CLAIMS

1. A health monitor configured to be supported by a subject, the health monitor comprising:

an accelerometer configured to generate motion data in response to a first activity performed by the subject;

a cardiac sensor configured to detect at least a heart rate of the subject during performance of the first activity;

an on-board power source configured to provide power to the accelerometer and the cardiac sensor; and

a processor configured to calculate a first caloric burn rate for the first activity performed by the subject according to a first method based upon data from both the accelerometer and the cardiac sensor.

2. The health monitor of claim 1, wherein the processor is further configured to determine at least one power conservation mode of the health monitor based upon data received from the cardiac sensor.

3. The health monitor of claim 2, wherein the at least one power conservation mode comprises a mode in which power is reduced to at least the cardiac sensor for an interval between T-wave and P-wave portions of successive cardiac cycles.

4. The health monitor of any of claims 1-3, wherein the processor is configured to calculate the first caloric burn rate using values of heart rate and speed of the subject or values of heart rate and foot contact time of the subject.

5. The health monitor of any of the preceding claims, wherein the processor is configured to calculate the first caloric burn rate using values of heart rate and a VO_2 max value computed for the subject.

6. The health monitor of any of the preceding claims, wherein the processor is further configured to calibrate a second method for determining caloric burn for a subject performing an activity, wherein the calibration is based upon results obtained from the first method.

7. The health monitor of claim 6, wherein the second method comprises determining caloric burn based upon heart rate and not based upon data from the accelerometer.

8. The health monitor of any of the preceding claims, further comprising a timer, wherein the processor is further configured to:

calculate a second caloric burn rate for a second activity performed by the subject for a first time interval of a sequence of first time intervals; and

determine whether the second caloric burn rate falls within at least one recommended range of values proscribed by a health entity for the duration of the first time interval.

9. The health monitor of claim 8, wherein the health entity is the Center for Disease Control or the World Health Organization.

10. The health monitor of claim 8, wherein the health entity is a physician, a qualified medical personnel, or a professional trainer.

11. The health monitor of any of claims 8-10, wherein the processor is further configured to verify performance of the second activity from a power spectrum of the motion data.

12. The health monitor of any of claims 8-11, wherein the processor is further configured to determine the intensity level of the second activity from a heart rate and/or respiratory rate of the subject.

13. The health monitor of any of claims 8-12, wherein the processor is further configured to:

record a first credit value for each first time interval that the caloric burn rate falls within a first recommended range of the at least one recommended range for the duration of the first time interval; and

record a second credit value for each first time interval that the caloric burn rate falls within a second recommended range of the at least one recommended range for the duration of the first time interval.

14. The health monitor of claim 13, wherein the first recommended range of the at least one recommended range is between approximately 3.5 kilocalories per minute and approximately 7 kilocalories per minute and the second recommended range of the at least one recommended range includes values greater than approximately 7 kilocalories per minute.

15. The health monitor of claim 13 or 14, wherein the processor is further configured to:

identify a type of the second activity performed by the subject from among a plurality of activity types for which the health monitor is configured to recognize; and

identify non-human activities.

16. The health monitor of any of the preceding claims, wherein the processor is further configured to:

determine, from data received from the accelerometer, a period of increased activity performed by the subject; and

determine a heart-rate recovery time following cessation of the activity.

17. The health monitor of any of the preceding claims, wherein the processor is further configured to calculate heart rate variability or a LF/HF spectral power ratio from data received from the cardiac sensor.

18. The health monitor of any of the preceding claims, wherein the health monitor includes two electrodes configured to be electrically connected to the subject using a removable adhesive.

19. The health monitor of any of the preceding claims, wherein the accelerometer comprises a three-axis accelerometer.

20. A method for determining fitness metrics for a subject by a health monitor configured to be supported by the subject, the method comprising:

receiving, by a processor, motion data that was generated by the health monitor in response to a first activity performed by the subject;

receiving, from a cardiac sensor in communication with the processor, cardiac data for the subject detected during performance of the first activity; and

calculating a first caloric burn rate for the first activity performed by the subject according to a first algorithm based upon information in both the motion data and cardiac data.

21. The method of claim 20, further comprising executing a power conservation mode of the health monitor based upon data received from the cardiac sensor.

22. The method of claims 20 or 21, further comprising reducing power to at least the cardiac sensor for an interval between T-wave and P-wave portions of successive cardiac cycles.

23. The method of any of claims 20-22, wherein the calculation of the first caloric burn rate includes values of heart rate and speed of the subject or values of heart rate and foot contact time of the subject.

24. The method of any of claims 20-23, wherein the calculation of the first caloric burn rate includes values of heart rate and a VO_2 max value computed for the subject.

25. The method of any of claims 20-24, further comprising calibrating a second algorithm for determining caloric burn for a subject performing an activity, wherein the calibration is based upon results obtained from the first algorithm.

26. The method of claim 25, wherein the second algorithm comprises determining caloric burn based upon cardiac data and not based upon motion data.

27. The method of any of claims 20-26, further comprising:

calculating a second caloric burn rate for a second activity performed by the subject for a first time interval of a sequence of first time intervals; and

determining whether the second caloric burn rate falls within at least one recommended range of values proscribed by a health entity for the duration of the first time interval.

28. The method of claim 27, wherein the health entity is the Center for Disease Control or the World Health Organization.

29. The method of claims 27 or 28, further comprising:

determining a power spectrum for the motion data; and

verifying performance of the second activity from the power spectrum.

30. The method of any of claims 27-29, further comprising:

recording a first credit value for each first time interval that the second caloric burn rate falls within a first recommended range of the at least one recommended range for the duration of the first time interval; and

recording a second credit value for each first time interval that the second caloric burn rate falls within a second recommended range of the at least one recommended range for the duration of the first time interval.

31. The method of claim 30, wherein the first recommended range of the at least one recommended range is between approximately 3.5 kilocalories per minute and approximately 7 kilocalories per minute and the second recommended range of the at least one recommended range includes values greater than approximately 7 kilocalories per minute.

32. The method of claims 30 or 31, further comprising identifying a type of the second activity performed by the subject from among a plurality of activity types for which the health monitor is configured to recognize.

33. The method of any of claims 20-32, further comprising:

determining, from the motion data, a period of increased activity performed by the subject; and

determining a heart-rate recovery time following cessation of the activity.

34. The method of any of claims 20-33, further comprising calculating heart rate variability or a LF/HF spectral power ratio from the cardiac data.

35. A computer-readable storage medium including machine-readable instructions that, when executed by at least one processor of a health monitor that includes a cardiac sensor and accelerometer, adapt the health monitor to:

receive, by the processor, motion data that was generated by the accelerometer in response to a first activity performed by a subject;

receive cardiac data for the subject detected during performance of the first activity; and

calculate a first caloric burn rate for the first activity performed by the subject according to a first algorithm based upon information in both the motion data and cardiac data.

36. The computer-readable storage medium of claim 35, further comprising machine-readable instructions that, when executed by the at least one processor, adapt the health monitor to:

calculate a second caloric burn rate for a second activity performed by the subject for a first time interval of a sequence of first time intervals; and

determine whether the second caloric burn rate falls within at least one recommended range of values proscribed by a health entity for the duration of the first time interval.

37. The computer-readable storage medium of claim 36, further comprising machine-readable instructions that, when executed by the at least one processor, adapt the health monitor to:

record a first credit value for each first time interval that the second caloric burn rate falls within a first recommended range of the at least one recommended range for the duration of the first time interval; and

record a second credit value for each first time interval that the second caloric burn rate falls within a second recommended range of the at least one recommended range for the duration of the first time interval.

Claims:

1. A method for evaluating a fitness metric of a subject with a health monitor that is worn by the subject, the method comprising:

receiving at a processor cardiac data for the subject from a cardiac sensor of the health monitor;

receiving at the processor motion data for the subject from a motion sensor of the health monitor;

determining, by the processor, a body position of the subject from the motion data; and

evaluating, by the processor, the fitness metric from at least cardiac data produced at a time when the subject was in the body position.

2. The method of claim 1, wherein the determined body position is a prone position and evaluating the fitness metric comprises calculating a resting heart rate from cardiac data produced at a time when the subject was in the prone position.

3. The method of claim 1, wherein the determined body position is a prone position and evaluating the fitness metric comprises calculating heart rate variability from cardiac data produced at a time when the subject was in the prone position.

4. The method of claim 1, further comprising determining from the motion data and cardiac data that the subject is asleep.

5. The method of claim 4, further comprising determining a basal metabolic rate for the subject using motion data and cardiac data produced at a time when the subject was asleep.

6. The method of claim 4, further comprising determining a quality of sleep for the subject using motion data produced at a time when the subject was asleep and heart rate variability computed from cardiac data produced at a time when the subject was asleep.

7. The method of claim 1, wherein the determined body position is a prone position and evaluating the fitness metric comprises evaluating heart rate variability or a ratio of low-

frequency and high-frequency spectral properties of cardiac data produced after the subject awoke and was in the prone position.

8. The method of claim 1, wherein the fitness metric is indicative of the subject's health.

9. A wearable health monitor comprising:

a cardiac sensor configured to detect at least a portion of a cardiac waveform for a subject and produce cardiac data for the subject;

a motion sensor configured to detect motion of the subject and produce motion data representative of the motion; and

a processor in communication with the cardiac sensor and the motion sensor and configured to identify, from motion data received from the motion sensor, a body position of the subject and to evaluate a fitness metric from at least cardiac data produced by the cardiac sensor at a time when the subject was in the identified body position.

10. The wearable health monitor of claim 9, wherein the identified body position is a prone position and the processor is configured to calculating a resting heart rate from cardiac data produced at a time when the subject was in the prone position.

11. The wearable health monitor of claim 9, wherein the identified body position is a prone position and the processor is configured to calculating heart rate variability from cardiac data produced at a time when the subject was in the prone position.

12. The wearable health monitor of claim 9, wherein the processor is further configured to determine from the motion data and the cardiac data that the subject is asleep.

13. The wearable health monitor of claim 12, wherein the processor is further configured to determine a basal metabolic rate for the subject using motion data and cardiac data produced at a time when the subject was asleep.

14. The wearable health monitor of claim 12, wherein the processor is further configured to determine a quality of sleep for the subject using heart rate variability data and motion data produced at a time when the subject was asleep.

15. The wearable health monitor of claim 9, wherein the determined body position is a prone position and the processor is further configured to evaluate heart rate variability or a ratio of low-frequency and high-frequency spectral properties of cardiac data produced after the subject awoke and was still in the prone position.

16. A computer-readable medium encoded with instructions that, when executed by a processor of a wearable health monitor, cause the processor to:

receive cardiac data for the subject from a cardiac sensor of the health monitor;

receive motion data for the subject from a motion sensor of the health monitor;

determine a body position of the subject from the motion data; and

evaluate a fitness metric of the subject from at least cardiac data produced at a time when the subject was in the body position.