while the medical device is administering the medication to the patient, an identifier message including the device identifier and at least one of the patient identifier or the medication order identifier, and creating an association between the EMR of the patient and the medical device by matching the patient identifier or the medication order identifier of the identifier message to the medication order identifier or the patient identifier of the medication order. Additionally, the operations include receiving, at a second time that is after the association between the EMR of the patient and the medical device, second medical device data from the medical device, the second medical device data including the device identifier. The operations moreover include storing the second medical device data to the EMR of the patient based on the created association between the EMR of the patient and the medical device. The first medical device data and the second medical device data can include at least one of device operating parameters, treatment progress data, alarm/alert data, event data, or diagnostic information.

[0007] In accordance with a second aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the server is configured to create the association between the EMR of the patient and the medical device by at least one of storing the device identifier and at least one of the patient identifier or the medication order identifier to an entry of an association record, storing the device identifier to the EMR of the patient, or storing the device identifier to the medication order of the patient.

[0008] In accordance with a third aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the server is configured to, after the association between the EMR of the patient and the medical device is created, store the first medical device data to the EMR of the patient.

[0009] In accordance with a fourth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the server is configured to, cause at least one of the unassociated record or the first medical device data to be deleted from the database.

[0010] In accordance with a fifth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the device identifier of the identifier message is determined by scanning while the medical device is administering the medication to the patient, via a bar code scanner, at least one of alpha-numeric characters, a barcode, or a quick-response ("QR") code.

[0011] In accordance with a sixth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the server is configured to receive the identifier message from the bar code scanner or a computer on wheels connected to the bar code scanner.

[0012] In accordance with a seventh aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the electronic medical record system further includes a gateway communicatively coupled to the medical device and the server via the network. The gateway is configured to receive the medical device data from the medical device in an INTCOM or EXTCOM format, convert the medical device data into an HL7 format, and transmit the formatted medical device data to the server.

[0013] In accordance with an eighth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the unassociated record is indexed in the database by the device identifier.

[0014] In accordance with a ninth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the medical device includes at least one of an infusion pump or a renal failure therapy machine.

[0015] In accordance with a tenth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, an electronic medical record method includes storing, via a processor, to an electronic medical record ("EMR") in a database, a medication order of a patient, the medication order including a medication order identifier and a patient identifier, receiving, in the processor, first medical device data from a medical device via a network, the first medical device data including a device identifier of the medical device, storing, via the processor, the first medical device data to an unassociated record in the database after determining that there is no association between the device identifier and any patient identifier or medication order identifier, receiving, in the processor while the medical device is administering the medication to the patient, an identifier message including the device identifier and at least one of the patient identifier or the medication order identifier, creating, via the processor, an association between the EMR of the patient and the medical device using the identifier message, receiving, in the processor, after the association between the EMR of the patient and the medical device, second medical device data from the medical device, the second medical device data including the device identifier, and storing, via the processor, the second medical device data to the EMR of the patient based on the created association

between the EMR of the patient and the medical device. The first medical device data and the second medical device data can include at least one of device operating parameters, treatment progress data, alarm/alert data, event data, or diagnostic information.

[0016] In accordance with an eleventh aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the method further includes after the association between the EMR of the patient and the medical device is created, storing the first medical device data to the EMR of the patient.

[0017] In accordance with a twelfth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the method further includes while the medical device is administering the medication to the patient, receiving at an interface of the medical device, an operator input for displaying the device identifier, and causing, via the medical device, the device identifier to be displayed on a screen of the medical device.

[0018] In accordance with a thirteenth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the device identifier is displayed via at least one of alpha-numeric characters, a barcode, or a quick-response ("QR") code.

[0019] In accordance with a fourteenth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the method further includes receiving, in a bar code scanner, first information that is indicative of the device identifier from reading the device identifier displayed on the screen of the medical device;, receiving, in a bar code scanner, second information that is indicative of the patient identifier from reading the patient identifier provided on a patient wrist band, creating, via a computer connected to the bar code scanner, the identifier message, and transmitting, via the computer, the identifier message to the processor via the network.

[0020] In accordance with a fifteenth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the method further includes receiving, in the processor, the medication order in at least one HL7 message from a pharmacy server, and storing, via the processor, the medication order to the EMR of the patient using the patient identifier for association between the EMR of the patient and the medication order.

[0021] In accordance with a sixteenth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the medication order includes at least one of a medication name, a volume to be infused, a medication concentration, or a medication delivery rate.

[0022] In accordance with a seventeenth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the device identifier in the identifier message is encrypted, further comprising decrypting, via the processor the device identifier using a stored key.

[0023] In accordance with an eighteenth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, an electronic medical record memory stores machine-readable code or instructions, that when executed by a processor, cause the processor to receive, while an infusion pump is administering a medication to a patient, an identifier message including a device identifier of the infusion pump, and at least one of a patient identifier of the patient or a medication order identifier of a medication, create an association between an EMR of the patient located in a database and the infusion pump using the identifier message, receive after the association between the EMR of the patient and the infusion pump, infusion pump data from the infusion pump, the infusion pump data including the device identifier, and store the infusion pump device data to the EMR of the patient based on the created association between the EMR of the patient and the infusion pump. The first medical device data and the second medical device data can include at least one of device operating parameters, treatment progress data, alarm/alert data, event data, or diagnostic information.

[0024] In accordance with a nineteenth aspect of the present disclosure, which may be used in combination with any other aspect listed herein unless stated otherwise, the electronic medical record memory stores further machine-readable code or instructions, that when executed by the processor, cause the processor to receive first infusion pump device data before the association between the EMR of the patient and the infusion pump, and store the first medical device data to an unassociated record in the database after determining that there is no association between the device identifier and any patient identifier or medication order identifier.

CLAIMS

Claim 1: An electronic medical record system comprising:

a database stored in a memory device, the database configured to store a medication order to an electronic medical record ("EMR") of a patient, the medication order including a medication order identifier and a patient identifier of the patient, the EMR of the patient including the patient identifier; and

a server communicatively coupled to the database and a memory storing machine-readable code or instructions, that when executed by a processor of the server, cause the server to:

receive first medical device data from a medical device via a network, the first medical device data including a device identifier of the medical device,

determine, at a first time, there is no association between the device identifier and any patient identifier or medication order identifier and store the first medical device data to an unassociated record in the database,

receive, while the medical device is administering the medication to the patient, an identifier message including the device identifier and at least one of the patient identifier or the medication order identifier,

create an association between the EMR of the patient and the medical device by matching the patient identifier or the medication order identifier of the identifier message to the medication order identifier or the patient identifier of the medication order,

receive, at a second time that is after the association between the EMR of the patient and the medical device, second medical device data from the medical device, the second medical device data including the device identifier, and

store the second medical device data to the EMR of the patient based on the created association between the EMR of the patient and the medical device,

wherein the first medical device data and the second medical device data include at least one of device operating parameters, treatment progress data, alarm/alert data, event data, or diagnostic information.

Claim 2: The system of Claim 1, wherein the server is configured to create the association between the EMR of the patient and the medical device by at least one of:

storing the device identifier and at least one of the patient identifier or the medication order identifier to an entry of an association record;

storing the device identifier to the EMR of the patient; or

storing the device identifier to the medication order of the patient.

Claim 3: The system of Claim 1, wherein the server is configured to, after the association between the EMR of the patient and the medical device is created, store the first medical device data to the EMR of the patient.

Claim 4: The system of Claim 3, wherein the server is configured to, cause at least one of the unassociated record or the first medical device data to be deleted from the database.

Claim 5: The system of Claim 1, wherein the device identifier of the identifier message is determined by scanning while the medical device is administering the medication to the patient, via a bar code scanner, at least one of alpha-numeric characters, a barcode, or a quick-response ("QR") code.

Claim 6: The system of Claim 5, wherein the server is configured to receive the identifier message from the bar code scanner or a computer on wheels connected to the bar code scanner.

Claim 7: The system of Claim 1, further comprising a gateway communicatively coupled to the medical device and the server via the network, the gateway configured to:

receive the medical device data from the medical device in an INTCOM or EXTCOM format;

convert the medical device data into an HL7 format; and

transmit the formatted medical device data to the server.

Claim 8: The system of Claim 1, wherein the unassociated record is indexed in the database by the device identifier.

Claim 9: The system of Claim 1, wherein the medical device includes at least one of an infusion pump or a renal failure therapy machine.

Claim 10: An electronic medical record storage method comprising:

storing, via a processor, to an electronic medical record ("EMR") in a database, a medication order of a patient, the medication order including a medication order identifier and a patient identifier;

receiving, in the processor, first medical device data from a medical device via a network, the first medical device data including a device identifier of the medical device;

storing, via the processor, the first medical device data to an unassociated record in the database after determining that there is no association between the device identifier and any patient identifier or medication order identifier;

receiving, in the processor while the medical device is administering the medication to the patient, an identifier message including the device identifier and at least one of the patient identifier or the medication order identifier;

creating, via the processor, an association between the EMR of the patient and the medical device using the identifier message;

receiving, in the processor, after the association between the EMR of the patient and the medical device, second medical device data from the medical device, the second medical device data including the device identifier; and

storing, via the processor, the second medical device data to the EMR of the patient based on the created association between the EMR of the patient and the medical device,

wherein the first medical device data and the second medical device data include at least one of device operating parameters, treatment progress data, alarm/alert data, event data, or diagnostic information.

Claim 11: The method of Claim 10, further comprising, after the association between the EMR of the patient and the medical device is created, storing the first medical device data to the EMR of the patient.

Claim 12: The method of Claim 10, further comprising:

while the medical device is administering the medication to the patient, receiving at an interface of the medical device, an operator input for displaying the device identifier; and

causing, via the medical device, the device identifier to be displayed on a screen of the medical device.

Claim 13: The method of Claim 12, wherein the device identifier is displayed via at least one of alpha-numeric characters, a barcode, or a quick-response ("QR") code.

Claim 14: The method of Claim 12, further comprising:

receiving, in a bar code scanner, first information that is indicative of the device identifier from reading the device identifier displayed on the screen of the medical device;

receiving, in a bar code scanner, second information that is indicative of the patient identifier from reading the patient identifier provided on a patient wrist band;

creating, via a computer connected to the bar code scanner, the identifier message; and

transmitting, via the computer, the identifier message to the processor via the network.

Claim 15: The method of Claim 10, further comprising:

receiving, in the processor, the medication order in at least one HL7 message from a pharmacy server; and

storing, via the processor, the medication order to the EMR of the patient using the patient identifier for association between the EMR of the patient and the medication order.

Claim 16: The method of Claim 10, wherein the medication order includes at least one of a medication name, a volume to be infused, a medication concentration, or a medication delivery rate.

Claim 17: The method of Claim 10, wherein the device identifier in the identifier message is encrypted, further comprising decrypting, via the processor the device identifier using a stored key.

Claim 18: An electronic medical record memory storing machine-readable code or instructions, that when executed by a processor, cause the processor to:

receive, while an infusion pump is administering a medication to a patient, first infusion pump device data before an association is made between an electronic medical record ("EMR") of the patient and the infusion pump, the first infusion pump device data including a device identifier of the infusion pump, the EMR of the patient including a medication order identifier and a patient identifier;

store the first infusion pump device data to an unassociated record in a database after determining that there is no association between the EMR of the patient and the infusion pump;

receive, while the infusion pump is administering the medication to the patient, an identifier message including the device identifier of the infusion pump and at least one of the patient identifier of the patient or the medication order identifier of the medication being administered by the infusion pump;

create an association between the EMR of the patient located in the database and the infusion pump using the identifier message;

receive after the association between the EMR of the patient and the infusion pump, second infusion pump device data from the infusion pump, the second infusion pump device data including the device identifier; and

store the second infusion pump device data to the EMR of the patient based on the created association between the EMR of the patient and the infusion pump,

wherein the first and the second infusion pump device data includes at least one of device operating parameters, treatment progress data, alarm/alert data, event data, or diagnostic information.

Claim 19: An electronic medical record memory of Claim 18, storing further machine-readable code or instructions, that when executed by the processor, cause the processor to, after the association between the EMR of the patient and the infusion pump is created, store the first infusion pump device data to the EMR of the patient.