

# Observations and testing of the Tochtech Sleepsense bed sensor in a retirement community and lab setting

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## BACKGROUND

Retirement community nursing staff are tasked with ensuring the safety of their residents. During the night, this presents a challenge as many dementia care residents experience episodes of wandering, while night staffing is typically reduced.

The Tochtech Sleepsense device is an under-the-bed sensor, used to monitor residents and alert staff when s/he gets out of bed.



Figure 1: TochTech SleepSense Sensor

## METHODS

**Lab Setting:** Sleepsense was tested in the Carleton University SAM3 lab, objective testing of exit scenarios were run with various weights on both hospital and residential beds.

Modular weights were created to stimulate various human weights.

Table 1: Testing scenarios and their weights.

Movement	Human Weight (lbs/kg)	Pet Weight
Rolling from middle to side of bed	41 / 18.6	na
	97 / 44	na
Rolling from middle to side of bed and falling off	41 / 18.6	na
	97 / 44	na
Moving from middle to foot of bed	52 / 23.6	na
Removing a pet from bed while human stays on it	41 / 18.6	37 / 16.8
	52 / 23.6	17 / 7.7
	97 / 44	17 / 7.7
	97 / 44	30 / 13.6
Human exits from bed while pet stays on it	97 / 44	30 / 13.6
	97 / 44	17 / 7.7
Rolling from middle to side of bed and back to middle	60 / 27.2	na
	75 / 34	na
	97 / 44	na

**Retirement Community:** Sleepsense was tested in a retirement community with 15 resident participants. These participants were selected as they were candidates for night-time wandering and/or high falls risks. The night staff carried a phone which received alerts when a resident got out of bed.

## RESULTS

**Lab Setting:** Lab testing found the sensor performance was accurate across a range of weights and various exit scenarios.

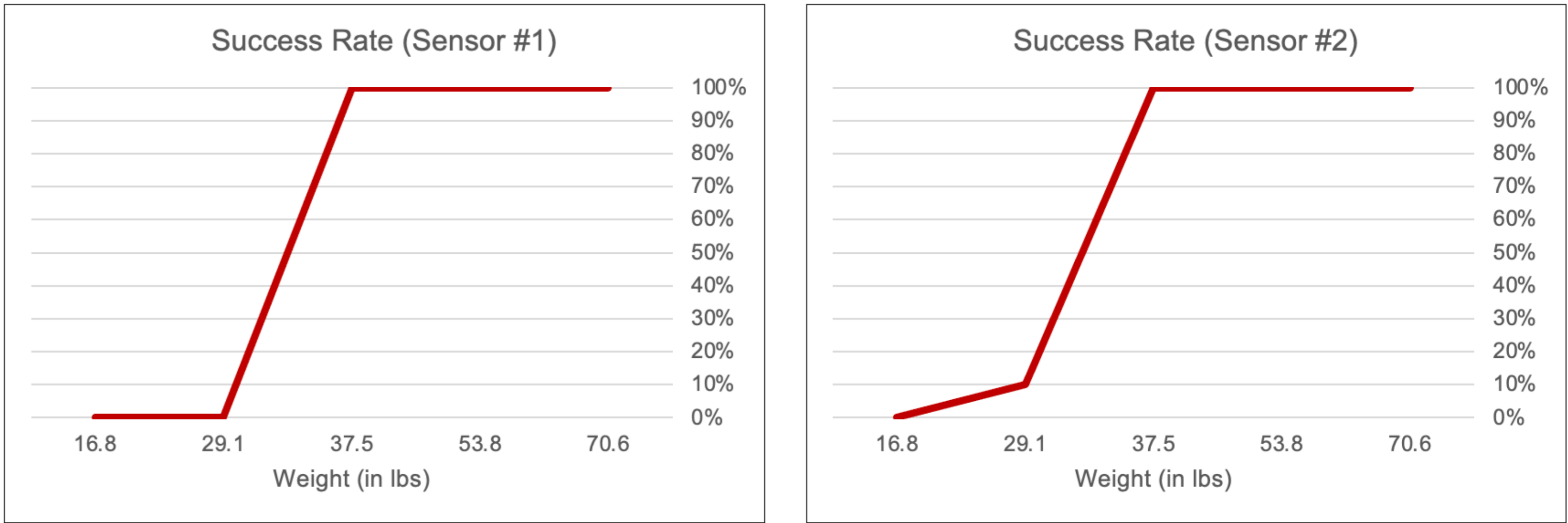


Figure 2: Static Loading results in the centre of a residential (4-leg) bed.

Figures 2 shows example results where the sensor detected bed exits 100% of the time for a bed occupant of over 37lbs or more

**Retirement Community:** Over 2 weeks of clinical testing, staff received 61 alerts:

- 48: the residents were found out of bed by staff
- 13: the resident was in bed when observed by staff

A challenge of implementing technology in this care setting was that some residents removed or unplugged the sensor causing inaccuracies.

## DISCUSSION and CONCLUSION

**Lab Setting:** The lab tests were used to test the limits of the device and determine its weight threshold. All tests were performed on both a residential bed and a hospital bed, with a large weight difference, and the device displayed similar weight threshold results. Results show the device worked within expected older adult weight ranges as well as various extra weights, representing a pet which may come and go in the night.

**Retirement Community:** In over ¾ of cases, the alarm correctly identified that the resident was out of bed. This system facilitated the timely attendance to residents that are at risk of wandering or falling, possibly reducing the risk of morbidity. Additionally, staff efficiency could be improved as the need for frequent room checks is reduced

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