

# Evaluation in Digital Health and Care: experience and reflections

## Contributors

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<https://digitalhealth.wales/tec-cymru>

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<http://www.tec.scot/>

*The recordings of the previous sessions are now available to view.*

*To view go to: [www.tec.scot](http://www.tec.scot/)*

Available on-demand

[\*Knowledge Exchange Snapshots - view on-demand\*](#)

*We asked the contributors who work with TEC Scotland, the ALLIANCE and Near Me, to share lessons about different aspects of delivering digitally enabled services - from design stages right through to gathering and using the feedback from the people who use these services.*

[\*Knowledge Exchange Session – Innovation in Care Homes – view on-demand\*](#)

*Contributors shared examples of digital tools which are being developed and used to support improvement for Care Home residents and staff. The session contributors, who came from Wales, England, Northern Ireland and Scotland.*

Follow us on @TECScotland and @DigiCare4Scot

# The Evidence

# Why did we do it?

## Evidence Gap

### The Problem

- Too many pilots and silo studies
- Local lens
- Small sample sizes / barely representative
- Rarely disseminated

### Our Solution

- National team
- Independent lens
- Capture large, representative samples
- Using mixed methodologies
- Multi-disciplinary research team / expertise
- National showcasing

# TEC Cymru's 10 Golden Rules to Research & Evaluation



Make 'co-design'  
central to your R&E  
approach



Conduct a robust  
mixed  
methodology



Follow a Plan, Do,  
Study, Act  
approach



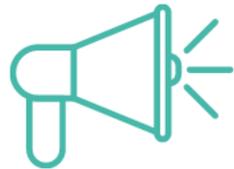
Evaluate from Day 1,  
and continue doing so



Get out there, and  
understand the lay of  
the land



Be open to learning,  
and ask all types of  
questions



Capture 'all' types  
of voices, and  
involve all players



Avoid assuming  
you know the  
answer/outcome



Keep asking these  
questions, and keep  
learning



Disseminate and  
share your learning

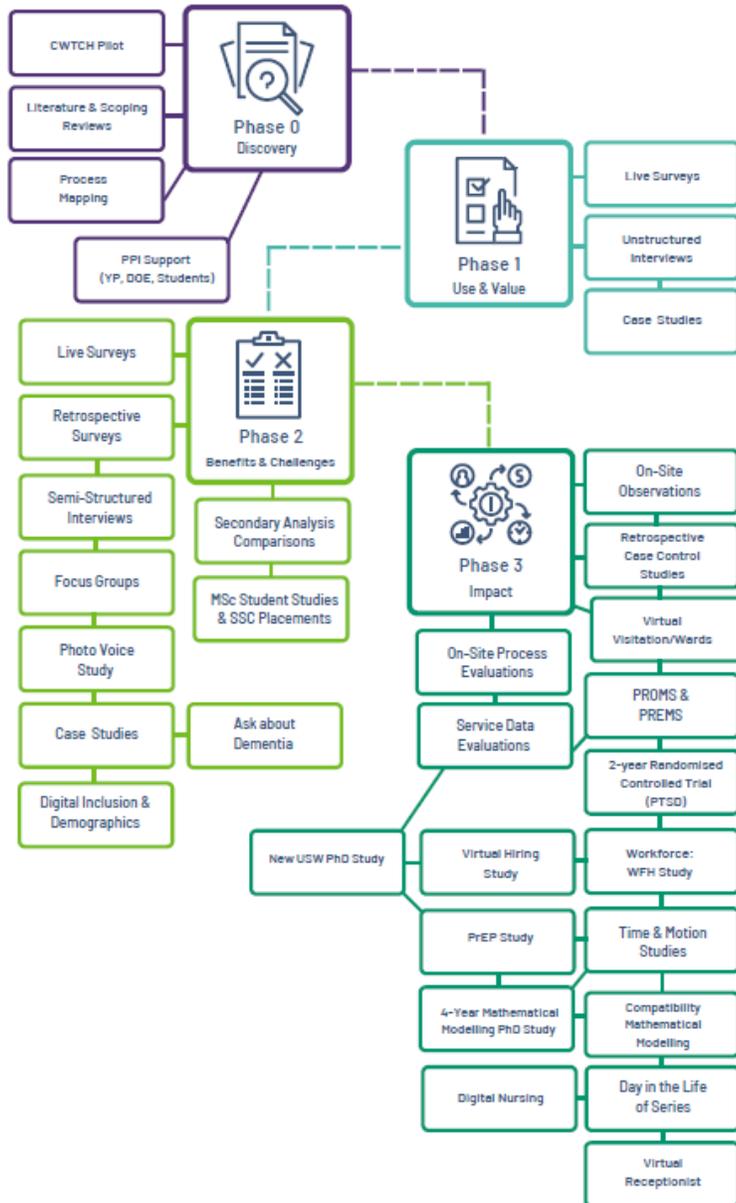
# TEC Cymru's Phased Approach



**See our Framework at:**

<https://digitalhealth.wales/tec-cymru/research-and-evaluation>

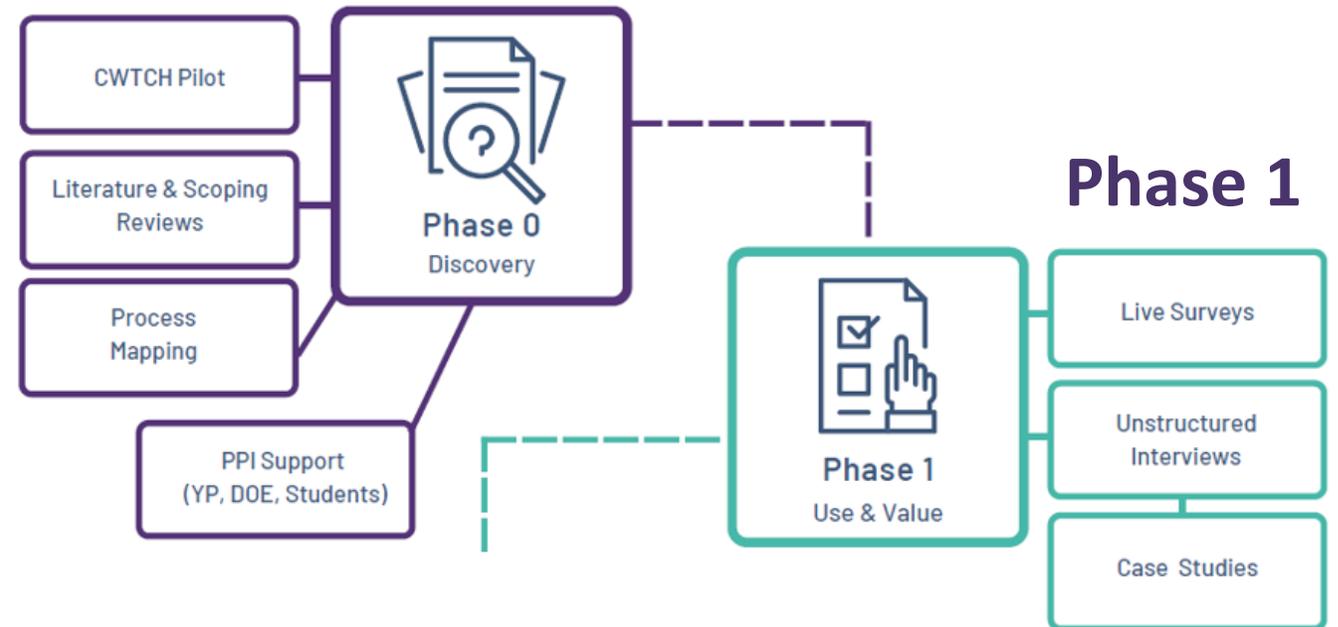
## Embedded Research & Evaluation Design: Video Consulting



# Phased Embedded Approach

We use a **mixed methods embedded methodology** - allows one study design to naturally lead into another.

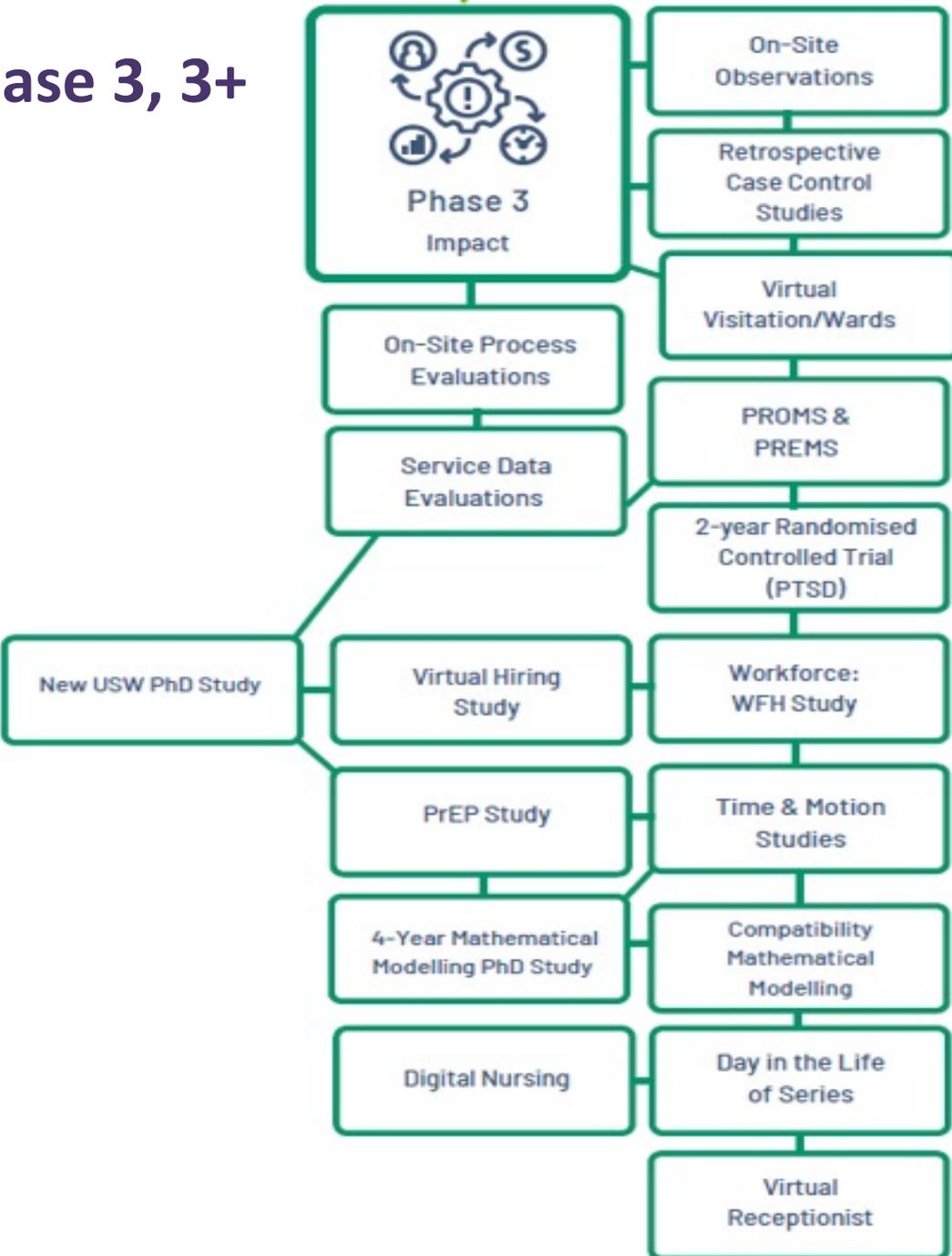
## Phase 0



# Phase 2a, b, c...



# Phase 3, 3+



# What Does this Look Like?

Embedded research uses a range of methods & expertise, building upon another – (like building blocks).

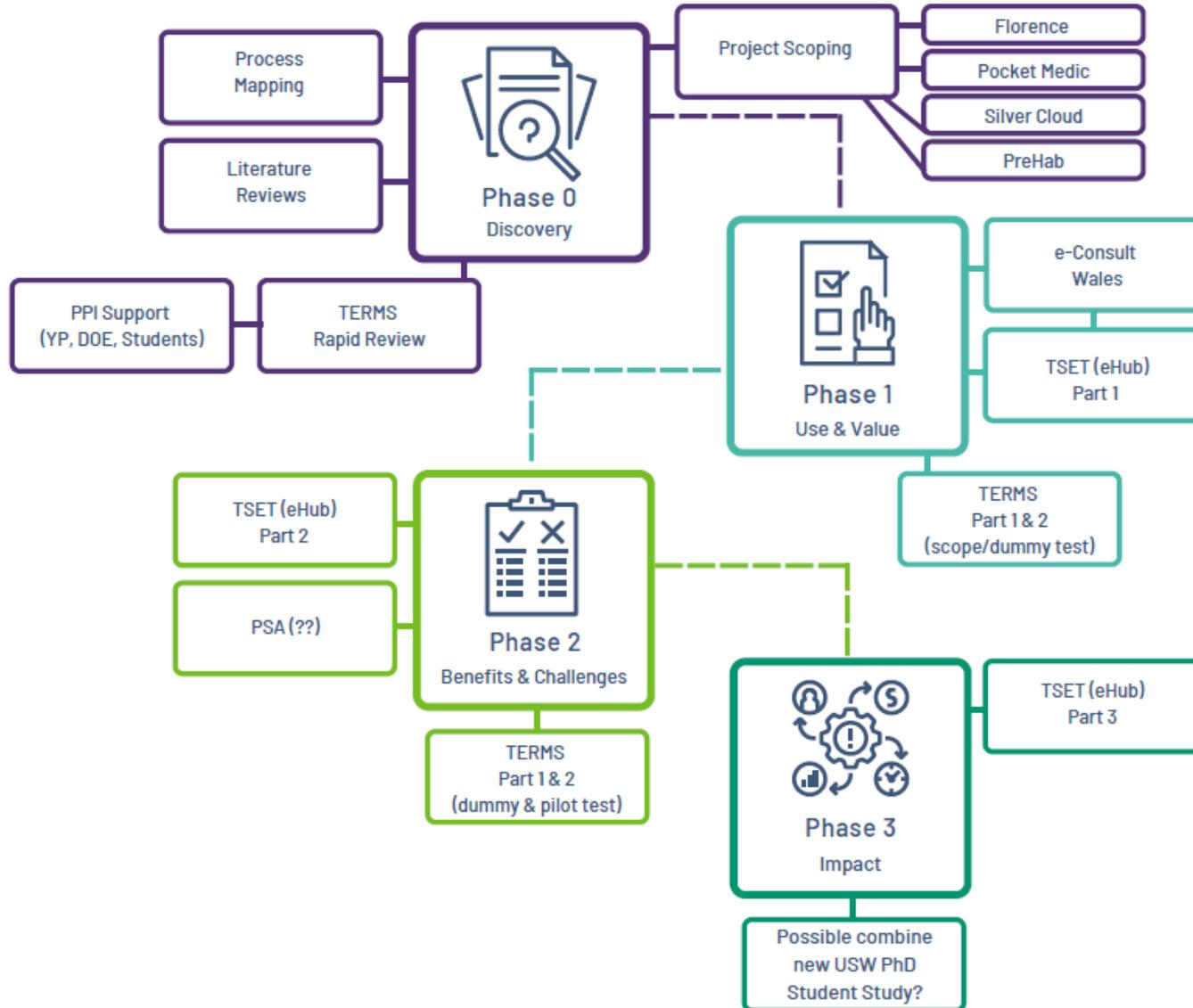
Using all resources, techniques and opportunities at your disposal – across disciplines and expertise.

Bridging the gap – working with all key players & stakeholders.

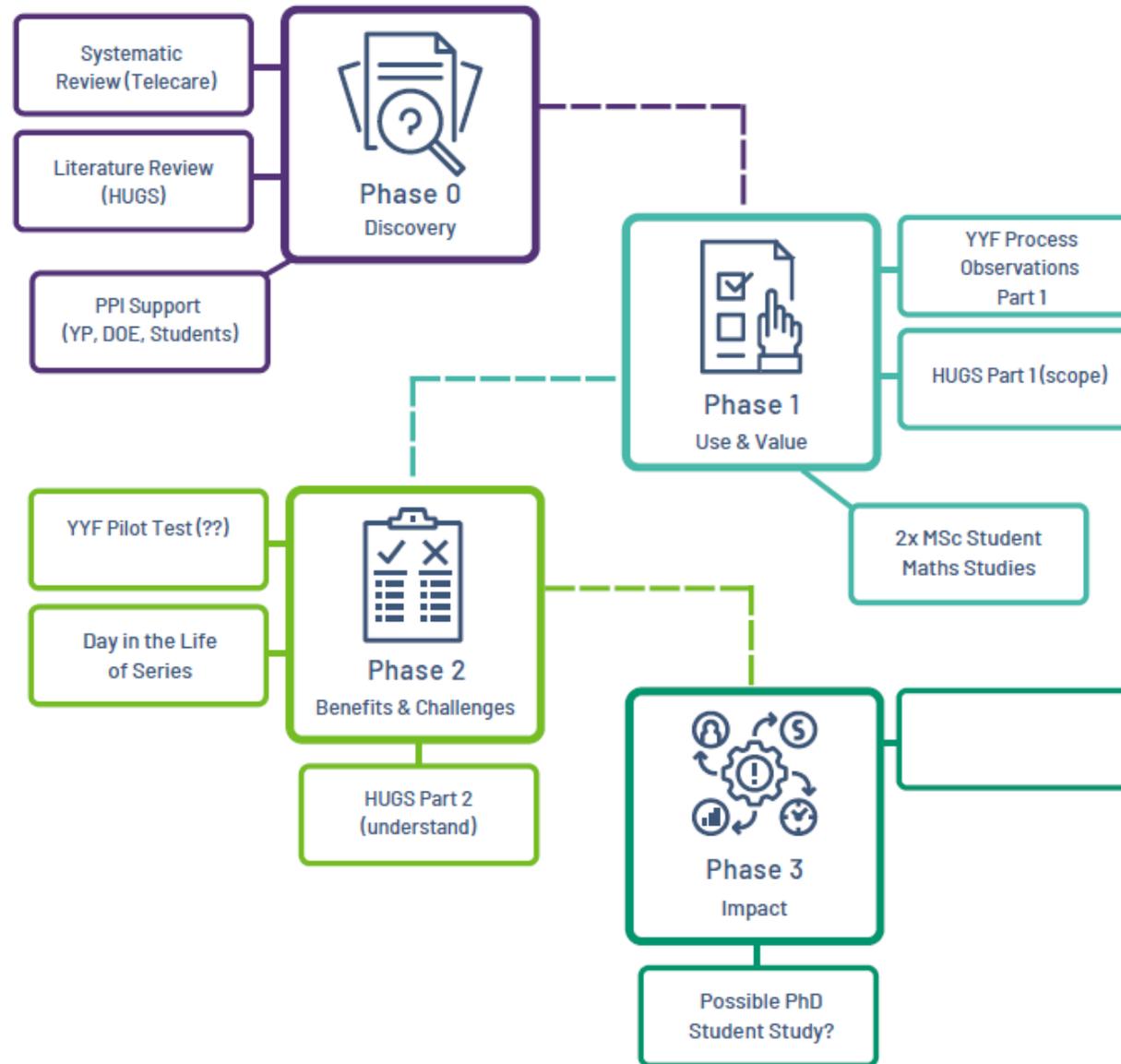
*Patients, families, carers, clinicians, administration, management, clinical and non-clinical researchers, academics, policy leads, and so on.*

More real and rounded understanding to facilitate innovation and improvement, and strengthen policy and practice.

# Embedded Research & Evaluation Design: Telehealth



# Embedded Research & Evaluation Design: Telecare



# Our Research Team

We have an internal & external working team working inside & outside the NHS, inside and outside of Wales/UK.

- National Clinical Lead
- Head of Research
- Research Officer
- Several FT/PT Researchers
- Data Analyst
- Health Economist
- Digital Fellow
- PhD Students
- Academics
- National & International teams
- Multi-Agency Working – Schools/Gov
- Young Person Advisory Panel
- Duke of Edinburgh (DOE) Placements
- School/College Volunteer Scheme
- Medical Student Placements
- MSc Assignments

## The Evidence

How many people  
did we speak to?

### Sample Size



Mixed methods data from more than  
52,000 participants

### Representation

#### To include:

- Patients
- Families & carers
- Clinicians
- Admin/Management
- Social care
- 3rd sector



**Across all Health Boards in Wales**

# The Evidence

# What did we find?

## No Digital Divide for VC in Wales



20.7% > 65 years

(0.1% less than national population total of > 65 years)



51.7%

< £30k household income

(Majority under £15,000)



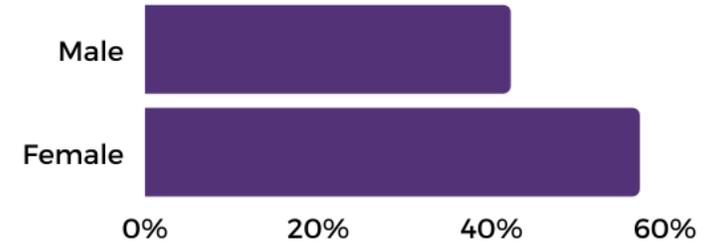
29% had a disability  
(compared to 26% of the general population)



3.8%

Asian, Black, 'mixed / multiple ethnic group' or 'other ethnic group'

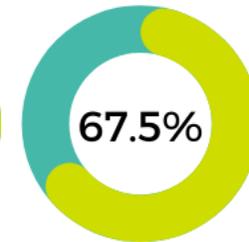
(Compared to 4.5 of general population)



No clinical status exclusion



rural



urban

(c.f. national population: 64.9% = urban & 35.1% = rural)

# The Evidence

# What did we find?

## High Satisfaction



## Benefits



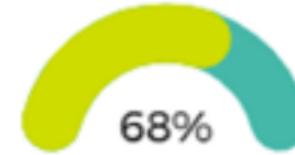
## The Evidence

## What did we find?

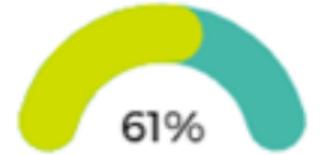
### Enablement Scores



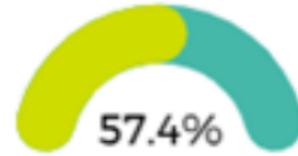
cope with life



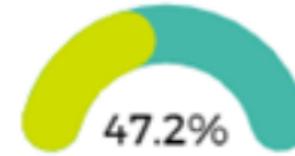
understand their illness



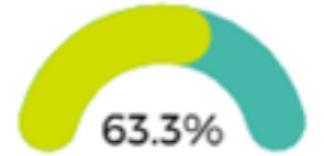
cope with their illness



keep healthy



be confident about their



help themselves

### Challenges



lack of confidence



non-suitable



issues with safe space



improvements in resources & WiFi needed in Wales

## Keeping it green!

## The Evidence

- 31% VC clinicians working from home
- 85% prevention of face to face
- Huge travel savings for patients

## What did we find?



5.8 m miles



1.7m kg CO<sub>2</sub>e



193k hours



travel around the  
world 240 times

# Digital Research/Evaluation – Any Different?

Digital research & evaluation is no different to any other type, in that it is typically evaluating the product itself and the human factors associated to it (and its change/intervention).

The only difference is that expertise may be needed from different disciplines, such as Informatics, Mathematics or Economics, and new lessons and skills are learnt.

But the same research standards and methodologies remain the same.

# Virtual vs. In-Person

During the pandemic, in-person was limited, and virtual data collection accounted for the majority of our work.

Whilst this can impact on much of the 'in-person' qualities, especially in qualitative work.

But we learnt new ways of working.

- Reaching far and wide (across Wales, UK & World)
- Different types of samples
- More representative / Larger numbers
- More variation in design & mixed methodologies
- Ability to obtain live and retrospective datasets



# Evaluating Digitally Enabled Services in Scotland

Dr Helen Alexander  
NHS Lanarkshire,

funded for TEC evaluation by the Scottish Government

# Technology Enabled Care (TEC) Evaluation

- 2018 review commissioned by Scottish Government recommended theory-based evaluation approaches for TEC
  - Logic models created for all workstreams
- Contribution Analysis for *Connect Me* (remote health monitoring programme)
  - 2018 first evaluation, then Scale-Up BP programme in 2022
  - Also NASSS framework (Greenhalgh et al, 2020) for how to scale, spread and sustain (evolving into PERCS framework)

2018 Data Review and Evaluation Options study - <https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2018/05/technology-enabled-care-programme-data-review-evaluation-options-study-summary/documents/00535760-pdf/00535760-pdf/govscot%3Adocument/00535760.pdf>

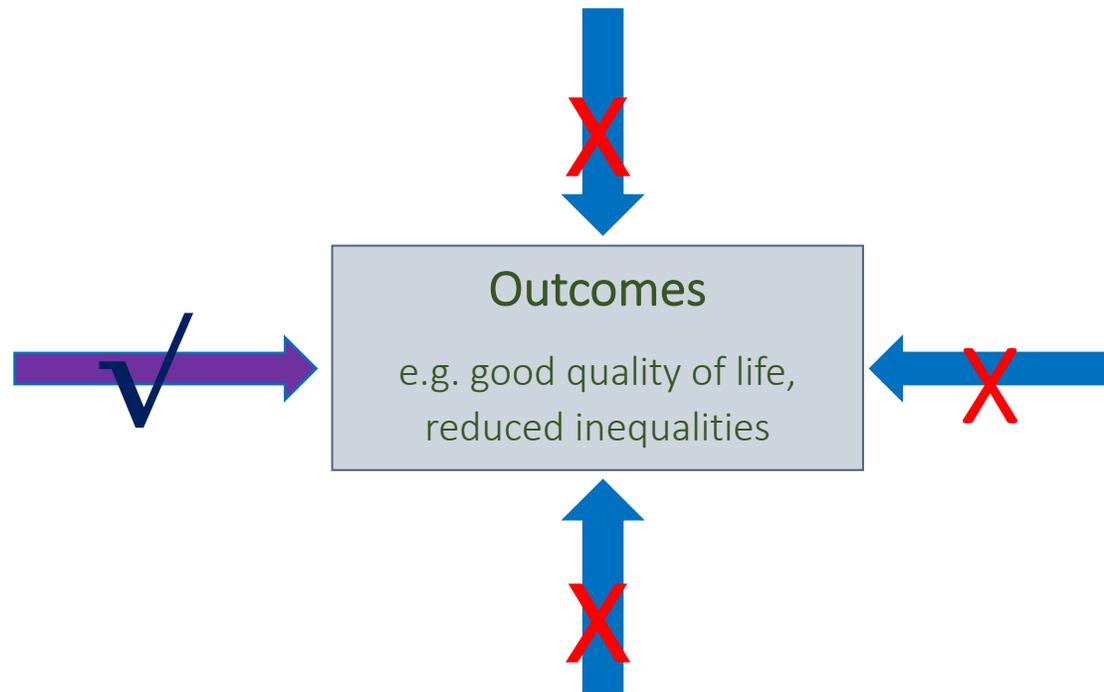
Greenhalgh et al (2020) NASSS-CAT tools JMIR Res Protoc. 13;9(5):e16861. doi: 10.2196/16861. PMID: 32401224; PMCID: PMC7254278.

# Contribution Analysis (Mayne, 2012)

- Acknowledges it is difficult to directly attribute results to specific interventions in complex environments
  - Contributions to outcome achievement, many things can contribute
- Six steps of CA:
  1. What are you trying to achieve (your vision)?
  2. What is your theory of how you'll get there (logic model, with outcomes)?
  3. What evidence will demonstrate a contribution?
  4. What story does this evidence tell you?
  5. Gather more evidence to fill any gaps, or to discount other influences
  6. Write a final contribution story

# Other possible contributions/influences

It is possible that other things may also influence your outcomes, so you can gather evidence to support or discount them:



Instead of direct cause & effect we make 'causal claims'

- If we can verify a theory of change (ToC) with evidence and account for other influencing factors, then it is reasonable to claim that an intervention has made a difference

# Scotland's TEC Evaluation Approach

Scotland does not have an explicitly agreed phased TEC evaluation approach  
But we have an implicit one, albeit not fully agreed across stakeholders:

We have agreed outcomes (in a theory of change) for each part of the TEC programme to achieve  
(from the TEC Options Study, 2018)

We have successfully deployed a theory-based approach for several Remote Monitoring  
evaluations (one example to follow)

These give us both what we are aiming to achieve, and results from multiple methods to  
demonstrate whether or not we are doing so

# TEC data & results for COVID-19 monitoring

## STAFF WERE TOLD TO GO HOME

- Staff with no patient contact
- Those who could contact patients remotely



## PATIENTS WERE NOT TO COME IN

- Those who didn't require hands-on or who could wait

## IF YOU MUST, COME IN AS LITTLE AS POSSIBLE

- Do what you can elsewhere/send stuff in



# NHS Scotland and Technology Enabled Care

## RIPE FOR REMOTE HEALTH MONITORING

- 10 year track record of European and Scottish Government support
- Various evaluations (of use, not the technology itself)
- Early adopters, not at scale

## COVID-19 BRONZE COMMAND (Apr '20)

- Emergency procurement of better technology
- Emerging evidence base for early identification of COVID-19 symptoms
- Collegiate approach to developing the remote monitoring pathway

# Evaluation discussions - Sept '20

- **Relevant Outcomes** from TEC Options Study (2018)

Improved access to services, positive experience of services, staff engaged and supported, increased self-management, resources used effectively & efficiently, reduced inequalities

- Continued with **Contribution Analysis**

- Not everyone agrees with this theory-based approach (*RCT gold standard?*)
- First person with COVID-19 remotely monitored on **14<sup>th</sup> January '21**
  - Third wave of pandemic in decline
  - It took time to agree parameters, 14 NHS Board approvals, build the system

# What was being evaluated

- Remote monitoring for people **below the threshold for hospital admission** but at risk of rapid deterioration
  - those over 65 years of age with underlying health conditions and younger people with presentations of concern
- Designed to detect and manage early deterioration
- Choice of SMS text, online portal/app, automated calls
  - Opt-in to respond to system questions about symptoms, given pulse oximeter, questions twice a day for 14 days
  - Readings of concern triggered alert to call 111 or 999 (more severe symptoms)

65 SMS text messaging

32 online/app

8 patient portal

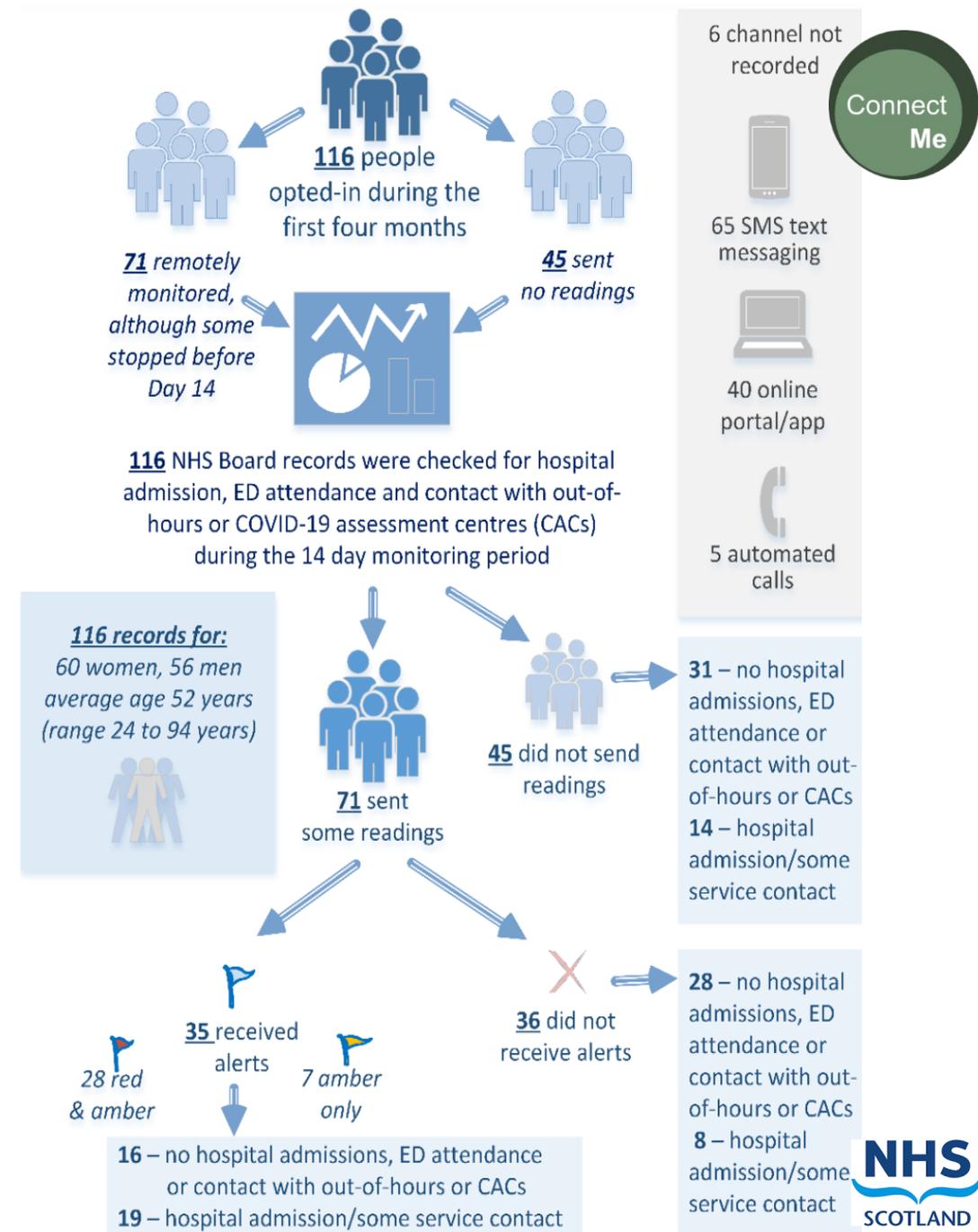
5 automated calls



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# Improved access to services

- Remote monitoring data captured from 14<sup>th</sup> January to 11<sup>th</sup> August, 2021
- n=149, from 6 NHS Boards
  - Lanarkshire = 112
- Lanarkshire & Highland follow-up (n=116)
  - **Those most in need of services accessed them more than those in less need**
  - 71 of 116 sent readings via the technology
    - **35 triggered alerts** to call services based on remote monitoring results. This is the group with severest symptoms
    - Follow up of all 35 showed oxygen saturation triggered some alerts. **People would not have been aware of this risk otherwise**
  - 45 of 116 did not send readings



# Positive experience of services



- Patient feedback survey (n=39), telephone interviews (n=14)
  - People felt **reassured** or ‘it stopped you worrying’
  - 3 who had not sent readings thought the pulse oximeter was ‘**a good idea**’
    - One said ‘it was a comfort knowing you were within those safe limits’
    - One had passed it on to another family member with COVID-19
    - One was still using it six weeks later
  - 4 had someone else do the monitoring on their behalf (dementia, learning disability, unfamiliar with the technology)
  - 4 did not respond to system alerts, waiting until their oxygen level improved, knowing they’d sent in a wrong reading, or not feeling ill enough
  - **Endorsed remote monitoring** for others in the same position

# Other outcomes

## Staff feel engaged and supported – staff survey (n=11)

- Found it **easy to use** and **useful** to their work with COVID-19 patients
- It did not make excessive demands on their **time**



## Increased population self-management – interviews (n=14)

- All had **learned** to use a pulse oximeter or had someone do so on their behalf
- They **knew the safe limits** for oxygen saturation, two had **decided to wait** to see if their results returned to normal before contacting services



## Resources used effectively and efficiently – staff survey (n=11)

- Efficient **use of time**, no added burden, checked results **without patient there**



## Reduced health inequalities – system data (n=58), interviews (n=14)

- **Twice as many** from SIMD 1&2 as 4&5, 4 **overcame digital exclusion**



# Remotely monitoring COVID-19 is **effective** \*

- There was evidence of it making a **contribution to outcomes**
  - Increased access for those most in need, some of whom would not otherwise have been aware of their risk of deterioration
  - People generally described positive experiences, it enhanced staff efficiency
  - There was evidence of some self-managing their symptoms, resources being used effectively/efficiently, greater use by people from disadvantaged communities, and some overcame digital exclusion to participate
- **BUT** it would have been better to have bigger numbers
- A refreshed version (with central registration) was launched in 2022. This **did not scale** but we have **learned** a lot



\* Full report: [https://tec.scot/sites/default/files/2021-11/TEC%20RHP%20COVID-19%20eval%20Report%20FinalNov21\\_0.pdf](https://tec.scot/sites/default/files/2021-11/TEC%20RHP%20COVID-19%20eval%20Report%20FinalNov21_0.pdf)

# Impact of Virtual Evaluation Methods

- ✓ Several stakeholders interviewed described increased attendance at meetings if they were not in-person. It saved travelling time and people could link in just for the bits that were relevant to them
- Interviews with patients were not affected as mostly used telephone pre-pandemic
  - ✓ More people were at home, so easier to make contact and an increased rate of agreeing to an interview
- ✓ QR codes became popular and people seemed more amenable to accessing surveys using them, and providing on-line responses
- × Gradual dawning of virtual fatigue the longer the pandemic restrictions continued

# Is Evaluating Digital Different?

- It is contended that evaluation is evaluation and the methods are always tailored to the project/programme under review
  - So evaluating digital is no different
- There are some useful technology-specific frameworks that help us move beyond identifying success/failure, barriers/enablers
  - NASSS-CAT (Non-adoption, Abandonment, Scale, Spread, Sustain – Complexity Assessment Tool)
    - Based on the idea that complex things are difficult to use, therefore we should make things as simple as possible to facilitate scale, spread and sustainability
    - Used for Scale-Up BP evaluation \* in Scotland, along with Contribution Analysis approach
  - PERCS \*\* (Planning and Evaluating Remote Consultation Services)
    - Eight domains that help to explain technology adoption or abandonment

\* Alexander (2022) <https://tec.scot/sites/default/files/2022-03/Scale-Up%20BP%20final%20eval%20v22Feb22.pdf>

\*\* Greenhalgh et al (2021) Planning and evaluating remote consultation services: a new conceptual framework incorporating complexity and practical ethics. *Front Dig Health* 2021; **(3)**: 103.