



ADVANCED RISK MODELLING FOR EARLY DETECTION

# Prevention in Action

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# The Role of Artificial Intelligence

<https://www.armedprevention.co.uk/news/whitepaperai>

**HAS**  
technology group

WILL ARTIFICIAL INTELLIGENCE SET THE STANDARD FOR FALLS DETECTION?

Understanding h  
facilitating heal

**SCOTLAND**

Source: www.gov.scot

**£470 MILLION**

THE ESTIMATED ANNUAL COST TO HEALTH AND SOCIAL CARE SERVICES FOR MANAGING THE CONSEQUENCES OF FALLS

THAT'S **£1.3 MILLION A DAY!**

18,000 UNSCHEDULED ADMISSIONS AND...

390,500 BED DAYS EACH YEAR

DUE TO FALLS AND FRACTURES IN PEOPLE AGED 65 AND OVER

**WALES**

Source: www.againgweltnwales.com

ESTIMATED THAT **230,000 - 460,000**

PEOPLE OVER THE AGE OF 60 FALL EACH YEAR

UP TO **45,900**

OF THESE SUFFER SERIOUS INJURY: FRACTURE, HEAD INJURY, OR SERIOUS LACERATION

**ENGLAND**

Source: Local Government Association (LGA)

**£2 BILLION A YEAR**

FALLS ESTIMATED TO COST THE NHS

BY 2020 UP TO **1,000**

ELDERLY PEOPLE

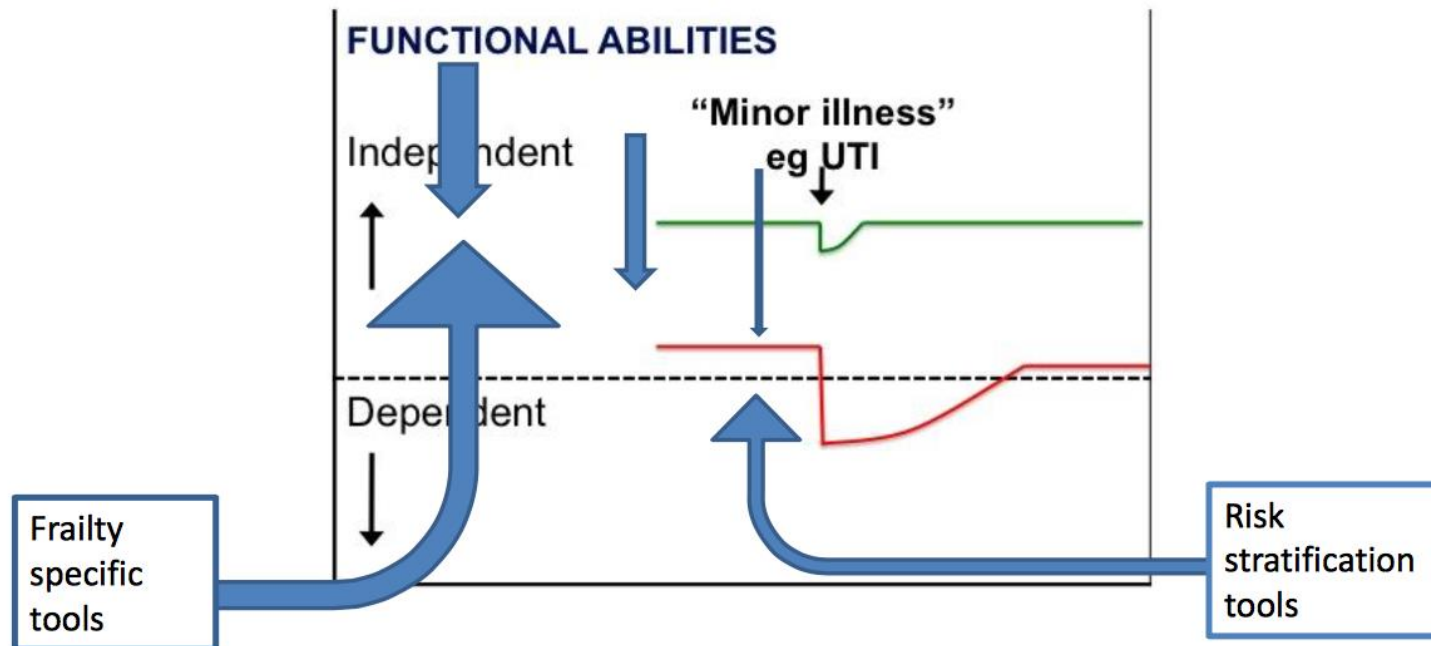
A DAY WILL BE ADMITTED TO HOSPITAL BECAUSE OF A FALL

FALL-RELATED HOSPITAL ADMISSIONS AMONG THE ELDERLY INCREASED BY **9%** BETWEEN 2014-2018

"The core currency of any business going forward will be the ability to convert their data into AI that drives competitive advantage" - Satya Nadella.

# The Frailty Conundrum

## Frailty as an abnormal health state (Loss of physiological reserve)



# Polar Device Data Metrics

## Daytime Activity

Date	Low
Resting	Medium
Sitting	High

## Sleep Pattern

Total sleep	Restful sleep	Restless sleep
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## Mobility

Inactivity stamps	Distance walked	Steps taken
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# Body Composition Scales Data Metrics

## BC Scales

Body Fat (%)

Muscle Mass

Bone Mass

Body Mass Index (BMI)

Metabolic Age

Body Water (%)

Visceral Fat

Daily Calorie Intake (DCI)

Weight



# Strength Grips Data Metrics

## Grip Strength Meter

Grip Strength Reading 1

Grip Strength Reading 2

Grip Strength Reading 3

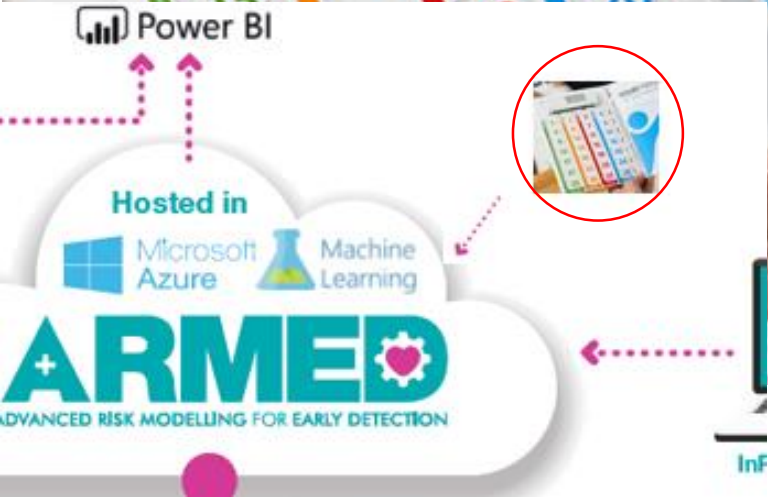


# Medication Adherence Management



**“What if we could identify issues like UTI’s prior to the person being diagnosed.....”**

- Fully managed by local pharmacies. Medications collected / delivered directly to the individual
- Provides an audible and visual prompt to the user with which medication number to be taken
- Alerts configured per person with where the “non adherence” messages are sent
- Provides data for future use within the ARMED analytics to identify common but problematic issues such as UTI’s
- 25% increase in adherence seen to data



# What is the effect of the Environment? Using LoRa WAN

Our LoRa Gateway on the Left attached to a high gain external antenna.

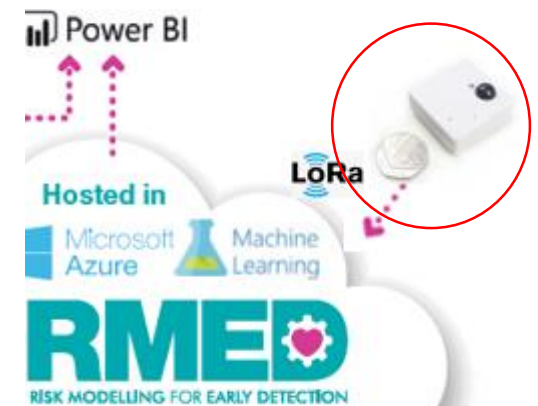


Test Equipment that Boston Network have provided on the right.

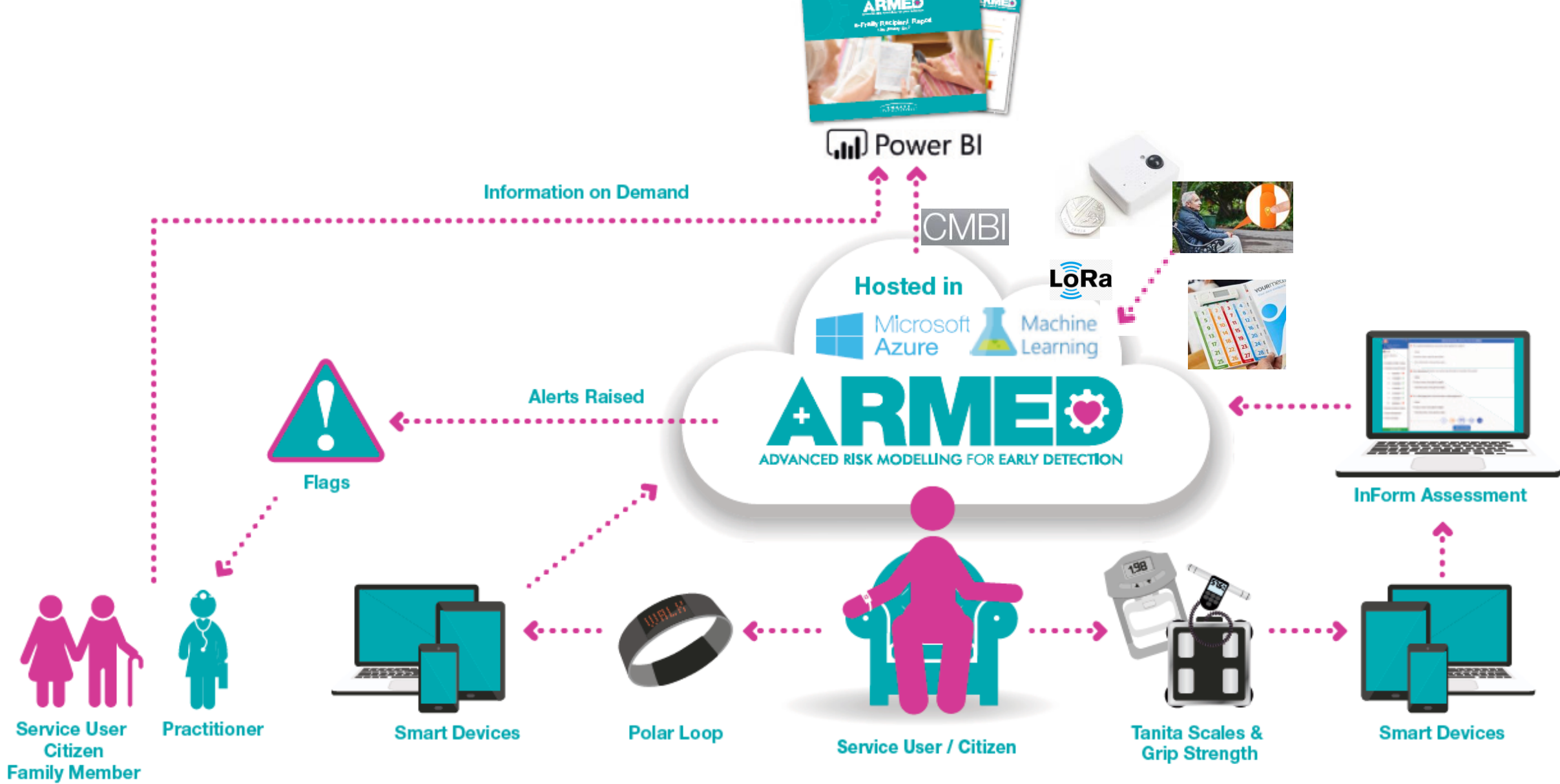


- This combined sensor includes
  - Motion Detection(PIR)
  - Temperature
  - Relative Humidity
  - Accelerometer
  - Light detection
  - Magnetic switch

- Data collected over long range low power network called LoRa
- Significantly reduces ongoing monthly costs
- Ability to capture data from very remote & rural locations
- GPS panic button via LoRa









**E-Frailty – CM2000 Pilot Report**  
**(Nithsdale Mills & JM Barrie House)**

**Author:**  
Moira Charters  
Head of Partnerships & New Initiatives  
Loreburn Housing Association

26 June 2017

# Loreburn Housing Association / NHS Dumfries & Galloway

## Rollout of ARMED commenced in May 2018

# ARMED use Within Loreburn HA



- Reported falls since May 2018 (reported as @ May 2019) where ARMED **not deployed**

	Number of Reported Falls	Number of Unique Individual Fallers	GP Visit	Ambulance Called	Social Care Package Instigated
Sheltered Development 1	30	9	11	16	9
Sheltered Development 2	13	5	2	3	3
Sheltered Development 3	9	5	2	2	3
Sheltered Development 4	7	3	0	0	0
<b>Total</b>	<b>59</b>	<b>22</b>	<b>15</b>	<b>21</b>	<b>15</b>

- Establishments 1-4 (where ARMED has yet to be deployed), there has been 59 reported falls in this timeframe of 22 unique people
- There has been a lot of statutory service involvement of GP callout's, ambulances called, and packages of care put into place. This has conservatively costed at **approximately £200,000\***

How many falls has there been within Sheltered Development 5 where ARMED has been deployed? **ZERO!!!**

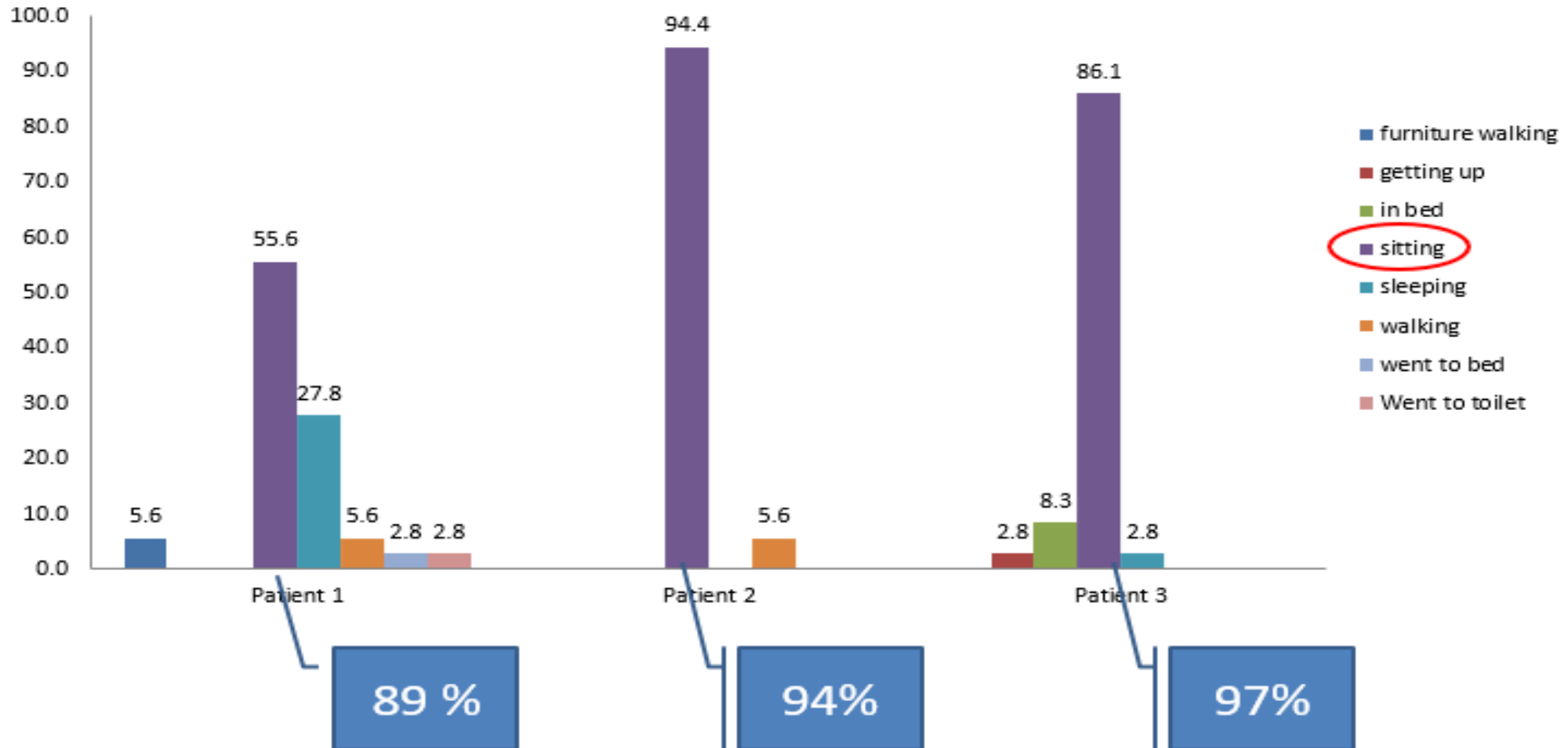
- In development 5 where we have the ARMED solution rolled out there has been zero falls. The cost of the ARMED solution over the same period would be **approximately £8,000**
- The ARMED solution in this example would represent a significant return in investment in the region of **25: 1** save to spend ratio

# Improving Activity

**Argyll and Bute Health  
and Social Care  
Partnership  
2018/19**

# Ward Observation A&B October 2018

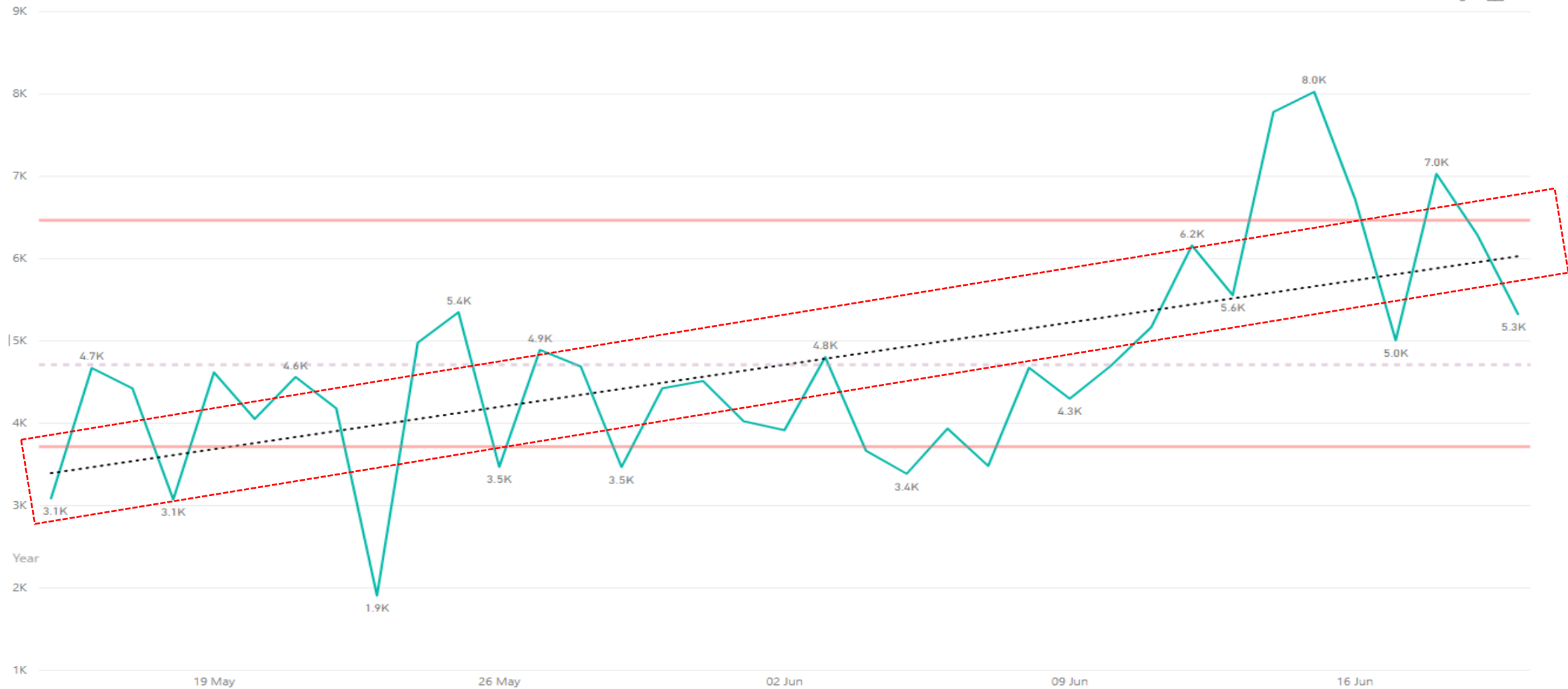
## Percentage time activity for 4 patients 1000 hrs to 1600 hrs



**A & B consistent with national data for inactivity in hospital**

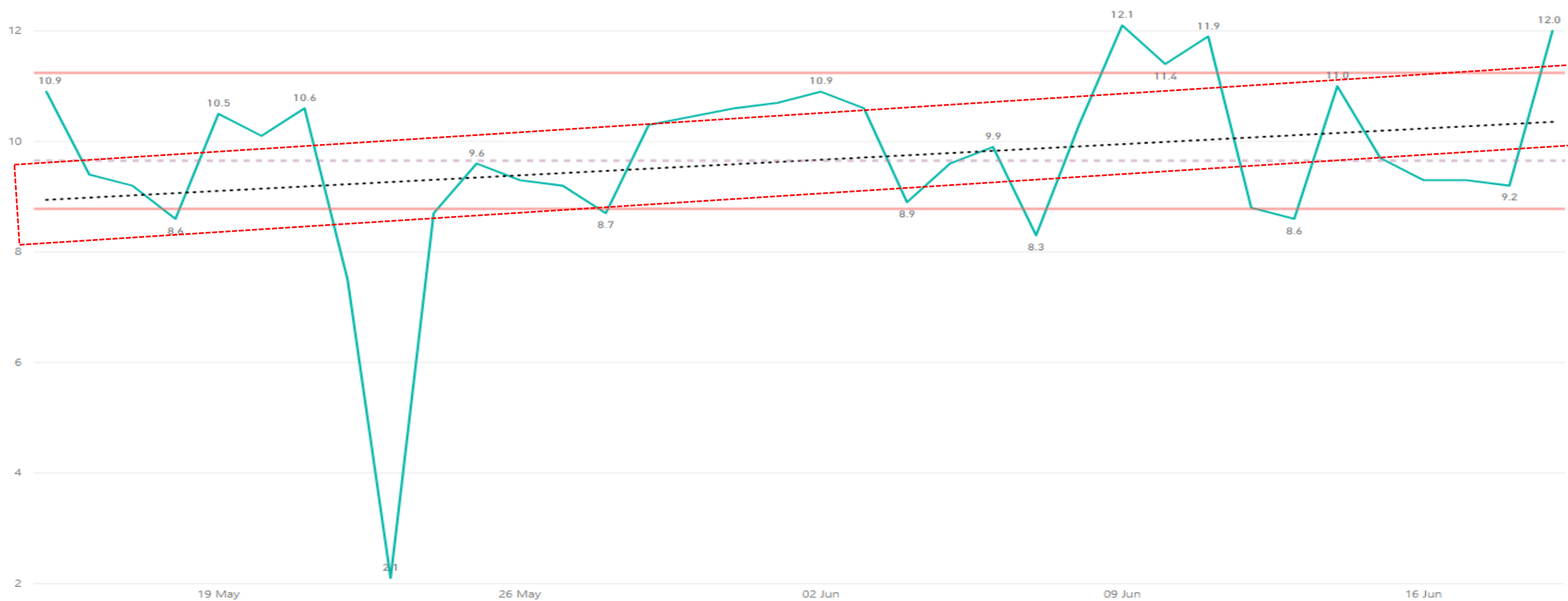
# Daily Steps Taken

Total Steps by Date



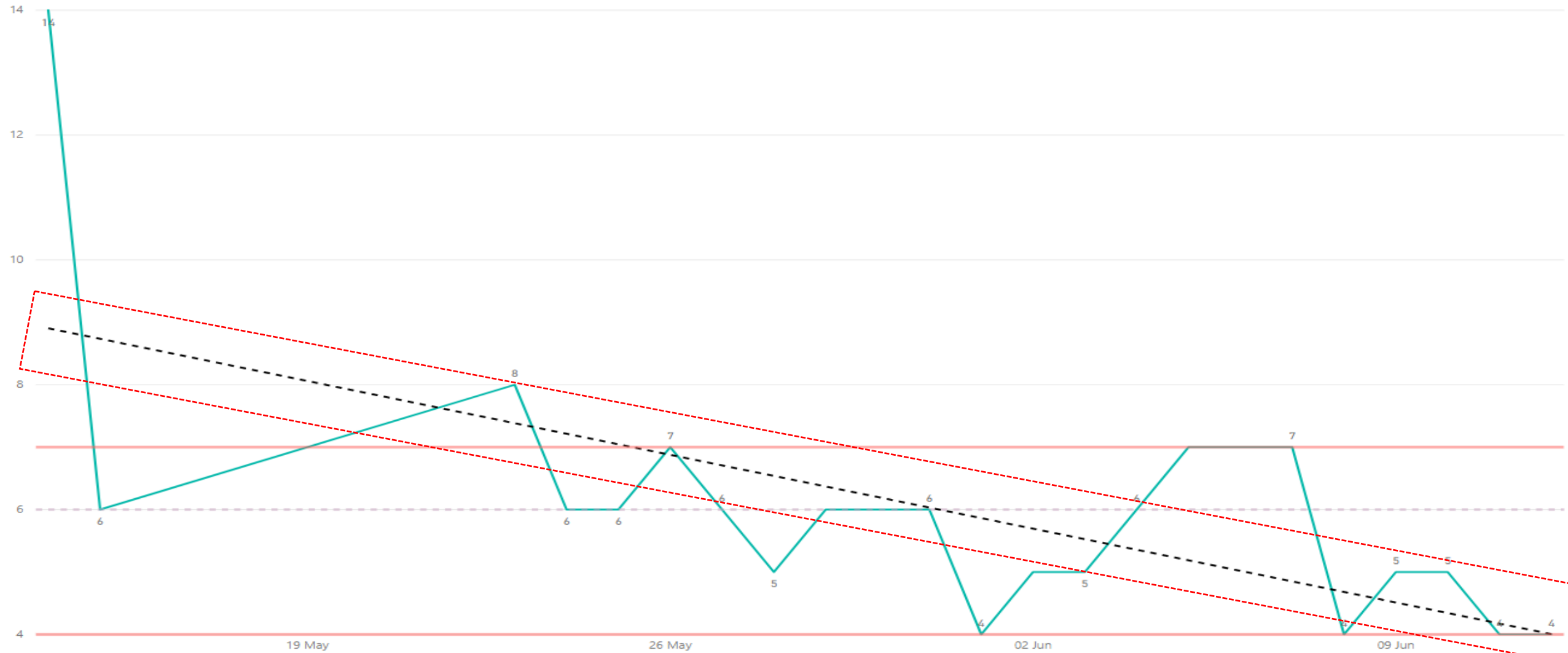
# Sleep Hours

Sleep Hrs by Date



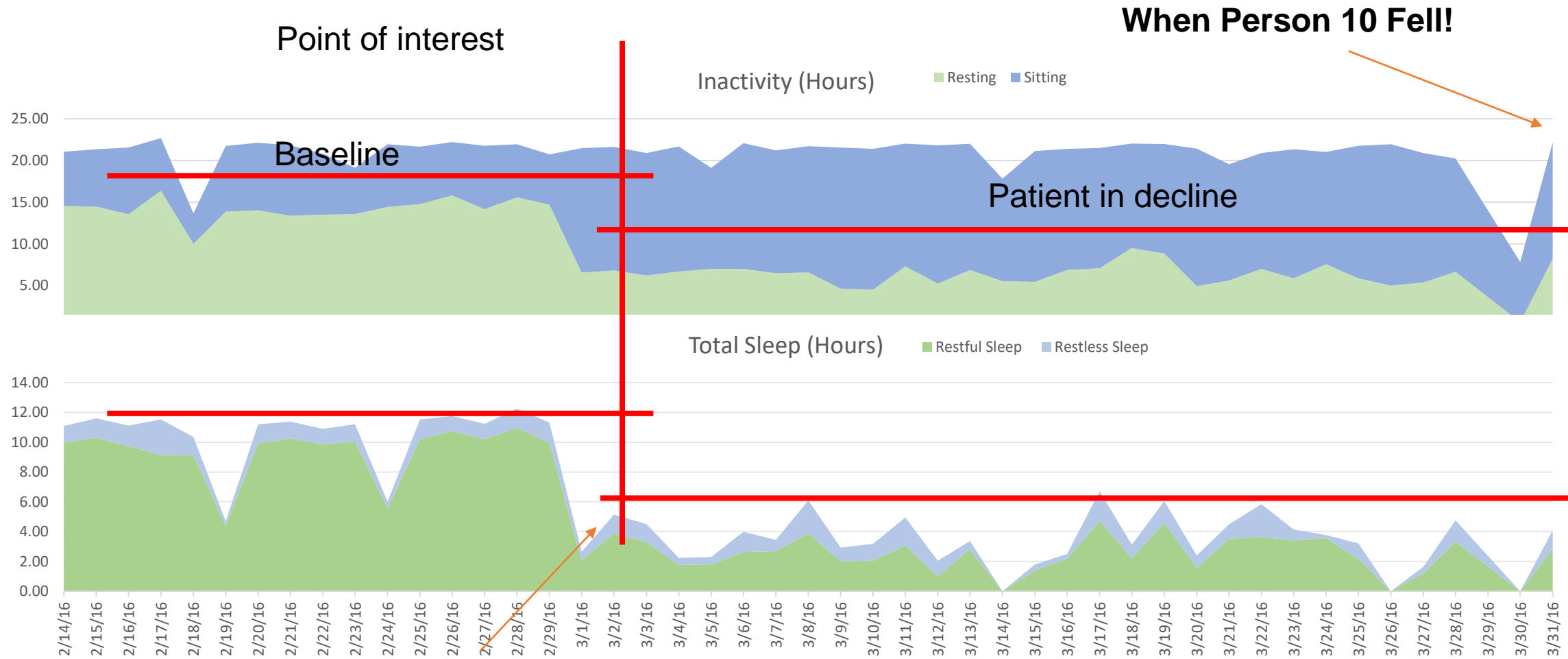
# Inactivity Stamps

Sum of Inactive Stamps by Date





# ARMED Data Visualisation of Previous Faller



When the ARMED flag would have been raised. 32 days in advance of when person fell

# ARMED

ADVANCED RISK MODELLING FOR EARLY DETECTION

*Measure more,  
Live better*

We are part of

**HAS**  
technology group

Taking you to where technology matters

**ARMED**  
ADVANCED RISK MODELLING FOR EARLY DETECTION

**care management**  
inspiring excellence

**ezitracker**  
action through innovation

**Ezicare**  
making care easy

**PAMMS**  
INTELLIGENT CARE

**QUALITY INSIGHT**  
leading with intelligence

**savii**  
INC.