Summary

It is therefore desirable to provide methods and devices which address the above-mentioned technical challenges of controlling the functionality of an analytical system using a control fluid. Specifically, methods and devices shall be proposed which overcome the need for manual recording of important information, such as expiry information of control fluids.

This problem is addressed by a method for controlling the functionality of an analytical system with the features of the independent claims. Advantageous examples which might be realized in an isolated fashion or in any arbitrary combinations are listed in the dependent claims.

As used in the following, the terms “have”, “comprise” or “include” or any arbitrary grammatical variations thereof are used in a non-exclusive way. Thus, these terms may both refer to a situation in which, besides the feature introduced by these terms, no further features are present in the entity described in this context and to a situation in which one or more further features are present. As an example, the expressions “A has B”, “A comprises B” and “A includes B” may both refer to a situation in which, besides B, no other element is present in A (i.e. a situation in which A solely and exclusively consists of B) and to a situation in which, besides B, one or more further elements are present in entity A, such as element C, elements C and D or even further elements.

Further, it shall be noted that the terms “at least one”, “one or more” or similar expressions indicating that a feature or element may be present once or more than once typically will be used only once when introducing the respective feature or element. In the following, in most cases, when referring to the respective feature or element, the expressions “at least one” or “one or more” will not be repeated, non-withstanding the fact that the respective feature or element may be present once or more than once.

Further, as used in the following, the terms "preferably", "more preferably", "particularly", "more particularly", "specifically", "more specifically" or similar terms are used in conjunction with optional features, without restricting alternative possibilities. Thus, features introduced by these terms are optional features and are not intended to restrict the scope of the claims in any way. The disclosure may, as the skilled person will recognize, be performed by using alternative features. Similarly, features introduced by "in an example of the disclosure" or similar expressions are intended to be optional features, without any restriction regarding alternative examples of the disclosure, without any restrictions regarding the

scope of the disclosure and without any restriction regarding the possibility of combining the features introduced in such way with other optional or non-optional features of the disclosure.

In an aspect of the disclosure, a method of controlling the functionality of an analytical system is disclosed, the analytical system comprising at least one analytical device for determining an analyte concentration in a sample of a bodily fluid. The analytical device is a handheld device configured for a mobile analytical measurement. The method comprises the following steps which, as an example, may be performed in the given order. It shall be noted, however, that a different order is also possible. Further, it is also possible to perform one or more of the method steps once or repeatedly. Further, it is possible to perform two or more of the method steps simultaneously or in a timely overlapping fashion. The method may comprise further method steps which are not listed.

The method further comprises:

a. providing at least one container containing at least one control fluid, the container comprising at least one identifier, wherein the identifier comprises at least one identification number of the container;
b. reading the identifier of the container by using at least one reading device of the analytical system; and
c. performing a database query in a database of the analytical system, the database containing database entries for a plurality of known containers comprising identification numbers of the known containers and assigned expiry information for the respective known containers, the database query comprising checking if the container already has a database entry in the database.

The method may specifically be performed at least half-automated or even fully-automated. Automated steps may be performed and/or initiated by a processor, a machine and/or a controller. The term “half-automated” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to a process or method comprising multiple steps or actions, wherein a part but not all of the steps or actions are performed, supported and/or initiated by a processor, a machine and/or a controller. The term “fully-automated”, also referred to as “automatically”, as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to a process or method comprising multiple steps or actions, wherein all of the steps or actions are performed, supported and/or initiated by a processor, a machine and/or a controller. Regarding step a., the container may for example

container wall and, optionally, at least one opening for removing at least a part of the content from an interior of the container. The opening, as an example, may be sealed or sealable, such as by at least one closure, e.g. a cap, a stopper, a breakable seal or the like. As an example, the container may comprise at least one of the following: a vial, a bottle, a blister, a flask, a pouch, a syringe, a bottle, a tube, a capillary container, a needle, a glass container, a plastic container. In general, the container may be formed and/or filled by a blow-mold technology in one specific example. Specifically, the container may be configured for storing at least one fluid, such as a control fluid, e.g. a control fluid having a well-defined concentration of at least one analyte. Further, the container may be configured to be closed reversibly, thereby protecting the fluid stored inside the vial from the environment outside the vial. The container may be configured to release the fluid stored inside the container in the form of drops, such as with a volume of no more than 1 ml.

The term “control fluid” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to a liquid containing at least one analyte, e.g. a control analyte, such as one or more of a solution of the analyte, a dispersion of the analyte, a re-constituted lyophilisate and/or an emulsion of the analyte, e.g. a liquid containing at least one solvent, wherein the liquid has one or more predetermined properties, e.g. a predetermined concentration of the at least one analyte. For example, the control fluid for a blood glucose measurement may comprise glucose as a control analyte dissolved in an aqueous buffer solution. The concentration of the glucose may be set to a predetermined level. Thus, the control fluid may have a known and predetermined concentration of glucose. The control fluid may further comprise additional ingredients such as one or more of a buffer, a biological salt, a preservative and/or other nonreactive ingredients. The control fluid may be used to verify the functionality of the analytical system. Therein, for verifying the functionality of the analytical system, one, or more than one control fluids may be used.

The term “identifier” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to an element or a combination of elements configured for storing one or more items of information identifying the container and/or at least one content of the container, such as in a readable fashion, specifically in a machine-readable fashion. The identifier may comprise at least one of an optical identifier, an electronic identifier, such as for example an RFID tag, a magnetic identifier

and/or a mechanical identifier. As an example, the identifier, specifically the optical identifier, may be or may comprise at least one of: a one- or two-dimensional code and/or a readable information tag, such as one or more of a barcode, specifically a one- or two-dimensional barcode, a QR code or another type of code directly or indirectly attached to the container, such as by being applied directly to the container and/or by being attached to the container via at least one label or tag. Further examples or options of the identifier will be described in detail below. The information stored in the identifier may be read using an appropriate reading device.

The at least one item of information stored by the identifier may identify one or more of the container or the content of the container. For identifying the container and/or its content, various options are feasible, as generally known to the skilled person. Thus, as an example, the at least one item of information may specifically comprise at least one identification number of the container and/or the content of the container, such as the control fluid. The term “identification number” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to one or more of an array or a sequence of numbers and/or letters encoding the identification information of a specific container. The identification number may be unique for a specific container. Thus, it may be possible to identify a specific container according to the respective identification number. The identifier may specifically encode an identification number for identifying the container or any other information related to the content of the container or the container itself, such as the container volume and/or the date of opening the container, for example.

The term “comprising at least one identifier, wherein the identifier comprises at least one identification number” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to a situation in which the identifier is comprised by at least one device or object, wherein the at least one identifier encodes at least one identification number on the object or device.

The term “reading” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to the process of retrieving at least one item of information, such as the at least one item of information stored in the identifier, such as in an electronic format. The reading may specifically take place

The method according to the present disclosure may further comprise comparing a current date with the expiry information, specifically an automated step of comparing a current date with the expiry information performed by a processor, a machine or a controller. If the comparing of the current date with the expiry information indicates that the control fluid in the container has expired, the method may comprise triggering and/or taking at least one expiry action, such as at least one action which is predefined for the case that the control fluid in the container has expired. Further, the expiry action may comprise at least one action selected from the group consisting of: providing indication to a user that the control fluid in the container has expired; displaying a warning; providing at least one electronic information indicating that the control fluid in the container has expired; preventing further use of the control fluid in the container.

However, if the comparing of the current date with the expiry information indicates that the control fluid in the container has not expired, the method may include taking at least one confirmation action, such as at least one action which is predefined for the case that the control fluid in the container has not expired. The confirmation action may comprise at least one action selected from the group consisting of: providing indication to a user that the control fluid in the container has not expired; displaying a clearance indication for the control fluid; providing at least one electronic information indicating that the control fluid in the container has not expired; allowing for further use of the control fluid in the container.

Further, the expiry action and/or the confirmation action may be provided to the user via the analytical device. The analytical device may be configured to provide information to the user via at least one interface, specifically via at least one display of the analytical device. It shall be noted that other options are also feasible. As an example, the expiry action and/or the confirmation action may also, additionally or alternatively, be brought to the user´s attention by other means, such as by audio means and/or haptic means. The method may also comprise outputting a sign, specifically a warning sign and/or a clearance indication, such as one or more of a visual warning and/or clearance indication, an audio warning and/or a clearance indication or a haptic warning and/or a clearance indication.

In case the comparing of the current date with the expiry information indicates that the control fluid in the container has not expired, the method according to the present disclosure may further comprise the following step:

d. determining the analyte concentration of the control fluid contained in the container by using the analytical device.

control solution may have altered properties and thus, can lead to a deviation of the analyte measurement.

The terms “the control fluid has expired” and “the control fluid has not expired”, respectively, as used herein, are broad terms and are to be given their ordinary and customary meaning to a person of ordinary skill in the art and are not to be limited to a special or customized meaning. The terms may specifically refer, without limitation, to a present condition of the control fluid, be it a real present condition or an assumed present condition, specifically an age of the control fluid and/or a duration of exposure of the control fluid to ambient air. Specifically, the control fluid may have expired if the current date is later than the expiry date. Further, the control fluid may have not expired if the current date is before the expiry date or equals the expiry date. Thus, an expired control fluid may have lost its predetermined properties or may be assumed to have lost its predetermined properties, specifically the predetermined level of the control analyte, and may therefore not be suitable for use as a control fluid. Consequently, a control fluid which has not expired may maintain its predetermined properties and is therefore suitable for use as a control fluid.

The term “in-use stability period” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to a maximum time period of safe use of the control fluid starting from a first opening of the container or, in case of a re-constituted lyophilisate, from the time-point of re-constitution. Specifically, the safe use of the control fluid may be established in case the control fluid is stable against a change in properties.

The term “in-use stability date” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to a numerical value indicating a day according to the calendar on which the in-use stability time period ends. The in-use stability date may be calculated by determining the end of the predetermined in-use stability period calculated from a date of first opening of the container. The date of first opening may indicate a current date of first use of the container and may be recorded in step e. of the method according to the present disclosure, as will be described in further detail below.

The term “expiry action” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special

or customized meaning. The term may specifically refer, without limitation, to an action taken by the analytical system, a processor, a machine and/or a controller related to the analytical system in the event that the comparison of the current date with the expiry information has resulted in the conclusion that the control fluid stored in the container has expired. Consequently, the term “confirmation action” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to an action taken by the analytical system in the event that the comparison of the current date with the expiry information has resulted in the conclusion that the control fluid stored in the container has not expired.

The term “user” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to a human being independent from the fact that the human being may be in healthy condition or may suffer from one or more diseases. As an example, the human being may be a patient suffering from diabetes and/or other diseases. However, the user may also be a medical trained person examining a patient suffering from diabetes and/or other diseases. Specifically, the user may be or may comprise a medical healthcare person, specifically in point-of-care applications. The user, however, may also be the patient himself or herself, specifically in homecare applications. The user may specifically be a person handling one or more of the analytical system, the analytical device, the container or the control fluid.

The method according to the present disclosure may further comprise the following step:

e. if the container does not yet have a database entry in the database, creating a new database entry for the container, the new database entry comprising the identification number of the container and assigned expiry information for the container.

Step e. may be performed and/or initiated automatically by a controller, a machine and/or a processor and may therefore be automated. The expiry information of the new database entry may comprise at least one of: an expiry date, the expiry date indicating an absolute date of expiration of the control fluid; a date of the creating of the new database entry; a date of first opening of the respective container; an in-use stability date, the in-use stability date indicating a date calculated by determining the end of a predetermined in-use stability period calculated from a date of first opening of the container.

customized meaning. The term may specifically refer, without limitation, to a device having at least one imaging element configured for recording or capturing spatially resolved one-dimensional, two-dimensional or even three-dimensional optical data or information. As an example, the camera may comprise at least one camera chip, such as at least one CCD chip and/or at least one CMOS chip configured for recording images.

The term “image” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to data recorded and/or captured by using a camera, such as a plurality of electronic readings from the imaging device, such as the pixels of the camera chip. Thus, the image may be or may comprise at least one array of information values, such as an array of grey scale values and/or color information values. The image may be a single color image or a multi-color or colored image.

The camera, besides the at least one camera chip or imaging chip, may comprise further elements, such as one or more optical elements, e.g. one or more lenses. As an example, the camera may be a fix-focus camera, having at least one lens which is fixedly adjusted with respect to the camera. Alternatively, however, the camera may also comprise one or more variable lenses which may be adjusted, automatically or manually. The disclosure specifically shall be applicable to cameras as usually used in mobile applications such as notebook computers, tablets or, specifically, cell phones such as smartphones. Thus, specifically, the camera may be part of a mobile device which, besides the at least one camera, comprises one or more data processing devices such as one or more data processors. Other cameras, however, are feasible.

The term “RFID reader” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to a device configured to read an RFID tag by using radio-frequency electromagnetic radiation. Specifically, the RFID reader may be configured to read the information stored in a RFID tag by decoding the radio-frequency signal. The RFID reader, as an example, may comprise an NFC standard communication interface or NFC reader.

As outlined above, the analytical system according to the present disclosure comprises at least one analytical device for determining an analyte concentration in a sample of a bodily fluid. The analytical system may further comprise at least one test element, the test element

For example, the test chemical may be or may comprise at least one test chemical of a diagnostic test, such as of a blood glucose test. Alternatively or additionally, the test chemical may be or may comprise at least one test chemical within an immunological test setup, such as within a urine test, an allergy test, a pregnancy test or the like.

The analytical system may further comprise at least one backbone server, the backbone server being configured for exchanging information with the analytical device. The backbone server may be configured for storing the database. Further, the analytical system may comprise a plurality of analytical devices.

The term "backbone server" as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to a device, specifically a server device, which is capable of performing one or more operations with the data to be processed. Specifically, the server may comprise at least one processor, which may be programmed, by appropriate software, for performing one or more operations with the data to be processed. Further, the backbone server may be configured for data exchange, specifically for exchanging information with the analytical device. The backbone server may also be configured to store data. As an example, the backbone server may be configured for storing the database. The backbone server may comprise at least one data interface for exchange of one or both of data or commands with the at least one analytical device and/or with further devices. The at least one data interface may be or may comprise at least one of a wire-bound or a wireless interface. The backbone server may also, fully or partially, be embodied as a cloud server device.

As already mentioned above, the method according to the present disclosure may be at least partially automated and/or computer implemented, specifically at least one of steps b., c. and optionally d. and e. as described in more detail below.

An analytical system is disclosed. The analytical system comprises:

A. at least one analytical device for determining an analyte concentration in a sample of a bodily fluid;

B. at least one reading device, the reading device being configured for reading at least one identifier of a container containing at least one control fluid, the identifier comprising at least one identification number of the container;

C. at least one database containing database entries for a plurality of known containers comprising identification numbers of the known containers and assigned expiry information for the respective known containers; and

D. at least one processor configured for performing at least one database query, the database query comprising checking if the container already has a database entry in the database.

The analytical system may further comprise the at least one container containing the at least one control fluid or may be configured for use with the at least one container. Specifically, the analytical system may be configured for performing the method according to the present disclosure and/or for being used in the method according to the present disclosure. For definitions of the features of the analytical systems and for optional features of the analytical system, reference may be made to one or more of the examples of the method as disclosed above or as disclosed in further detail below.

The term “system” as used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to an arbitrary set of interacting or interdependent components parts forming a whole. Specifically, the components may interact with each other in order to fulfill at least one common function. The at least two components may be handled independently or may be coupled or connectable. Thus, the term “analytical system” generally refers to a group of at least two elements or components which are capable of interacting in order to perform at least one analytical measurement by interacting with an arbitrary test element, specifically at least one analytical measurement of at least one analyte of the sample. The analytical system may generally also be referred to as a test element analysis system, an analytical kit, a sensor system or a measurement system. The analytical system may be an apparatus, specifically comprising at least two components.

The term “processor” as generally used herein is a broad term and is to be given its ordinary and customary meaning to a person of ordinary skill in the art and is not to be limited to a special or customized meaning. The term may specifically refer, without limitation, to an arbitrary logic circuitry configured for performing basic operations of a computer or system, and/or, generally, to a device which is configured for performing calculations or logic operations. In particular, the processor may be configured for processing basic instructions that drive the computer or system. As an example, the processor may comprise at least one arithmetic logic unit (ALU), at least one floating-point unit (FPU), such as a math co-processor

or a numeric coprocessor, a plurality of registers, specifically registers configured for supplying operands to the ALU and storing results of operations, and a memory, such as an L1 and L2 cache memory. In particular, the processor may be a multi-core processor. Specifically, the processor may be or may comprise a central processing unit (CPU). Additionally or alternatively, the processor may be or may comprise a microprocessor, thus specifically the processor's elements may be contained in one single integrated circuitry (IC) chip. Additionally or alternatively, the processor may be or may comprise one or more application-specific integrated circuits (ASICs) and/or one or more field-programmable gate arrays (FPGAs) or the like. The processor may specifically be configured, such as by software programming, for performing one or more evaluation operations.

A computer program is disclosed, the computer program comprising instructions which, when the program is executed by the analytical system according to the present disclosure, such as according to any one of the examples disclosed above and/or according to any one of the examples disclosed in further detail below, cause the analytical system to carry out at least steps b. and c. and optionally e. of the method according to the present disclosure, such as according to any one of the examples disclosed above and/or according to any one of the examples disclosed in further detail below. For the steps which are not computer-implemented or computer-implementable, the computer program may imply a prompting of the user to perform specific acts or trigger an element of the analytical system to perform and/or initiate these steps. Thus, as an example, the computer program may comprise instructions which, when executed, prompt the user to one or more of providing at least one container, i.e. for performing step a. of the method. Additionally or alternatively, the computer program may comprise instructions which, when executed, prompt the user to read the identifier of the container by using the at least one reading device of the analytical system, such as by scanning the barcode and/or the QR code. The prompting, as an example, may take place by visually displaying instructions, e.g. on a display of the analytical device, and/or by other means, such as by providing audible instructions. Step c., however, may be fully computer-implemented by the computer program, as well as, optionally, step e. of the method. Thus, the computer program may comprise instructions which, when the program is executed by the analytical system according to the present disclosure, cause the analytical system to prompt the user to perform step a., to optionally prompt the user to assist in performing step b. and, further, to automatically read the identifier, and, to carry out at least step c. automatically.

Similarly, a computer-readable storage medium is disclosed, comprising instructions which, when executed by the analytical system according to the present disclosure, such as according

to any one of the examples disclosed above and/or according to any one of the examples disclosed in further detail below, cause the analytical system to carry out at least steps b. and c. and optionally e. of the method according to the present disclosure, such as according to any one of the examples disclosed above and/or according to any one of the examples disclosed in further detail below. For the options of prompting the user to assist in some of the method steps, specifically in step a., reference is made to the description of the computer program.

As used herein, the term “computer-readable storage medium” may specifically refer to a non-transitory data storage means, such as a hardware storage medium having stored thereon computer-executable instructions. The computer-readable data carrier or storage medium may specifically be or may comprise a storage medium such as a random-access memory (RAM) and/or a read-only memory (ROM).

The computer program may also be embodied as a computer program product. As used herein, a computer program product may refer to the program as a tradable product. The product may generally exist in an arbitrary format, such as in a paper format, or on a computer-readable data carrier and/or on a computer-readable storage medium. Specifically, the computer program product may be distributed over a data network.

The methods and devices according to the present disclosure may provide a large number of advantages over similar methods and devices known in the art. Specifically, the method and devices as described herein may increase the usability of a control fluid. Thus, the method according to the present disclosure enables the analytical system to recognize and/or identify the individual container of a control fluid on the date of first use by reading out the identifier. This enables the analytical system, specifically the analytical device, to monitor the allowed time period of use of this individual control fluid after opening the respective container.

Further, the method and devices according to the present disclosure allow for an automatic recording of the date of first use of a control fluid. Therefore, the need for a manual recording the first date of use becomes obsolete. The risk of wiping the information noted on the container is avoided as well. Thus, a loss of this information is prevented by using the method according to the present disclosure.

Moreover, the method described herein ensures that the date of first use of a control fluid is recorded correctly. Further, the user´s attention will be drawn to the status of the control fluid, since the status will be brought to the user automatically via the at least one interface

of the analytical device. It is therefore no longer possible to use a control fluid with expired in-use stability.

The analytical system can hence avoid the application of outdated control material which cannot be guaranteed to serve its purpose in view of the control function of the analytical system. It may be possible that a result obtained from a control made with outdated control material is not accepted by the analytical system and only a result obtained from a control made with control material in the qualified range (e.g. by shelf life studies) will be accepted for use by the analytical system.

Summarizing and without excluding further possible examples, the following examples may be envisaged:

Example 1: A method of controlling the functionality of an analytical system, the analytical system comprising at least one analytical device for determining an analyte concentration in a sample of a bodily fluid, the method comprising:

a. providing at least one container containing at least one control fluid, the container comprising at least one identifier, wherein the identifier comprises at least one identification number of the container;
b. reading the identifier of the container by using at least one reading device of the analytical system; and
c. performing a database query in a database of the analytical system, the database containing database entries for a plurality of known containers comprising identification numbers of the known containers and assigned expiry information for the respective known containers, the database query comprising checking if the container already has a database entry in the database.

Example 2: The method according to the preceding example, wherein the identifier comprises at least one of: a bar code; a QR code; an RFID tag.

Example 3: The method according to any one of the preceding examples, wherein the identifier comprises, besides the at least one identification number of the container, at least one further item of information, the at least one further item of information being selected from the group consisting of: an item of type information providing information on the type of the control fluid; an item of kit information, the kit information providing information on a kit comprising at least one analytical test element and the control fluid; a level information, the level information providing information on a level of at least one control

analyte being comprised in the control fluid; a lot number; a shelf life; an expiration date; a date of manufacturing; a version number of code content and/or a layout; a kit type; a level type; a bottle ID; a time period of in-use stability; a target value (lot specific).

Example 4: The method according to any one of the preceding examples, further comprising comparing a current date with the expiry information, specifically an automated step of comparing a current date with the expiry information performed by a processor, a machine or a controller.

Example 5: The method according to the preceding example, wherein, if the comparing of the current date with the expiry information indicates that the control fluid in the container has expired, the method further comprises triggering and/or taking at least one expiry action.

Example 6: The method according to the preceding example, wherein the expiry action comprises at least one action selected from the group consisting of: providing indication to a user that the control fluid in the container has expired; displaying a warning; providing at least one electronic information indicating that the control fluid in the container has expired; preventing further use of the control fluid in the container.

Example 7: The method according to the preceding example, wherein, if the comparing of the current date with the expiry information indicates that the control fluid in the container has not expired, taking at least one confirmation action.

Example 8: The method according to the preceding example, wherein the confirmation action comprises at least one action selected from the group consisting of: providing indication to a user that the control fluid in the container has not expired; displaying a clearance indication for the control fluid; providing at least one electronic information indicating that the control fluid in the container has not expired; allowing for further use of the control fluid in the container.

Example 9: The method according to any one of the two preceding examples, further comprising:

d. determining the analyte concentration of the control fluid contained in the container by using the analytical device.

Example 10: The method according to any one of the preceding examples, wherein the expiry information comprises at least one of: an expiry date, the expiry date indicating an absolute date of expiration of the control fluid; an in-use stability date, the in-use stability date indicating a date calculated by determining the end of a predetermined in-use stability period calculated from a date of first opening of the container.

Example 11: The method according to any one of the preceding examples, wherein the analytical device is configured to provide information to the user via at least one interface, specifically via at least one display of the analytical device.

Example 12: The method according to any one of the preceding examples, further comprising:

e. if the container does not yet have a database entry in the database, creating a new database entry for the container, the new database entry comprising the identification number of the container and assigned expiry information for the container.

Example 13: The method according to the preceding example, wherein the expiry information of the new database entry comprises at least one of: an expiry date, the expiry date indicating an absolute date of expiration of the control fluid; a date of the creating of the new database entry; a date of first opening of the respective container; an in-use stability date, the in-use stability date indicating a date calculated by determining the end of a predetermined in-use stability period calculated from a date of first opening of the container.

Example 14: The method according to any one of the preceding examples, wherein the reading device is selected from the group consisting of: a reading device integrated into the analytical device; a reading device being separate from the analytical device, specifically an independent bar code scanner.

Example 15: The method according to the preceding example, wherein the reading device comprises at least one of a bar code scanner, a QR code scanner, a camera or an RFID reader.

Example 16: The method according to any one of the preceding examples, wherein the analytical system further comprises at least one test element, the test element comprising at least one test chemical, specifically at least one test chemical of a diagnostic test and/or at least one test chemical within an immunological test setup, wherein the test chemical is configured for performing at least one detection reaction in the presence of the analyte, wherein

the analytical device is configured for determining the analyte concentration by using the test element.

Example 17: The method according to the preceding example, wherein the test element comprises at least one test strip and/or at least one test device, such as at least one test device comprising one or more of a cartridge, a fluidic system, a sensor unit and the like, wherein the analytical device comprises at least one test strip port configured for receiving the test strip and/or at least one port of the test device.

Example 18: The method according to any one of the preceding examples, wherein the analytical system further comprises at least one backbone server, the backbone server being configured for exchanging information with the analytical device, wherein the backbone server is configured for storing the database.

Example 19: The method according to any one of the preceding examples, wherein the analytical system comprises a plurality of analytical devices.

Example 20: The method according to any one of the preceding examples, wherein the method is at least partially computer implemented, specifically at least one of steps b., c. and optionally d. and e..

Example 21: An analytical system, comprising:

A. at least one analytical device for determining an analyte concentration in a sample of a bodily fluid;

B. at least one reading device, the reading device being configured for reading at least one identifier of a container containing at least one control fluid, the identifier comprising at least one identification number of the container;

C. at least one database containing database entries for a plurality of known containers comprising identification numbers of the known containers and assigned expiry information for the respective known containers; and

D. at least one processor configured for performing at least one database query, the database query comprising checking if the container already has a database entry in the database.

Example 22: The analytical system according to the preceding example, wherein the analytical system is configured for performing the method according to any one of the preceding examples referring to a method.

Example 23: A computer program comprising instructions which, when the program is executed by the analytical system according to any one of the preceding examples referring to an analytical system, cause the analytical system to carry out at least steps b. and c. and optionally d. and/or e. of the method according to any one of the preceding examples referring to a method.

Example 24: A computer-readable storage medium comprising instructions which, when executed by the analytical system according to any one of the preceding examples referring to an analytical system, cause the analytical system to carry out at least steps b. and c. and optionally d. and/or e. of the method according to any one of the preceding examples referring to a method.

Short description of the Figures

Further optional features and embodiments will be disclosed in more detail in the subsequent description of embodiments, preferably in conjunction with the dependent claims. Therein, the respective optional features may be realized in an isolated fashion as well as in any arbitrary feasible combination, as the skilled person will realize. The scope of the invention is not restricted by the preferred embodiments. The embodiments are schematically depicted in the Figures. Therein, identical reference numbers in these Figures refer to identical or functionally comparable elements.

In the Figures:

Figure 1 shows embodiments of an analytical system, an analytical device and a container in a schematic view; and

Figure 2 shows a flow chart of an embodiment of a method for controlling the functionality of an analytical system.

Detailed description of the embodiments

In Figure 1, embodiments of an analytical system 110, an analytical device 112 and a container 114 are shown in a schematic view. The analytical system 110 comprises the at least one analytical device 112, which is configured for determining an analyte concentration in a sample of a bodily fluid. The analytical system 110 further comprises at least one reading