How Are Your Patients Managing Pressure Throughout the Day? Developing Technology for Individualizing Patient Education

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Background:

- Seat interface pressure mapping (IPM) is used to visualize pressure distribution.
- IPM guides clinical assessment of pressure injury risk, wheelchair setup & cushion selection, positioning, and patient/caregiver education about managing sitting-related pressure.
- Clinicians rely on self-report from patients about how they manage pressure throughout daily routines while using a wheelchair.
- An updated continuous IPM mobile app and custom pressure map was developed with feedback from Veterans with SCI in a parallel aim (Figure 1).

Our Objectives:

- Understand expert clinician (OT/PT) preferences for observing and interacting with continuous IPM data on a remote dashboard.
- Design, develop, and test a remote IPM Clinical Dashboard with OT/PT/Nursing and inpatients at a VA SCI center.

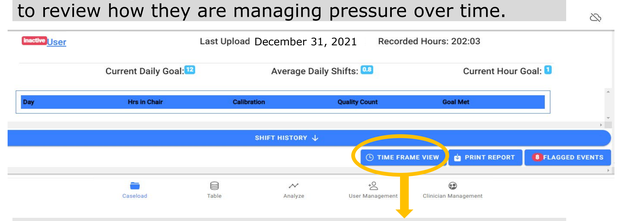
Design: Qualitative

Methods:

- OT & PT SCI and wheelchair seating experts recruited from VA SCI centers nationally (N=6).
- 3 rounds of virtual focus groups and interviews, each followed by design & development of a Clinical Dashboard.
- Hamilton Rapid Turn Around method used to analyze transcripts.
- Data summaries provided actionable design & development steps.

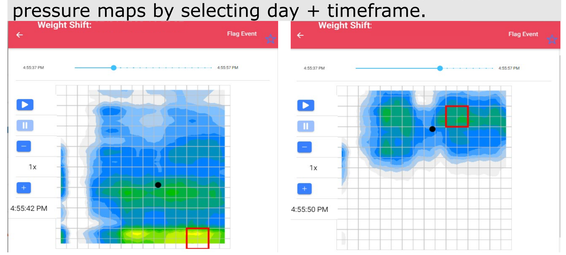
"It's neat to see the evolution from that first session, to today. I feel like you've taken all the things that we talked about into account."

Caseload page provides overview of all users. Select User to review how they are managing pressure over time.

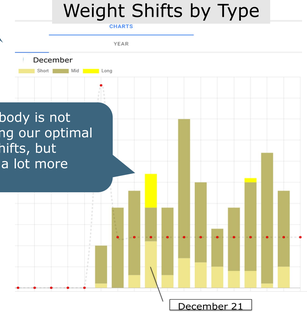


"Hey, you know what, you're really close to getting those really good weight shifts. You're down in mid weight shifts, look how many of these you did if you could hold it another 5 seconds – that would be optimal."

Pressure continuously recorded/saved. Replay any past pressure maps by selecting day + timeframe.

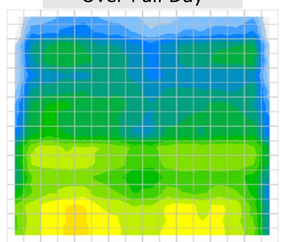


Daily Performance of Weight Shifts by Type

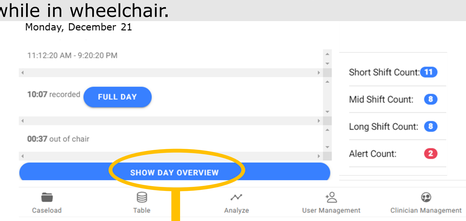


"Maybe somebody is not perfect at doing our optimal long weight shifts, but they're doing a lot more mids."

Average Pressure Over Full Day

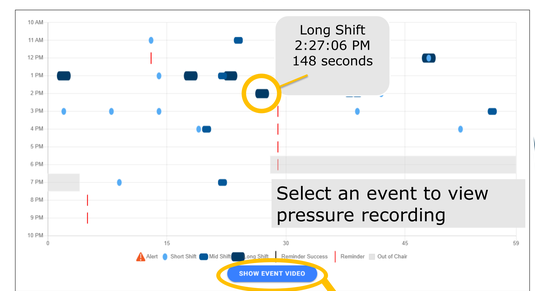


View daily summaries and an overview of pressure-related events while in wheelchair.



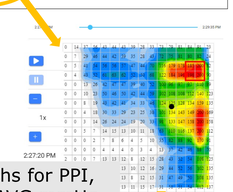
"... to see actual statements that I know I've said, or other people said really put into action here"

"You can help people change some habits they don't even realize they have."



"If I was with my patient I'd say, 'well I see that you are doing a quality pressure relief every couple of hours or every hour but only about one. So, at this 8 o'clock hour, what were you doing? Were you making breakfast at the time, or what was the reason that maybe you just didn't get a chance to do it?' and so I'd probably go through this hour by hour; talk about it and how can we change that. Do we need to set more alerts, or is there something else we are missing?"

"You can look at this ladder graph and say, 'you had a good quality weight shift here' and then you could take it to the other graph [line plots of PPI/DI] and use it to help them figure out what they were doing right."



View line graphs for PPI, DI, COP, and AVG mmHg for any event.

"I'd most likely be selecting whatever area we're trying to keep a close eye on. If there's an active wound, or if we're trying to prevent a wound in a certain spot."

Results

Summary of focus group feedback. Participant comments shown in figure.

- Continuous IPM reported on a Clinical Dashboard provides necessary detail to evaluate **quality of weight shifts** and may support clinical decision making.
- Visual overview of **all-day pressure management on one figure** with option for more/fewer detail allows clinicians to focus on relevant individualized patient data.
- **Replay pressure maps** from selected timeframes in past to identify source of problems.
- Customizable reporting features for **objective documentation** and **patient/caregiver education**.
- Dashboard view features **meet needs of a variety of practice settings**.
- **Remote access** allows clinicians to change patient-facing mobile app settings. update goals or simplify the patient's interface.

Limitations

- Use of IPM on top of seat cushion has potential to alter pressure at sitting interface, however research is lacking on the clinical effect impact in day-long use by wheelchair users.
- IPM has inherent limitations in reliability of absolute measures in single sensels, however, relative measures such as PPI and DI are more stable over time.

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