Kinesis Fall Prevention Solutions

KINESIS SUPPORTS FALL PREVENTION BY SCREENING, ASSESSING AND INTERVENING TO PREVENT FALLS

Kinesis
Health Technologies

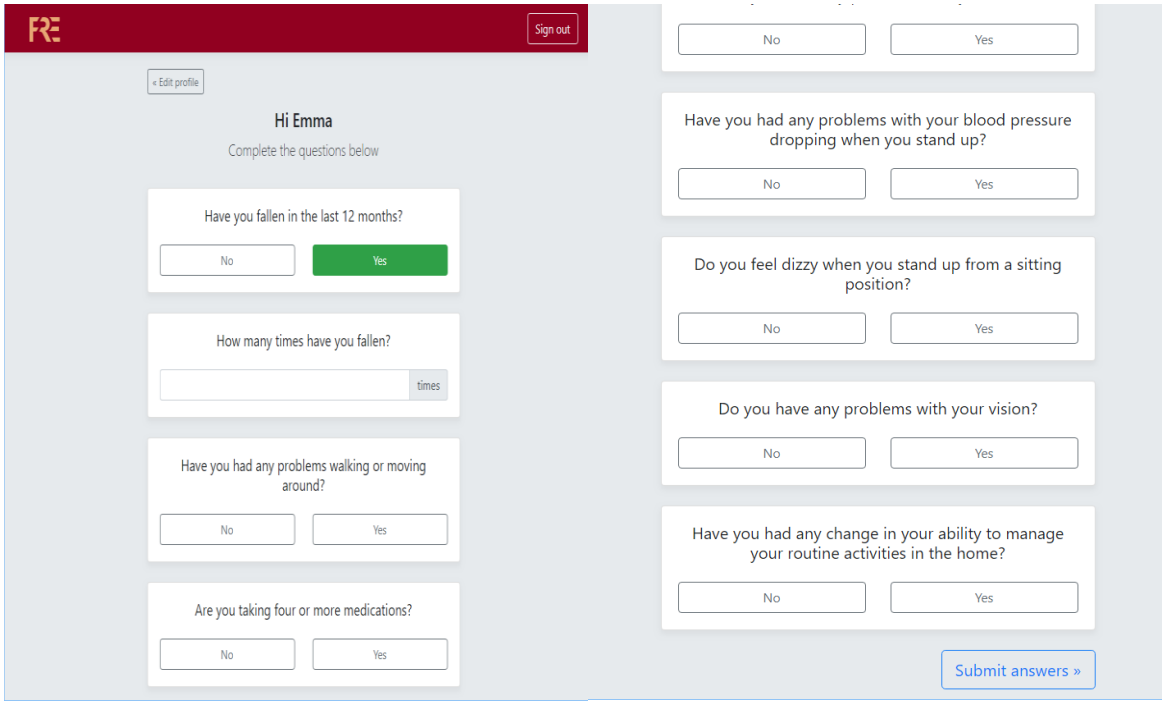
Fall Prevention with Kinesis Health Technologies

Falls are a serious threat to the health and well-being of older patient, with enormous economic and societal impacts. The CDC's STEADI initiative offers a coordinated approach to implementing the American and British Geriatrics Societies' clinical practice guideline for fall prevention. Kinesis Health Technologies are supporting fall prevention which is in line with the STEADI program, enhanced with wearable sensor technology and harnessing predictive analytics.

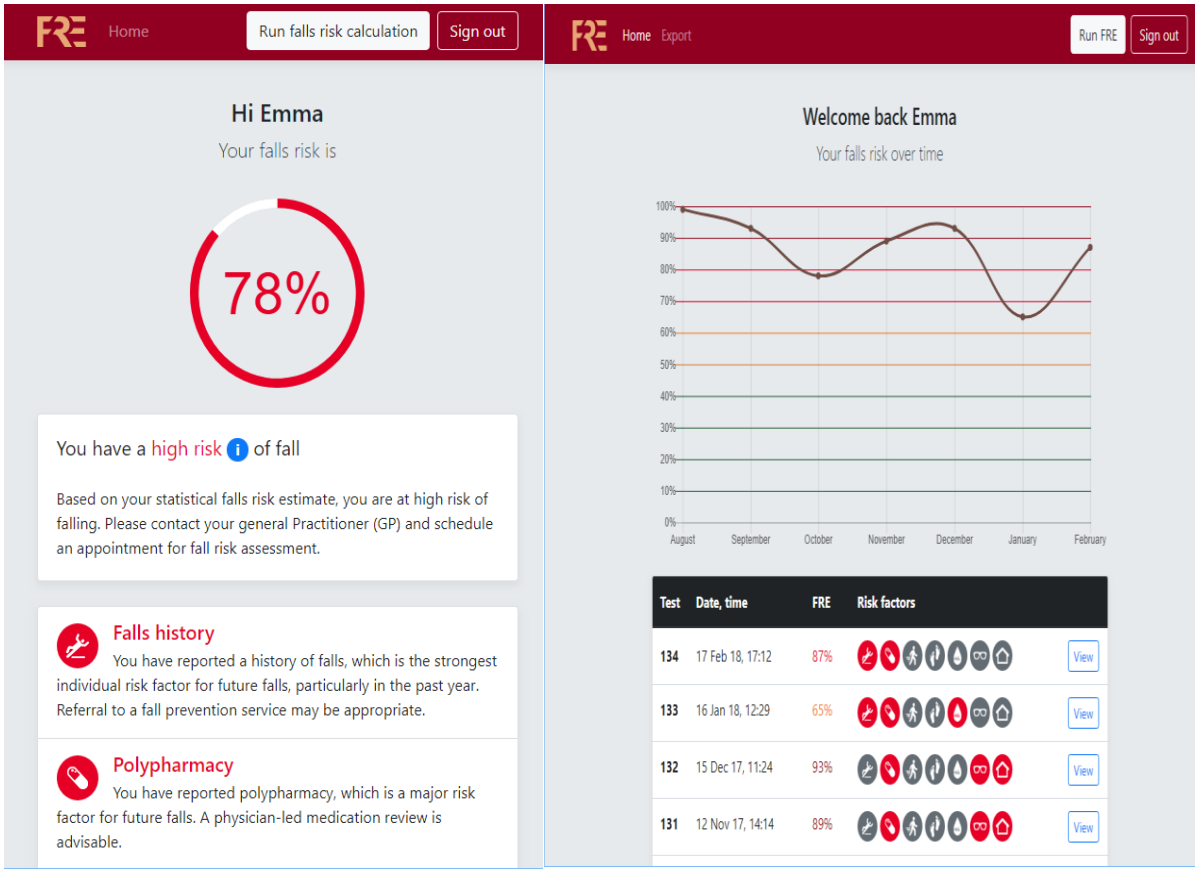
The CDC STEADI program advocates a three-pronged approach: **Screen, Assess, Intervene**. We support each of these elements through our secure HIPAA compliant solutions that can be integrated into a range of Electronic Medical Record (EMR) systems. By intelligent use of data, we enhance the diagnostic accuracy offered of falls screening and assessment and improve long term outcomes and reduce associated costs. We offer more objective and cost-effective fall prevention programs that can be implemented by non-expert health and social care workers.

Screen

Kinesis Health Technologies offer a suite of validated algorithms which utilize clinical evaluation questionnaires as recommended by the American Geriatric Society (such as the Stay Independent brochure) to provide more accurate screening for falls.



Our algorithms can be customized to use different questionnaires (such as the CDC Stay Independent questionnaire or CDC falls risk factors form), run on a web-browser or smartphone and are based on decade of research. Our systems are HIPPA compliant, can integrate into existing EMR systems and are based on a data set of thousands of older adults, to provide more precise screening for falls risk.

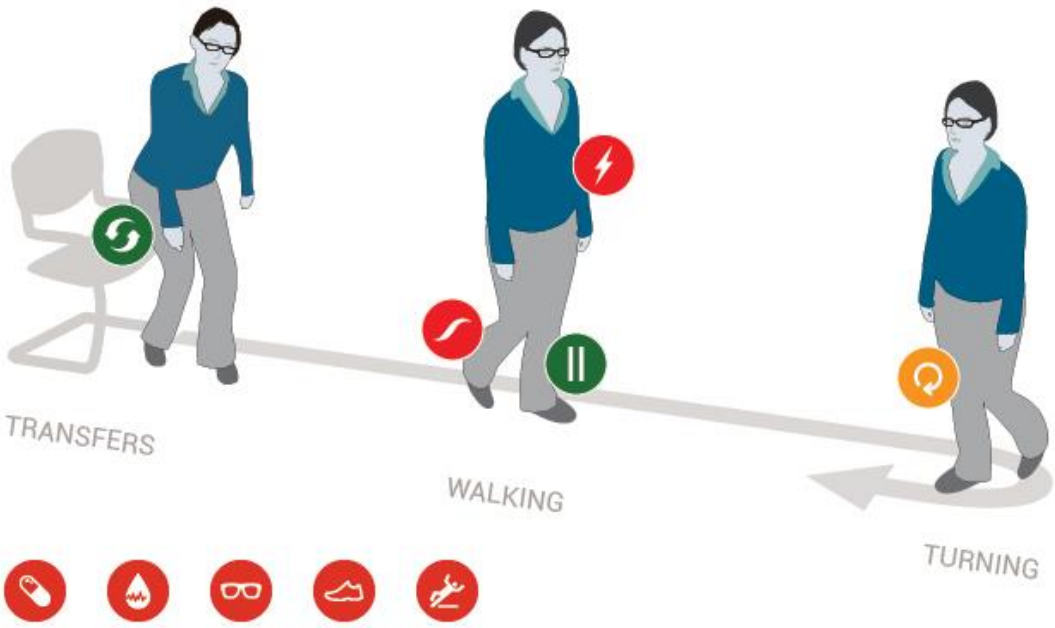


Assess

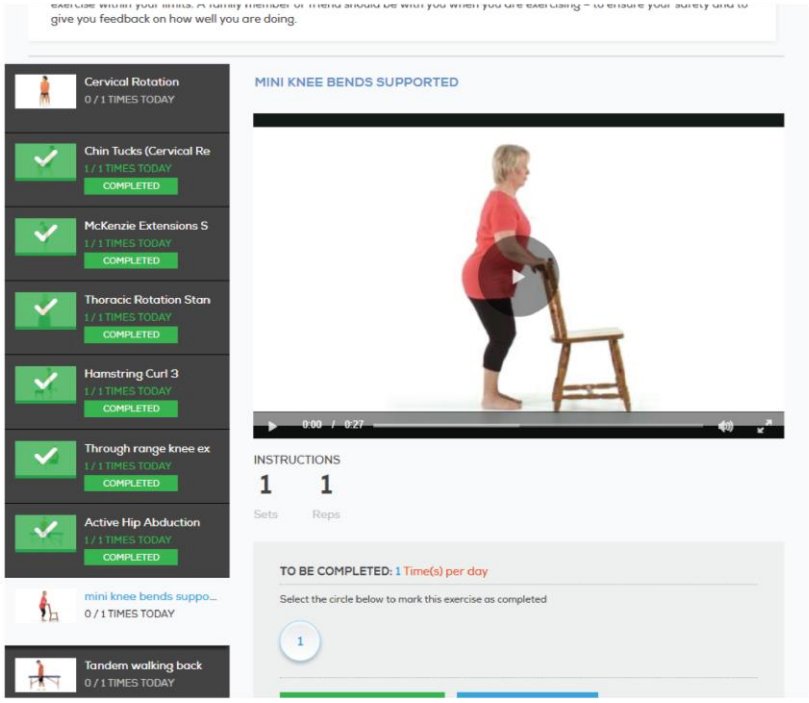
Best practice in falls prevention recommends that patients identified at risk of falls from screening are referred for fall risk assessment. Current methods for assessing falls risk can be inaccurate and subjective[1, 13]. We have developed Kinesis QTUG™ a portable, accurate and reliable fall risk assessment tool, based on the recommended and widely used Timed Up and Go (TUG) test. QTUG™ uses wearable sensors and machine learning algorithms and has been shown to more accurate in identifying seniors at risk of falls compared to the TUG test or other standard methods[4, 6-8]. In addition, reported accuracy results for QTUG™ are a significant improvement (15% more accurate) on those reported for other screening tools[11]. QTUG™ can identify specific falls risks and mobility impairment by comparison against a large reference data set of 1,495 patients is suitable for use by non-specialists. Accurate, early identification of seniors at risk of falls can significantly reduce the incidence of falls and the associated costs.

Intervene

Falls are not inevitable and incidences of falls can be reduced by 50% through early and targeted intervention[2, 3]. Research has shown that exercise interventions are the most effective[3], as they focus on modifiable risk factors such as strength and balance. Kinesis QTUG™ can be used to quantify the degree and source of falls risk (e.g. mobility impairment, medication problems, orthostatic hypotension etc). Kinesis QTUG™ also provides advice to the older adult on steps to reduce their falls risk.



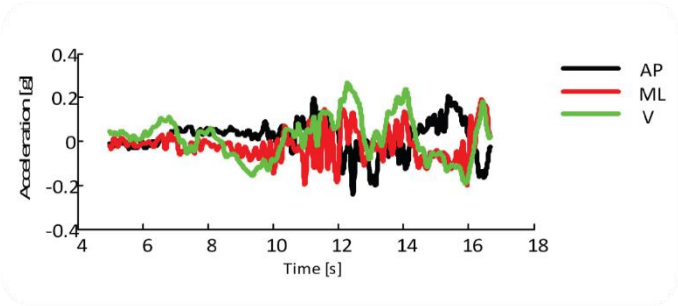
In supporting best practice intervention, Kinesis has partnered with an online exercise platform to deliver personalized fall prevention exercise programs, targeting strength and balance deficits identified by Kinesis QTUG™. Patient receive a personalized exercise program, tailored specifically towards them, in order to minimize their risk of a fall.



Remote monitoring and assessment

Kinesis Balance™ is a patient-led falls risk assessment application that facilitates remote assessment to measure of the patient response to the intervention, tracks compliance and encourages patient engagement. Developed as part of the Kinesis commitment to improving older adult's lives and supporting ageing in place it allows an older adult to objectively assess and monitor their balance and risk of falls in their own home, using a smartphone. The application can be used by the older adult unsupervised or supervised by their carer, and has been designed for ease of use by this cohort.

Using the inertial sensors embedded in the smartphone along with simple questionnaires it provides an evidence-based falls risk score using validated, patent-protected algorithms, based on a dataset of 290 community dwelling older adults and it is supported by a number of peer-reviewed scientific publications[5, 9, 10].



Cost-saving

The costs associated with falls are enormous, the cost savings that can be realised using Kinesis fall prevention solutions are significant (see Kinesis QTUG™ cost saving calculator: https://www.kinesis.ie/qtug-calculator/).

Kinesis QTUG™ (Quantitative Timed Up and Go) maintains the convenience and ease of use of the TUG test but with significantly better results and can be administered by non-expert health and social care worker. The table below compares the accuracies of the assessments of QTUG™ and two TUG cut-off values which span the typical range used, for a population of 1,000 patients with an expected prevalence of falls of 33.3%[a].

Table 1: Patient Outcomes Comparison

	QTUG™	TUG w/ 12 second cutoff	TUG w/ 15 second cutoff
Total number of patients identified at risk	284	238	101
Number of fallers correctly identified	221	134	63
Number of fallers that were missed	109	196	267
Number of Falls Prevented[b]	88	54	25

As can easily be seen from this table, QTUG™ provides a far more accurate assessment – correctly identifying over two-thirds of the fallers. In contrast, TUG with a 12-second cut-off only catches 41% of fallers and with a 15-second cut-off *fails* to identify 81% of the fallers. Most importantly, QTUG™ prevents over 60% more falls compared to the TUG with 12 second cut-off and over 250% more falls compared to the TUG with 15-second cut-off.

Although the patient outcomes benefits are very compelling, most healthcare systems are under significant cost pressure. QTUG™ demonstrates very compelling benefits in this realm as well. To quantify the return on investment, we have built a very simple economic model. We assume that a typical intervention costs $500[c] and the average fall costs $9,643[12]. Combining these assumptions with the patient outcome data from above, this model projects that a $10,000 investment in 1,000 assessments QTUG™ provides approximately 70-fold return in economic benefits.

Table 2: Simple Economic Model Comparison

	QTUG™	TUG w/ 12 second cutoff	TUG w/ 15 second cutoff
Savings from avoided falls	$848,584.00	$520,722.00	$241,075.00
Costs of interventions	$142,000.00	$119,000.00	$50,500.00
Cost of 1,000 QTUG™ Assessments	$10,000.00		
Net benefit	$696,584.00	$401,722.00	$190,575.00
Economic benefit of using QTUG™ instead		$294,862.00	$506,009.00

[a] The population size is the estimated capacity of a single QTUG system, based on 10 tests per day, 250 days per year, administered every six months, with additional tests given to a portion of the population.
[b] Assumes 40% reduction in rate of falls through intervention (e.g., Otago exercise program).
[c] Estimate based on mix of Otago group and individual exercise programs.

Of course, this simple model does not consider all the costs and benefits, and every healthcare system will have different economic structures. In particular, it omits many of the benefits of QTUG™ that have been experienced anecdotally. For example:

- Improvement of patient acceptance of interventions
- Increased motivation of patients to achieve improvements (e.g., achieve a certain level of QTUG™ performance)
- Elimination of redundant tests (e.g., 6 meter walk)
- Improved consistency of results across staff and locations
- Ability to leverage less-experienced staff to conduct the test
- Use of longitudinal data to monitor patient's response to therapy
- Ability to tailor intervention to the specific patient issues

Please contact Kinesis Health Technologies if you would like help developing an economic model that reflects the unique situation of your organization.

Reimbursement

Falls-related services may be reimbursable by Medicare or through negotiation with private plans.

- Welcome to Medicare Examination (CPT code: G0402)
  - A falls risk assessment is a required element of the Welcome to Medicare examination (Initial Patient Preventative Physical Exam
- Annual Wellness Visit (CPT code: G0438/G0439)
  - A review of individual functional level and safety (falls) is included in the initial Annual Wellness Visit (AWV)
- Evaluation and Management (CPT code: 99201-99205/ 99211-99215)
  - Falls-related assessment may be completed as part of a scheduled office visit if >50% of visit was face-to-face education/counseling and documented (time) or by an identified and appropriately documented reimbursable medical condition
- Motion Analysis Procedures (CPT code: 96000)
- Physical performance test (CPT code: 97750)
- Gait training (CPT code: 97116)
- Orthotic training (CPT code: 97760)
- Prosthetic training (CPT code: 97761)
- Therapeutic exercise (CPT code: 97110)
- Neuromuscular re-education of movement (CPT code: 97112)

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