What is claimed is:

1. A system for processing at least one vital sign from a patient and generating an alarm, the system comprising:

a first sensor comprising a first detector configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

a second sensor comprising a second detector configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

at least two motion-detecting sensors positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of the motion-detecting sensors generating at least one motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

a first processing component configured to receive the time-dependent physiological and motion waveforms and determine therefrom: (i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms; and (ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors; and

a second processing component configured to receive the at least one vital sign and motion parameter and determine therefrom: (i) a first alarm condition, calculated by comparing the at least one vital sign to an alarm threshold; (ii) a second alarm condition, calculated from the at least one motion parameter; and (iii) an alarm rule, determined by collectively processing the first and second alarm conditions with an alarm algorithm, the alarm rule indicating whether or not the system generates an alarm.

2. The system of claim 1, wherein the motion parameter corresponds to at least one of resting, moving, sitting, standing, walking, running, falling, lying down, and convulsing.

3. The system of claim 2, wherein the alarm rule comprises generating the alarm if the motion parameter corresponds to falling or convulsing.

4. The system of claim 2, wherein the motion parameter corresponds to walking, the at least one vital sign comprises at least one of heart rate, respiratory rate, and SpO2, and the alarm rule comprises not generating the alarm.

5. The system of claim 2, wherein the motion parameter corresponds to walking, the at least one vital sign comprises heart rate, and the alarm rule comprises generating the alarm if the heart rate exceeds an alarm threshold that is increased relative to its initial value.

6. The system of claim 2, wherein the motion parameter corresponds to standing, the at least one vital sign comprises blood pressure, and the alarm rule comprises generating the alarm if the blood pressure exceeds an alarm threshold that is decreased relative to its initial value.

7. The system of claim 1, wherein the first time-dependent physiological waveform is an ECG waveform.

8. The system of claim 7, wherein the second time-dependent physiological waveform is an optical waveform.

9. The system of claim 8, wherein the first processing component is further configured to: i) calculate a time difference between a feature in the ECG waveform and a feature in the optical waveform; and ii) determine a blood pressure value from the time difference.

10. The system of claim 1, wherein both the first and second time-dependent physiological waveforms are selected from a group consisting of an optical waveform, an acoustic waveform, an ECG waveform, and a pressure waveform.

11. The system of claim 10, wherein the first processing component is further configured to: i) calculate a time difference between a feature in the first time-dependent physiological waveform and a feature in the second time-dependent physiological waveform; and ii) determine a blood pressure value from the time difference.

12. The system of claim 1, wherein the motion parameter is calculated by processing a time-dependent component from at least one motion waveform, and a frequency-dependent component from at least one motion waveform.

13. The system of claim 1, wherein the motion parameter corresponds to walking, and the first processing component determines walking by: i) calculating a frequency-dependent motion waveform from at least one of the motion waveforms; and ii) analyzing a band of frequency components from the frequency-dependent motion waveform to determine that the patient is walking.

14. The system of claim 13, wherein the band of frequency components is between 0 – 3 Hz.

15. The system of claim 1, wherein the motion parameter comprises convulsing, and the first processing component determines convulsing by: i) calculating a frequency-dependent motion waveform from at least one of the motion waveforms; and ii) analyzing a band of frequency components from the frequency-dependent motion waveform to determine that the patient is convulsing.

16. The system of claim 15, wherein the band of frequency components is between 0 – 10 Hz.

17. The system of claim 1, wherein the motion parameter comprises falling, and the first processing component determines falling by: i) calculating a time-dependent change in at least one of the motion waveforms; ii) calculating a frequency-dependent motion waveform from at least one of the motion waveforms; and iii) analyzing the time-dependent change in at least one of the motion waveforms and a band of frequency components from at least one of the frequency-dependent motion waveforms to determine that the patient has fallen.

18. The system of claim 17, wherein the band of frequency components is between 0 – 15 Hz.

19. The system of claim 17, wherein the time-dependent change in at least one of the motion waveforms comprises at least a 50% change in the motion waveform's value within a time period of less than 2 seconds.

20. The system of claim 1, wherein the first processing component is further configured to determine the motion parameter by comparing a parameter determined from the motion waveform to an ROC threshold value associated with a ROC curve, wherein both the ROC threshold value and the ROC curve are determined beforehand.

21. The system of claim 1, wherein both the first and second processing components comprise algorithms operating on a microprocessor.

22. The system of claim 21, wherein both the first and second processing components comprise algorithms operating on a common microprocessor configured to be worn on the patient's body.

22. The system of claim 1, wherein the first processing component is configured to operate on a processor worn on the patient's body, and the second processing component is configured to operate on a remote computer.

23. A method for continuously monitoring a patient, comprising the following steps:

detecting a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a first sensor comprising a first detector configured to be worn on the patient's body;

detecting a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a second sensor comprising a second detector configured to be worn on the patient's body;

detecting sets of time-dependent motion waveforms with at least two motion-detecting sensors positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, wherein each set of motion waveforms is indicative of motion of the location on the patient's body to which it is affixed;

processing the first and second time-dependent physiological waveforms to determine at least one vital sign from the patient;

analyzing at least a portion of the sets of time-dependent motion waveforms with a motion-determining algorithm to determine if the patient is in an activity state selected

from the group of resting, moving, sitting, standing, walking, running, falling, lying down, and convulsing; and

generating an alarm by processing the patient's activity state and comparing the vital sign to a predetermined alarm criteria corresponding to the activity state.

24. A method for continuously monitoring a patient, comprising the following steps:

detecting a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a first sensor comprising a first detector configured to be worn on the patient's body;

detecting a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a second sensor comprising a second detector configured to be worn on the patient's body;

detecting sets of time-dependent motion waveforms with at least two motion-detecting sensors positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, wherein each set of motion waveforms is indicative of motion of the location on the patient's body to which it is affixed;

processing the first and second time-dependent physiological waveforms to determine at least one vital sign from the patient;

analyzing at least a portion of the sets of time-dependent motion waveforms with a motion-determining algorithm to determine if the patient is in an activity state selected from the group of resting, moving, sitting, standing, walking, running, falling, lying down, and convulsing; and

generating an alarm by processing the patient's activity state and comparing the vital sign to a predetermined alarm criteria corresponding to the activity state.

25. The method of claim 24, wherein the analyzing step further comprises calculating a mathematical transform of at least one time-dependent motion waveform to determine a frequency-dependent motion waveform.

26. The method of claim 25, wherein the analyzing step further comprises analyzing frequencies in a band between 0 – 3 Hz to determine if the patient is walking.

27. The method of claim 25, wherein the analyzing step further comprises analyzing frequencies in a band between 0 – 10 Hz to determine if the patient is convulsing.

28. The method of claim 25, wherein the analyzing step further comprises analyzing frequencies in a band between 0 – 15 Hz to determine if the patient is falling.

29. The method of claim 24, wherein the analyzing step further comprises calculating a time-dependent change in at least two time-dependent motion waveforms.

30. The method of claim 29, wherein the analyzing step further comprises calculating a standard deviation of at least one time-dependent motion waveform.

31. The method of claim 29, wherein the analyzing step further comprises calculating a mathematical derivative of at least one time-dependent motion waveform.

32. The method of claim 29, wherein the analyzing step further comprises comparing at least one time-dependent motion waveform to a mathematical function.

33. The method of claim 24, wherein the analyzing step further comprises calculating a logit variable from at least one time-dependent motion waveform, or a waveform calculated therefrom, and comparing the logit variable to a predetermined ROC curve to determine the patient's activity state.

34. The method of claim 33, wherein the analyzing step further comprises comparing the logit variable calculated from at least one time-dependent motion waveform, or a waveform calculated therefrom, to different ROC curves corresponding to activity states selected from resting, moving, sitting, standing, walking, running, falling, lying down, and convulsing.

35. The method of claim 24, wherein the processing step further comprises calculating a time difference between a feature in the first time-dependent physiological waveform and a feature in the second time-dependent physiological waveform.

36. The method of claim 24, wherein the processing step further comprises calculating a blood pressure from the time difference.

37. The method of claim 36, wherein the first time-dependent physiological waveform is an electrical waveform, and the second time-dependent physiological waveform is an optical waveform.

38. The method of claim 36, wherein each of the first and second time-dependent physiological waveforms are selected from a group consisting of an optical waveform, an acoustic waveform, an ECG waveform, and a pressure waveform.

39. The method of claim 24, wherein the first time-dependent physiological waveform is an electrical waveform, and the vital sign determined during the processes step is heart rate.

40. The method of claim 24, wherein the first time-dependent physiological waveform is an electrical waveform, and the vital sign determined during the processes step is respiratory rate.

41. The method of claim 24, wherein the first time-dependent physiological waveform is an optical waveform, and the vital sign determined during the processes step is SpO2.

42. A system for processing at least one vital sign from a patient and generating an alarm, the system comprising:

a first sensor comprising a first detector configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

a second sensor comprising a second detector configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

at least two motion-detecting sensors positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of the motion-detecting sensors generating at least one motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

a first processing component configured to receive the time-dependent physiological and motion waveforms and determine therefrom: (i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms; and (ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors; and

a second processing component configured to receive the at least one vital sign and motion parameter and determine therefrom: (i) a first alarm condition, calculated by comparing the at least one vital sign to an alarm threshold; (ii) a second alarm condition, calculated from the at least one motion parameter; and (iii) an alarm rule, determined by collectively processing the first and second alarm conditions with an alarm algorithm, the alarm rule indicating whether or not the system generates an alarm.

43. A system for continuously monitoring a plurality of patients, the system comprising:

a patient monitor configured to be worn on the body of each of the plurality of patients, each patient monitor comprising:

a first sensor comprising a first detector configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

a second sensor comprising a second detector configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

at least two motion-detecting sensors positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of the motion-detecting sensors generating at least one motion waveform indicative of motion of a body location onto which the motion-detecting sensor is affixed;

a location sensor comprising a wireless component and a location processing component, the location processing component configured to receive a signal from the

wireless component and process this signal to determine a physical location of the patient to which the location sensor is attached;

a processing component configured to receive the time-dependent physiological and motion waveforms and determine therefrom: (i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms; (ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors; and (iii) an alarm parameter calculated from the at least one of the vital sign and motion parameter; and,

a wireless transceiver configured to wirelessly transmit the vital sign, motion parameter, location of the patient, and alarm parameter through a wireless system; and,

a remote computer system comprising a display and an interface to the wireless system, the interface configured to receive from the wireless system a vital sign, motion parameter, location of the patient, and alarm parameter corresponding to each of the plurality of patients comprising a patient monitor, and the display configured to render a user interface that describes at least one of a vital sign, motion parameter, location of the patient, and alarm parameter for each patient of the plurality of patients comprising a patient monitor.

44. The system of claim 43, wherein the display is configured to render a graphical user interface.

45. The system of claim 44, wherein the display is configured to render a graphical user interface comprising a field that displays a map corresponding to an area comprising a plurality of sections, with each section corresponding to the location of the patient and comprising: a field that displays the vital sign corresponding to the unique patient, a field that displays the motion parameter corresponding to the unique patient, and a field that displays the alarm parameter corresponding to the unique patient.

46. The system of claim 45, wherein the display is configured to render a graphical user interface comprising a field that displays a map corresponding to an area of a hospital.

47. The system of claim 45, wherein the display is configured to render a graphical user interface comprising a field that displays a map corresponding to an area of a hospital, and each of the plurality of sections corresponds to a specific bed in the area of the hospital.

48. The system of claim 43, wherein the display is configured to render a graphical icon corresponding to the motion parameter for each of the plurality of patients comprising a patient monitor.

49. The system of claim 43, wherein the display is configured to render a graphical icon corresponding to the motion parameter for each of the plurality of patients comprising a patient monitor.

50. The system of claim 43, wherein the display is configured to render a graphical icon corresponding to the alarm parameter for each of the plurality of patients comprising a patient monitor.

51. The system of claim 43, wherein the patient monitor display is further configured to display the vital sign corresponding to the specific patient to which the patient monitor is attached, the motion parameter corresponding to the specific patient to which the patient monitor is attached, and the alarm parameter corresponding to the specific patient to which the patient monitor is attached.

52. The system of claim 43, wherein the wireless component comprised by the location sensor and the wireless transceiver are comprised by a common wireless system.

53. The system of claim 52, wherein the common wireless system operates a protocol based on 802.11.

54. The system of claim 52, wherein the common wireless system is comprised by a cellular network.

55. The system of claim 43, wherein the patient monitor configured to be worn on the body of each of the plurality of patients further comprises a first voice interface.

56. The system of claim 55, wherein the remote computer further comprises a second voice interface that integrates with the first voice interface.

57. The system of claim 43, wherein the wireless component comprised by the location sensor, the wireless transceiver, and the first and second voice interfaces are all comprised by a common wireless system.

58. The system of claim 57, wherein the common wireless system operates a protocol based on 802.11.

59. The system of claim 58, wherein the common wireless system is comprised by a cellular network.

60. The system of claim 43, wherein the remote computer system is comprised by a medical monitor, configured to be worn on the body of a person other than the patient, which is essentially identical to the patient monitor.

61. The system of claim 60, wherein the medical monitor configured to be worn on the body of the person other than the patient comprises a medical monitor display.

62. The system of claim 61, wherein the medical monitor display is further configured to select and display at least one of: the vital sign corresponding to a specific patient to which the patient monitor is attached, the motion parameter corresponding to the specific patient to which the patient monitor is attached, the location of the patient to which the patient monitor is attached, and the alarm parameter corresponding to the specific patient to which the patient monitor is attached.

63. The system of claim 62, wherein the patient monitor configured to be worn on the body of each of the plurality of patients further comprises a first voice interface.

64. The system of claim 63, wherein the medical monitor configured to be worn on the body of a person other than the patient further comprises a second voice interface that integrates with the first voice interface.

65. A system for continuously monitoring a patient, the system configured to be worn on the patient's body and comprising:

an optical sensor comprising a first light source, a second light source, and a light detector, the optical sensor configured to detect a first time-dependent optical waveform from radiation generated by the first light source, and a second time-dependent optical

waveform from radiation generated by the second light source, wherein both the first and second time-dependent optical waveforms are indicative of one or more contractile properties of the patient's heart;

an electrical sensor comprising at least two electrodes and an electrical circuit, wherein each electrode is configured to attach to separate locations on the patient and measure an electrical signal, and the electrical circuit is configured to receive and process an electrical signal from each electrode to generate a first time-dependent electrical waveform indicative of one or more contractile properties of the patient's heart and a second time-dependent electrical waveform indicative of a respiratory rate;

at least two motion-detecting sensors positioned on two separate locations on the body of the patient, the locations selected from a forearm, upper arm, chest, and hand of the patient, wherein each of the motion-detecting sensors generates at least one motion waveform indicative of motion of a body location onto which the motion-detecting sensor is affixed; and

a processing component configured to receive the first and second time-dependent optical waveforms, the first and second time-dependent electrical waveforms, and the motion waveforms, and determine therefrom: (i) a time difference between a feature in one of the first and second time-dependent optical waveforms and a feature in one of the first and second electrical waveforms; (ii) a blood pressure value calculated from the time difference; iii) an SpO2 value calculated from both the first and second time-dependent optical waveforms; (iii) a heart rate calculated from at least one of the time-dependent electrical waveforms; (iv) a respiratory rate calculated from the second time-dependent electrical waveform; (v) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors; and (vi) an alarm parameter calculated from at least one of the blood pressure value, SpO2 value, heart rate, respiratory rate, and the motion parameter.

66. The system of claim 65, wherein the processing component is further configured to render on a user interface numerical values corresponding to the blood pressure value, SpO2 value, heart rate, and respiratory rate.

67. The system of claim 66, wherein the processing component is further configured to render a numerical value corresponding to heart rate, but not render a numerical value corresponding to blood pressure, SpO2, and respiratory rate, when the motion parameter it calculates corresponds to a moving patient.

68. The system of claim 67, wherein the processing component is further configured to render a numerical value corresponding to heart rate, but not render a numerical value corresponding to blood pressure, SpO2, and respiratory rate, when the motion parameter it calculates corresponds to a walking patient.

69. The system of claim 65, wherein the processing component is further configured to process at least one motion waveform generated by each of the motion-detecting sensors to calculate a motion parameter corresponding to the patient lying down.

70. The system of claim 69, wherein the processing component is further configured to detect when the patient's respiratory rate has ceased for an extended period of time.

71. The system of claim 70, wherein the extended period of time is at least 20 seconds.

72. The system of claim 70, wherein the processing component is further configured to generate an alarm parameter corresponding to apnea when the patient's respiratory rate has ceased for the extended period of time.

73. The system of claim 69, wherein the processing component is further configured to analyze at least one of the first and second time-dependent electrical waveforms to determine heart rate along with an additional parameter.

74. The system of claim 72, wherein the additional parameter is one of VFIB, VTAC, and ASY.

75. The system of claim 65, wherein the processing component is further configured to analyze at least one of the first and second time-dependent optical waveforms to determine a pulse rate.

76. The system of claim 75, wherein the processing component is further configured to calculate a pulse pressure from a difference between a diastolic blood pressure and a systolic blood pressure.

77. The system of claim 76, wherein the processing component is further configured to calculate a significant pulse rate if the pulse rate is determined to be greater than 30 beats per minute, and the pulse pressure is greater than 10 mmHg.

76. The system of claim 77, wherein the processing component is further configured to analyze at least one of the first and second time-dependent electrical waveforms to determine heart rate along with an additional parameter.

77. The system of claim 78, wherein the additional parameter is one of VFIB, VTAC, and ASY.

78. The system of claim 79, wherein the processing component is further configured to generate an alarm parameter corresponding to one of VFIB, VTAC, and ASY if one of VFIB, VTAC, and ASY is determined from one of the first and second time-dependent electrical waveforms and the processing component calculates that a significant pulse rate is not present from the patient.

79. The system of claim 69, wherein the processing component is further configured to process at least one motion waveform generated by a motion-detecting sensor to determine a number of times that the patient moves from lying in a first position to lying in a different position.

80. The system of claim 79, wherein the processing component is further configured to generate an alarm parameter corresponding to the number of times that the patient moves from lying in a first position to lying in a different position if the number of times is less than a threshold value.

81. The system of claim 80, wherein the threshold value is 1 time per 4 hours.

82. The system of claim 65, further comprising a temperature sensor.

83. The system of claim 82, wherein the temperature sensor is configured to attach to a portion of the patient's chest.

84 A system for processing at least one vital sign from a patient and generating an alarm, the system comprising:

a first sensor comprising a first detector worn on the patient's body and configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

a second sensor comprising a second detector worn on the patient's body and configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

a first motion-detecting sensor positioned on a first location on the patient's body, the motion-detecting sensor configured to generate a first set of motion waveforms indicative of motion of the location on the patient's body to which it is affixed;

a processing component configured to be worn on the patient's body, the processing component comprising:

a second motion-detecting sensor positioned on a second location on the patient's body, the second motion-detecting sensor configured to generate a second set of motion waveforms indicative of motion of the location on the patient's body to which the processing component is affixed; and

a microprocessor configured to receive the time-dependent physiological waveforms and at least of portion of the first and second set of motion waveforms and determine therefrom: (i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms; (ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion, the motion parameter calculated by comparing at least one of the following components to a predetermined threshold value: (a) a component calculated from a time-dependent waveform generated by the motion-detecting sensor; (b) a component calculated from a frequency-dependent waveform calculated from the time-dependent waveform; and (c) a component determined from an ROC curve; and (iii) an alarm, determined by collectively processing the at least one vital sign and the motion parameter with an alarm algorithm.

85. The system of claim 84, wherein each motion sensor comprises an accelerometer configured to generate a time-dependent motion waveform.

86. The system of claim 85, wherein each motion sensor further comprises an analog-to-digital converter configured to digitize the time-dependent waveform.

87. The system of claim 84, wherein the first sensor comprises at least two ECG electrodes and an ECG circuit.

88. The system of claim 87, wherein the first sensor is configured to attach to a location selected from the patient's arm and chest.

89. The system of claim 84, wherein the second sensor is an optical sensor comprising at least one light source and a photodetector.

90. The system of claim 89, wherein the second sensor is configured to attach to a location selected from the patient's hand, fingers, wrist, and arm.

91. The system of claim 87, wherein the first time-dependent physiological waveform is an ECG waveform.

92. The system of claim 91, wherein the second time-dependent physiological waveform is an optical waveform.

93. The system of claim 92, wherein the processing component is further configured to: i) calculate a time difference between a feature in the ECG waveform and a feature in the optical waveform; and ii) determine a blood pressure value from the time difference.

94. The system of claim 84, wherein both the first and second time-dependent physiological waveforms are selected from a group consisting of an optical waveform detected by an optical sensor, an acoustic waveform detected by an acoustic sensor, an electrical waveform detected by an electrical sensor, and a pressure waveform detected by a pressure sensor.

95. The system of claim 94, wherein the processing component is further configured to: i) calculate a time difference between a feature in the first time-dependent physiological waveform and a feature in the second time-dependent physiological waveform; and ii) determine a blood pressure value from the time difference.

96. The system of claim 84, further comprising a graphical display.

97. The system of claim 96, wherein the graphical display is further comprised by the processing component configured to be worn on the patient's body.

98. The system of claim 96, wherein the graphical display is configured to render numerical values indicating the patient's vital signs, and iconic images indicating both the motion parameter and the alarm.

99. The system of claim 84, wherein the graphical display further comprises a first user interface for a patient, and a second user interface for a medical professional that is rendered after the processing unit processes an identifier corresponding to the medical professional.

100. The system of claim 99, wherein the identifier is encoded in a barcode.

101. The system of claim 99, wherein the identifier is encoded in an RFID tag.

102. The system of claim 84, further comprising a wireless transceiver configured to transmit the vital sign, motion parameter, and alarm to a remote computer.

103. The system of claim 101, wherein the remote computer comprises a graphical display configured to render numerical values indicating the patient's vital signs, and iconic images indicating both the motion parameter and the alarm.

104. A method for generating an alarm while monitoring vital signs and posture of a patient, the method comprising the following steps:

(a) detecting a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a first sensor comprising a first detector configured to be worn on the patient's body;

(b) detecting a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart with a second sensor comprising a second detector configured to be worn on the patient's body;

(c) detecting a set of time-dependent motion waveforms with at least one motion-detecting sensor positioned on the patient's torso, wherein the one motion-detecting sensor detects a set of motion waveforms indicative of motion of the patient's torso;

(d) processing the first and second time-dependent physiological waveforms to determine at least one vital sign from the patient;

(e) analyzing at least a portion of the set of time-dependent motion waveforms, or a mathematical derivative thereof, to determine a vector corresponding to motion of the patient's torso;

(f) comparing the vector to a coordinate space representative of how the motion-detecting sensor is oriented on the patient to determine a posture parameter;

(g) comparing the posture parameter to a threshold value to estimate the patient's posture; and

(h) generating an alarm by processing at least one of the patient's posture and a parameter resulting from a comparison of the vital sign to a predetermined alarm criteria, wherein the alarm is indicated by a variance of the vital sign relative to the predetermined alarm criteria and is regulated according to the patient's posture.

105. The method of claim 104, wherein step (h) further comprises processing both the patient's posture and a parameter resulting from the comparison of the vital sign to the predetermined alarm criteria to generate the alarm.

106. The method of claim 104, wherein step (h) further comprises generating the alarm in response to a change in the patient's posture.

107. The method of claim 106, wherein step (h) further comprises generating the alarm if the patient's posture is standing up.

108. The method of claim 106, wherein step (h) further comprises generating the alarm if the patient's posture changes from lying down to one of sitting and standing up.

109. The method of claim 106, wherein step (h) further comprises generating the alarm if the patient's posture changes from one of standing up and sitting to lying down.

110. The method of claim 104, wherein step (e) further comprises analyzing three time-dependent motion waveforms, each corresponding to a unique axis, to determine the vector.

111. The method of claim 110, wherein step (f) further comprises comparing the vector to a coordinate space defined by three positional vectors, each indicating an orientation of the motion-detecting sensor on the patient.

112. The method of claim 111, wherein a first positional vector corresponds to a vertical axis in the coordinate space, a second positional vector corresponds to a horizontal axis in the coordinate space, and the third positional vector corresponds to a normal axis extending normal to the patient's chest.

113. The method of claim 111, wherein the posture parameter is an angle.

114. The method of claim 113, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and at least one of the three positional vectors.

115. The method of claim 114, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and a vector corresponding to a vertical axis, or a property of the angle between the vector and the vector corresponding to the vertical axis.

116. The method of claim 115, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 45 degrees, and wherein the patient's posture is estimated to be upright if the angle is less than the threshold value.

117. The method of claim 115, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 45 degrees, and wherein the patient's posture is estimated to be lying down if the angle is greater than the threshold value.

118. The method of claim 117, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and a vector corresponding to a normal axis extending normal to the patient's chest, or a property of the angle between the vector and the vector corresponding to a normal axis extending normal to the patient's chest.

119. The method of claim 118, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 35 degrees, and wherein the patient's posture is estimated to be supine if the angle is less than the threshold value.

110. The method of claim 118, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 135 degrees, and wherein the patient's posture is estimated to be prone if the angle is greater than the threshold value.

111. The method of claim 117, wherein step (f) further comprises comparing the vector to the coordinate space to determine the angle between the vector and a vector corresponding to a horizontal axis, or a property of the angle between the vector and the vector corresponding to the horizontal axis.

112. The method of claim 111, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 90 degrees, and wherein the patient's posture is estimated to be lying on a first side if the angle is less than the threshold value.

113. The method of claim 111, wherein step (g) further comprises comparing the angle to a threshold value that is substantially equivalent to 90 degrees, and wherein the patient's posture is estimated to be lying on a side opposite the first side if the angle is greater than the threshold value.

114. The method of claim 104, wherein step (c) further comprises detecting a set of time-dependent motion waveforms with at least one motion-detecting sensor positioned on the patient's chest.

115. The method of claim 104, where the at least one motion-detecting sensor is an accelerometer.

116. The method of claim 104, wherein step (d) further comprises processing the first and second time-dependent physiological waveforms to calculate a time difference between a feature in the first time-dependent physiological waveform and a feature in the second time-dependent physiological waveform.

117. The method of claim 116, wherein step (d) further comprises calculating a blood pressure from the time difference.

118. The method of claim 116, wherein the first time-dependent physiological waveform is an electrical waveform, and step (a) further comprises detecting the electrical waveform with at least two electrodes attached to the patient and operably connected to an electrical circuit.

119. The method of claim 118, wherein the second time-dependent physiological waveform is an optical waveform, and step (b) further comprises detecting the optical waveform with an optical sensor comprising a light source and a photodiode.

120. The method of claim 116, wherein each of the first and second time-dependent physiological waveforms are selected from a group consisting of an optical waveform, an electrical waveform, an acoustic waveform, and a pressure waveform.

121. The method of claim 120, wherein steps (a) and (b) each further comprise detecting a time-dependent physiological waveform with a sensor selected from a group consisting of: (i) an optical sensor comprising a light source and a photodiode; (ii) an electrical sensor comprising at least two electrodes operably connected to an electrical circuit; (iii) an acoustic sensor comprising a microphone; and (iv) a pressure sensor comprising a transducer.

What is claimed is:

1. A system for processing at least one vital sign from a patient and generating an alarm, the system comprising:

a first sensor comprising a first detector configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

a second sensor comprising a second detector configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

at least two motion-detecting sensors configured to be positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of the motion-detecting sensors configured to generate at least one motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

a first processing component configured to receive the time-dependent physiological and motion waveforms and the first processing component also configured to determine therefrom:

(i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms; and

(ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors, wherein the motion parameter is calculated by processing a time-dependent component from at least one motion waveform, and a frequency-dependent component from at least one motion waveform; and

a second processing component configured to receive the at least one vital sign and motion parameter and determine therefrom:

(i) a first alarm condition, calculated by comparing the at least one vital sign to an alarm threshold;

(ii) a second alarm condition, calculated from the at least one motion parameter; and

(iii) an alarm rule, determined by collectively processing the first and second alarm conditions with an alarm algorithm, the alarm rule indicating whether or not the system generates an alarm.

2. A system for processing at least one vital sign from a patient and generating an alarm, the system comprising:

a first sensor comprising a first detector configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

a second sensor comprising a second detector configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

at least two motion-detecting sensors configured to be positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of the motion-detecting sensors configured to generate at least one motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

a first processing component configured to receive the time-dependent physiological and motion waveforms and determine therefrom:

(i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms; and

(ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors, wherein the motion parameter corresponds to walking, and the first processing component is configured to determine walking by:

i) calculating a frequency-dependent motion waveform from at least one of the motion waveforms; and

ii) analyzing a band of frequency components from the frequency-dependent motion waveform to determine that the patient is walking; and

a second processing component configured to receive the at least one vital sign and motion parameter and determine therefrom:

(i) a first alarm condition, calculated by comparing the at least one vital sign to an alarm threshold;

(ii) a second alarm condition, calculated from the at least one motion parameter; and

(iii) an alarm rule, determined by collectively processing the first and second alarm conditions with an alarm algorithm, the alarm rule indicating whether or not the system generates an alarm.

3. The system of claim 2, wherein the band of frequency components is between 0 - 3 Hz.

4. A system for processing at least one vital sign from a patient and generating an alarm, the system comprising:

a first sensor comprising a first detector configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

a second sensor comprising a second detector configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

at least two motion-detecting sensors configured to be positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of the motion-detecting sensors configured to generate at least one motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

a first processing component configured to receive the time-dependent physiological and motion waveforms and determine therefrom:

(i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms; and

(ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors, wherein the motion parameter comprises convulsing, and the first processing component is configured to determine convulsing by:

i) calculating a frequency-dependent motion waveform from at least one of the motion waveforms; and

ii) analyzing a band of frequency components from the frequency-dependent motion waveform to determine that the patient is convulsing; and

a second processing component configured to receive the at least one vital sign and motion parameter and the second processing component also configured to determine therefrom:

(i) a first alarm condition, calculated by comparing the at least one vital sign to an alarm threshold;

(ii) a second alarm condition, calculated from the at least one motion parameter; and

(iii) an alarm rule, determined by collectively processing the first and second alarm conditions with an alarm algorithm, the alarm rule indicating whether or not the system generates an alarm.

5. The system of claim 4, wherein the band of frequency components is between 0 -10 Hz.

6. A system for processing at least one vital sign from a patient and generating an alarm, the system comprising:

a first sensor comprising a first detector configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

a second sensor comprising a second detector configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

at least two motion-detecting sensors configured to be positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of the motion-detecting sensors configured to generate at least one motion waveform indicative of motion of the location on the patient's body to which the motion-detecting sensor is affixed;

a first processing component configured to receive the time-dependent physiological and motion waveforms and determine therefrom:

(i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms; and

(ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors, wherein the motion parameter comprises falling, and the first processing component is configured to determine falling by:

i) calculating a time-dependent change in at least one of the motion waveforms;

ii) calculating a frequency-dependent motion waveform from at least one of the motion waveforms; and

iii) analyzing the time-dependent change in at least one of the motion waveforms and a band of frequency components from at least one of the frequency-dependent motion waveforms to determine that the patient has fallen; and

a second processing component configured to receive the at least one vital sign and motion parameter and determine therefrom:

(i) a first alarm condition, calculated by comparing the at least one vital sign to an alarm threshold;

(ii) a second alarm condition, calculated from the at least one motion parameter; and

(iii) an alarm rule, determined by collectively processing the first and second alarm conditions with an alarm algorithm, the alarm rule indicating whether or not the system generates an alarm.

7. The system of claim 6, wherein the band of frequency components is between 0 -15 Hz.

8. The system of claim 6, wherein the time-dependent change in at least one of the motion waveforms comprises at least a 50% change in the motion waveform's value within a time period of less than 2 seconds.

9. A system for processing at least one vital sign from a patient and generating an alarm, the system comprising:

a first sensor comprising a first detector configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient’s heart;

a second sensor comprising a second detector configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient's heart;

at least two motion-detecting sensors configured to be positioned on locations selected from a forearm, upper arm, and a body location other than the forearm or upper arm of the patient, each of the motion-detecting sensors configured to generate at least one motion waveform indicative of motion of the location on the patient’s body to which the motion-detecting sensor is affixed;

a first processing component configured to receive the time-dependent physiological and motion waveforms and determine therefrom:

(i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms; and

(ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors; and

a second processing component configured to receive the at least one vital sign and motion parameter and determine therefrom:

(i) a first alarm condition, calculated by comparing the at least one vital sign to an alarm threshold;

(ii) a second alarm condition, calculated from the at least one motion parameter; and

(iii) an alarm rule, determined by collectively processing the first and second alarm conditions with an alarm algorithm, the alarm rule indicating whether or not the system generates an alarm,

wherein the first processing component is further configured to determine the motion parameter by comparing a parameter determined from the motion waveform to an ROC threshold value associated with a ROC curve, wherein both the ROC threshold value and the ROC curve are determined beforehand.

10. A system for continuously monitoring a patient, the system configured to be worn on the patient's body and comprising:

an optical sensor comprising a first light source, a second light source, and a light detector, the optical sensor configured to detect a first time-dependent optical waveform from radiation generated by the first light source, and a second time-dependent optical waveform from radiation generated by the second light source, wherein both the first and second time-dependent optical waveforms are indicative of one or more contractile properties of the patient's heart;

an electrical sensor comprising at least two electrodes and an electrical circuit, wherein each electrode is configured to attach to separate locations on the patient and measure an electrical signal, and the electrical circuit is configured to receive and process an electrical signal from each electrode to generate a first time-dependent electrical waveform indicative of one or more contractile properties of the patient's heart and a second time-dependent electrical waveform indicative of a respiratory rate;

at least two motion-detecting sensors configured to be positioned on two separate locations on the body of the patient, the locations selected from a forearm, upper arm, chest, and hand of the patient, wherein each of the motion-detecting sensors is configured to generate at least one motion waveform indicative of motion of a body location onto which the motion-detecting sensor is affixed; and

a processing component configured to receive the first and second time-dependent optical waveforms, the first and second time-dependent electrical waveforms, and the motion waveforms, and determine therefrom:

(i) a time difference between a feature in one of the first and second time-dependent optical waveforms and a feature in one of the first and second electrical waveforms;

(ii) a blood pressure value calculated from the time difference;

(iii) an SpO2 value calculated from both the first and second time-dependent optical waveforms;

(iv) a heart rate calculated from at least one of the time-dependent electrical waveforms;

(v) a respiratory rate calculated from the second time-dependent electrical waveform;

(vi) at least one motion parameter selected from the patient's posture, activity state, and degree of motion calculated using at least one motion waveform generated by each of the motion-detecting sensors; and

(vii) an alarm parameter calculated from at least one of the blood pressure value, SpO2 value, heart rate, respiratory rate, and the motion parameter.

11. A system for processing at least one vital sign from a patient and generating an alarm, the system comprising:

a first sensor comprising a first detector configured to be worn on the patient's body and configured to detect a first time-dependent physiological waveform indicative of one or more contractile properties of the patient’s heart;

a second sensor comprising a second detector configured to be worn on the patient's body and configured to detect a second time-dependent physiological waveform indicative of one or more contractile properties of the patient’s heart;

a first motion-detecting sensor configured to be positioned on a first location on the patient's body, the motion-detecting sensor configured to generate a first set of motion waveforms indicative of motion of the location on the patient's body to which it is affixed;

a processing component configured to be worn on the patient's body, the processing component comprising:

a second motion-detecting sensor configured to be positioned on a second location on the patient's body, the second motion-detecting sensor configured to generate a second set of motion waveforms indicative of motion of the location on the patient's body to which the processing component is affixed; and

a microprocessor configured to receive the time-dependent physiological waveforms and at least of portion of the first and second set of motion waveforms and determine therefrom:

(i) at least one vital sign calculated using at least one of the first and second time-dependent physiological waveforms;

(ii) at least one motion parameter selected from the patient's posture, activity state, and degree of motion, the motion parameter calculated by comparing at least one of the following components to a predetermined threshold value:

(a) a component calculated from a time-dependent waveform generated by the motion-detecting sensor;

(b) a component calculated from a frequency-dependent waveform calculated from the time-dependent waveform; and

(c) a component determined from an ROC curve; and

(iii) an alarm, determined by collectively processing the at least one vital sign and the motion parameter with an alarm algorithm.