NRS Healthcare

ARMED

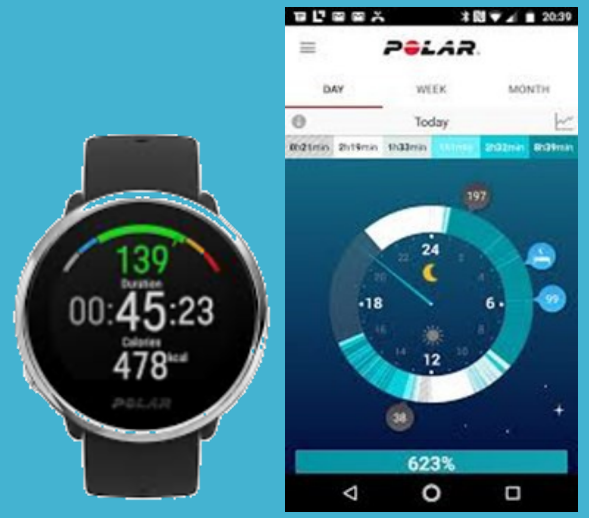
ADVANCED RISK MODELLING FOR EARLY DETECTION

INTRODUCTION TO THE ARMED PROJECT

By Chelsea Friar

WHAT IS IT?

- ARMED was developed following 6 years of PHD research at Edinburgh Napier University into frailty and health informatics
- Monitors a persons daytime activity levels (resting, sitting and level of activity) as well as night time sleep patterns (e.g. light, moderate, non-wear, sedentary and sleep).
- Polar device and phone
- Early detection and prevention of falls (upstreaming)
- Enabling people with more complex care needs to live longer
- Cost saving by avoiding hospital admission/care
- Improving quality of life



"If we can predict that a person is at risk of falling, we can prevent the pain, anxiety and loss of confidence that comes from a fall, by getting support in fast."

- Elaine Torrance, Past President of Social Work Scotland

EVIDENCE-BASED

- Number of people aged 65 years forecast to rise by a third by 2025 and those over 80 forecast to double in the same period (Department of health, 2009).
- Department of health data shows that 30% of Scotland's population are aged 65-79 years and 45% of those age 80 years and over, fall each year (2009).

Number of falls-related events in Scotland 2010/2011:

- Total number of people falling: 294,194 (34% of population aged 62 years and over)
- Admissions: 16,549 (35% of A&E attendances)

Post-discharge:

- All patients were assumed to have a shared assessment by a social worker and community therapist, taking 1 hour at a cost of **£84**.
- For those going directly home, a package comprising a GP visit **(£36)** and 8 weeks of 'low cost' care including home care and healthcare at a unit **£207** per week was assumed, giving a total cost, including assessment, of **£1776**.
- Estimated cost of falls: cost of hospital admission for a hip fracture, from calling an ambulance to costs arising after discharge, including any subsequent re-admissions, was estimated at **£39,490** with each other falls-related admission estimated to cost **£21,960**.

(Craig et al, 2013)

CASE STUDY

Mrs A is a 91 year old lady living on her own, who was admitted to hospital following a fall. Mrs A is receiving support from the Care Home and Telecare Team.

Before ARMED: Concerns/Risks

- Since the fall, Mrs A has lacked confidence with walking and ascending and descending the external staircase in her flat block.
- She also suffered from intermittent periods of pain which had an impact on her functional movement.

During ARMED trial

- Mrs A made significant improvement in her mobility and functional movement.
- She continued to struggle with charging of ARMED devices and required support with this.
- The data received indicated that Mrs A was maintaining a good level of activity throughout the day.
- She was consistently meeting the step-count range set by the system and prompts were helping to reduce periods of inactivity.
- Increase in confidence in walking outdoors and had no problems ascending/descending the communal stairs in her first floor flat.
- A programme was established to help recognise the inactivity levels and increase activity to help maintain muscle and bone strength.

Outcome

- Mrs A began using phone data to increase her step-count and going out daily.
- She began monitoring her sleep pattern with the phone app and adapting her behaviour to improve sleep hygiene.
- The data helped the practitioner develop a programme the client could work on, helping to improve mobility and confidence.

CASE STUDY

Mr A is a 77 year old man, living alone who was admitted to hospital in October 2019, following a fall.
He has continued to have mobility issues since and is now in receipt of a Care at Home and Telecare Service.
Prior to his fall, Mr A walked independently unaided.

Before ARMED: Concerns/Risks

- Mr A was struggling with external access to his house, due to depth and steepness of steps at the main entrance and could not access the local area independently as a result.
- Increased risk of falls.

During ARMED trial

- Data received from ARMED showed that he was having significant periods of inactivity and low step-count.
- These risks may be reducing muscle tone, general physical deconditioning and disrupted sleep pattern.
- Mr A agreed he maintains a healthy hygiene however he was unaware of the inactive periods he was having during the day as he was going out for a daily walk in his local area and doing some household chores. Later revealed that he was spending long periods of time watching TV or on social media.
- Agreed that it would be beneficial for him to slightly increase his step count during the day and on the next home visit, the data indicated that Mr A's step-count has slightly increased, which he was pleased with and felt this had a positive benefit with increase in length of local walk.
- Mr A agreed that he will continue to increase step-count to maintain condition and build on stamina.

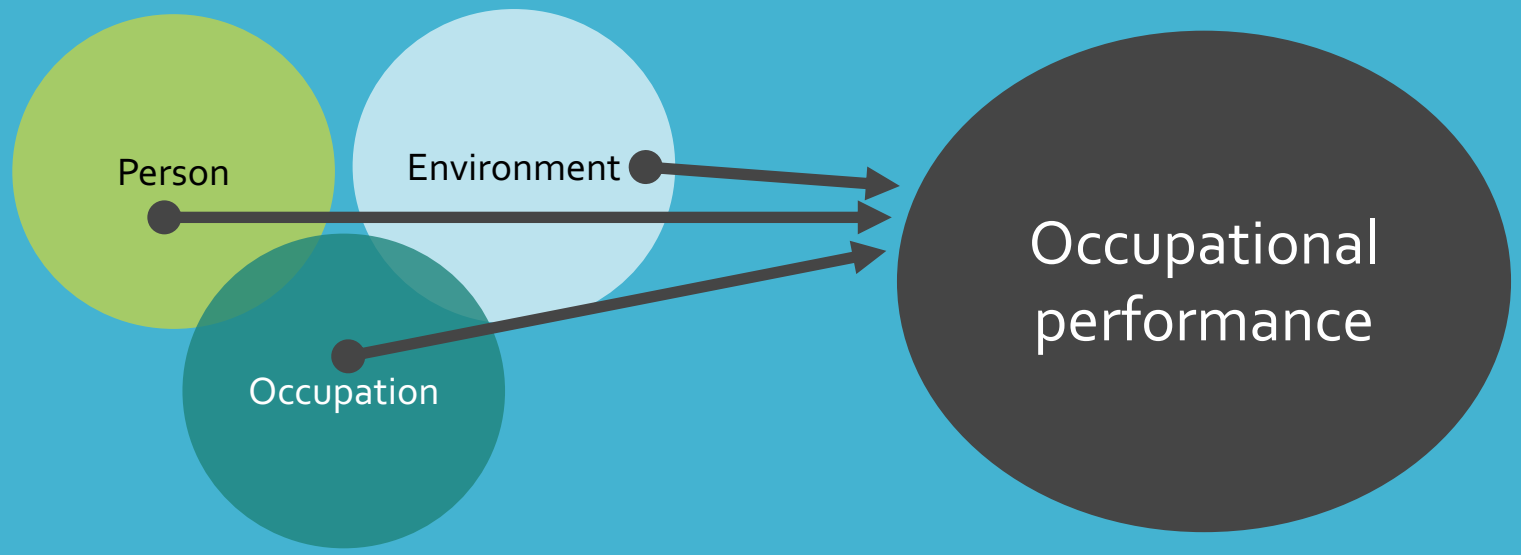
Outcome

- Since taking part in the ARMED project, Mr A's mobility improved after being shown the data and felt part of the trial has positive benefits to him.
- The programme developed with the client from the data received can potential reduce the amount of home visits as the data can be monitored and the client updated by telephone of how they are progressing.

RELATING TO OCCUPATIONAL THERAPY

Person:

- **Age: 65+**
- **Challenges:** falls risk
- **Personality and learning style:** willing to engage and able to learn new skills
- **Values, strengths and interests:**
- **Presenting conditions:** progressive or statutory?
- **Roles**
- **Experience**
- **Uniqueness**



Occupation:

- **Self-care**
- **Productivity**
- **Leisure**

Environment:

- **Physical environment:** where do they spend most of there time?
- **Social environment:** who are they surrounded by?
- **Cultural environment:** influence on healthy or not so healthy lifestyle
- **Institutional environment:** rules and requirements e.g. in extra care facility

PROJECT WITH NYCC

- Participants: 10 in community & 10 in extra care facility
- North Yorkshire Sport: intervention for those low/medium risk
  - 2 sessions a week for 4 weeks
- Duration: 3 months.
- Surveys for evaluations:
  - wellbeing survey
  - self-assessment score
- Ways of monitoring progress:
  - Timed up & go
  - 30-second sit to stand

ARMED Equipment Quick Guide

You have been given a Polar Device, as shown to the right. This should be worn at all times, including when you are sleeping.

This device is fully waterproof, therefore can be work when showering or washing hands.
The reason for wearing this device, is that it provides a wealth of information on how well you are doing. For example, it will collect data on your sleep pattern, activity and step levels. We will also be able to see periods when you are sedentary for more than an hour at a time.

Getting started

Your Polar device should automatically open the Polar application when you turn on your phone. Your phone will look like this (see image below) and is used to send the information collected from the Polar device to the ARMED system, for this to be analysed.
The first time after turning your phone on, press the button on your Polar device, located here:
This will synchronise with your phone and will then automatically happen every 2 hours.

Important: This band does not replace your Community Alarm – continue to use your Community Alarm as usual if you have one.

Your can view the historical data from your device by opening the Polar flow application. The icon for this looks like: and is shown in the image to the left.

When you **click** on this Icon, it will open the application. This will show you a clock face, see image to the right.

Software has been added onto the phone that prevents any accidental use of this device such as making calls or changing settings. This will look like the image to the left. This means that you will not be able to break anything by mistake.

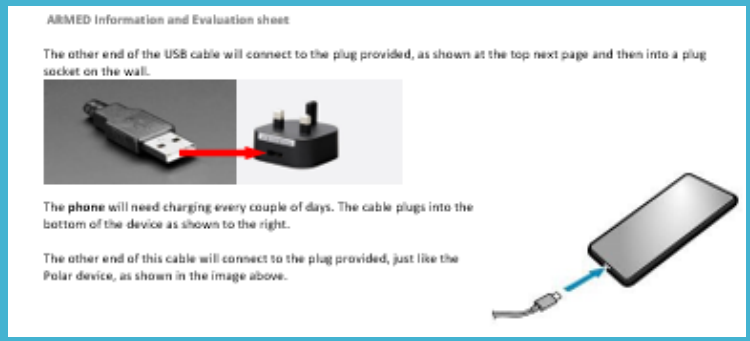
The phone **must only** be used for the purpose of collecting and viewing ARMED data.

Charging the devices

The **Polar device** will need charging every 4 days. We would ask that you please do not charger the device overnight.
The information that the Polar device captures during the evening is as important as your activity during the day.

You will find the charging port for your Polar device on the back of the device as shown below:

The cable in the image can only be inserted one way. If this is not inserting correctly, please flip the cable over to allow this to connect. To help you to ensure that it is connecting properly, align the red dot on the cable with the red dot on the back of the Polar device, as shown in the image to the left.



ARMED Information and Evaluation sheet

The other end of the USB cable will connect to the plug provided, as shown at the top next page and then into a plug socket on the wall.

The **phone** will need charging every couple of days. The cable plugs into the bottom of the device as shown to the right.

The other end of this cable will connect to the plug provided, just like the Polar device, as shown in the image above.

Wellbeing survey

To evaluate the band we would like to ask you some questions before and after you have been using it.

Name	Address
Height	Date Of Birth

Please score the following statements honestly using the 1-10 scale below.

1	2	3	4	5	6	7	8	9	10
Totally disagree								Totally agree	

All about you

Statement	Start of project score	End of project score	Comments
All things considered, I live a healthy lifestyle.			
I get up and move around regularly during the day.			
I drink enough water every day (including tea, coffee, juice, etc)			
I take regular exercise.			
I participate in all the social events I can/want to.			
I remember to take any daily medication.			
I sleep well most nights.			

About Technology

Statement	Start of project score	End of project score	Tenant comments
Overall, I have a positive view that technology can help us all live healthier lives.			
I use technology and the internet on a regular basis (ipad, tablet, smart tv or phone, computer, etc).			
I am happy to wear a ARMED bracelet 24/7 to help monitor my wellbeing.			
I am happy to take part in the weekly weigh-in and grip test.			
I am happy to be taking part in this project.			

General Comments

General	Start of project	End of project
Are there any other comments you would like to make?		

Sign Off

Start of Project		End of Project	
Staff Signature		Staff Signature	
Date		Date	
Participant Signature		Participant Signature	
Date		Date	

Progress Tests

We would also like to do some tests before and after to see if your strength and mobility have improved.

Timed Up & Go

Purpose: To assess mobility

Equipment: A stopwatch

Directions: Patients wear their regular footwear and can use a walking aid, if needed. Begin by having the patient sit back in a standard arm chair and identify a line 3 meters, or 10 feet away, on the floor.

Note:
Always Stay By the patient for safety

1. Instruct the patient:
   When I Say "Go," I want you to:
   1. Stand up from the chair.
   2. Walk to the line on the floor at your normal pace.
   3. Turn.
   4. Walk back to the chair at your normal pace.
   5. Sit down again.
2. On the word "Go," begin timing.
3. Stop timing after patient sits back down.
4. Record time.

Start of Project		End of Project	
Date		Date	
Time test was carried out	☐ AM ☐ PM	Time test was carried out	☐ AM ☐ PM
Time taken for Test		Time taken for Test	

Observations: Observe the patient's postural stability, gait, stride length, and sway.	
Start of Project	**End of Project**
Check all that apply: ☐ Slow tentative pace ☐ Loss of balance ☐ Short strides ☐ Little or no arm swing ☐ Steadying self on walls ☐ Shuffling ☐ En bloc turning ☐ Not using assistive device properly These changes may signify neurological problems that require further evaluation.	Check all that apply: ☐ Slow tentative pace ☐ Loss of balance ☐ Short strides ☐ Little or no arm swing ☐ Steadying self on walls ☐ Shuffling ☐ En bloc turning ☐ Not using assistive device properly These changes may signify neurological problems that require further evaluation.

30-Second Chair Stand

Purpose: To test leg strength and endurance. Sit to stand in 30 secs can show a big improvement when you practise this regularly.

Note:
Always Stay By the patient for safety

Equipment: A chair with a straight back without arm rests (seat 17" high), and a stopwatch.

1. **Instruct the patient:**
   1. Sit in the middle of the chair.
   2. Place your hands on the opposite shoulder crossed, at the wrists.
   3. Keep your feet flat on the floor.
   4. Keep your back straight, and keep your arms against your chest.
   5. On "Go," rise to a full standing position, then sit back down again.
   6. Repeat this for 30 seconds.
2. **On the word "Go," begin timing.**
   If the patient must use his/her arms to stand, stop the test. Record "0" for the number and score.
3. **Count the number of times the patient comes to a full standing position in 30 seconds.**
   If the patient is over halfway to a standing position when 30 seconds have elapsed, count it as a stand.
4. **Record the number of times the patient stands in 30 seconds.**

Start of Project		End of Project	
Number		Number	
Score		Score	

Information from this survey will be reported in the overall assessment of the project, but there will be no information published that could lead to any user's identity or sensitive information being divulged.

USER STATUS AND TRIGGER RESPONSES

Level	Trigger from ARMED	Response
0 – all functioning as normal. No trigger is sent from ARMED	No trigger is sent from ARMED	No response
1 – Low level trigger	Email sent from ARMED	Referral to North Yorkshire Sport
2 – Medium level trigger	Email send from ARMED	Referral to North Yorkshire Sport
3 – High level trigger	Email send from ARMED	Potential referral to hospital

INFLUENCE OF PROJECT ON FUTURE PRACTICE

- Ability to identify the influence of ARMED on individuals health, well-being and occupational performance.
- The hypothesis is to see an increase in function and decrease in potential or occurring falls.
- Potential for business as usual: using ARMED as future interventions for those who are at risk of falls.

REFERENCES AND RESOURCES

Craig, J., Murray, A., Mitchell, S., Clark, S., Saunders, L. and Burleigh, L. (2013) 'The high cost to health and social care of managing falls in older adults living in the community in Scotland', Scottish Medical Journal, 58 (4), pp. 198- 203.

ARMED website: https://www.hastechnology.com/armed

Useful Videos:

- Short video explaining the ARMED solution: https://www.youtube.com/watch?v=eY9rHaQaJ2s&t=33s
- Loreburn Housing Case Study: https://www.youtube.com/watch?v=xkw9x8EaGLg
- Loreburn Housing Association focus on prevention using HAS Technology's ARMED Solution: https://www.youtube.com/watch?v=4nvEvALlXac

Evidence-based

THANK YOU FOR LISTENING!

Are there any questions?