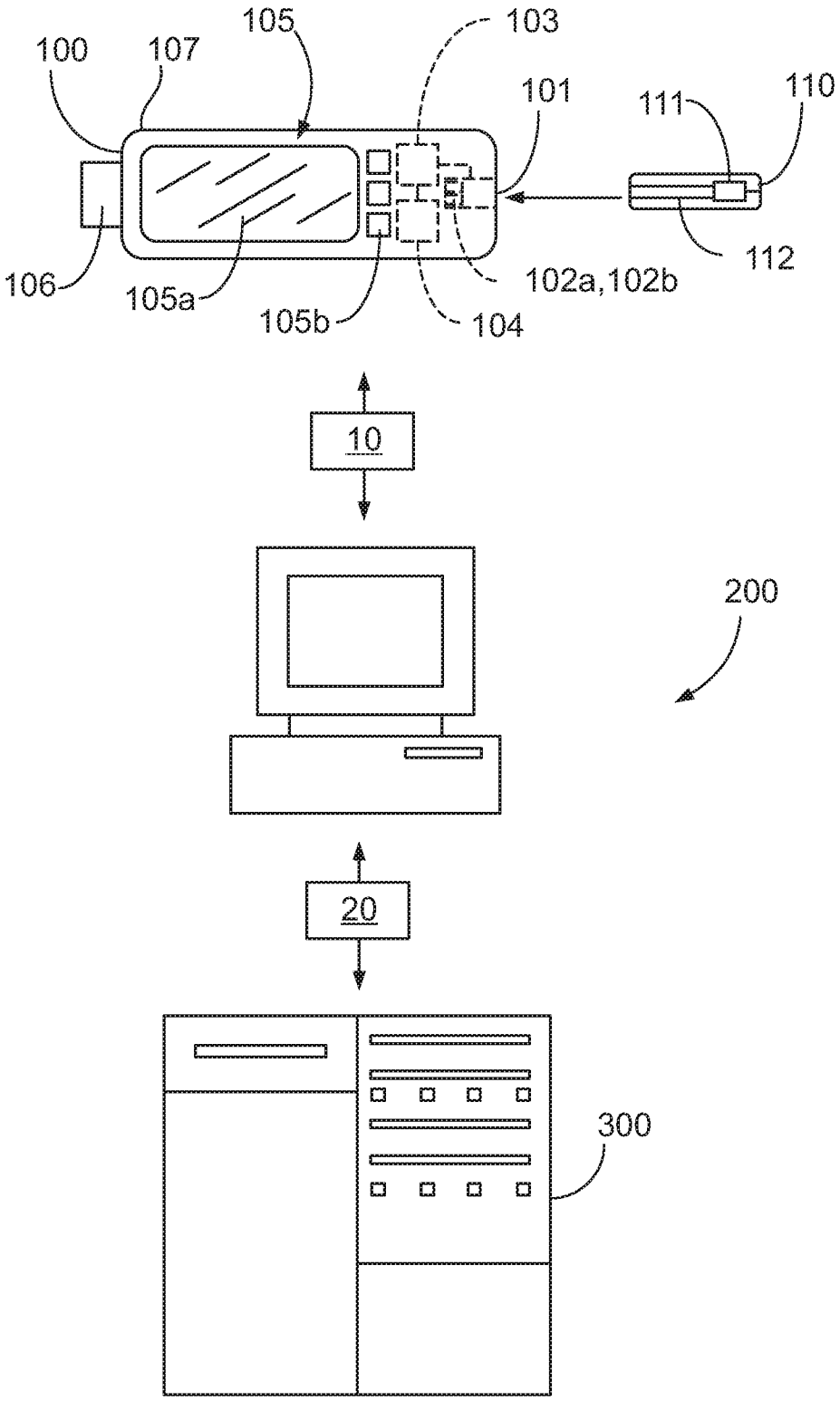

100
107
105
103
101
111
110
112
106
105a
105b
104
102a,102b
10
200
20
300

FIG. 1

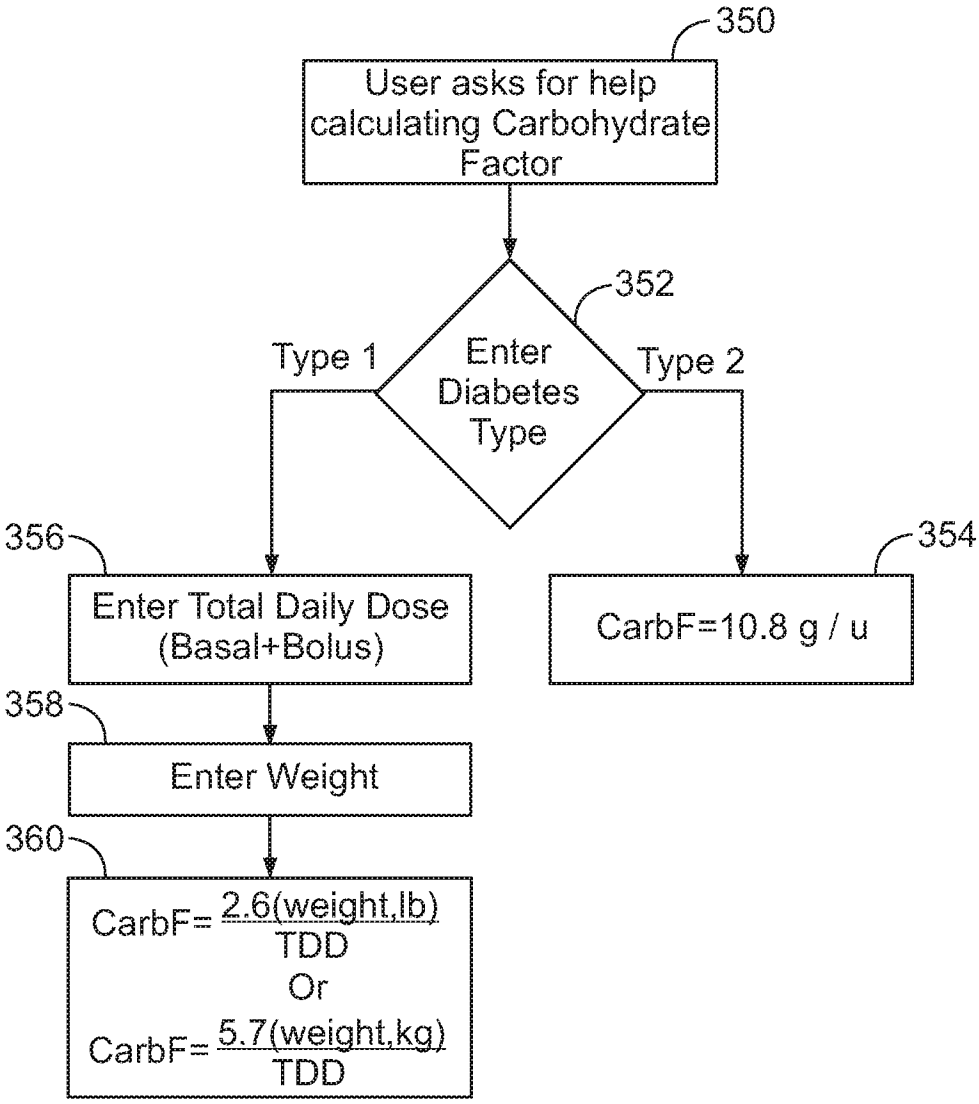

350
User asks for help calculating Carbohydrate Factor
352
Enter Diabetes Type
Type 1
Type 2
356
Enter Total Daily Dose (Basal+Bolus)
354
CarbF=10.8 g / u
358
Enter Weight
360
CarbF= 2.6(weight,lb) / TDD
Or
CarbF= 5.7(weight,kg) / TDD

FIG. 2

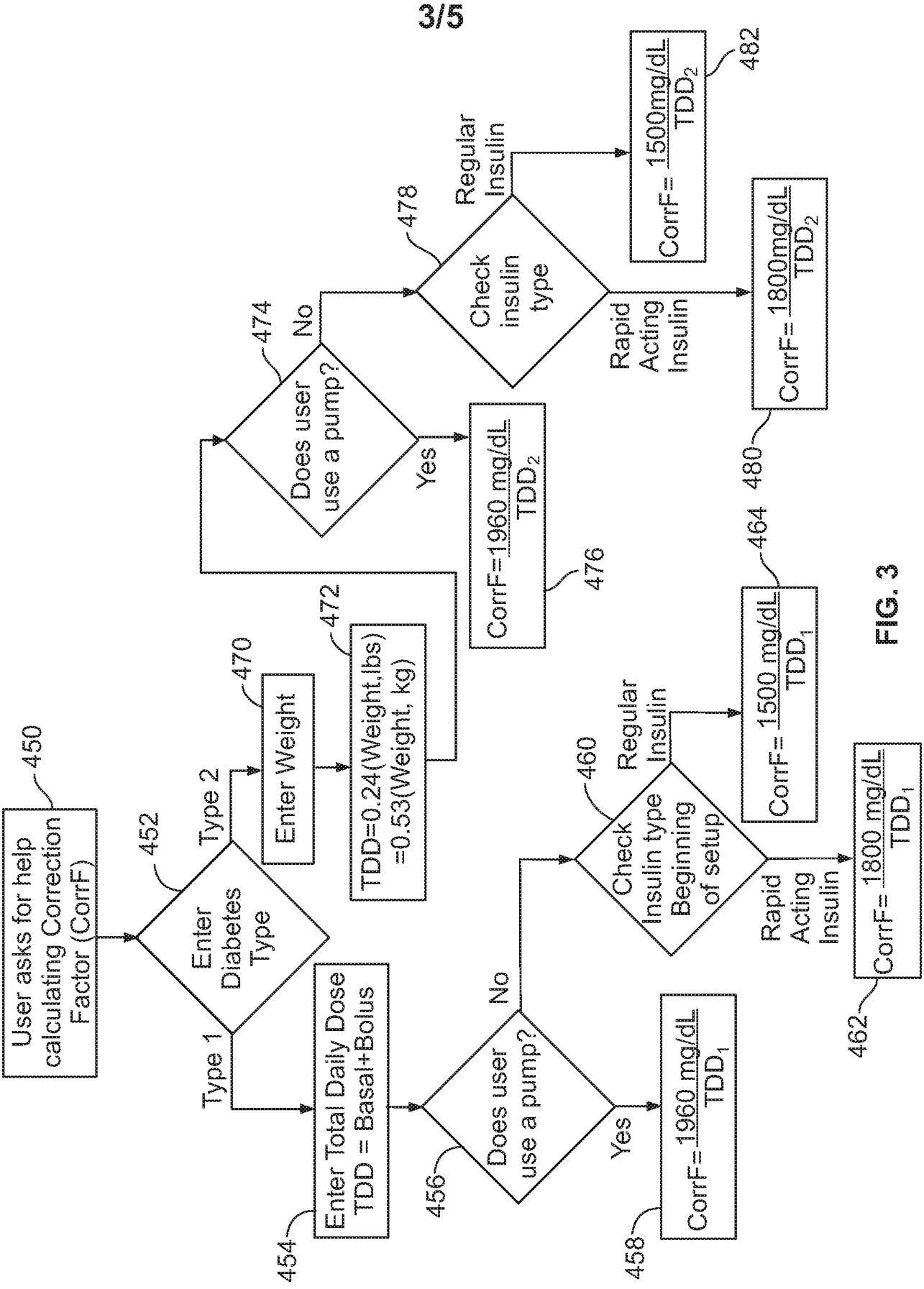

User asks for help calculating Correction Factor (CorrF)
450
Enter Diabetes Type
452
Type 1
Type 2
Enter Weight
470
TDD=0.24(Weight,lbs) =0.53(Weight, kg)
472
CorrF=1960 mg/dL / TDD2
476
Does user use a pump?
474
No
Yes
Check insulin type
478
Regular Insulin
Rapid Acting Insulin
CorrF= 1500mg/dL / TDD2
482
CorrF= 1800mg/dL / TDD2
480
Enter Total Daily Dose TDD = Basal+Bolus
454
Does user use a pump?
456
No
Yes
CorrF= 1960 mg/dL / TDD1
458
Check Insulin type Beginning of setup
460
Regular Insulin
Rapid Acting Insulin
CorrF= 1500 mg/dL / TDD1
464
CorrF= 1800 mg/dL / TDD1
462

FIG. 3

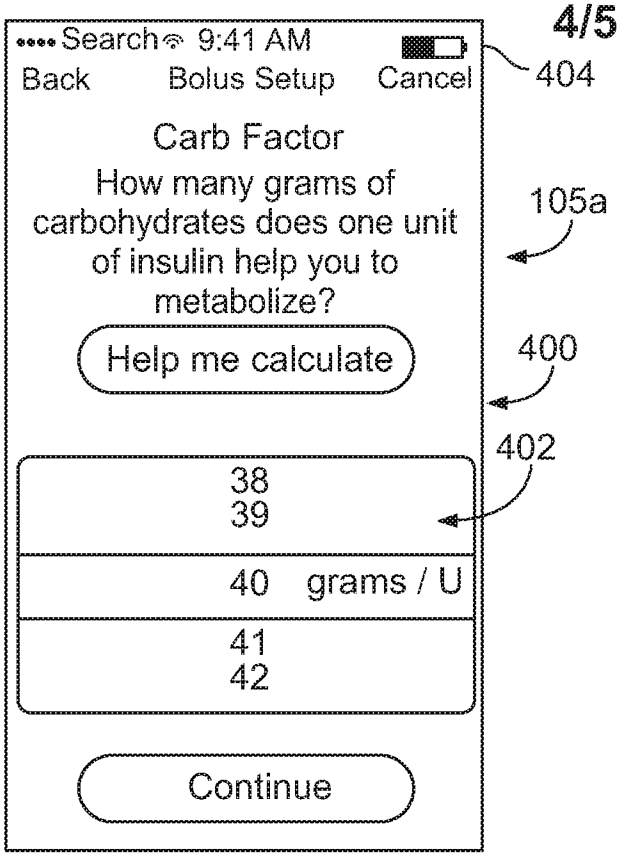


FIG. 4a

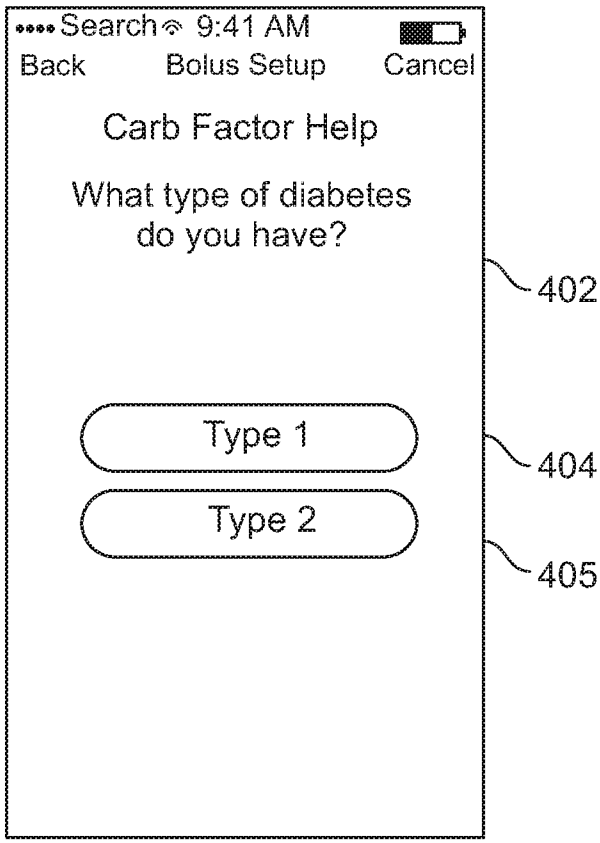


FIG. 4b

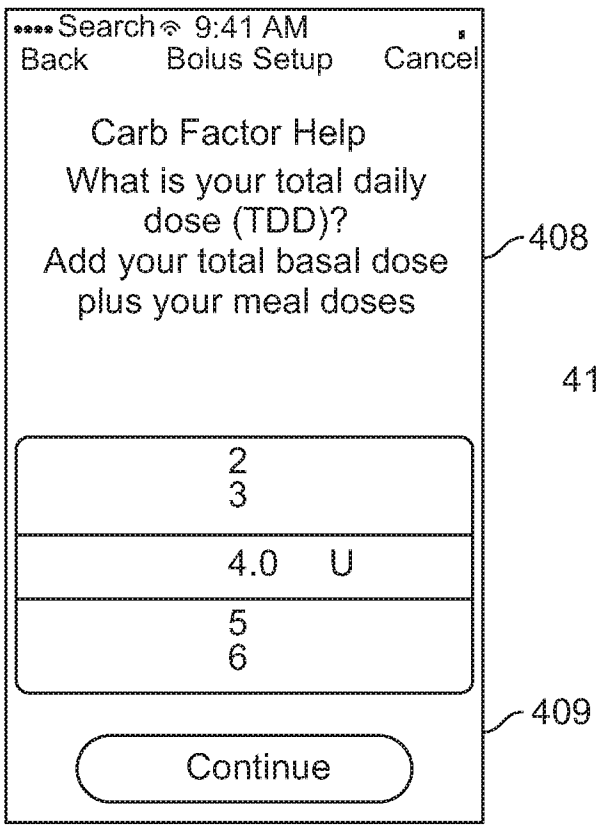


FIG. 4c

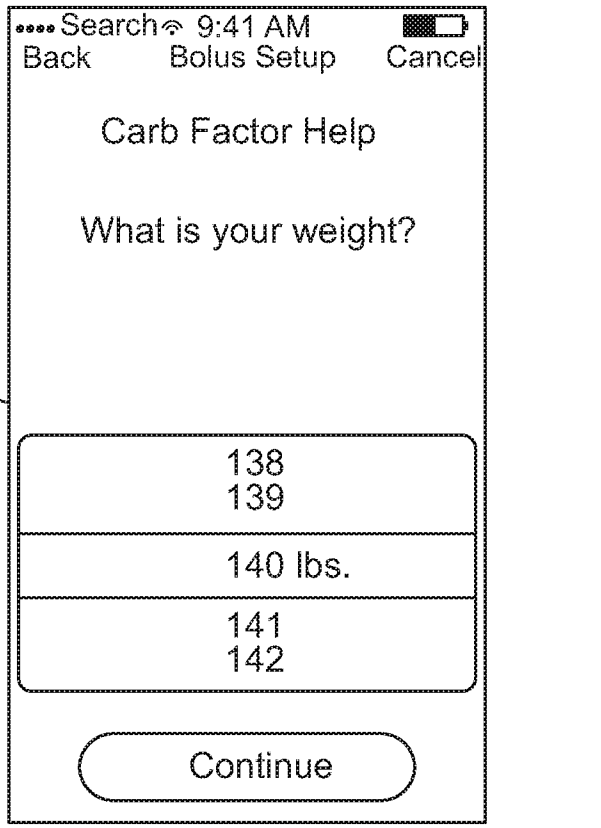


FIG. 4d

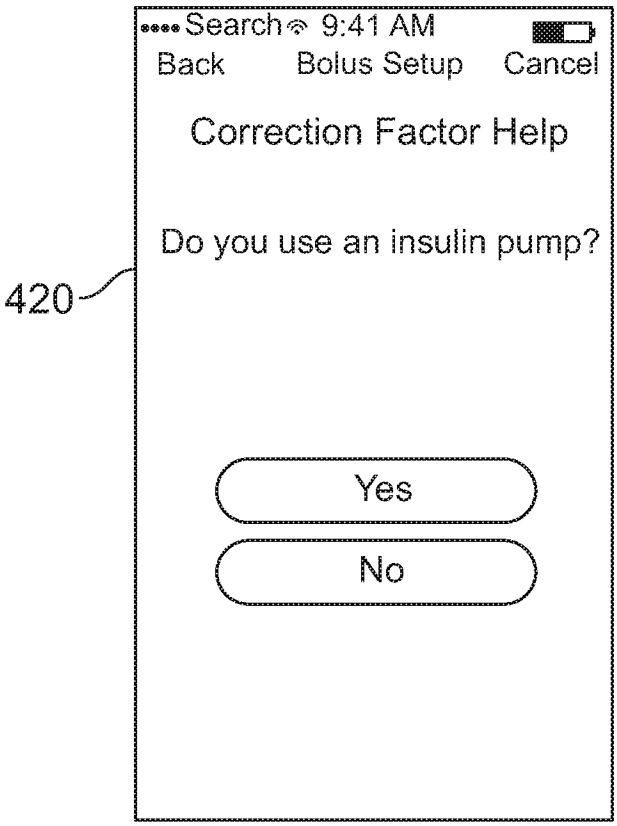

Search 9:41 AM
Back
Bolus Setup
Cancel
Correction Factor Help
Do you use an insulin pump?
420
Yes
No

FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/052755

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F19/00
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)
G06F

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, BIOSIS, Sequence Search, EMBASE, 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 2012/245447 A1 (KARAN JAI [US] ET AL) 27 September 2012 (2012-09-27)	1-21
Y	par. [0367]-[0398],[0484],[0561],[0562],[0564], [0677]	1-21

Y	John Walsh ET AL: "Guidelines for Optimal Bolus Calculator Settings in Adults", Journal of Diabetes Science and Technology Volume Diabetes Technology Society J Diabetes Sci Technol, 1 January 2011 (2011-01-01), pages 129-135, XP055293839, Retrieved from the Internet: URL:http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3045234/pdf/dst-05-129.pdf [retrieved on 2016-08-05] pgs. 131, 134, 135	1-21

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[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
8 August 2016	17/10/2016

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	Wimmer, Georg

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/052755

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Maguire, Phyllis: "Tips for calculating a total daily dose of insulin", Today'sHospitalist , 2 April 2015 (2015-04-02), page 4PP, XP002760585, Retrieved from the Internet: URL:https://web.archive.org/web/20150402005842/http://www.todayshospitalist.com/articles/tips-for-calculating-a-daily-dose-of-insulin.htm [retrieved on 2016-08-05] page 2 - page 3 -----	1-21

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2016/052755

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		CN 103619255 A	05-03-2014
		EP 2680754 A1	08-01-2014
		US 2012245447 A1	27-09-2012
		WO 2012154286 A1	15-11-2012