VitalTrack

Problem

Instead of being **proactive**, the senior living industry is very **reactive** in its protocols for resident health events. Residents are checked in on at routine intervals of several hours. Staffing shortages, ubiquitous in this industry, can make these intervals even longer. Therefore, when residents have heart attacks, strokes, falls, etc., they often go unnoticed for critically long periods of time. Ultimately, these facilities have major limitations to **preventative care** and **emergency readiness.** These facilities also rely on outdated practices and lack **technology integration** to address these problems.

Solution

A **wristband system** that **tracks resident health metrics**, integrating into an app that **sends alerts to designated staff members** when any abnormality is detected. Features include:

- Emergency Button
- Ability to talk to designated staff member like phone call

Heart Rate
Skin Conductance
Temperature
Blood Oxygen

Passive tracking of key vital signs (most important)

Simply knowing if a patient is sleeping or exercising itself can offer key insights when combined with vitals

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Staff communication

Sleep and activity tracking

Battery Overview: Each wristband comes with 2 insertable rechargeable batteries. This way, staff can swap batteries without resident effort and without periods without function

Medicine/Event notification system

Precise GPS abilities

Medicine Reminders

Event Reminders

Vibration sensors for fall detection

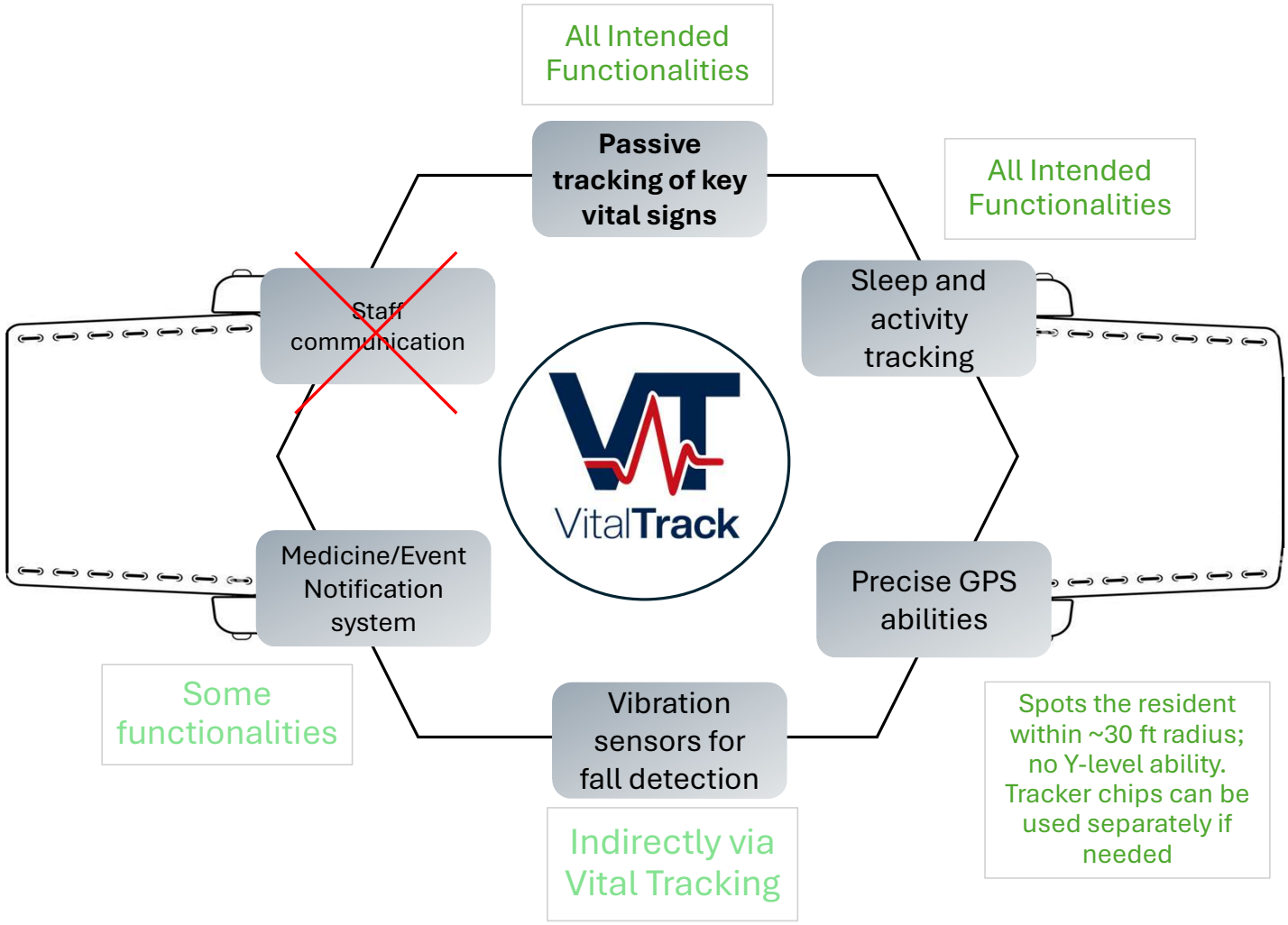
Allows for:

- Wandering Prevention
- Locating Residents in Emergencies
- Contact Tracing
- Social Networking

Limitations on Prototype Functionalities

We currently do not have the capital to build our own product. Therefore, our near-term solution is to integrate the Garmin Vivoactive 6 using its user API. This slide details the limitations it would have compared to our final intended product.

In order of importance:	
1. Passive tracking of key vital signs	✓
2. Vibration sensors for fall detection	✓
3. Sleep and activity tracking	✓
4. GPS abilities	✓
5. Staff Communication	✗
6. Medicine/Event Notification System	✓



Four Key Vitals

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Temperature

Time between abnormal change detection and conscious symptoms: 5 – 30 minutes in typical cases. Source

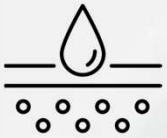
Common health events associated with changes: Fever (from infection or inflammation), heatstroke, hypothermia, thyroid disorders, and autoimmune or neurologic conditions affecting thermoregulation. Source

Heart Rate

Time between abnormal change detection and conscious symptoms: Sometimes quickly, sometimes as much as several minutes, sometimes not perceived at all. Source

Common health events associated with changes: Atrial fibrillation, supraventricular and ventricular tachycardia, bradycardia, heart failure, myocardial infarction, and electrolyte or thyroid imbalances. Source

Skin Conductance



Time between abnormal change detection and conscious symptoms: Typically between 2-10 minutes. Source

Common health events associated with changes: Anxiety disorders, panic attacks, hyperhidrosis, autonomic neuropathy, and conditions involving sympathetic nervous system dysregulation (e.g., Parkinson's disease, PTSD). Source

Blood Oxygen

Time between abnormal change detection and conscious symptoms: 1 to 3 minutes if oxygen drops rapidly but can take 5 to 15 minutes or longer in gradual-onset hypoxia. Source

Common health events associated with changes: Chronic obstructive pulmonary disease (COPD), pneumonia, pulmonary embolism, sleep apnea, high-altitude exposure, and heart failure. Source

Research

VitalTrack

	COVID-19	Influenza	Septic Shock	Heart Attack	Stroke	Atrial Fibrillation
Early Detection Capability	**63%** of COVID-19 infections could be detected before symptom onset using merely heart rate tracking (with a median of **4 days** between detection and symptoms). Source	Heart rate and skin temperature tracking demonstrated **89%** prediction accuracy prior to symptoms for Influenza and the common cold. Source	Tracking heart rate, temperature, and oxygen saturation allowed septic shock to be detected **4 hours** before symptoms, with an accuracy of **96%** (and **85%** for severe sepsis). Source	Tracking heart rate in coronary artery disease patients allowed heart attacks to be anticipated: about **89%** of ischemic episodes were preceded by a rise in heart rate at least **5 minutes before symptoms**, and episodes occurred **80%** of the times heart rate reached each patient's ischemic threshold. Source	A combination of vital signs trackable with the Fitbit Inspire 3 (with the exception of blood pressure) allowed in-hospital strokes to be predicted within **4 hours** before symptom onset, with accuracy up to **92%**. Source	Tracking heart rate allowed atrial fibrillation to be predicted **~32** minutes before onset, with **83%** accuracy. Source
Early Response Efficacy	Pre-symptomatic COVID-19 treatment resulted in a **5.6 day** average reduction in COVID symptom duration. Source	Treatment within 24h of symptom onset resulted in an **86%** risk reduction for Influenza. Source	Sepsis detection with alerts averaging **4 hours** before ICU referral was associated with a **19–22%** relative reduction in mortality. Source	If someone is suspected to be near a heart attack, starting aspirin and an anticoagulant immediately can cut the short-term risk of an actual infarction by about **1/3**. If the patient is confirmed to have high-risk unstable angina/small heart attack, moving quickly to angiography and stenting lowers their chance of having another, more severe heart attack by **~20–25%.** Source 1. Source 2	In the event of a stroke, every hour of delay decreases the chance of recovering independence by **5%**. Source	In older adults with asymptomatic, *device-detected* atrial fibrillation, intervening with anticoagulation cut the rate of stroke or systemic embolism by **~37%** over **~3.5** years. Source

Benefits

- Reduction in preventable hospitalizations
- Reduction in understaffing burden due to optimized care prioritization
- Increase in liability shield

Reductions in costs associated with all of the above

Increase in quality of resident care

Scenario Examples

During sleep, the wearable detects a sudden spike in skin conductance, a sharp drop in heart rate variability, and an abnormal rise above the resident's baseline resting heart rate. These abnormalities persist for hours, flagging "cardiovascular strain" well before the wearer wakes. Recognizing the high risk of a cardiac event, the nurse contacts emergency services and the patient is hospitalized before symptoms fully develop. Early intervention prevents the heart attack, and tests confirm the patient was in the early stages of myocardial infarction.

A resident is in their room and falls, hits their head, and goes unconscious, unable to call for help. A fall alert goes out to the resident's designated nurse, who otherwise wouldn't have known about the event

A memory care patient wanders outside through an unattended door at the back of a nursing home. As soon as the resident crosses the door's barrier, an alert is sent out to a staff member who responds promptly. Without immediate attention, the resident could've wandered far away from the premises

A resident recovering from knee surgery wakes feeling mildly lightheaded and short of breath, so she presses the wristband's alert button to contact her designated nurse. Through the wristband's talking feature, she describes her symptoms. As she does this, the nurse looks at her dashboard, which shows a resting heart rate spike of 20+ BPM, SpO_2 dip to 91%, and multiple skin conductance spikes indicating stress. She recognizes the pattern as consistent with a potential blood clot given her recent immobility from surgery. The nurse immediately arranges transport to the ER, where a CT angiogram confirms a pulmonary embolism

Business Plan

Current Stage

Code our software onto a Garmin using its user API interface

1

Integrate software to senior living facilities for free in exchange for testimonials

2

Convert free trials to paid trials and begin adding new senior living facilities. Further develop our relationship with Garmin

3

Move into developing our own model, potentially with the help of Garmin

4

End

Adoption Barriers

Adoption Barrier	How/Why It's Surmountable
Cost to facility	• National average assisted living rent is ~$5900/month. Our tentative pricing considerations are a per-user installment fee to cover the cost of the wearables (approximately $300 per user) and $50-250 per user per month subscription. **Therefore, one resident's monthly rent would amount to ~20 users acquired on average, and subsequent subscription costs would be fairly low** • Give facilities one-month free trials • CMS coverage down the line
Lack of evidentiary data	• Collect testimonials and data from free trial and paid users • Find opportunities for research partnerships
Integration & Workflow Friction	• Make the software program extremely user-friendly. We don't anticipate much integration friction given the simplicity of our product. Residents just need to passively wear the wrist device and nurses can respond at their discretion to notifications
Privacy, Data Security & Regulation	• Implement easy safeguards like encryption, multi-factor authentication, etc., and sign Business Associate Agreements (BAAs) with each facility. Doing so would ensure HIPAA compliance. Could consider third-party certification down the line

FAQs

Do we need to be FDA-approved?
No, we are not a medical device because we are not providing diagnostic decision-making. We will need to be FDA-registered, however, before acquiring revenue. We can, however, have facilities “share costs” with us. The registration process is doable with the resources we have, but could be fairly time-consuming and costly.

Have you done any customer discovery?
Yes, we had in-person discussions with 10 senior living facilities. All expressed interest and gave us their contact information without us asking for it, and 3 urged us to reach back out once our MVP is developed.

Who else have you gotten in contact with?
We’ve spoken with high-up executives at Fitbit and Garmin who could be a resource for getting approvals for functionalities that aren’t immediately available for general API users. We have a mentor who had an 8-9 figure exit selling wearable technology for healthcare. We have a legal team that works with us for free through Mizzou’s entrepreneurship legal clinic. We have a personal connection to a well-renowned patent lawyer who has offered us expensive services for free. We’ve connected with a Mizzou professor who leads research in senior living closely related to what we’re doing.

Are there any notable competitors?
Every similar company we have come across either doesn’t have autonomous vital sign streaming or hooks up to large, impractical devices. Most of these products address specific conditions rather than being intended for general wellness.

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