



OHIO NURSING HOME QUALITY IMPROVEMENT PROJECT



VirtuSense
Transforming Healthcare with AI

Reducing Falls with Artificial Intelligence

The Problem

Every year, one in three seniors fall, resulting in well over \$50 billion in annual medical costs. Over 3 million seniors are treated in Emergency Departments each year for fall-related injuries. Falls are the leading cause of injury-related deaths for seniors. In 2016, nearly 30,000 people ages 65+ died from a fall. As the U.S. population ages rapidly, the number of falls occurring each year continues to rise. From 2007 to 2016, the rate of fall-related deaths rose 31%.

Reducing Falls with Artificial Intelligence

At VirtuSense, our mission is to revolutionize care for seniors by reducing adverse events using artificial intelligence (AI). The first product we developed is an AI system called VSTBalance, which uses predictive analytics based on balance and gait analysis to identify deficits and forecast risk. By implementing VSTBalance, partners of ours have seen a reduction in falls in excess of 43% across the continuum of care.

Measurable, Actionable Results

Skilled Nursing Case Study: 4,000 residents in 37 SNFs across three years according to CMS data. In 2017, when VSTBalance was implemented, these communities averaged 12.7% of their residents falling each year. In 2018, after a year of using the system, the average fell to 3.3%. This resulted in 380 fewer falls compared to 2017. The cost savings from the reduced falls equates to \$11.4 million across these communities.

Expected Quality Improvements

- Each facility will achieve a 10% reduction in falls and falls with injury in CY 2021 and CY 2022.
- Residents that were identified to have balance and function deficiencies and were provided treatment will show on average an improvement of at least 10% in balance and function assessment scores in CY 2021 and a 10% average improvement in balance and functions scores in CY 2022.



Figure A (VSTBalance)

1 month 3 months 6 months 1 year Overall Custom

No. of Visits	Last Visit Date	Gait Speed (m/sec)	TUG Time (sec)	Berg Score (56)	Tinetti Score (28)	Forward Reach (in)	mCTSIB Score (100)	5x Sit To Stand (sec)	Follow Up
32	Nov 28, 2018	0.91	11.13	30	0	9.02	0	12.3	No A
26	Dec 28, 2018	0.24	9.57	2	0	8.31	56.94	7.13	No A
15	Dec 06, 2018	0.4	12.13	24	18	8.66	84.36	12.43	No A
14	Jul 25, 2019	0.38	11.33	7	20	5.94	20.23	9.4	Forw
14	Aug 05, 2019	0.94	12.03	1	16	8.54	58	1.97	Start
11	Dec 06, 2018	0.93	6.33	28	18	9.21	13.56	5.1	No A
9	Oct 30, 2018	0.7	17.73	4	6	13.07	56.33	7.33	Start
7	Jul 31, 2019	0.63	-	34	27	8.46	10.12	-	Alres
6	Aug 08, 2018	0.64	-	9	-	11.06	23.93	-	No A
6	Dec 06, 2018	0.77	8.93	32	22	12.4	55.27	7.7	No A
6	Aug 05, 2019	1.15	8.2	-	-	-	-	-	Refu
6	Mar 07, 2019	0.44	13.14	4	19	14.76	13.08	18.07	No A
5	Aug 02, 2019	0.94	17.3	8	10	9.76	27.5	5.6	No A
4	Jul 25, 2019	0.91	-	-	-	3.78	14	27.47	Not E
4	Jul 25, 2019	1.16	-	-	-	4.02	48.19	32.57	Not E
3	Oct 11, 2018	1.04	-	-	-	14.41	-	26.4	No A

Figure B (Cloud Risk Board)

Brief Description of Required Activities

The facility will adopt and implement this training as part of their general policy and operations to improve the quality of care and reduce the number of falls occurring in the facility.

Phase I

- a) Participating facility and Administrator sign participation agreements;
- b) Training on how to utilize VSTBalance—a 2-day program taught by Outcomes Success Consultants from VirtuSense Technologies;

Phase II

- c) Begin mobility and functional evaluations for residents utilizing the machine vision and artificial intelligence of VSTBalance. Develop a schedule of routinely screening residents to evaluate mobility level, functional status, and fall risk likelihood;

Phase III

- d) Evaluation of data and continued screenings—monthly calls will be held for the duration of the project to evaluate the data being generated, as well as the progress towards the intended quality improvement metrics. Figure C depicts an example of the type of data able to be automatically generated and exported to evaluate outcomes improvements.

B	C	D	E	F	G H I		
Location	Overall Mobility	Baseline Risk %	Current Risk %	Risk% Change	Gait Speed (m/s)		
					Baseline	Current Test	Change/Improvement
Test System	Medium	70.10	43.65	-26.45	0.23	0.94	302.46%
Demo System	Low	48.89	53.32	4.43	0.77	0.64	-16.88%
Test System	Low	-	37.69	-	1.16	-	-
Demo System	Medium	73.45	51.23	-22.22	0.18	0.7	337.5%
Demo System	Low	50.89	62.58	11.69	0.71	0.4	-43.66%
Demo System	Medium	47.29	50.55	3.26	0.82	0.72	-12.2%
Test System	Medium	35.73	41.11	5.38	1.24	1.03	-16.46%
Demo System	Medium	-	44.53	-	0.91	-	-
Demo System	Low	-	63.42	-	0.38	-	-
Demo System	Medium	41.66	43.94	2.28	1.01	0.93	-7.92%
Demo System	Medium	42.50	46.04	3.54	0.98	0.86	-12.24%
Test System	Medium	-	49.88	-	0.74	-	-
Test System	Low	55.50	53.68	-1.82	0.58	0.63	8.74%
Demo System	Medium	46.97	48.89	1.92	0.83	0.77	-7.23%
Test System	Low	40.02	60.93	20.91	1.07	0.44	-58.88%
Test System	High	56.25	37.94	-18.31	0.56	1.15	106.53%
Test System	High	36.70	39.76	3.06	1.2	1.08	-9.83%
Demo System	Low	-	-	-	-	-	-
Demo System	Medium	58.94	40.83	-18.11	0.49	1.04	112.24%
Demo System	Low	-	52.97	-	0.65	-	-
Test System	Low	-	60.13	-	0.46	-	-
Demo System	Low	50.21	55.87	5.66	0.73	0.57	-21.92%
Demo System	Medium	-	48.57	-	0.78	-	-
Test System	Low	-	73.94	-	0.15	-	-
Demo System	Medium	73.94	44.53	-29.41	0.15	0.91	506.67%
Demo System	Low	57.38	69.63	12.25	0.53	0.24	-54.72%
Demo System	Low	58.54	64.28	5.74	0.5	0.36	-28%
Demo System	High	-	-	-	-	-	-
Test System	Medium	-	-	-	-	-	-
Test System	Medium	66.01	44.24	-21.77	0.32	0.92	188.34%
Test System	Medium	-	50.21	-	0.73	-	-
Demo System	Low	-	-	-	-	-	-
Test System	Low	72.48	63.42	-9.06	0.18	0.38	108.63%
Test System	Low	69.63	44.53	-25.10	0.24	0.91	282.77%
Test System	Medium	-	-	-	-	-	-
Demo System	Medium	-	48.24	-	0.79	-	-

Figure C (VSTBalance Cloud Outcomes Export)

Phase IV

e) Quarterly review of data—evaluating quality improvement progress in reducing falls and improving mobility for residents. At the conclusion of the project create summary of project experience and lessons learned as well as final outcomes achieved.

Date(s) of Project

January 1, 2021 – December 31, 2022

Evidence of Participation in the Project*

**Expected evidence of participation in the project should be kept by the nursing home for use in state survey to demonstrate compliance with Sec. 3721.072 (B) which states that “Beginning July 1, 2013, each nursing home shall participate every two years in at least one of the quality improvement projects included on the list made available by the department of aging under the nursing home quality initiative established under section 173.60 of the Revised Code.”*

- Signed Project Participation Agreement from the participating nursing facility;
- Cloud data usage report created automatically when the system is utilized; and
- Quarterly review of Risk Board Export (see Figure C) documented by QAPI team.

How to begin this quality improvement initiative:

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Relevant links

<https://virtusense.ai/>

[Reducing Falls with Artificial Intelligence CMP Proposal](#)