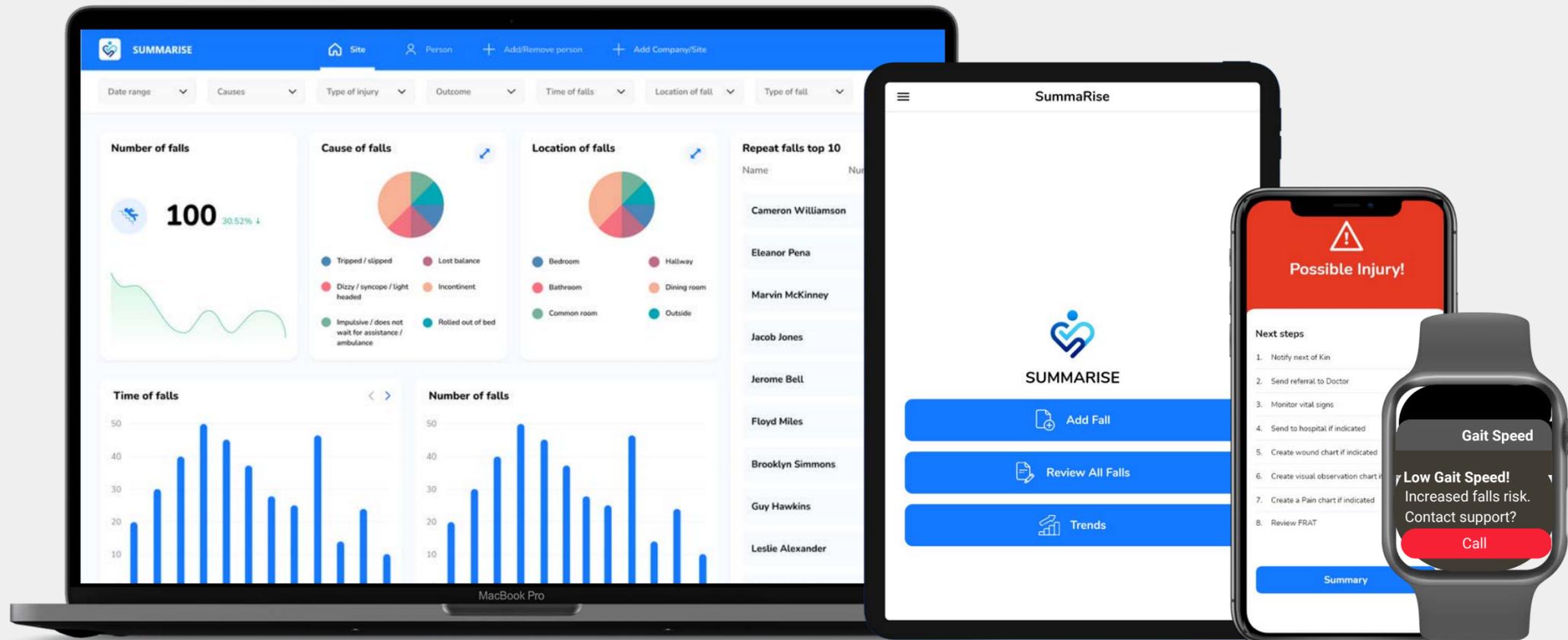




SummaRise

Intelligent Falls Management System



Daniel Hug
Founder

12/3/23
Perth, WA

Australian Guidelines- Preventing Harm in residential aged care 2009.

Australian commission on safety and quality in healthcare.

Check for injuries

- Check for signs of injury, including abrasion, contusion, laceration, fracture and head injury.^{232,275,280}

Move the resident

- Assess whether it is safe to move the resident from their position, and identify any special considerations in moving them. Staff members should use a lifting device instead of trying to lift the resident on their own. Follow the RACF's policy or guideline on lifting.

Monitor the resident

- Observe residents who have fallen and who are taking anticoagulants or antiplatelets (blood-thinning medications) carefully, because they have an increased risk of bleeding and intracranial haemorrhage. Residents with a history of alcohol abuse may be more prone to bleeding. Contact the medical officer and provide relevant details.
- Ensure ongoing monitoring of the resident, because some injuries may not be apparent at the time of the fall.^{4,232} Make sure RACF staff know the type, frequency and duration of the observations that are required.

Report the fall

- Report all falls to a medical officer, even if injuries are not apparent.^{232,275,280} The medical officer should assess and treat any injury, assess the conditions that may have caused the fall, and put any appropriate interventions in place. Staff may need to call for an ambulance to transfer the resident to hospital. In this case, transfer information should be provided, including details of the fall event.

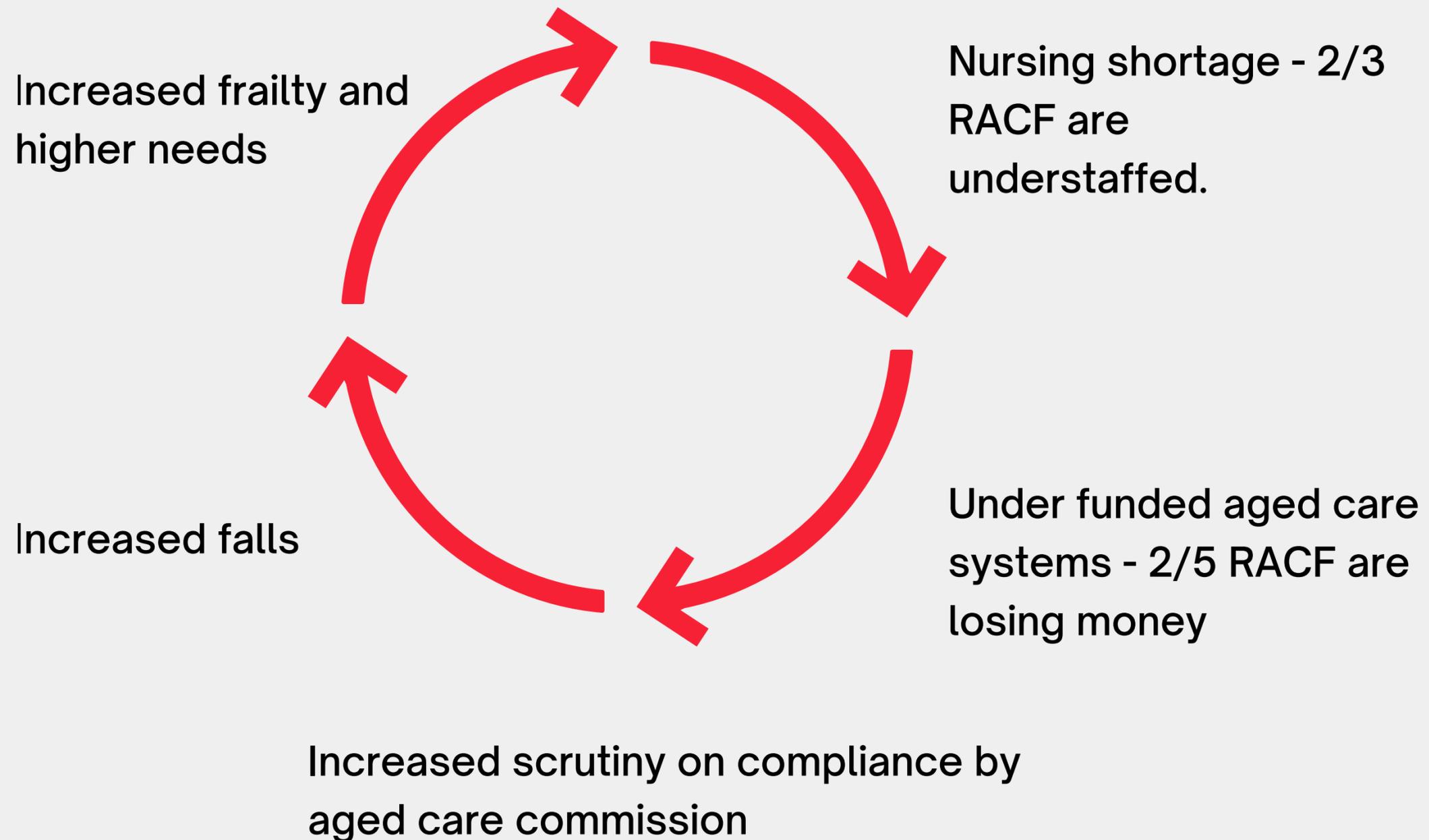
Report the fall

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- Document all details in the person's medical record, including their appearance or response, evidence of injury, location of the fall, notification of their medical provider and actions taken.^{232,275,280}
- Complete an incident reporting form for all falls,^{4,275,280,299} regardless of where the fall occurred or whether the person was injured.
- Note any details of the fall when reporting the incident, including any recollections of the resident.^{275,280} At a minimum, this should include the location and time of the fall, what the resident was doing immediately before they fell, the mechanisms of the fall (eg slip, trip, overbalance, dizziness), and whether they lost consciousness or had a conscious collapse.

Discuss the fall and future risk management

- Communicate to all relevant staff, family and carers that the resident has fallen and has an increased risk of falling again.²⁷⁵
- At the earliest opportunity, notify the person nominated to be contacted in case of an emergency.^{275,280}
- Discuss with the resident and their family the circumstances of the fall, its consequences and actions planned to reduce their risk of falling again.²³²
- Assume that once a resident has fallen, they automatically have a high risk of falling again until they have been assessed.²³²
- Follow local guidelines for identifying residents as being at increased risk of falling.

The Problem with Falls in Residential Aged care



Further problems with RACF

- **Allied health is not funded in new funding model**
 - Subbeam trial demonstrate up to 50% falls reduction with physiotherapy intervention
- **Falls reviews is lengthy**
 - Can take between 45minutes to 2 hours to document a fall.
 - More time documenting than on the floor assisting residents.
- **Lack of digitization in the health system**
 - Industries that are digitized are working with legacy software that is focused on documentation not user efficiency
- **Complexity of falls**



What we know - Prevalance

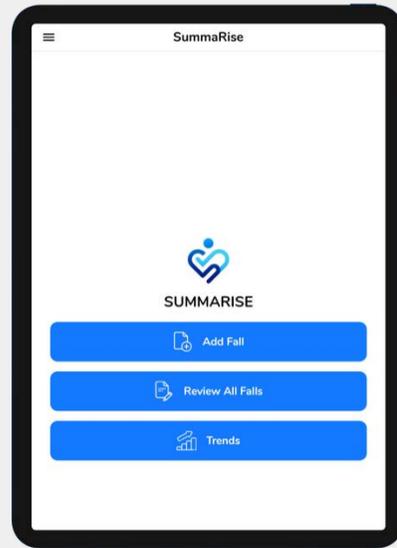
- 1 in 3 people living at home over 65 have one fall every year
 - Approx 1.3 million falls per year
- Over 200,000 ED visits due to falls
- In 2018 2.3 billion was spent on treating falls related injuries for people over the aged of 65.
- In 2020 there were 5,034 fall related deaths.
- From July to Sept 2022 62,000 falls were reported in RACF.
 - Approximately 32.4% of all aged care recipients had a fall in three months.

* Note: 2030 and 2040 figures for health outcomes are based on 2020 data from AIHW4 combined with the ABS population projections



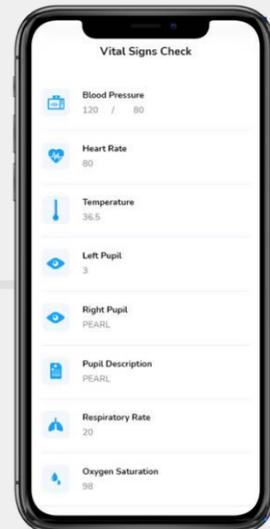
Falls reporting for residential aged care facility is from the Australian Institute of Health and Welfare.

SummaRise Solution



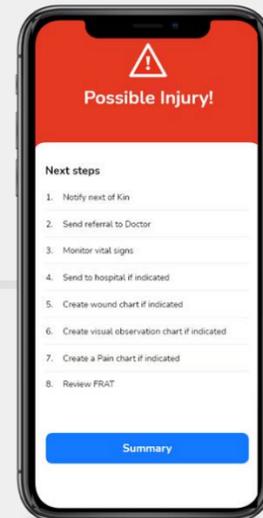
FALL OCCURS

Immediate documentation at the bedside.



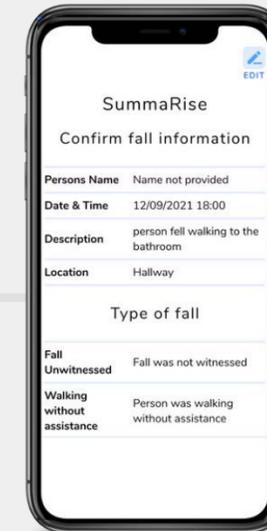
STANDARDISED ASSESSMENT

Nurses guided through assessment process.



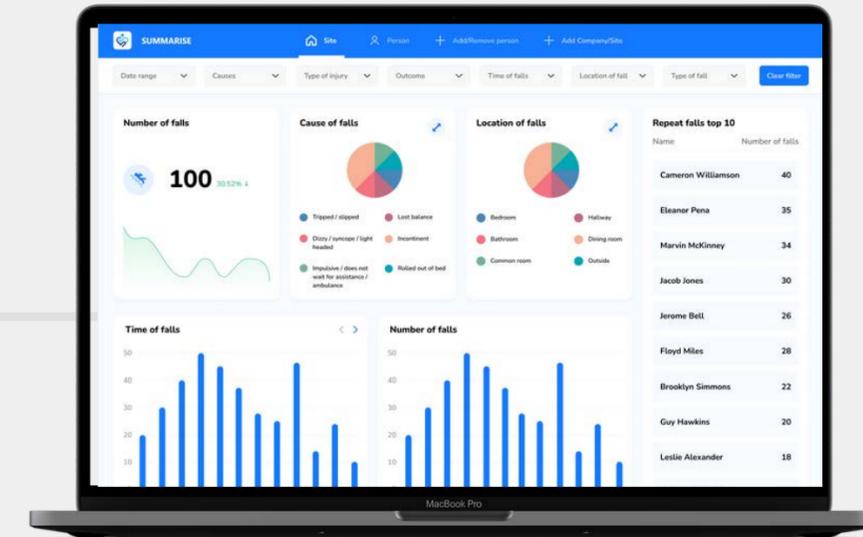
ALGORITHM TO RECOMMEND NEXT STEPS

Nurse advised on management and prevention steps.



AUTOMATED DOCUMENTATION

Notes automatically generated to be uploaded to CMS



INTELLIGENT DASHBOARD

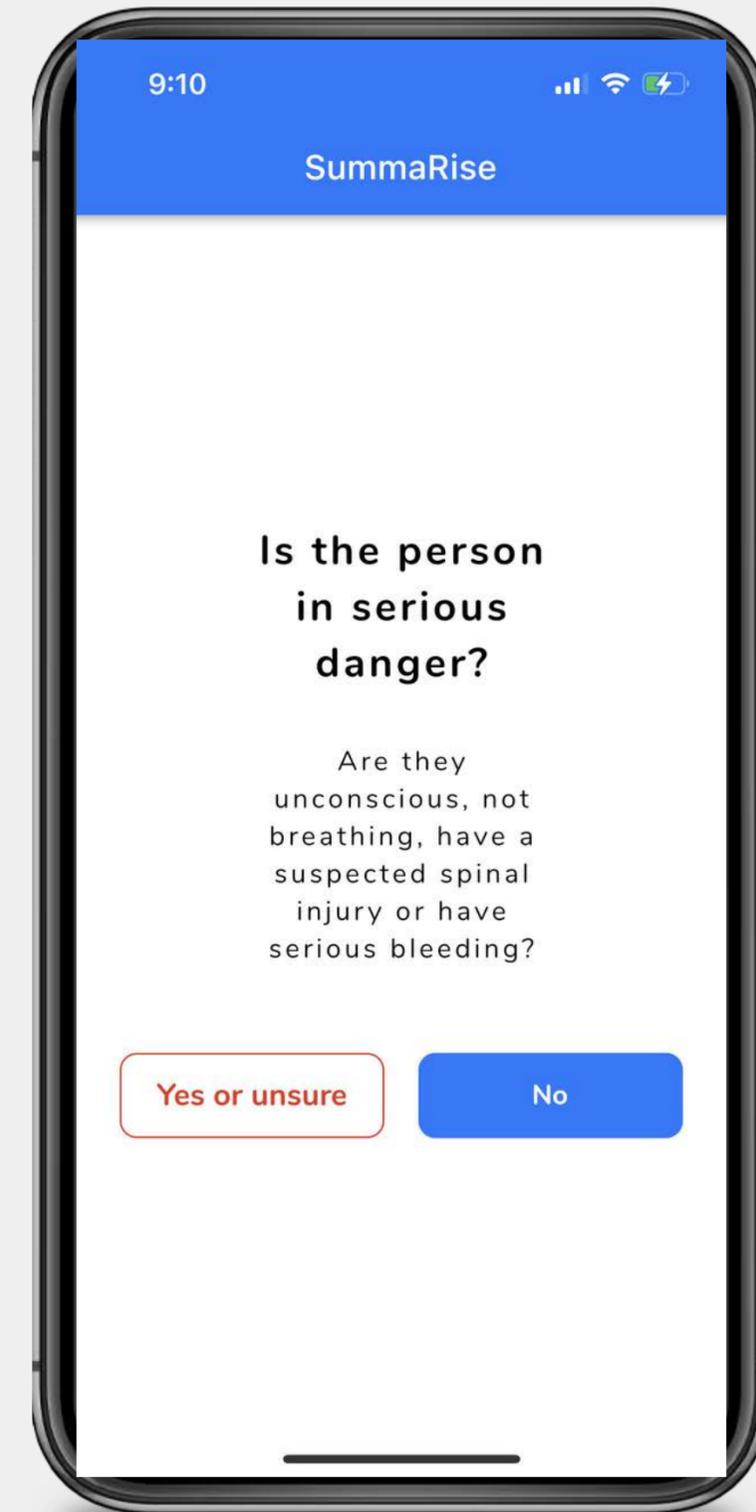
Improve falls management and prevent falls by analysing trends and patterns



Post-fall Assessment

SERIOUS DANGER

- Follow DRS.ABCD principles
- Don't move person until we are cleared of this.
- Send for help



Post-fall Assessment

INITIAL DESCRIPTION

- Description
 - How they fell
 - What they were doing
 - intention
 - head strike
 - Time of day
- Type of fall
 - witnessed/unwitnessed
 - walking without assistance
 - walking without aid
- Location

9:03

SummaRise

Please enter the persons name

Enter name

Please enter a description of the fall

Enter description

Type of fall

Unwitnessed Fall

Walking without assistance

Walking without walking aid

Call bell out of reach

Other

FRACTURE ASSESSMENT

- Do they have pain
- Location of pain
- Bony tenderness
- Increased pain with movement
- Obvious deformity or shortening
- * Changes in weight bearing status and mobility*

9:05

SummaRise

Do you suspect a fracture?

Do they have pain?

right hip, 9/10 pain

Bony tenderness on palpation?

right hip.

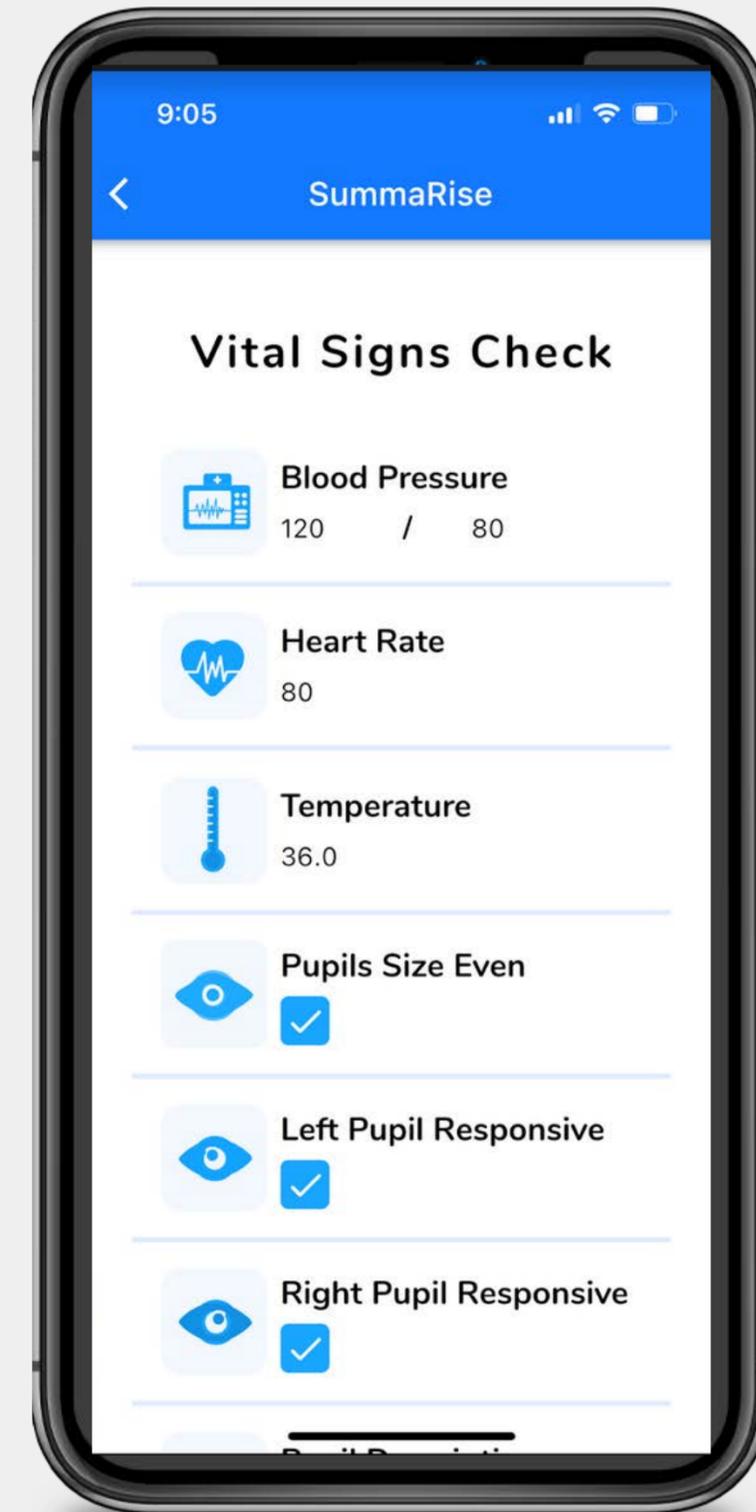
Increased pain with movement?

Limb shortening or deformity?

Next

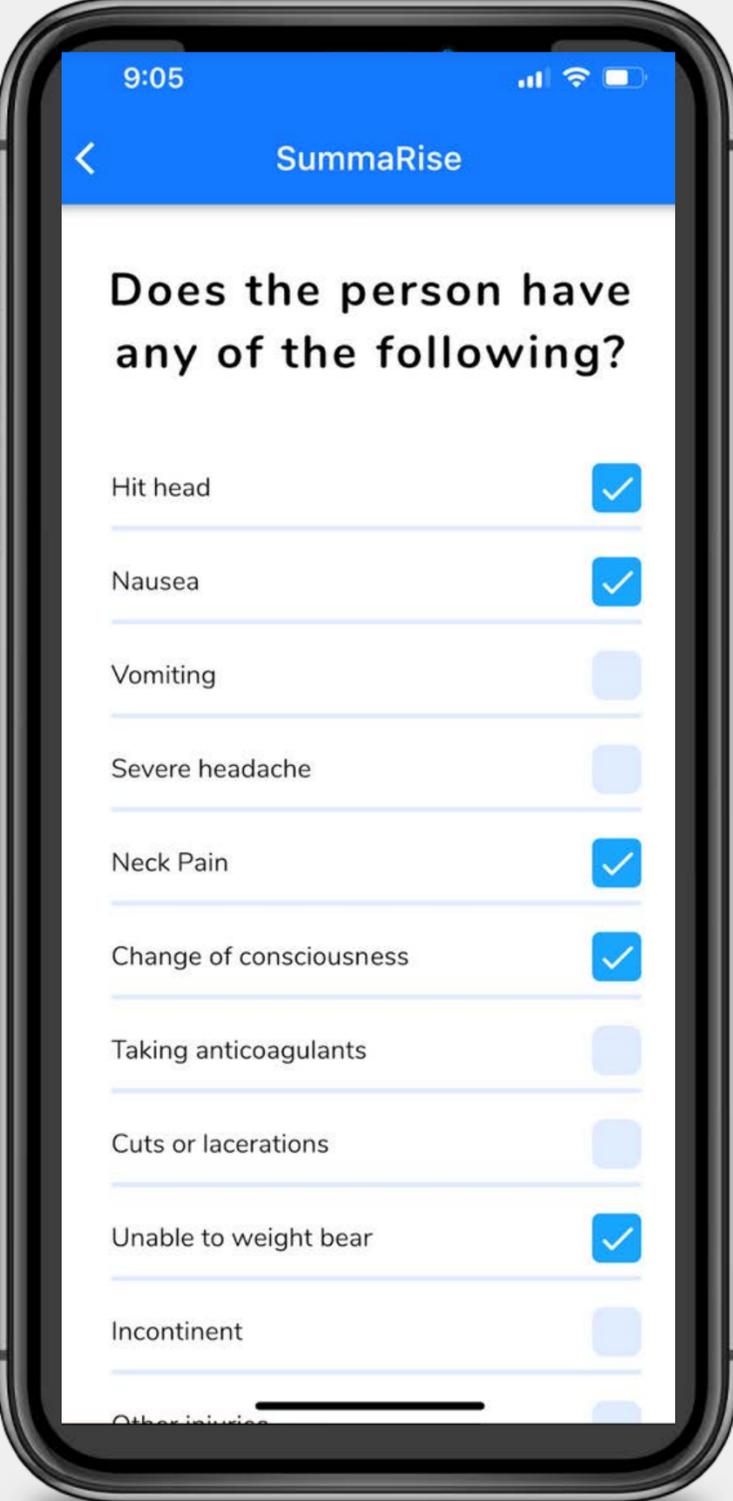
VITAL SIGNS

- Blood pressure
- Heart rate
- Temperature
- Pupils
 - response to light
 - Left and right equal size
- SpO2
- Blood glucose
- Respiratory rate



OTHER INJURIES

- Hit head
- Nausea
- Vomiting
- Severe headaches
- Neck pain
- Change of consciousness
- Taking anticoagulants/antiplatelets medication
- Cuts/lacerations
- Unable to weight bear
- Incontinent at time of review



9:05

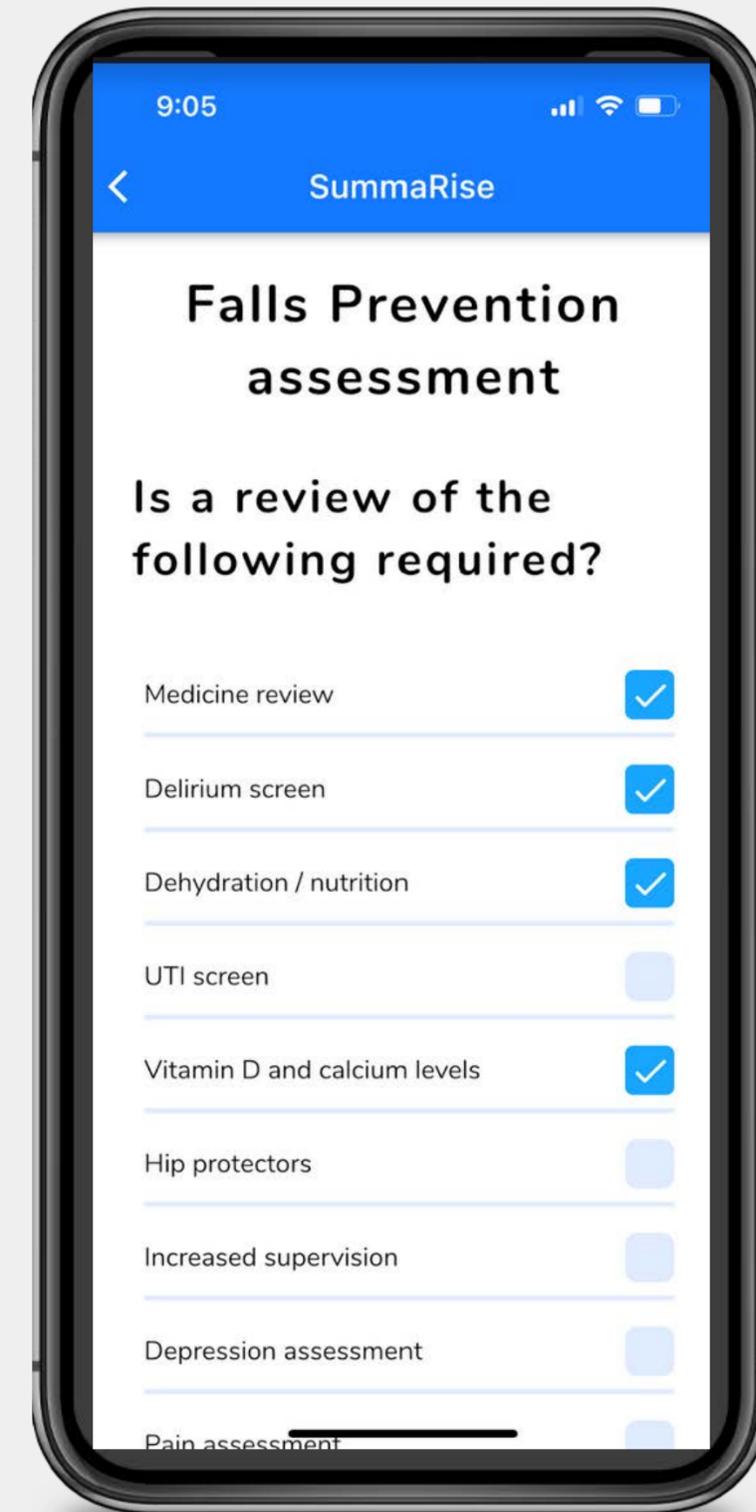
SummaRise

Does the person have any of the following?

Hit head	<input checked="" type="checkbox"/>
Nausea	<input checked="" type="checkbox"/>
Vomiting	<input type="checkbox"/>
Severe headache	<input type="checkbox"/>
Neck Pain	<input checked="" type="checkbox"/>
Change of consciousness	<input checked="" type="checkbox"/>
Taking anticoagulants	<input type="checkbox"/>
Cuts or lacerations	<input type="checkbox"/>
Unable to weight bear	<input checked="" type="checkbox"/>
Incontinent	<input type="checkbox"/>
Other injuries	<input type="checkbox"/>

PREVENTION ASSESSMENT

- Medication review
- Delirium screen
- UTI screen
- Dehydration/nutrition assessment
- Vitamin D and calcium levels
- Hip protectors
- Increased supervision
- Depression assessment
- Pain assessment



POSSIBLE CAUSES/CONTRIBUTING FACTORS

- Tripped/Slipped
- Lost balance
- Dizzy/syncope/light headed
- Incontinent
- Ambulating without assistance
- Rolled out of bed

9:06

SummaRise

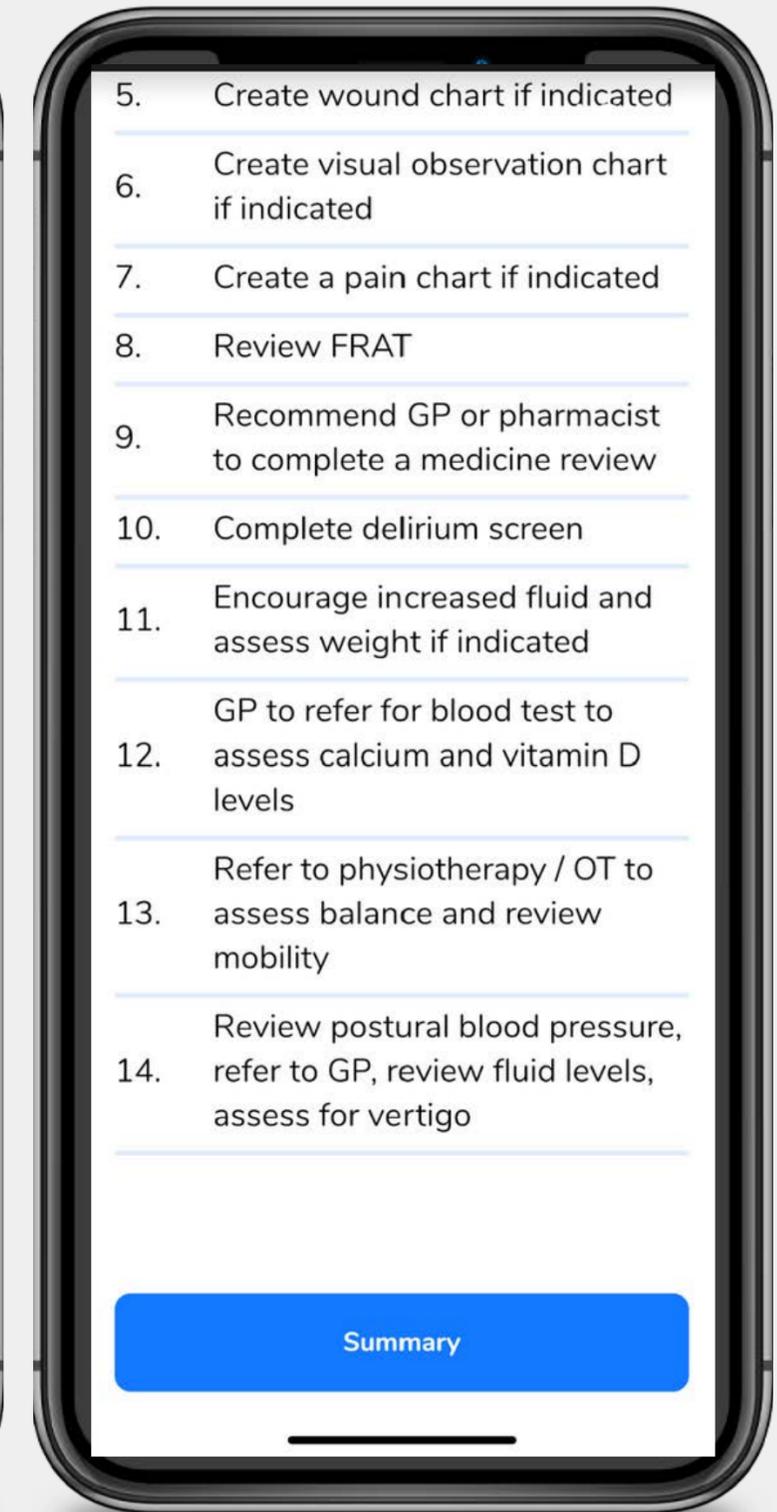
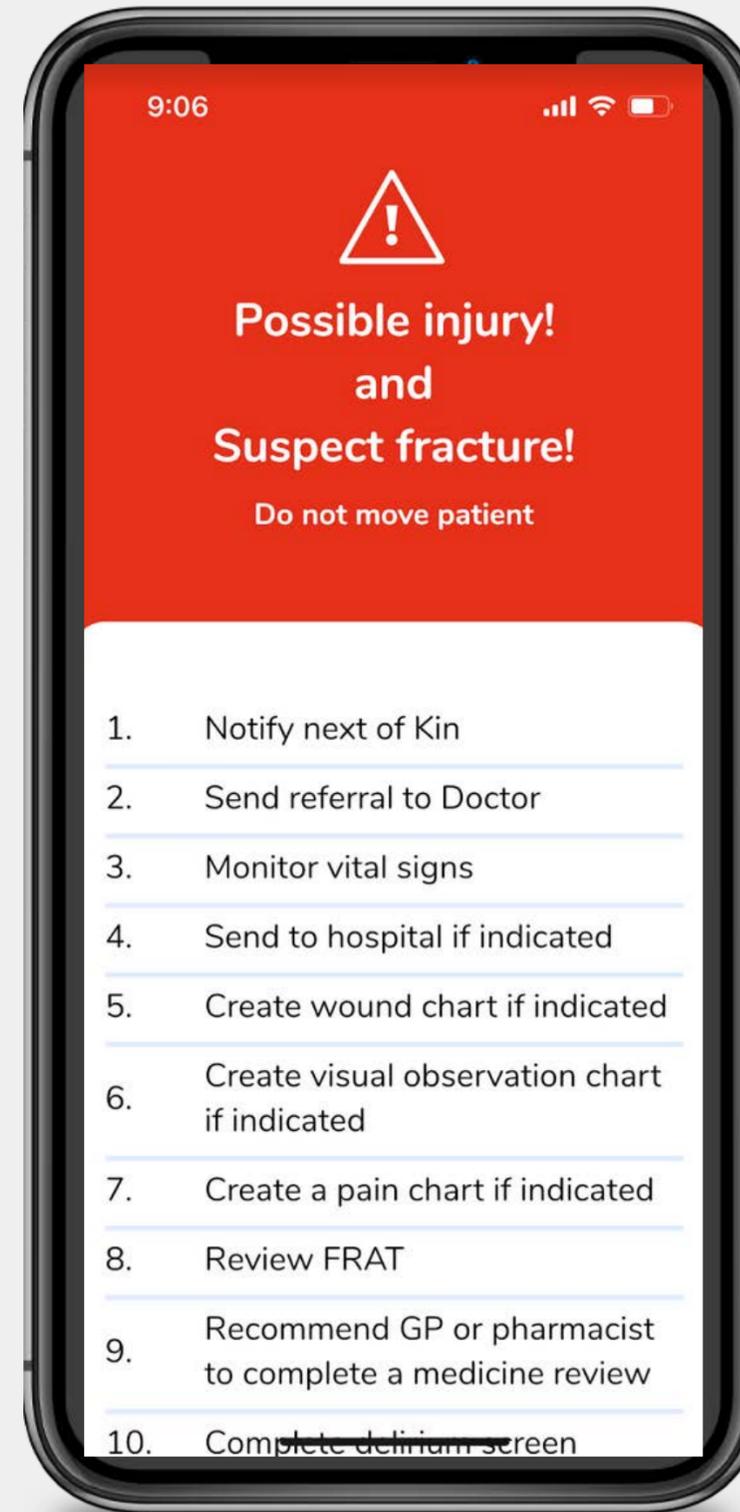
Possible causes/
contributing factors? -
You can choose
multiple factors

Tripped / slipped	<input type="checkbox"/>
Lost balance	<input checked="" type="checkbox"/>
Dizzy / syncope / light headed	<input checked="" type="checkbox"/>
Incontinent	<input type="checkbox"/>
Ambulates without assistance	<input type="checkbox"/>
Rolled out of bed	<input type="checkbox"/>
Other	<input type="checkbox"/>

Next

NEXT STEPS

- Alert to suspect injury or fracture
- Assistance on next steps based on individual assessment
- Assistance with management



SUMMARY

- Automatically Summarised notes
- Easily copy and paste
- Full sentences
- Documentation to assist nurse
- Records what may have been observed but not documented

9:41

SummaRise

EDIT

Confirm fall information

Persons Name	Andrew Stephens
Date & Time	10/03/2023 21:00
Description	resident fell whilst walking to the toilet. was found lying on his right side
Location	Bedroom

Type of fall

Fall Unwitnessed	Fall was not witnessed
------------------	------------------------

9:41

Type of fall

Fall Unwitnessed	Fall was not witnessed
------------------	------------------------

Fracture Assessment

Pain	Person reports pain, right hip, 9/10 pain
Bony tenderness	Person reports bony tenderness, right hip.
Change in pain	Person does not report changes in pain with movement of upper or lower limbs
Limb shortening	Person has no visible deformity or limb shortening

Vital Signs

9:41

shortening

Vital Signs

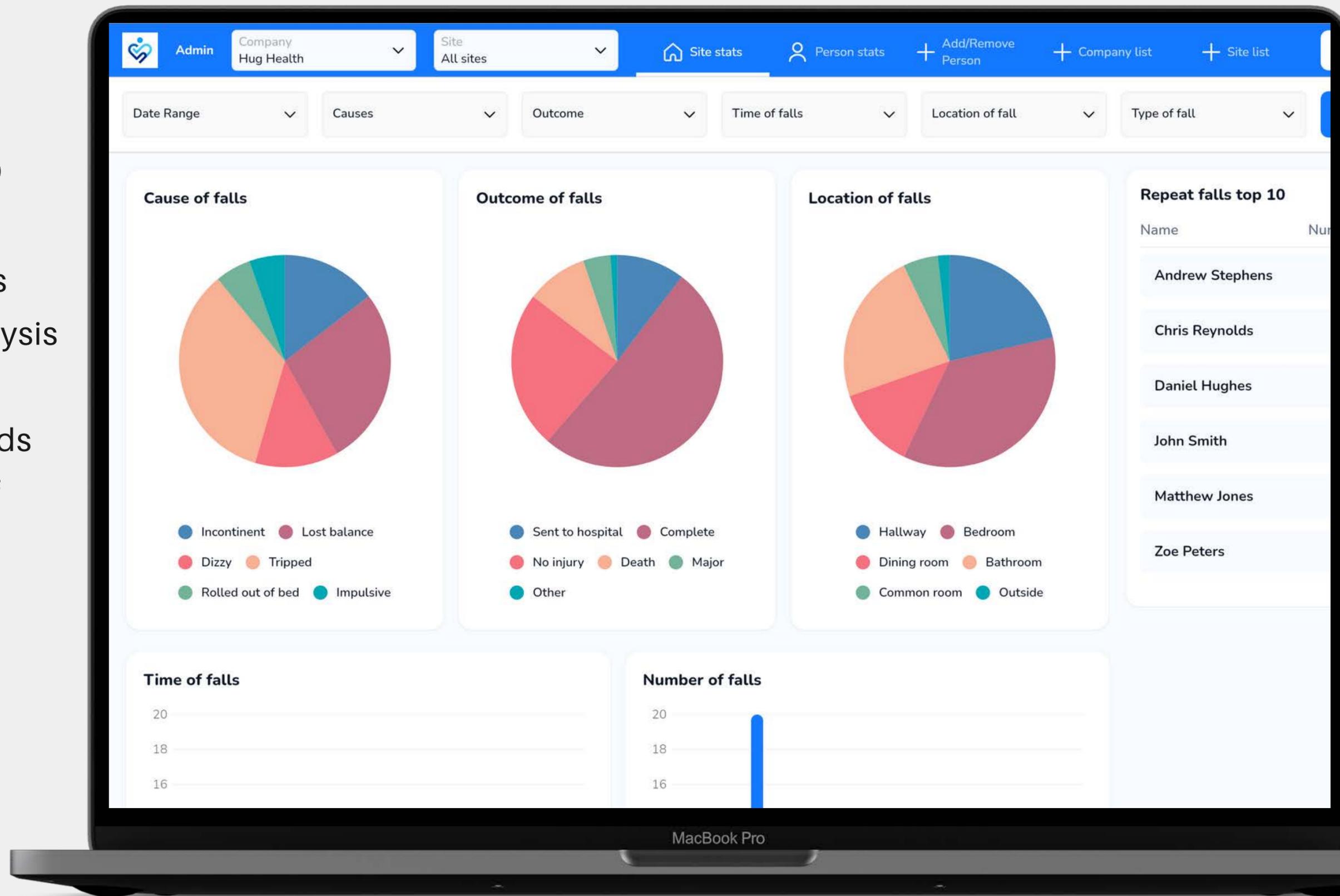
BP	120/80 mmHg
Heart rate	80 BPM
Temperature	36.0 °C
Pupils Even	Even
Pupil Left Responsive	Responsive
Pupil Right Responsive	Responsive
Resp rate	Not assessed
Oxygen saturation	Not assessed

Injury Assessment

Hit head	Person reports hitting head
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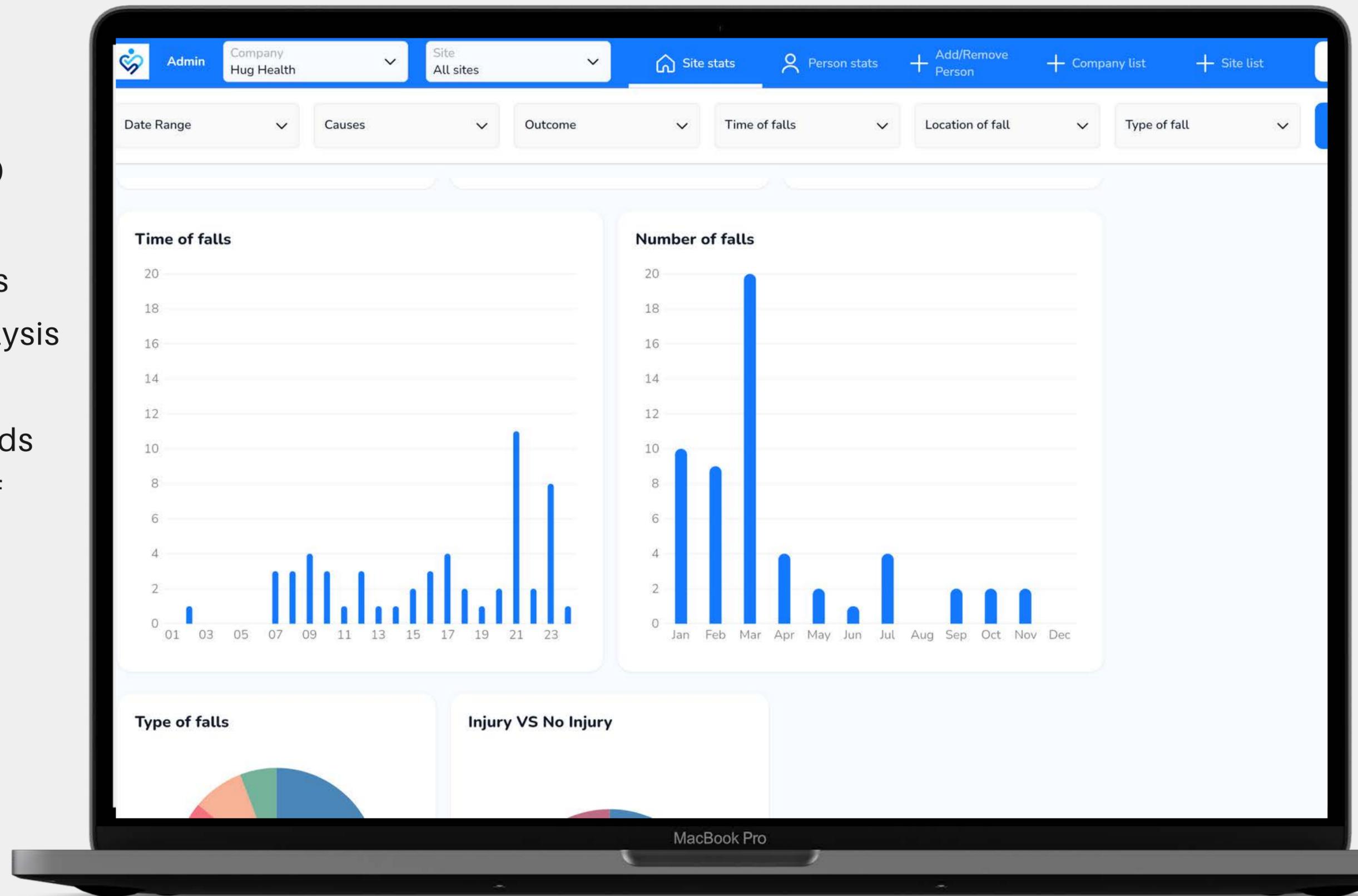
DASHBOARD

- Organisation analysis
- Individual home analysis
- Pin point causes/patterns/trends
- Individual analysis of residents



DASHBOARD

- Organisation analysis
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- Pin point causes/patterns/trends
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The Falls Continuum

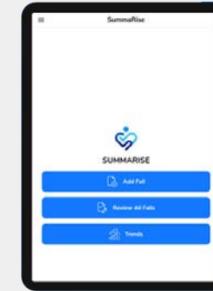
PRE-FALL



INCREASE IN RISK



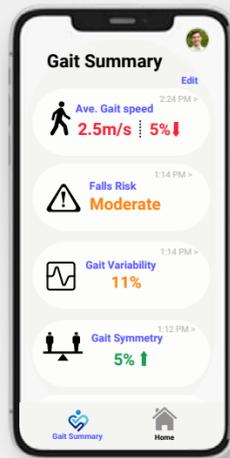
REVIEW



MANAGEMENT
AND PREVENTION

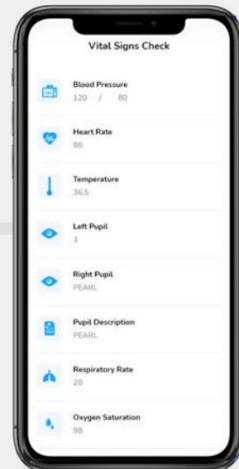


SummaRise Solution



FALLS RISK ASSESSMENT

- Therapist assessment
- Wearable assessment
- AI risk calculator



INDIVIDUALISED PREVENTION PLAN

- Automated prevention strategy advice
- Individualised falls prevention plan



ELEVATED FALL RISK DETECTION

- Wearable detects elevation in falls risk before fall
- Refer to health care professionals



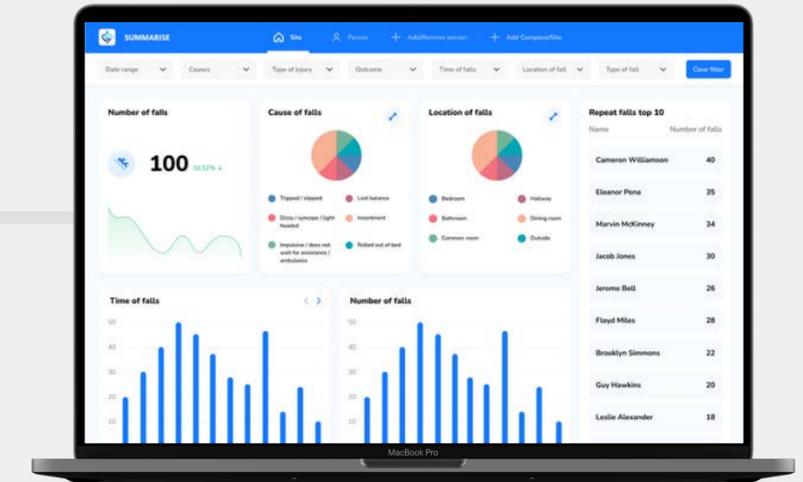
FALL DETECTION

- Alert for fall detection



FALLS DOCUMENTATION SYSTEM

- Standardised assessment
- Automated documentation
- Management advice
- Prevention advice



VIEWS TRENDS

Improve falls management and prevent falls with the SummaRise dashboard



Exciting future

- Advanced signal processing algorithms that extract digital gait biomarkers from wrist-worn devices and validation using 1-week data from 78,822 UK Biobank participants
- Algorithm based on harmonic ratio, gait speed and steps per minute to accurately predict falls risk.
- Sensitivity of 93% to detect walking

Development and large-scale validation of the Watch Walk wrist-worn digital gait biomarkers

Lloyd L. Y. Chan^{1,2}, Tiffany C. M. Choi³, Stephen R. Lord^{1,2}✉ & Matthew A. Brodie^{1,4}

Digital gait biomarkers (including walking speed) indicate functional decline and predict hospitalization and mortality. However, waist or lower-limb devices often used are not designed for continuous life-long use. While wrist devices are ubiquitous and many large research repositories include wrist-sensor data, widely accepted and validated digital gait biomarkers derived from wrist-worn accelerometers are not available yet. Here we describe the development of advanced signal processing algorithms that extract digital gait biomarkers from wrist-worn devices and validation using 1-week data from 78,822 UK Biobank participants. Our gait biomarkers demonstrate good test–retest-reliability, strong agreement with electronic walkway measurements of gait speed and self-reported pace and significantly discriminate individuals with poor self-reported health. With the almost universal uptake of smart-watches, our algorithms offer a new approach to remotely monitor life-long population level walking speed, quality, quantity and distribution, evaluate disease progression, predict risk of adverse events and provide digital gait endpoints for clinical trials.

Exciting future

- Changes in gait speed increase falls risk by 4.22 times within 3 weeks.

Using Embedded Sensors in Independent Living to Predict Gait Changes and Falls

Lorraine J Phillips¹, Chelsea B DeRoche¹, Marilyn Rantz¹, Gregory L Alexander¹, Marjorie Skubic¹, Laurel Despins¹, Carmen Abbott¹, Bradford H Harris¹, Colleen Galambos¹, Richelle J Koopman¹

Affiliations + expand

PMID: 27470677 PMCID: [PMC5272917](#) DOI: [10.1177/0193945916662027](#)

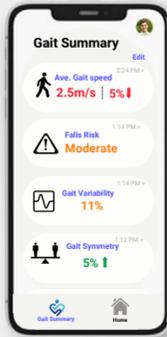
[Free PMC article](#)

Abstract

This study explored using Big Data, totaling 66 terabytes over 10 years, captured from sensor systems installed in independent living apartments to predict falls from pre-fall changes in residents' Kinect-recorded gait parameters. Over a period of 3 to 48 months, we analyzed gait parameters continuously collected for residents who actually fell (n = 13) and those who did not fall (n = 10). We analyzed associations between participants' fall events (n = 69) and pre-fall changes in in-home gait speed and stride length (n = 2,070). Preliminary results indicate that a cumulative change in speed over time is associated with the probability of a fall (p < .0001). The odds of a resident falling within 3 weeks after a cumulative change of 2.54 cm/s is 4.22 times the odds of a resident falling within 3 weeks after no change in in-home gait speed. Results demonstrate using sensors to measure in-home gait parameters associated with the occurrence of future falls.

The Falls Continuum

PRE-FALL



INCREASE IN RISK

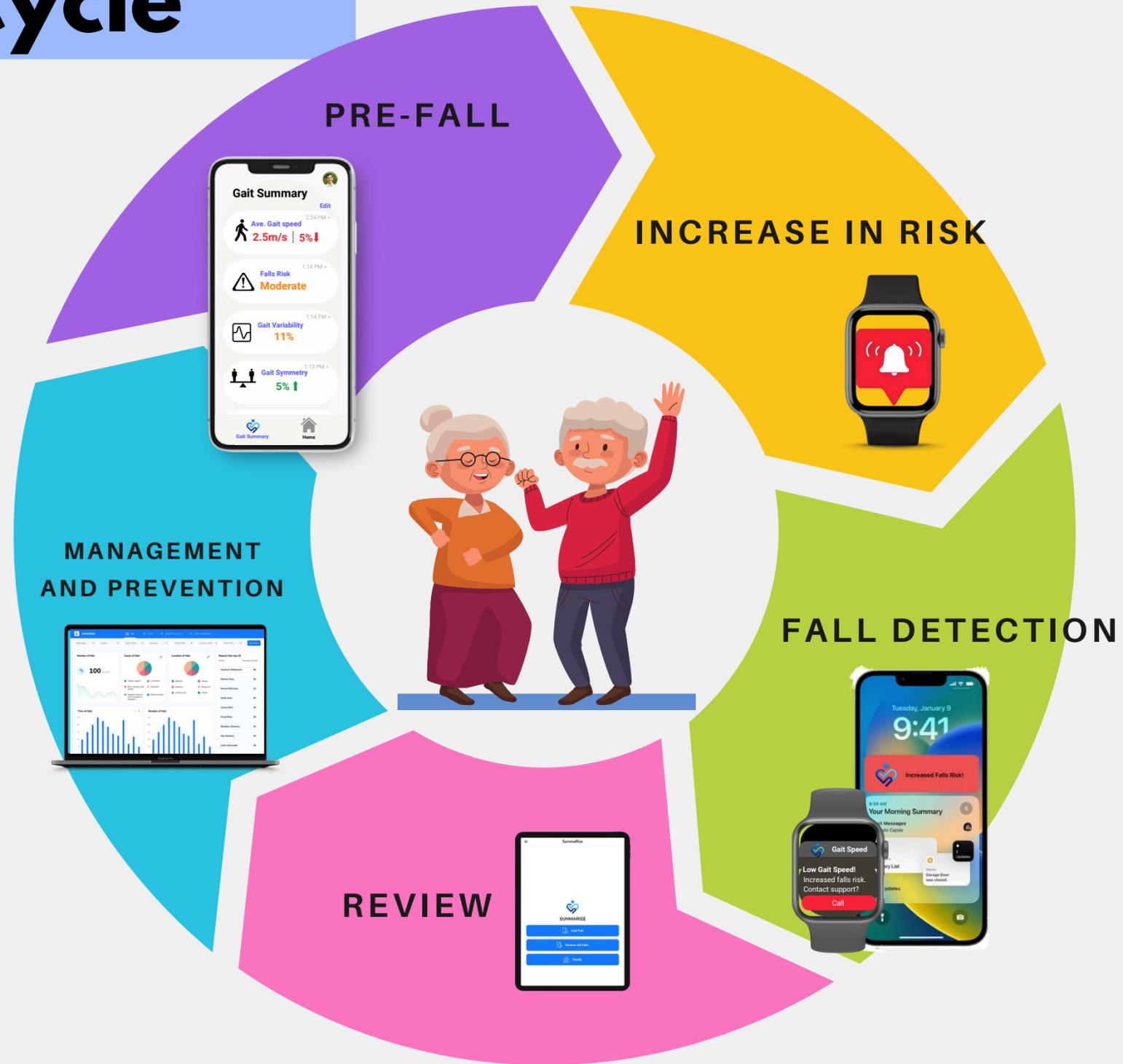


REVIEW

MANAGEMENT AND PREVENTION



The Falls Cycle





Thank You



Contact us to learn more

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Founder

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daniel.hug@summarise.com.au

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