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(71) Applicant *(for all designated States except US)*: **ABBOTT DIABETES CARE, INC.** [US/US]; 1420 Harbor Bay Parkway, Suite 290, Alameda, CA 94502 (US).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **REGGIARDO, Christopher, V.** [US/US]; 3702 Spyglass Court, Castro Valley, CA 94546-3367 (US).

(74) Agent: **FRESCHI, Gina, C.**; Bozicevic, Field & Francis LLP, 1900 University Avenue, Suite 200, East Palo Alto, CA 94303 (US).

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(54) Title: ANALYTE METER HAVING ALERT, ALARM AND TEST REMINDER CAPABILITIES AND METHODS OF USE

(57) Abstract: An analyte measurement system is provided that can issue an alert or an alarm to a user when a measurement falls within a particular predetermined range. The system can also include a reminder for the user to perform additional tests at a predetermined time period after a measurement that falls within a predetermined range. Various visual, audible and physical alerts, alarms and reminders are disclosed. Methods associated with the use of the analyte measurement system are also covered.

ANALYTE METER HAVING ALERT, ALARM AND TEST REMINDER CAPABILITIES AND METHODS OF USE

FIELD OF THE INVENTION

[0001] The present invention relates to medical devices for monitoring analytes in a living body, such as monitoring glucose levels in people with diabetes. More particularly, the invention relates to providing meter users with test reminder capabilities.

BACKGROUND OF THE INVENTION

[0002] In recent years, people with diabetes have typically measured their blood glucose level by lancing a finger tip or other body location to draw blood, applying the blood to a disposable test strip in a hand-held meter and allowing the meter and strip to perform an electrochemical test of the blood to determine the current glucose concentration. Such discrete or individual, *in vitro* tests are typically conducted at least several times per day. Detailed descriptions of such glucose monitoring systems and their use are provided in U.S. Patent No. 7,058,437, issued to TheraSense, Inc. on June 6, 2006, which is incorporated by reference herein in its entirety.

[0003] *In vivo* glucose monitoring devices are currently being developed to provide continuous glucose monitoring. Some of these continuous systems employ a disposable, transcutaneous sensor that is inserted into the skin to measure glucose concentrations in interstitial fluid. A portion of the sensor protrudes from the skin and is coupled with a durable controller and transmitter unit that is attached to the skin with adhesive. A wireless handheld unit is used in combination with the skin-mounted transmitter and sensor to receive glucose readings periodically, such as once a minute. At a predetermined time interval, such as every three, five or seven days, the disposable sensor is removed and replaced with a fresh sensor which is again coupled to the reusable controller and transmitter unit. With this arrangement, a person with diabetes may continuously monitor their glucose level with the handheld unit. The handheld unit of the *in vivo* system can also include an *in vitro* test strip meter for conducting individual tests as described above. The *in vitro* test strip meter can be used to calibrate the continuous monitoring system each time a new *in vivo* sensor is implanted. Additionally, the *in vitro* test strip meter can be used as back up in case the *in vivo* system fails, a new sensor is equilibrating, or when the transmitter must be turned off, such as during takeoffs and landings when aboard an airliner. Detailed descriptions of such a continuous glucose monitoring system and its use are provided in U.S. Patent No. 6,175,752, issued to TheraSense, Inc. on January 16, 2001, which is incorporated by reference herein in its entirety.

[0004] The purpose of in vitro or in vivo glucose monitoring is to assist people with diabetes to keep their blood glucose within a predetermined range. If a person's blood glucose level rises too high, hyperglycemia can occur. The short term effects of hyperglycemia can include fatigue, loss of cognitive ability, mood swings, excessive urination, excessive thirst and excessive hunger. Of more immediate concern, if a person's blood glucose level drops too low, hypoglycemia can occur. Like hyperglycemia, symptoms of hypoglycemia also include fatigue and loss of cognitive ability. If unchecked, however, hypoglycemia can quickly lead to loss of consciousness or coma. Some diabetics have little or no symptoms of hypoglycemia, or find it difficult to distinguish between symptoms of hyperglycemia and hypoglycemia. Long term effects of not keeping blood glucose levels within a proper range include health complications such as cardiovascular disease, chronic renal failure, retinal damage which can lead to blindness, nerve damage, impotence, and gangrene with risk of amputation of toes, feet, and even legs. Clearly, proper glucose monitoring and corrective action based on the monitoring is essential for people with diabetes to maintain their health.

[0005] An ideal blood glucose range can vary from person to person. However, a fairly typical goal for someone with diabetes can be 75 to 175 milligrams of glucose per deciliter of blood (i.e. 75 to 175 mg/dL). Eating causes blood glucose concentrations to go up, while administration of insulin and exercise both cause glucose to go down. Different types of food affect how much and how fast glucose will rise. Stress, fatigue and other factors can also have a significant affect on glucose levels. In light of the many factors that affect blood glucose, a diabetic person must monitor glucose at least several times a day to maintain a proper balance. Moreover, it is often not enough to take a single test to determine a current glucose level. A second test sufficiently spaced apart in time from the first (e.g. 15 or 30 minutes) may be advisably to determine not just the current glucose level, but whether the level is rising, falling or remaining level.

SUMMARY OF THE INVENTION

[0006] According to aspects of some embodiments of the present invention, an *in vitro* analyte monitoring system is provided with alert features. These alert features assist a user in maintaining proper analyte levels. Blood glucose is one of many analytes that may be maintained using aspects of the present invention. For each user, an ideal or target analyte range can be established. Above and below this ideal range, upper and lower ranges of moderate concerns, respectively, can also be established. Above the upper range of moderate concern, an upper range of high concern can be established. Similarly, below the lower range

of moderate concern, a lower range of high concern can also be established. By way of example, a user can make *in vitro* blood glucose measurements, such as with a handheld meter and test strip. In some embodiments of the invention, the user can be alerted by the test meter when a measurement falls within either of the upper or lower ranges of moderate concern. Preferably, the alert indicates to the user which of the upper and lower ranges of moderate concern the measurement falls into.

[0007] According to other aspects of the invention, an *in vitro* analyte monitoring system is provided with alarm features. These alarm features also assist a user in maintaining a proper analyte (e.g., glucose) level. As described above, upper and lower analyte ranges of high concern can be established. In some embodiments of the invention, a test meter can be provided with alarms that warn the user when a measurement falls within either of the upper or lower ranges of high concern. Preferably, the alarm indicates to the user which of the upper and lower ranges of high concern the measurement falls into. Additionally, it is preferable that the alarms indicate a higher level of urgency than do the previously described alerts. Note that a user's analyte level may pass from an ideal range, through a range of moderate concern and into a range of high concern before the user conducts an analyte measurement. In such cases, the user may be provided with an alarm without receiving an alert first.

[0008] According to other aspects of the invention, an analyte monitoring system is provided with reminder features. The reminder features also assist a user in maintaining a proper analyte (e.g., glucose) level. Analyte ranges of moderate or high concern can be established, as described above. In some embodiments of the invention, a test meter can have a reminder feature that is triggered when a measurement value falls into a range of moderate or high concern. The reminder can prompt the user after a predetermined period of time to take another analyte measurement to ensure that the analyte level is heading toward or has returned to the ideal range. Such a reminder feature can be particularly helpful since it frees the user from either trying to remember when to retest or from setting an external alarm, if available. For those users that require supervision, such as children, the reminder feature automatically assists the care giver by providing the user with a retest reminder, even when the care giver is not present to perform the task of reminding.

[0009] According to various aspects of the invention, the above-described alerts, alarms and reminders can be conveyed to the user visually, such as with a graphical user interface (GUI) or light emitting diode(s) (LED). In one embodiment of the invention, a fixed-segment liquid crystal display (LCD) is used as the GUI, with the value of the analyte measurement appearing in flashing numerals when not in the ideal range. In addition, or in an alternative embodiment,

up and down arrow icons can be provided to display when an analyte measurement is in the upper or lower range of moderate and/or high concern. For example, a solid arrow icon can be displayed when the level is in the range of moderate concern, and a flashing arrow can be displayed when the level is in the range of high concern. Different icons can be used depending on whether the level is in the range of moderate or high concern. For instance, an arrow icon having a first size can be displayed when the analyte level is in the range of moderate concern, and a larger or vertically displaced arrow icon can be displayed when the level is in the range of high concern. Alternatively, a horizontal arrow can be displayed when the analyte level is in the ideal range, an arrow inclined upward or downward can be displayed when the level is in the upper or lower range of moderate concern, respectively, and an arrow inclined at a steeper upward or downward angle can be displayed when the level is in the upper or lower range of high concern, respectively. Alternatively, the opposite directions of the above arrows can be used to be indicative the course of action to be taken rather than whether the current level is high or low. For instance, a high analyte level may display a downward pointed arrow to indicate that the user should lower his or her analyte level. In other embodiments, symbols such as +, - and = can be used to indicate high, low and on track readings, respectively. The use of a dot matrix display instead of or in combination with a fixed element display may be employed, e.g., to allow for more flexibility in providing alerts and/or alarms and/or reminders to a user. Text may be shown on the display, with or without accompanying icons, and with or without user feedback, to provide information to the user about a particular alert, alarm and/or reminder. For example, after a test result falling into a range of concern, text may appear explaining the significance of the results, proposing one or more courses of action, and/or indicating that the user should re-test after a certain period of time. After such a period of time has elapsed, a further text message may appear which may include instructions to conduct further tests. Some text messages may be downloaded or otherwise activated as part of a prescription from a Health Care Provider.

[0010] To reduce size and/or cost of a meter, one or more LEDs may be used to convey an alert, alarm or reminder to a user. For instance, a single LED can be illuminated when the analyte measurement is not in the ideal range. The LED can be solid when in the range of moderate concern, and flashing when in the range of high concern. Different colors in one or more LEDs can indicate different ranges. For instance green can indicate the analyte level is in the ideal range, yellow can indicate the level is in a range of moderate concern and red can indicate the level is in a range of high concern. Two LEDs can be used to indicate whether the value is high or low (or whether the user's analyte level should be raised or lowered). Three

LEDs can be used, for instance with a first LED indicating an analyte level below the ideal range, a second LED indicating a level in the ideal range, and a third LED indicating a level above the ideal range. Four LEDs can be used to indicate an analyte level in the lower range of high concern, the lower range of moderate concern, the upper range of moderate concern and the upper range of high concern, respectively. A fifth LED can be added to indicate a level in the ideal range.

[0011] In addition to or instead of visual indicators of alerts, alarms and reminders, a glucometer constructed according to aspects of the present invention can incorporate audible or physical feedback. Since diabetes can adversely affect a person's eyesight, such forms of user interface can become necessary. In one embodiment of the invention, a meter can emit an audible tone to indicate an analyte reading that is outside of the ideal range. A high tone can be used to indicate a reading that is above the ideal range while a low tone can be used to indicate a reading that is below. A pulsing or intermittent tone can be used to indicate a reading that is in a range of high concern. A varying number of pulses and other variations can be employed to indicate what range the analyte reading is in. Similarly, a vibratory signal, such as used in cell phones, can be used with different variations for indicating alerts, alarms and reminders to a user.

[0012] According to various aspects of the invention, the above-described alerts, alarms and reminders can be set with default parameters during manufacture, and/or may be settable by a HCP (Health Care Professional such as a Doctor or Certified Diabetes Educator) with levels corresponding to prescribed values for a user, and/or may be user configurable. In one embodiment of the invention, a meter is provided that is set to automatically remind the user to retest after a predetermined period of time, which may be preset or configured, after a test that falls outside of an ideal analyte range. The meter may be configured to allow the user or healthcare professional to disable this feature. In an alternative embodiment, the meter is provided "out of the box" with such a reminder feature disabled, but with provisions to allow the user or healthcare professional to enable it and/or set configuration parameters. A meter can be provided that allows different reminder parameters depending on whether the underlying analyte measurement is in a range of moderate concern or a range of high concern. In one embodiment, the glucometer reminds the user with a first audible signal to retest a first time period (e.g. 30 minutes) after a test result falling in a range of moderate concern, and reminds the user with a second audible signal to retest after a second time period (e.g. 15 minutes) after a test result falling in a range of high concern. In certain embodiments, the second audible signal has a higher volume level and/or longer duration than the first audible

signal, and the second time period may be shorter than the first time period. In this embodiment, the second audible signal can also be accompanied with a vibratory signal. In this or alternative embodiments, the first and/or second signals can continue or repeat if not acknowledged by the user, such as with the push of a button, or with an actual test being conducted. The parameters of the reminders can also be different based on whether the analyte reading is above or below the ideal range, and/or can vary depending on the actual value of the analyte measurement. For each reminder (alert or alarm) the settings may include, but are not limited to, the analyte value, time to reminder, type of reminder (e.g. visual, audible, vibratory, or a combination thereof), persistence of the reminder (e.g. once, once a minute for n times, or once a minute until acknowledged), and the number of times (n) a persistent reminder will repeat.

[0013] According to other aspects of the present invention, a glucometer can be provided with alert and/or alarm and/or reminder settings that can be configured and locked until an access code is supplied, such as by a HCP or a caregiver. Such an arrangement prevents those under the care of a HCP from changing a prescription or those receiving guidance from a caregiver, for instance children, from modifying configuration values. This prevents inadvertent changes to the configuration values. It also prevents the bypassing of alerts, alarms or reminders, such as when a user wants to engage in behavior that may affect analyte levels, e.g., eat improperly. According to other aspects, configuration settings may be set through a glucometer data port, such as when the glucometer is connected to a computer for the uploading and/or downloading of information. In certain embodiments, a HCP or a caregiver is allowed to set and lock configuration values through the data port. Though the configuration locking concepts are described for a discrete *in vitro* measurement system (e.g. a glucometer), they are also applicable for continuous *in vivo* monitoring systems as described above.

[0014] Various analytes may be monitored using aspects of the present invention. These analytes may include but are not limited to lactate, acetyl choline, amylase, bilirubin, cholesterol, chorionic gonadotropin, creatine kinase (e.g., CK-MB), creatine, DNA, fructosamine, glucose, glutamine, growth hormones, hematocrit, hemoglobin (e.g. HbA1c), hormones, ketones, lactate, oxygen, peroxide, prostate-specific antigen, prothrombin, RNA, thyroid stimulating hormone, and troponin, in samples of body fluid. Meters may also be configured to determine the concentration of drugs, such as, for example, antibiotics (e.g., gentamicin, vancomycin, and the like), digitoxin, digoxin, drugs of abuse, theophylline, warfarin and the like. Such analytes can be monitored in blood, interstitial fluid, saliva, urine and other bodily fluids. It should also be noted that fewer or additional analyte measurement

ranges from those described herein can be used. This includes not using ranges at all, but instead using, e.g., absolute values, formulas, lookup tables or similar concepts know to those skilled in the art to determine if or what type of alert, alarm, reminder or other indication should be made to the user for a particular analyte measurement result.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Each of the figures diagrammatically illustrates aspects of the invention. Of these:

[0016] Fig. 1 is plan view showing an exemplary embodiment of a glucometer system constructed according to aspects of the present invention;

[0017] Fig. 2 is a detail example of various alert and alarm displays, one of which is shown in the system of Fig. 1;

[0018] Fig. 3 is a graph depicting an example of how the glucose level of a user might vary over the course of a portion of a day.

[0019] Fig. 4 is a graph depicting the glucose levels shown in Fig. 3 with testing points added, some of which occur as a result of a reminder (alert or alarm).

[0020] Variation of the invention from that shown in the figures is contemplated.

DETAILED DESCRIPTION

[0021] The following description focuses on one variation of the present invention. The variation of the invention is to be taken as a non-limiting example. It is to be understood that the invention is not limited to particular variation(s) set forth and may, of course, vary. Changes may be made to the invention described and equivalents may be substituted (both presently known and future-developed) without departing from the true spirit and scope of the invention. In addition, modifications may be made to adapt a particular situation, material, composition of matter, process, process act(s) or step(s) to the objective(s), spirit or scope of the present invention.

[0022] Fig. 1 shows a top view of an exemplary analyte system 10, a glucometer system in this particular embodiment. System 10 includes a handheld meter 12 and disposable test strip 14. Test strip 14 can be inserted into or removed from test strip port 16 of meter 12 for physical and electrical interconnection therewith. Meter 12 includes an LCD display 18 for displaying information to the meter user, and buttons 20, 22 and 24 for receiving input from the user.

[0023] In general, to take a blood glucose measurement with meter 12, a user inserts a new test strip 14 into port 16 of meter 12. Either before or after strip insertion into the meter, a user then lances a fingertip or other part of the body (i.e. an alternate site) to draw a small drop of

blood 26 to the surface of the skin. The meter and strip are positioned over the drop of blood 26 so that one of the sample chamber ends 28 is touching the drop of blood 26. While this particular example teaches the use of a side-fill strip, it should be noted that an end-fill, top-fill or other type of test strip may be utilized. Moreover, the analyte testing need not use a test strip at all. For instance, certain test meters may utilize a rotary test wheel for making multiple measurements, rather than individual test strips. In the present example, surface tension (wicking) automatically draws a small amount of blood 26 into the sample chamber and an electrochemical test is automatically performed by meter 12 to determine the glucose concentration in the blood 26. The glucose level 30 is then displayed on meter 12.

[0024] According to aspects of the present invention, an alert and/or alarm 32 can also be shown on display 18 indicating, for example, whether the current measurement falls within a predetermined range, such as an ideal glucose range, an upper or lower range of moderate concern or an upper or lower range of high concern.

[0025] Referring now to Fig. 2, a further example of alert and alarm displays 32 is shown. A steeply downwardly inclined arrow 34 (e.g. about -60 to about -90 degrees) can be used to indicate a glucose reading in a lower range of high concern, such as below about 50 mg/dL. A moderately downwardly inclined arrow 36 (e.g. about -30 to about -45 degrees) can be used to indicate a glucose reading in a lower range of moderate concern, such as about 50 mg/dL to about 75 mg/dL. A horizontal arrow 38 (e.g. about 0 degrees) can be used to indicate a glucose reading in an ideal range, such as about 75 mg/dL to about 175 mg/dL. A moderately upwardly inclined arrow 40 (e.g. about 30 to about 45 degrees) can be used to indicate a glucose reading in an upper range of moderate concern, such as about 175 mg/dL to about 250 mg/dL. Finally, a steeply upwardly inclined arrow 42 (e.g. about 60 or about 90 degrees) can be used to indicate a glucose reading in an upper range of high concern, such as above about 250 mg/dL. As previously indicated above, various other visual elements, and/or audible or physical indicators can be used to provide the user with an alert or an alarm.

[0026] Referring now to Fig. 3, an example of blood glucose values for a user is shown. Curve 100 depicts how the user's blood glucose might change with time over a portion of a day. In this example, the ideal range for the user is about 75 mg/dL to about 175 mg/dL, shown with reference numeral 110 and bounded by dashed lines 112 and 114. The ranges of moderate concern are about 50 mg/dL to about 75 mg/dL (lower alert zone 116, bounded by dashed lines 112 and 118) and about 175 mg/dL to about 250 mg/dL (upper alert zone 120, bounded by dashed lines 114 and 122). The ranges of high concern are below about 50 mg/dL (lower alarm

zone 124, below dashed line 118) and above about 250 mg/dL (upper alarm zone 126, above dashed line 122.

[0027] In Fig. 3 the glucose values (100) begin at about 150 mg/dL, rise to about 195 mg/dL (101), fall to about 155 mg/dL (102), rise to about 270 mg/dL (103), fall to about 60 mg/dL (104), rise to about 90 mg/dL (105), fall to about 40 mg/dL (106), and end at about 100 mg/dL.

[0028] Fig. 4 shows the same blood glucose values 100 as Fig. 3 but adds the testing that was performed by that user, some of which occurs as a result of a reminder (alert and/or alarm and/or reminder). For example, after a light meal (snack) the user tests with a reading of 193 mg/dL (201) that falls in the upper alert zone (120). This reading may cause meter 12 to generate an alert to the user, e.g., flashing display, beep, or the like, that his or her glucose is in an upper level of moderate concern, as previously described above. The meter may alert the user substantially immediately after the determination of the reading in the upper alert zone, or sometime thereafter as described below. Regardless of whether the user is notified substantially immediately of a reading in an alert zone (or other zone of concern as described herein), the meter may also be configured to remind the user to perform a re-test after a predetermined amount of time following a reading in a zone of importance (alarm zone or alert zone). For example, after the above-described meter reading in upper alert zone 120, a meter reminder may notify the user to perform a test after a predetermined amount of time, e.g., about 5 minutes, e.g., about 10 minutes, e.g., about 20 minutes, e.g., about 30 minutes, etc., and may periodically remind a user until a test is performed or until the reminder is cleared by the user. For example, the user may respond to the reading and alert (if alerted) with modest therapy and some time later (e.g., about 30 minutes), a reminder prompts the user to test, resulting in a reading of 160 mg/dL (202) that falls in the ideal zone (110).

[0029] Later, after a large meal the user tests with a reading of 268 mg/dL (203) that falls in the upper alarm zone (126). This reading causes meter 12 to generate an alarm to the user that his or her glucose is in an upper level of high concern. The user responds to the reading with an appropriate therapy and some time later (e.g. 20 minutes), a reminder prompts the user to test, resulting in a reading of 232 mg/dL (204) that falls in the upper alert zone (120). This reading causes meter 12 to generate an alert to the user that his or her glucose is in an upper level of moderate concern. The user may note that the previous therapy was appropriate and again, some time later (e.g. 30 minutes), a reminder prompts the user to test again, resulting in a reading of 156 mg/dL (205) that falls in the ideal zone (110) and confirms the previous therapy was appropriate.

[0030] Still later, after having exercised but not having eaten the user feels slightly symptomatic and tests with a reading of 61 mg/dL (206) that falls in the lower alert zone (116). This reading causes meter 12 to generate an alert to the user that his or her glucose is in a lower level of moderate concern. The user responds by eating a light meal (snack) and some time later (e.g. 25 minutes), a reminder prompts the user to test, resulting in a reading of 81 mg/dL (207) that falls in the ideal zone (110).

[0031] Yet later still, the user feels symptomatic and tests with a reading of 41 mg/dL (208) that falls in the lower alarm zone (124). This reading causes meter 12 to generate an alarm indicating that the glucose level is in a lower level of high concern. The user responds by eating a modest meal and some time later (e.g. 15 minutes), a reminder prompts the user to test, resulting in a reading of 63 mg/dL (209) that falls in the lower alert zone (116). This reading causes meter 12 to generate an alert indicating that the glucose level is now in a lower level of moderate concern. The user may note that the previous therapy (meal) was appropriate or may eat a small amount (snack) and again some time later (e.g. 25 minutes), a reminder prompts the user to test, resulting in a reading of 99 mg/dL (210) that falls in the ideal zone (110) and confirms the course of therapy was appropriate.

[0032] It should be noted that in this example, tests 201, 203, 206 and 208 were initiated by the user based on events known by the user to cause changes in blood glucose, or based on symptoms experienced by the user. More importantly, the user was prompted to perform tests 202, 204, 205, 207, 209 and 210 by a meter constructed according to aspects of the present invention. These prompts or timed reminders assist the user in performing appropriate tests in a timely manner. These tests in turn facilitate the user's important goal of keeping his or her blood glucose level in the ideal zone 110 to maintain the user's short-term and long-term health.

[0033] As for additional details pertinent to the present invention, materials and manufacturing techniques may be employed as within the level of those with skill in the relevant art. The same may hold true with respect to method-based aspects of the invention in terms of additional acts commonly or logically employed. Also, it is contemplated that any optional feature of the inventive variations described may be set forth and claimed independently, or in combination with any one or more of the features described herein. Likewise, reference to a singular item, includes the possibility that there are plural of the same items present. More specifically, as used herein and in the appended claims, the singular forms "a," "and," "said," and "the" include plural referents unless the context clearly dictates otherwise. It is further noted that the claims may be drafted to exclude any optional element. As such, this statement

is intended to serve as antecedent basis for use of such exclusive terminology as "solely," "only" and the like in connection with the recitation of claim elements, or use of a "negative" limitation. Unless defined otherwise herein, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. The breadth of the present invention is not to be limited by the subject specification, but rather only by the plain meaning of the claim terms employed.

CLAIMS

What is claimed as the invention is:

1. An analyte monitoring system comprising:

a sensor configured to make at least one individual measurement of an analyte of a living being, the sensor being operatively coupled to a meter for conveying measurement results to a user;

wherein the meter is configured to remind the user at a predetermined time to perform an additional analyte measurement with the sensor, and wherein setting of the reminder is triggered by a particular analyte measurement result.

2. The monitoring system of claim 1, wherein the meter is configured with an upper range of concern and a lower range of concern, and wherein the setting of the reminder is triggered by an analyte measurement result falling into one of the ranges of concern.

3. The monitoring system of claim 2, wherein the meter is configured with a plurality of upper ranges of concern and a plurality of lower ranges of concern, and wherein the setting of the reminder is triggered by an analyte measurement falling into one of the ranges of concern.

4. The monitoring system of claim 3, wherein the reminder is configured with at least one parameter that varies depending on which of the ranges of concern that the measurement falls into.

5. The monitoring system of claim 4, wherein the at least one parameter is selected from the group consisting of length of delay, volume, tone, duration, repetition, shape, size, orientation, location and color.

6. The monitoring system of claim 1, wherein the meter is configured with an ideal range of analyte measurement values, and wherein the setting of the reminder is triggered by an analyte measurement value falling outside of the ideal range.

7. The monitoring system of claim 1, wherein the reminder is configured with at least one parameter that varies depending on the value of the measurement result.

8. The monitoring system of claim 7, wherein the at least one parameter is selected from the group consisting of length of delay, volume, tone, duration, repetition, shape, size, orientation, location and color.

9. The monitoring system of claim 7, wherein the configuration of the at least one parameter of the reminder can be set by the user.

10. The monitoring system of claim 7, wherein the configuration of the at least one parameter of the reminder can be set by a Health Care Professional or a caregiver and locked with the use of an access code.

11. The monitoring system of claim 1, wherein the configuration of the reminder can be set by the user.

12. The monitoring system of claim 1, wherein the configuration of the reminder can be set by a caregiver and locked with the use of an access code.

13. A test kit comprising:
an analyte monitoring sensor and meter according to claim 1;
a plurality of disposable sensors; and
a lancing device for drawing blood samples.

14. The test kit of claim 13, further comprising a plurality of disposable lancets for use with the lancing device and a pouch for carrying the meter, sensors, lancing device and lancets.

15. An improved measurement system of the type having a processor for controlling measurements of a body analyte, wherein the improvement comprises:
a set of processor instructions configured to remind a user to perform a second test at a predetermined time after a first test when the first test results in a particular value.

16. The improved measurement system of claim 15, wherein the reminder is triggered when the first test results fall outside of an ideal range.

17. The improved measurement system of claim 15, wherein the reminder is triggered when the first test results fall into one of a plurality of ranges of concern.

18. A method of performing measurements of a body analyte comprising the steps of:

performing a first test of a body analyte with a meter to obtain a concentration value; and

automatically setting a reminder to perform a second test after a predetermined period of time if the value from the first test falls within a particular range of values.

19. The method of claim 18, further comprising the steps of establishing a plurality of ranges, and setting a parameter for the reminder based on which of the plurality of ranges the value falls within.

20. The method of claim 18, wherein the step of establishing a plurality of ranges is performed by a user of the meter.

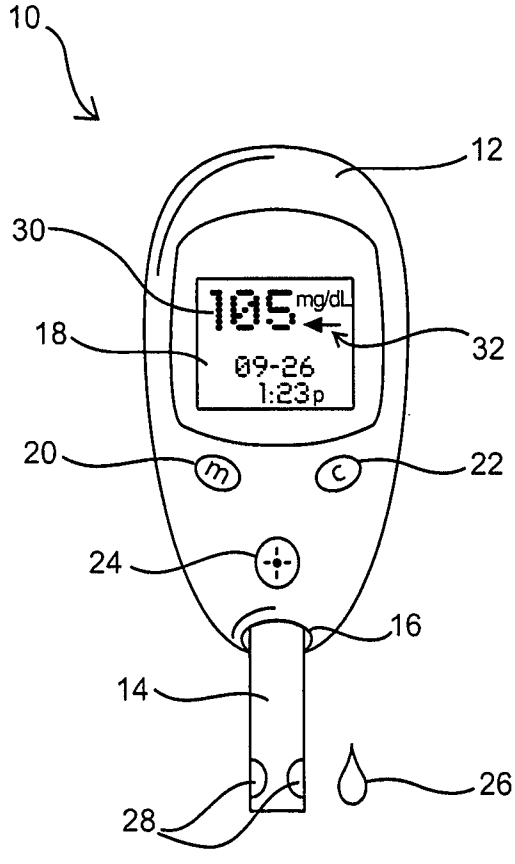
10
12
30
105 mg/dL
18
32
09-26
1:23p
20
m
c
22
24
16
14
26
28

FIG. 1

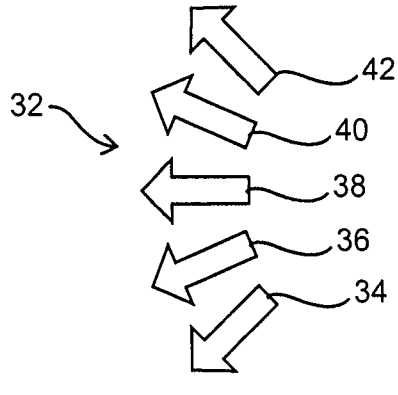
32
42
40
38
36
34

FIG. 2

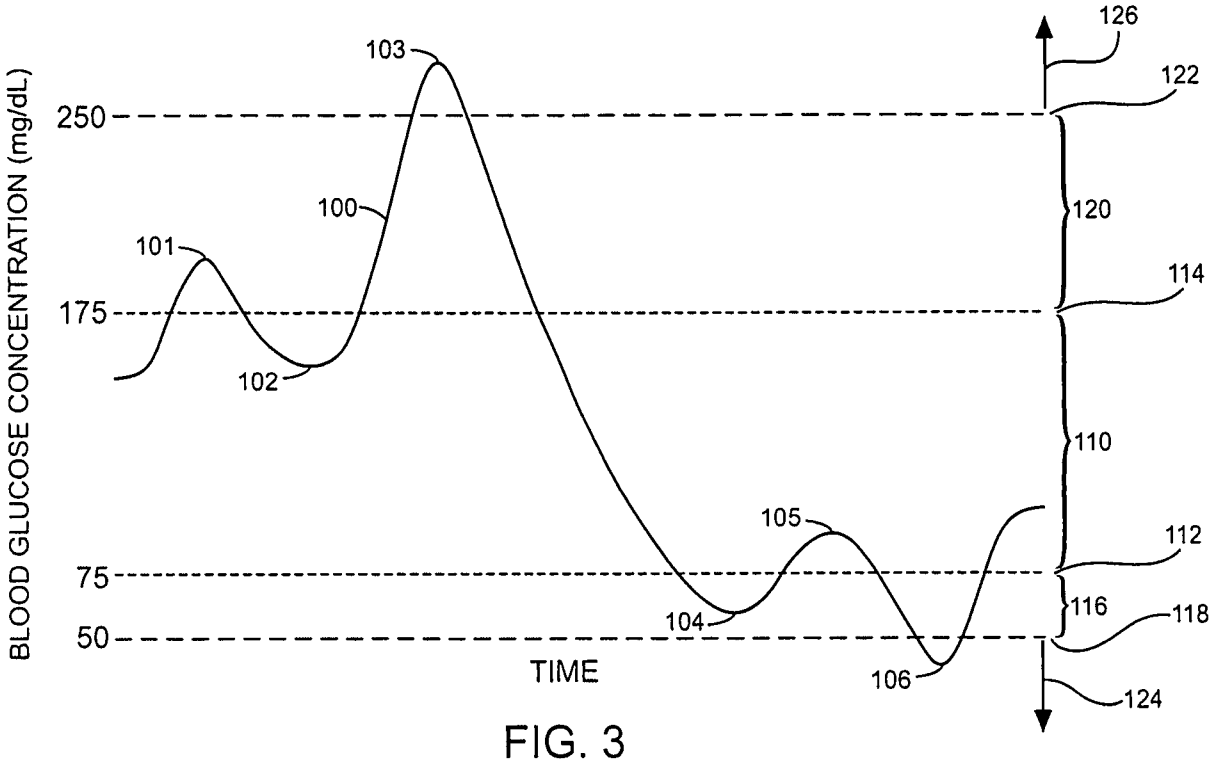
BLOOD GLUCOSE CONCENTRATION (mg/dL)
250
175
75
50
TIME
100
101
102
103
104
105
106
110
112
114
116
118
120
122
124
126

FIG. 3

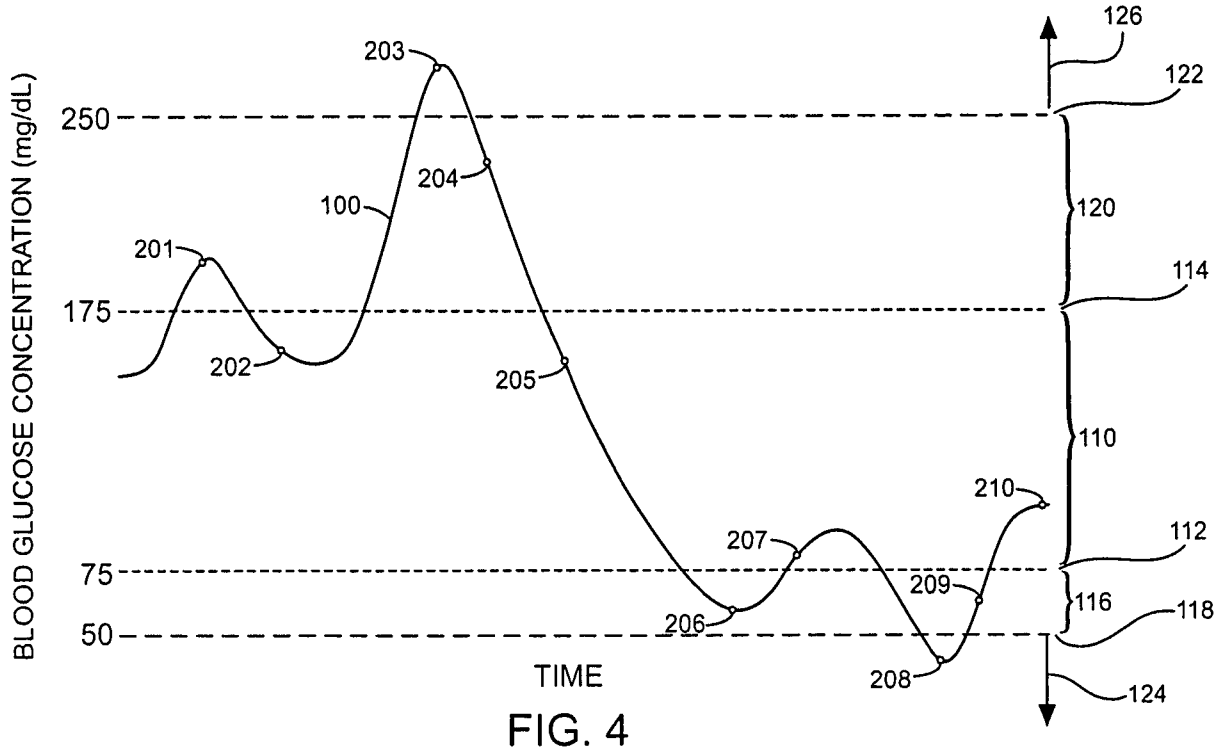
BLOOD GLUCOSE CONCENTRATION (mg/dL)
250
175
75
50
TIME
100
201
202
203
204
205
206
207
208
209
210
110
112
114
116
118
120
122
124
126

FIG. 4