Trend Analysis Protocol with BoundaryCare

BoundaryCare can be used to detect trends in the data it collects. This can help with the detection, understanding, and even the prediction of particular states. The most common uses for this protocol include:

- Detection of seizure-like symptoms
- Detection of mood changes—especially anxiety or anger
- Detection of falls (and their contributing factors)

How it works

Depending on the features turned on, BoundaryCare can collect data passively on many metrics, such as heart rate, oxygen saturation, falls, sleep quality, activity levels, repetitive motion (*available soon*), and more.

Certain states that care staff wish to track are related to these metrics.

For example, many **seizures** are accompanied by changes in heart rate (rising or falling) or oxygen saturation. They may include rapid muscle motion. They may be more common at certain times of day, or at times of sleep deprivation.

Similarly, **anxiety** and **anger** can affect heart rate and oxygen levels, and may be more common after poor sleep or lack of physical activity.

Falls may be more common when the heart rate and oxygen levels are low, or just before meals, if blood sugar is low.

By reviewing the history of multiple metrics, which are time-stamped, caregivers may be able to correlate specific events (seizures, outbursts, falls) with particular biometric ranges.

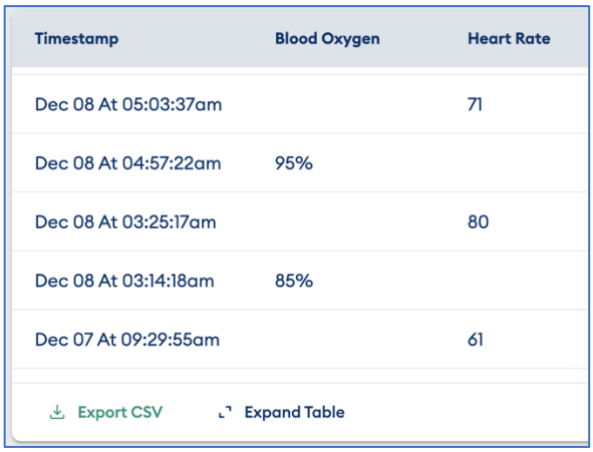
Moreover, by reviewing the metrics that correspond to particular health states, caregivers can gradually adjust the thresholds (e.g., high heart rate, low heart rate, etc.), to home in on the settings that will sound alerts that are helpful, without having too many false positives.

How to get started

1. At the time a BoundaryCare kit is ordered, we recommend requesting that all metrics be turned on (since it is hard to know in advance which ones will be most relevant). For those with adjustable alert settings, moderate settings (e.g. high heart rate of 110, low heart rate of 55, low oxygen at 94, etc.) will be fine. They will be adjusted later after the testing period.

2. Have the individual wear BoundaryCare as much as possible during a testing period that is long enough to include several of the states you're attempting to detect. This may be several days or even several weeks, depending on the frequency of the events. **When such events are witnessed, record manually the date and exact time and duration of the event.** (It's all right if some events are missed, as long as those witnessed are recorded clearly.)

3. At the end of the testing period, login to the BoundaryCare web portal (https://www.boundarycare.com/web_portal/), any click on any of the health metric tiles. That will take you to the metric history panel, where you can choose a date range, along with many health metrics, which will display in a table. By scrolling through the table (or downloading it via the "Export CSV" link at the bottom left, and opening it in Excel), you look for correlations.



Timestamp	Blood Oxygen	Heart Rate
Dec 08 At 05:03:37am		71
Dec 08 At 04:57:22am	95%	
Dec 08 At 03:25:17am		80
Dec 08 At 03:14:18am	85%	
Dec 07 At 09:29:55am		61

Export CSV Expand Table

Example of a display looking at oxygen levels and heart rate. Not all metrics are sampled at the same time, so they often appear on separate lines. Here, the drop in oxygen levels (85%) at about the same time as a rise in heart rate (80) in the middle of the night, suggests a change that may be worthy of an alert.

Note that BoundaryCare can also assist with this analysis. Contact us at info@boundarycare.com.

4. As you see the patterns you wish to track, go to "Alerts" in the web portal (left hand navigational panel). There you can edit or create alerts, setting the thresholds you would like for various metrics.

For more information about alerts, settings, and many other features of BoundaryCare, download the BoundaryCare User Manual.