SUMMARY OF THE INVENTION

[006a] According to a first aspect of the present invention, there is provided a wireless relay module comprising: a first 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 medical device data over an internet accessible wireless communications network; a second transmitter capable of wirelessly transmitting medical device data to a second wireless relay module over the wireless relay network; and a processor coupled to the first and second transmitters, wherein said processor is capable of determining a device status for each of the at least one medical device and a connection status of each of the first and second transmitters and the wireless relay module ; and a status module in communication with the first transmitter and processor, wherein the status module is capable of determining an access status of the wireless relay network and providing the access status to the processor for selecting the first or second transmitter for data transmission based upon at least two of: (1) the access status of the wireless relay network; (2) the device status for each of the at least one medical device determined; and (3) the connection status of each of the first and second transmitters in the wireless relay module.

[006b] According to a second aspect of the present invention, there is provided a process for operating a relay module in a medical device wireless network, comprising: receiving data from at least one medical device over a wireless relay network; communicating with at least one of a plurality of interface circuits and/or relay modules in the medical device network; determining an access status of an internet-accessible wireless communications network in communication with a first transmitter of said relay module, and a device status for each of the at least one medical device and a connection status of the transmitter and the wireless relay module; transmitting said data from said at least one medical device over said communications network by said first transmitter if the determined access status of the wireless relay network, device status for each of the at least one medical device, and connection status of the transmitter and the wireless relay module satisfy a particular criteria; and transmitting said 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 access status of the wireless relay network, device status for each of the at least one medical device, and connection status of the transmitter and the wireless relay module fail to satisfy the particular criteria.

[007] Embodiments of t~~T~~he present invention relate~~is directed~~ to a wireless relay module for providing networked communications between a series of medical devices and remote monitoring devices. In accordance with a preferred embodiment of the invention, one or more medical devices (including but not limited to including for example, respirators, external feeding devices, pulse oximeters, blood pressure monitors, pulse monitors, weight scales and glucose meters) are provided at a patient facility. An interface circuit is coupled to each medical device, and is configured for communicating with one of a plurality of the wireless relay modules via a wireless relay network. The wireless relay modules are advantageously further configured to communicate with a remote monitoring device over an internet-accessible wireless communication network, and preferably, a wireless wide-area network (WWAN) such as a mobile telephone data network including (for example, based on a Global System for Mobile Communications (GSM) or Code Division Multiple Access (CDMA) cellular network or associated wireless data channels). Also, for compliance for example with HIPAA regulations, communications over each of the wireless networks are preferably conducted securely.

[008] Each of the plurality of wireless relay modules includes a receiver capable of wirelessly receiving medical device data from respective interface circuits via the wireless relay network, a first transmitter capable of wirelessly transmitting medical device data to another one of the wireless relay modules over the wireless relay network, a second transmitter capable of wirelessly transmitting data over an internet-accessible wireless communications network, and a controller coupled to the first and second transmitters. The controller is configured to determine access status of the internet-accessible wireless communications network, and to select one of the first or second transmitters based on that status. For example, when the status indicates that the internet-accessible wireless communications network is accessible to the wireless relay module, the controller selects the second transmitter for transmitting medical device data transmitted by the interface circuit to the wireless relay module. When the status indicates that the internet-accessible wireless communications network is not accessible, the controller selects the first transmitter for transmitting the medical device data to another one of the wireless relay modules. In this manner, another attempt to transmit the medical device data over the internet-accessible wireless communication network can be