

SUMMARY OF THE INVENTION

[009a] According to a first aspect of the present invention, there is provided a wireless relay module comprising:

a receiver capable of wirelessly receiving medical device data over a wireless relay network from at least one medical device;

a first transmitter capable of wirelessly transmitting the medical device data to a second wireless relay module over the wireless relay network;

a second transmitter capable of wirelessly transmitting the medical device data over an internet-accessible wireless communication network;

a display capable of displaying at least one of graphical data or text data;

a controller coupled to the first and second transmitters, the controller capable of controlling the wireless relay module to select one of said first or second transmitter for transmitting medical device data received by the receiver, the controller capable of determining that at least a portion of the received medical device data is indicative of an alarm condition, and the controller causing the display to display an alert indicative of the alarm condition.

[009b] According to a second aspect of the present invention, there is provided a computerized method comprising the steps of:

receiving data at a wireless relay module wirelessly transmitted from at least one medical device;

a. receiving data from the at least one medical device over a wireless relay network;

b. determining the status of an internet-accessible wireless communications network in communication with a first transmitter of said relay module;

c. transmitting said data from the at least one medical device over said communications network by said first transmitter if said determined status satisfies a particular criteria;

d. transmitting said received data from said at least one medical device by a second transmitter in communication with the wireless relay network to a second relay module over the wireless relay network if said determined status fails to satisfy the particular criteria;

e. determining at the wireless relay module that at least a portion of the received data is indicative of an alarm condition; and

f. performing at least one of emitting an audible alarm at the wireless relay module based on the alarm condition, or displaying a visual alarm based on the alarm condition.

[009c] According to a third aspect of the present invention, there is provided a wireless relay module comprising:

a receiver capable of wirelessly receiving medical device data over a wireless relay network from at least one medical device;

a first transmitter capable of wirelessly transmitting the medical device data to a second wireless relay module over the wireless relay network;

a second transmitter capable of wirelessly transmitting the medical device data over an internet-accessible wireless communication network;

a microphone and speaker; and

a controller coupled to the first and second transmitters, microphone and speaker, the controller capable of controlling the wireless relay module to select one of said first or second transmitter for transmitting the medical device data received by the receiver, the controller also capable of exchanging voice information between a clinician proximate said wireless relay module and a remote location via the internet-accessible wireless communication network.

[0010] ~~The Embodiments of the present invention is~~are directed to wireless relay modules for enabling alarm recognition and display alerts in networked communications between a series of medical devices and remote monitoring devices via wireless relay networks and/or internet-accessible wireless communications networks. The wireless relay module comprises a display, a receiver capable of wirelessly receiving medical device data over a wireless relay network from at least one medical device along with a first transmitter capable of wirelessly transmitting medical device data to a second wireless relay module over the wireless relay network, and a second transmitter capable of wirelessly transmitting data over an internet-accessible wireless communication network. It is possible for the transmitters and receivers to be implemented as transceivers.

[0011] A controller is coupled to the first and second transmitters, and controls the wireless relay module to select one of said first or second transmitter for transmitting medical device data received by the receiver over one of the two respective networks. The controller is

further capable of determining that at least a portion of the received medical data is indicative of an alarm condition and causing the display to display an alert indicative of the alarm condition to alert caregivers.

[0012] The alert may include, for example, at least one of medical device description, medical device identification, medical device location, patient identification, patient condition, alarm type or code, alarm error code, and alarm severity or priority. The information indicative of an alarm condition in certain instances may be received from the wireless relay module itself and/or the second wireless relay module as well as possibly being received from the one or more medical devices as described above.

[0013] In another embodiment, the controller is configured to alternately display alerts on the display at intermittent intervals if data from more than one medical device data is indicative of alarm conditions. The controller may determine what information is displayed, as well as the duration of such information on the display based upon the severity of the alarm condition. In a further embodiment, the controller is configured to display a color on the display indicative of the alarm condition or normal, non-alarm status.

[0014] In yet a further embodiment, a speaker is coupled to the controller, where the speaker is capable of providing an audible alert, e.g., speech or other sounds, of the alarm condition. It is contemplated in accordance with embodiments of the invention that the volume or type of such