

TRACKING AND DELIVERY CONFIRMATION OF PHARMACEUTICAL PRODUCTS

INVENTORS: Todd Thompson, Lawrence Arne, Fataneh Omidvar, Yashar Behzadi,
Robert Duck, Lorenzo DiCarlo, Gregory Moon

5

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Patent Application No. 61/346,035 entitled "Tracking and Delivery Confirmation of Pharmaceutical Products" and filed on May 19, 2010, which is herein entirely incorporated by reference.

10

FIELD OF THE INVENTION

The present invention is related to electronic systems for tracking products from manufacturer to consumer and, more specifically, to multiple devices including a mobile communication unit and an identifiable tag that is associated with a pharmaceutical product to confirm source of the dosage, the proper type and amount of dose, and delivery to the patient.

15

INTRODUCTION

In many instances there is a need for tracking pharmaceutical products from the manufacturer to the patient. In so doing, the provider or dispenser of the pharmaceutical products is able to confirm that the pharmaceutical products come from a reliable source and that the pharmaceutical products are not counterfeit. Additionally, in many remote areas, where access to medical facilities is limited, it is often the case wherein the provider is not able to read or understand information provided on the label. In such situations, the provider needs a simple and effective way to identify the patient and determine what medication should be delivered, especially when there are various medications from which to choose.

20

25

30

Thus, what is needed is a system and method that can track pharmaceutical products from the manufacturer along the supply chain to the patient as well as confirm actual delivery of the pharmaceutical products to the patient.

SUMMARY

35

~~Embodiments of the present invention disclose~~ a system for tracking pharmaceutical products from manufacturer to the patient. ~~Embodiments of the present invention also include~~ systems for confirming delivery of the pharmaceutical products to the patient; the delivery confirmation includes systems and methods for confirming delivery of the right dose and the correct quantity. ~~Embodiments of the present invention include~~ systems that include circuitry and components that can function

within certain environments that include a conducting fluid. One example of such an environment is outside or inside a container that houses the conducting fluid, such as a sealed bag with a solution, which includes an IV bag. Another example is within the body of a living organism, such as an animal or a human. According to various embodiment aspects of the present invention, part of the system is ingestible or injectible and, hence, can be taken by
5 or injected to or inhaled by the patient.

In one aspect, a computer system is provided to track a medication from manufacturer to a patient, to enable a care provider to determine the origin of the medication and to confirm that at least one of the right type and the right dosage of the medication was delivered to the patient. The computer system comprising: a processor
10 operative to: receive a unique identity of an identifier device secured to a dosage of medication, wherein the identifier device comprises the unique identity that is associated with at least one of the manufacturer and the medication; receive information from a patient interface device in communication with the computer and the patient, wherein at the time
15 the patient takes the medication, the patient interface device is operative to detect the unique identity associated with the identifier device and confirm delivery of the medication to the patient; and receive the detected unique identity associated with the identifier device detected via the patient interface device and the confirmation of delivery of the medication to the patient via the patient interface device; wherein the processor is operative to confirm
20 the origin of the medication and the type of the medication based at least on the unique identity of the identifier device.

In another aspectembodiment of the computer system, the processor is operative to interrogate the identifier device.

In another aspectembodiment of the computer system, the identifier device comprises a tag
25 provided with circuitry, wherein the tag is secured to the dosage of the medication, and wherein the processor is operative to read the unique identity from the tag.

In another aspectembodiment of the computer system, the tag is secured to a dosage of medication in the form of a pill.

In another aspectembodiment of the computer system, the tag is secured to a syringe configured
30 for delivery of the dosage of medication, wherein the syringe comprises a safety component which is activated upon exposure to air.

In another aspectembodiment of the computer system, the syringe comprises a needle and wherein the needle comprises at least one contact point coupled to the tag.

In another aspectembodiment of the computer system, the processor is operative to
35 communicate with a datacenter database to at least one of retrieve medical information

about the patient and provide information related to the medication to be administered to the patient.

In another aspectembodiment of the computer system, the processor is operative to: communicate with at least one of a database or a processing system at the datacenter;
5 transmit information to the processing system; receive information from the processing system, wherein the processing system is operative to access the information in the database of the data center and provide the information to the patient through the computer.

In another aspectembodiment of the computer system, the processor is operative to validate at
10 least one of the type and dosage selected by the care provider prior to dispensing the medication to the patient.

In another aspectembodiment of the computer system, the processor is operative to communicate with an interrogation unit coupled to the identifier device, wherein the interrogation unit is operative to interrogate the identifier device secured to the medication
15 and receive the unique identity of the identifier device to confirm the origin of the medication and the type of the medication, wherein the computer is operative to interrogate the interrogation unit and receive the unique identity of the identifier from the interrogation unit.

In another aspectembodiment of the computer system, the processor is operative to: communicate with a memory of the interrogation unit; and receive the unique identity of the
20 identifier stored in the memory of the interrogation unit.

In another aspectembodiment of the computer system, the processor is operative to receive biometric parameters from the patient interface device, wherein the biometric parameters can identify the patient.

In another aspectembodiment of the computer system, the processor is operative to receive an
25 image of the patient captured by a camera on the patient interface device.

In another aspectembodiment of the computer system, a display provides information associated with the patient, wherein the information comprises any of an image of the patient, medical history of the patient, and a next type and dose of medication to deliver to the patient.

In one aspect, a computer-implemented method is provided to track a medication
30 from manufacturer to a patient, to enable a care provider to determine the origin of the medication and to confirm that at least one of the right type and the right dosage of medication was delivered to the patient, the computer comprising a processor. The method comprising: receiving by the processor a unique identity of the identifier device secured to a dosage of medication, wherein the identifier device comprises the unique identity that is
35 associated with at least one of the manufacturer and the medication; receiving by the processor information from a patient interface device in communication with the computer

and the patient, wherein at the time the patient takes the medication, the patient interface device is operative to detect the unique identity associated with the identifier device and confirm delivery of the medication to the patient; receiving by the processor the detected unique identity associated with the identifier device detected from the patient interface
5 device and the confirmation of delivery of the medication to the patient from the patient interface device; and confirming the origin of the medication and the type of the medication based at least on the unique identity of the identifier device.

In another aspectembodiment, the computer-implemented method comprises interrogating by the processor the identifier device.

10 In another, the computer-implemented method comprises receiving by the processor the unique identity from a tag, wherein the identifier device comprises the tag provided with circuitry, wherein the tag is secured to the dosage of the medication, the method.

In another aspectembodiment, the computer-implemented method comprises receiving by the
15 processor the unique identity from the tag, wherein the tag is secured to a dosage of medication in the form of a pill.

In another aspectembodiment, the computer-implemented method comprises receiving by the processor the unique identity from the tag, wherein the tag is secured to a syringe configured for delivery of the dosage of medication, wherein the syringe comprises a safety
20 component which is activated upon exposure to air.

In another aspectembodiment, the computer-implemented method comprises receiving by the processor the unique identity from the tag, wherein the syringe comprises a needle, and wherein the needle comprises at least one contact point coupled to the tag.

In another aspectembodiment, the computer-implemented method comprises at least one of:
25 retrieving by the processor medical information about the patient from a datacenter database; and providing by the processor information related to the medication to be administered to the patient.

In another aspectembodiment, the computer-implemented method comprises transmitting by the processor information to the processing system; receiving by the processor information
30 from the processing system, wherein the processing system is operative to access the information in the database of the data center and provide the information to the patient through the computer.

In another aspectembodiment, the computer-implemented method comprises validating by the processor at least one of the type and dosage selected by the care provider prior to
35 dispensing the medication to the patient.

In another ~~aspect~~embodiment, the computer-implemented method comprises interrogating by the processor operative an interrogation unit coupled to the identifier device, wherein the interrogation unit is operative to interrogate the identifier device secured to a medication and receive the unique identity of the identifier device to confirm the origin of the medication and the type of the medication; and receiving by the computer the unique identity of the identifier from the interrogation unit.

In another ~~aspect~~embodiment, the computer-implemented method comprises communicating by the processor with a memory of the interrogation unit; and receiving by the processor the unique identity of the identifier stored in the memory of the interrogation unit.

In another ~~aspect~~embodiment, the computer-implemented method comprises receiving by the processor biometric parameters from the patient interface device, wherein the biometric parameters can identify the patient.

In another ~~aspect~~embodiment, the computer-implemented method comprises receiving by the processor an image of the patient captured by a camera on the patient interface device.

In another ~~aspect~~embodiment, the computer-implemented method comprises displaying on a display coupled to the processor information associated with the patient, wherein the information comprises any of an image of the patient, medical history of the patient, and a next type and dose of medication to deliver to the patient.

In an embodiment~~one aspect~~, an apparatus is provided. The apparatus comprising: at least one contact point configured to electrically engage an identifier device secured to a medication, wherein the identifier device comprises a unique identity that is associated with at least one of the manufacturer and the medication; an interrogation unit coupled to the at least one contact point, wherein the interrogation unit is operative to interrogate the identifier device to obtain the unique identity; and a communication module coupled to the interrogation unit, wherein the communication module is operative to transmit the unique identification.

In another embodiment~~aspect~~ of the apparatus, the interrogation unit is operative to read the unique identity associated with the identifier device.

In another embodiment~~aspect~~, the communication module is operative to transmit the unique identity associated with the identifier device to a computer in communication with the communication module.

In another embodiment~~aspect~~ of the apparatus, the apparatus comprises a memory coupled to the interrogation unit to store the unique identity associated with the identifier device.

In one another aspect, an apparatus is provided. The apparatus comprising at least one contact point configured to electrically engage an identifier device secured to a medication, wherein the identifier device comprises a unique identity that is associated with at least one of the manufacturer and the medication; an interrogation unit coupled to the at least one contact point, wherein the interrogation unit is operative to interrogate the identifier device to obtain the unique identity; and a communication module coupled to the interrogation unit, wherein the communication module is operative to transmit the unique identification wherein the interrogation unit is operative to read the unique identity from a tag provided with circuitry, wherein the tag is secured to the dosage of the medication.,

~~wherein~~ ~~In another aspect of the apparatus,~~ the interrogation unit is operative to read the unique identity from the tag, wherein the tag is secured to a dosage of medication in the form of a pill.

~~In oneanother aspect of the apparatus,~~ there is provided an apparatus. The apparatus comprising at least one contact point configured to electrically engage an identifier device secured to a medication, wherein the identifier device comprises a unique identity that is associated with at least one of the manufacturer and the medication; an interrogation unit coupled to the at least one contact point, wherein the interrogation unit is operative to interrogate the identifier device to obtain the unique identity; and a communication module coupled to the interrogation unit, wherein the communication module is operative to transmit the unique identification wherein the interrogation unit is operative to read the unique identity from a tag provided with circuitry, wherein the tag is secured to the dosage of the medication wherein, the interrogation unit is operative to read the unique identity from the tag, wherein the tag is secured to a syringe configured for delivery of the dosage of medication, wherein the syringe comprises a safety component which is activated upon exposure to air.

In another ~~embodiment~~aspect of the apparatus, the interrogation unit is operative to read the unique identity from the tag, wherein the syringe comprises a needle and wherein the needle comprises at least one contact point coupled to the tag.

In an ~~embodiment~~one aspect, a method is provided. The method comprising: electrically engaging by an interrogation unit an identifier device secured to a medication with at least one contact point coupled to the interrogation unit, wherein the identifier device comprises a unique identity that is associated with at least one of the manufacturer and the medication; interrogating the identifier device for the unique identity; and transmitting the unique identification by a communication module coupled to the interrogation unit.

In another ~~embodiment~~aspect, the method comprises reading by the interrogation unit the unique identity associated with the identifier device.

In another ~~embodiment~~aspect, the method comprises transmitting by the communication module the unique identity associated with the identifier device to a computer in communication with the communication module.

In another ~~embodiment~~aspect, the method comprises storing by the interrogation unit the unique identity associated with the identifier device in a memory, wherein the memory is coupled to the interrogation unit.

In another ~~embodiment~~aspect, the method comprises receiving by the interrogation unit the unique identity from a tag, wherein the identifier device comprises the tag provided with circuitry, wherein the tag is secured to the dosage of the medication.

~~In oneanother aspect,~~ a method is provided. ~~The method comprises~~electrically engaging by an interrogation unit an identifier device secured to a medication with at least one contact point coupled to the interrogation unit, wherein the identifier device comprises a unique identity that is associated with at least one of the manufacturer and the medication; interrogating the identifier device for the unique identity; and transmitting the unique identification by a communication module coupled to the interrogation unit further comprising receiving by the interrogation unit the

unique identity from the tag, wherein the tag is secured to a syringe configured for delivery of the dosage of medication, wherein the syringe comprises a safety component which is activated upon exposure to air.

In ~~one another~~ aspect, a method is provided. The method comprises electrically engaging by an interrogation unit an identifier device secured to a medication with at least one contact point coupled to the interrogation unit, wherein the identifier device comprises a unique identity that is associated with at least one of the manufacturer and the medication; interrogating the identifier device for the unique identity; and transmitting the unique identification by a communication module coupled to the interrogation unit further comprising receiving by the interrogation unit the

unique identity from the tag, wherein the tag is secured to a syringe configured for delivery of the dosage of medication, wherein the syringe comprises a safety component which is activated upon exposure to air.

In ~~one another~~ aspect, a method is provided. The method comprises electrically engaging by an interrogation unit an identifier device secured to a medication with at least one contact point coupled to the interrogation unit, wherein the identifier device comprises a unique identity that is associated with at least one of the manufacturer and the medication; interrogating the identifier device for the unique identity; and transmitting the unique identification by a communication module coupled to the interrogation unit further comprising receiving by the interrogation unit the
unique identity from the tag, wherein the syringe comprises a needle, and wherein the needle comprises at least one contact point coupled to the tag.

In one aspect, a patient interface device is provided. The patient interface comprising: a housing defining an outer surface, wherein the housing is configured to be held by a patient; at least one contact point exposed on the outer surface portion of the housing, wherein the at least one contact point is positioned to be physically contacted by the patient to detect biometric information associated with the patient, wherein the at least one contact point is configured to detect at least one physiological parameter associated with the patient; a control module coupled to the at least one contact point, wherein the at least one contact point is coupled to the control module to capture the at least one physiological parameter associated with the patient; and a communication module coupled to the control unit to transmit the at least one physiological parameter to a computer in communication with the communication module-, further comprising an image generation unit to capture an image of the patient, wherein the image generation unit is coupled to the control module and is configured to capture the image of the patient and to transmit the captured image to the control module.

In another ~~embodiment~~ aspect of the patient interface device, the patient interface device comprises a power source coupled to the control module.

~~In another aspect of the patient interface device, the patient interface device comprises an image generation unit to capture an image of the patient, wherein the image generation unit is coupled to the control module and is configured to capture the image of the patient and to transmit the captured image to the control module.~~

In another ~~embodiment~~ aspect of the patient interface device, the control module is operative to activate the image generation unit to capture the image of the patient when the contact point detects there is a change in the physiological parameter of the patient during the time the patient is in contact with the contact point and when the control module detects a current flow through the patient.

In one aspect, a method is provided. The method comprising: contacting by a patient at least one contact point exposed on an outer surface portion of a housing, wherein the at least one contact point is positioned to be physically contacted by the patient to detect biometric information associated with the patient, wherein the at least one contact point is configured to detect at least one physiological parameter associated with the patient; capturing by a control module coupled to the at least one contact point at least one physiological parameter associated with the patient; and transmitting by a communication module coupled to the control unit the at least one physiological parameter to a computer in communication with the communication module-, further comprising

~~In another aspect, the method comprises scanning by the at least contact point a fingerprint associated with the patient; confirming by the control module fingerprint information.~~

5 In another embodiment aspect, the method comprises capturing an image of the patient by an image generation unit, wherein the image generation unit is coupled to the control module; and transmitting by the image generation unit the captured image of the patient to the control module.

10 In another embodiment aspect, the method comprises activating by the control module the image generation unit to capture the image of the patient when the contact point detects there is a change in the physiological parameter of the patient during the time the patient is in contact with the contact point and when the control module detects a current flow through the patient.

15 In another embodiment aspect, a patient interface device is provided. The patient interface device comprising: a housing defining an outer surface, wherein the housing is configured to held by a patient; at least one contact point exposed on the outer surface portion of the housing, wherein the at least one contact point is positioned to be physically contacted by the patient to detect biometric information associated with the patient, wherein the at least one contact point is configured to detect at least one physiological parameter associated with the patient; a control module coupled to the at least one contact point, wherein the at least one contact point is coupled to the control module to capture the at least one physiological parameter associated with the patient; and a communication module coupled to the control unit to transmit the at least one physiological parameter to a computer in communication with the communication module.

25 In another embodiment aspect, the patient interface device comprises a power source coupled to the control module.

In another embodiment aspect, the patient interface device comprises an image generation unit to capture an image of the patient, wherein the image generation unit is coupled to the control module and is configured to capture the image of the patient and to transmit the captured image to the control module.

30 In another embodiment aspect of the patient interface device, the control module is operative to activate the image generation unit to capture the image of the patient when the contact point detects there is a change in the physiological parameter of the patient during the time the patient is in contact with the contact point and when the control module detects a current flow through the patient.

35 In one aspect, a method is provided. The method comprising: contacting by a patient at least one contact point exposed on an outer surface portion of a housing, wherein

the at least one contact point is positioned to be physically contacted by the patient to detect biometric information associated with the patient, wherein the at least one contact point is configured to detect at least one physiological parameter associated with the patient; capturing by a control module coupled to the at least one contact point at least one physiological parameter associated with the patient; and transmitting by a communication module coupled to the control unit the at least one physiological parameter to a computer in communication with the communication module; further comprising capturing an image of the patient by an image generation unit, wherein the image generation unit is coupled to the control module; and transmitting by the image generation unit the captured image of the patient to the control module.

In another ~~embodiment~~aspect, the method comprises scanning by the at least contact point a fingerprint associated with the patient; confirming by the control module fingerprint information.

~~In another aspect, the method comprises capturing an image of the patient by an image generation unit, wherein the image generation unit is coupled to the control module; and transmitting by the image generation unit the captured image of the patient to the control module.~~

In another ~~embodiment~~aspect, the method comprises activating by the control module the image generation unit to capture the image of the patient when the contact point detects there is a change in the physiological parameter of the patient during the time the patient is in contact with the contact point and when the control module detects a current flow through the patient.

Notwithstanding the claims and the above aspects of the present invention, in various other aspects, the present invention also may be defined by the following clauses:

1. A computer system to track medication from manufacturer to a patient, to enable a care provider to determine the origin of the medication and to confirm that at least one of the right type and the right dosage of medication was delivered to the patient, the computer system comprising:

a processor operative to:

receive a unique identity of an identifier device secured to a dosage of medication to confirm the origin of the medication and the type of the medication, wherein the identifier device comprises the unique identity that is associated with at least one of the manufacturer and the medication;

receive information from a patient interface device in communication with the computer and the patient, wherein at the time the patient takes the medication, the patient interface device is operative to detect the unique identity associated with the identifier device and confirm delivery of the medication to the patient; and