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Digital NHS Wales: A Qualitative Thematic Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

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Title Page

Digital NHS Wales: A Qualitative Thematic Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

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Digital NHS Wales: A Qualitative Thematic Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

The use of video consulting (VC) in Wales United Kingdom (UK) has expanded rapidly. Previous VC evidence has been the subject of small-scale projects and evaluations. TEC Cymru are an All-Wales digital service, and roll out digital interventions and evaluate on large scales, thus capturing representative datasets across Wales, and therefore a wide range of National Health Service (NHS) specialities. ***Objective****: To extract and analyse qualitative feedback from patients and clinicians using the NHS Wales VC Service for 6-months (September 2020 to March 2021).* ***Design****: A qualitative thematic analysis of a cross-sectional study was conducted* ***Setting****: From all Health Boards* ***Participants****: with NHS patients and clinicians across primary, secondary and community care settings in Wales.* ***Outcome Measures****: Data was captured on benefits, challenges and sustainability of VC and thematically analysed. Five dominant themes emerged, to include: 'The Ease of VC'; 'The Personal Touches'; 'The Benefits of VC; 'Technical Quality',* and *'Clinical Recommendations & Future Use'. An additional 14 sub-themes are included. Direct quotations from patients and clinicians are provided for context.* ***Results****: A total of 22,978 participants were included. This data demonstrates that NHS remote service delivery, via the method of VC, is highly satisfactory, well-accepted and clinically suitable, and provides a range of benefits which are perceived to outweigh challenges.* ***Conclusions****: The NHS Wales VC Service rolled out and evaluated at scale and demonstrate that VC has potential for long-term sustainability. TEC Cymru recommend a 'blended approach' for NHS appointments that are clinically judged and centred on patient choice.*

Abstract Summary

Strengths & Limitations

- This paper presents an in-depth and large scale qualitative study on patient and clinician experience of a relatively new digital service in NHS Wales.
- The study is representative of Wales, in that it's an all-Wales study, across all Health Boards.
- The study is a mix of patient and clinician voices across all types of NHS specialities.
- Due to the voluntary and anonymised nature of the feedback data, it is unclear as to how often recurring participants completed the feedback, thus potentially skewing the sample.
- Due to the size of the study sample it was not possible to present both the qualitative and quantitative findings together, however access to this data is readily available on our website.

Background

Video consulting (VC) has accelerated through health and social care delivery since the COVID-19 pandemic [1-3]. Since 2020, VC use has increased across the United Kingdom (UK) and throughout the National Health Service (NHS), especially in Wales [4]. There is growing evidence that VC can deliver safe and timely care in many settings and offer significant benefits to the users [5, 6]. However, the majority of evidence is based upon pilot studies, with small and often highly selected samples,

ultimately casting speculation on its use, benefits and challenges across varied care sectors, specialities and circumstances [7]. Therefore, the clear gaps existing in the current evidence-base suggest that there is a need to continuously evaluate and re-evaluate on a national level to allow for sustainable VC platforms to be embedded for the long-term into health and social care systems [8-9]. Technology Enabled Care (TEC) Cymru are an NHS Wales multidisciplinary team, with clinical, research, programme and technical expertise. TEC Cymru are an All-Wales digital service, that enable the sustainable use, scale up and spread of value added technology [10]. The NHS Wales Video Consulting (VC) Service is one of TEC Cymru's programme's that was rolled out as a national emergency response to the COVID-19 pandemic [11], and made available to all Health Boards and Trusts in Wales. Since March 2020, Technology Enabled Care (TEC) Cymru have rolled-out and evaluated on a large and representative scale basis across a wide range of NHS healthcare sectors across all Health Boards in Wales. This current study is one part of the larger evaluation, with more than 50,000 participants. For more information, please visit the TEC Cymru website at https://digitalhealth.wales/tec-cymru. In order to contribute to the current evidence-base, TEC Cymru work in partnership with the Welsh Government, academics, third sector and local Health Boards and Trusts in Wales to adopt a clinically driven and data informed approach to their digital service roll out, spread and evaluation, thus providing a more informed understanding of digital care as an all-country approach, thus producing consistent and valid outputs [12].

Aims & Methods

The aim of this study was to explore the benefits, challenges and sustainability of VC from the perspective of Welsh NHS clinicians and patients by thematically analysing and presenting the qualitative feedback received from 22,978 participants during a 6-month period (September 2020 and March 2021). This data extraction date was purposely chosen as a 'mid-point' during the COVID-19 pandemic to allow for any early teething problems during the earlier months of VC roll-out, and current changes occurring as services start seeking a more blended approach and scaling up VC to business as usual. However, to see other data captured across the lifespan of VC and other methodologies, please visit our website for other datasets [13].

METHODS:

Design, Setting, Participants

This paper presents the All-Wales data captured across all 7 Health Boards and 1 Trust (See Appendix 1 for Health Board and Trust distribution), across a range of NHS healthcare settings within primary, secondary and community care (See Appendix 2-3 for the breakdown of these categories). This is a qualitative analysis of VC experience feedback captured in a larger cross-sectional study [14], held by the NHS Wales VC Service, TEC Cymru [10, 11]. Participant eligibility included NHS clinicians and patients with experience of using VC in NHS Wales (see Appendix 4 for participant breakdown).

Sampling & Recruitment

The sampling approach used was opportunity sampling, due to access of the VC intervention and ability to capture data at the end of each consultation via an online feedback link. The feedback appeared as internet browser pop-ups at the end of each VC appointment – one per clinician and patient, and were completed immediately as live data to reflect the use, benefits, challenges and sustainability of VC. A copy of the feedback questions can be found as a supplementary 1 and 2.

Supplementary 1: Feedback Link Patient

Supplementary 2: Feedback Link Clinician

There is acknowledgement of risk of some bias of those willingly completing feedback data as potentially more 'positive' or more 'negative' towards the VC intervention, potentially missing out the 'neutral' responses. However, to limit this bias, TEC Cymru follow a phased approach to their evaluation and research, which involves a discovery phase, two evaluation phases and a research phase, thus providing ample opportunity across their digital interventions to explore a wider range of methodologies and study types. Further information about this is available on our website [10].

Measures

This paper presents national (All-Wales) qualitative free-text data from a cross-sectional feedback study across a number of measures. The qualitative feedback was retrieved from questions on use, value, benefits and challenges of using VC. Please see our recent report for the quantitative measures that sit beside these qualitative outcomes [12].

Ethics Approvals & Informed Consent

TEC Cymru obtained full ethical approvals and risk assessments from their host Health Board Aneurin Bevan University Health Board Research & Development Department (Reference Number: SA/1114/20), and then national approval was obtained from all other Health Boards in Wales.

Full consent was obtained from all participants. At the end of each feedback link, a statement of consent and a compulsory tick box was required prior to feedback submission.

Patient and Public Involvement.

No patient or public involvement.

Statistical Methods

For the data discussed in this paper, there are a total of 22,978 clinician and patient feedback submissions. The free text comments within the cross-sectional feedback study were initially identified and coded manually and entered into an excel sheet for manageable order (due to large numbers), and then followed with a thematic analysis to explore emerging themes and patterns. The free-text narrative was manually extracted and thematically analysed to explore emerging themes. All data was analysed by three members of the TEC Cymru research and evaluation team [GJ, BW, MW] to ensure quality and rigour, with an additional 20% validation check on all data by the National Clinical Lead for Wales [AA].

Results

A thematic analysis of the free-text narrative data collected at the end of the Video Consultation (VC) feedback was conducted. From the 22,978 patient and clinician responses captured during September 2020 and February 2021, five themes emerged with an additional 14 sub-themes. These include: The Ease of Video Consultations (VC); The Personal Touches; The Benefits of Video Consulting; Technical Quality, and Clinical Recommendations & Future Use. Direct quotations from patients and clinicians are provided. Each quotation is referenced to describe either the *patient* by their age range, gender, Health Board/Trust, healthcare speciality and type of appointment (e.g., first appointment, follow-up), or the *clinician* by their professional occupation and the Health Board/Trust in Wales in which they are based.

Theme 1: Ease of Use

Patients and clinicians generally rate their VC as high in quality (as demonstrated in the Quantitative data [ref] and their free-text narratives reflect this level in terms of high satisfaction and acceptability in relation to both technical and lived experience. For example, when patients and clinicians rate their VC as 'excellent', 'very good' or 'good' this is often paired with positive comments in relation to either the VC's technical performance as a video consulting platform or the overall lived experience of using VC as a healthcare delivery service.

1.1 Ease of Technical Use

One of the most common sub-themes associated to the platforms technical performance was that of 'ease of use'. It was often stated that the VC platform used in NHS Wales (Attend Anywhere) was 'easy to use' for both patients and clinicians.

> *"Good call easy to use"* ***(Dentist, HDUHB)***
>
> *"Easy to use. Great communication"* ***(Patient 13-17, ABUHB, Paediatrics & Child Health, Follow-up)***
>
> *"Easy to use, lots of good information"* ***(Parent of Patient under 12 years, ABUHB, Physiotherapist, Paediatrics & Child Health, Advice)***

"It was easy to use, and appropriate to use during the pandemic" ***(Patient, Female, HDUHB, 25-44, Midwife, Obstetrics & Gynaecology, First Appointment).***

In addition, this ease of use was expressed as a 'surprise' to some, in that both patients and clinicians found the VC platform much easier to use than they initially anticipated, and in some instances, this exceeded expectation.

"More effective than I expected a non-face to face appointment to be" ***(Patient, Male, 45-64, HDUHB)***

"This is my first experience of a video call, so I was pleasantly surprised" ***(Patient, Female, 64-80, BCUHB, Doctor, Follow-up)***

"First time to use video call I was very impressed, better than expected" ***(Patient, ABUHB, Podiatrist, Follow-up)***

1.2 Ease of Lived Experience

For some clinicians, it was felt that having access to a VC platform was 'easier' for some of their patients than a face-to-face appointment would be. This was especially apparent in terms of patient experience and their personal circumstances, and those with access difficulties, anxiety issues, or complex home situations that were made more convenient with VC.

"Easier to access with social anxiety" ***(Doctor, CVUHB)***

"Very helpful for autistic patient" ***(Dentist/Dental Nurse, SBUHB)***

"Child one of six children so this format of therapy helps mum" ***(SLT, ABUHB)***

This was also expressed in more depth by the patients themselves, whom in addition felt VC was actually better than attending a face-to-face appointment, such as making the patient feel safer, less stressed and more empowered, as opposed to their prior experience of face-to-face appointments.

"Brilliant - what an excellent service - long may it continue. So much better than coming to the hospital" ***(Patient, ABUHB, 45-64, Male, Doctor, Oral & Maxillo Facial, First Appointment)***

"Easier and safer than going to the hospital. I didn't have to take much time off work and it fit really easily into my schedule" ***(Patient, SBUHB, Female, 25-44, Dietician, First Appointment)***

"Just as good as a face to face meeting and to be honest I felt like I was being listened to far more than when I have been in face to face meetings on the same subject" ***(Parent of Patient, ABUHB, Female, under 12 years, Nurse, Mental Health, Advice)***

1.3: Ease & Unique Opportunities

Clinicians comment that the 'ease' of the VC platform and its positive associations to patient experience provides an additional unique opportunity. This opportunity is the ability to link up others to the video call, thus enabling dual participation and multi-disciplinary appointments to take place. This is felt to be unique in the sense that this collaborative approach would not have been possible if conducted face-to-face, thus in turn, produces additional advantages and improved outcomes for patient, families and clinicians.

"It was easy to join both my patients and other colleagues in" ***(Doctor, HDUHB)***

"Also, his Wife was able to join session – significant information shared by Wife today" **(SLT, BCUHB)**

"*Grandmother was also able to contribute to the call"* ***(Dietician, BCUHB)***

"Both parents could attend the appointment for their child" ***(Doctor, SBUHB)***

By having family members present in the participation in a VC, it also means that in some instances there is an increase in patient or parental onus which is perceived as an additional advantage to patient care.

"Parents have to take a more proactive role than they might in clinical session" ***(SLT, ABUHB)***

"Definitely helped with family involvement today" ***(Nurse, HDUHB)***

"Mum appears happy to support and possible not very involved until now" ***(SLT, ABUHB)***

Theme 2: The Personal Touches

2.1: Communication, Personalisation & Rapport

Patients commonly expressed how VC helps them to communicate effectively, to receive a more personalised and patient-centred approach, and build rapport with their clinicians during a VC.

"Having a video call made it more personal for me the support given to me was excellent" ***(Parent of Patient, CAVUHB, under 12 years, Paediatrics & Child Health, Advice)***

"We have built up a relationship with our clinician via VC" ***(Patient, Male, 45-64, CAVUHB, Counsellor, Mental Health)***

2.2 Patient Positivity & Appreciation

A strong consensus of patient 'positivity' and 'appreciation' towards their clinicians is expressed widely in the narrative. This positive clinical presence led to many patients feeling safe, comfortable and supported during and after their VC. This was particularly evident across specialities such as mental health and therapies.

"Thank you so much [name removed] for teaching me the skills to breathe correctly... God bless you so much, you are definitely in the right job" ***(Patient, SBUHB, Female, 64-80, Speech & Language Therapist, Otolaryngology (ENT), Advice)***

"Had a really tough week, but [name removed] was amazing and she listened to me. She gave me great support and was really kind to me" ***(Patient, CAVUHB, 25-44, Psychologist, Mental Health, Therapy/ Treatment)***

"[Name removed] was extremely helpful… She was engaging, courteous and professional in explaining what she felt the issues were with my hand. I found the whole experience thoroughly satisfactory. Many thanks" ***(Patient, CAVUHB, 45-64, Male, Occupational Therapist, Trauma & Ortho, First Appointment)***

"It was great to feel that someone was there to chat to, who could see a difference in [patient name removed], while at the same time supporting us as a family. Worked really well, thank you" ***(Guardian/Carer of Patient, SBUHB, 25-44, Male, Mental Health, Follow-up)***

Theme 3: The Benefits of Video Consulting

The benefits associated to using VC were one of the most common themes that emerged in the data.

3.1 Convenience, Safety & Home Comforts

Many of the patients demonstrate the benefit of convenience when using VC as opposed to a traditional face-to-face appointment, with the additional advantages such as improved safety and home comforts.

"This is so convenient. I had no problems with the technology and that is with an internet speed of less than 10" ***(Patient, HDUHB, Female, 45-64, Physiotherapist, Trauma & Ortho, Follow-up)***

"I thought it went very well and can see the benefits of people unable to attend appointments" ***(Patient, male, 64-80, male, VCC Cancer Services, Follow-up)***

"As we live quite far away, the virtual meetings are a lot more convenient and it's nice to feel more comfortable at home. Thank you" ***(Patient, CAVUHB Female, 25-44, Obstetrics & Gynaecology, Follow-up)***

"Nice to see an unmasked face! Did the job well" ***(Patient, BCUHB, 45-64, Male, Dentist/Nurse, Dental Health & Orthodontics, Dental Health & Ortho, Primary, Advice)***

"I felt really comfortable talking to [name removed]. I was able to get things off my chest, and talk about the assault more deeply than I have ever done...

I feel more confident that I am going to get my life back together, and to look forward to a better future" ***(Patient, ABUHB, 45-64, Female, Counsellor, Mental Health, Therapy / Treatment)***

"Client is pregnant and so is vulnerable to the COVID virus. AA means she can continue with therapy without the additional risks" ***(Mental Health, HDUHB)***

3.2 Flexible, Yet Comparable Care

For many patients, a benefit of using VC was the flexibility it allowed. For example, patients report to be able to continue 'getting on with other things' whilst waiting in the 'virtual waiting room', which would not have been possible in a physical healthcare location.

"I felt it was good as I could start the call and then get on with things around the house while I waited" ***(Parent of Patient, BCUHB, Female, under 12 years, Physiotherapist, Paediatrics & Child Health, Therapy / Treatment)***

"I think that it is excellent to have a consultation this way. It was easy to log on and saves so much time for both of us" ***(Patient, ABUHB, 45-64, Female, Physiotherapist)***

In addition, the flexibility of an appointment type (VC, telephone or face-to-face) provides a stronger sense of patient choice. However, it was felt that VC, as opposed to a telephone consultation, allows comparable aims and goals to be achieved as it would do in face-to-face.

"VC let us achieve patient's 1st choice, which could not have been achieved over the phone" ***(Occupational therapist, SBUHB)***

"AA is a way of bridging direct face-to-face and a visual interaction can be helpful as part of the clinical assessment" ***(Nurse, HDUHB)***

3.3 Time Savings

Many expressed that the use of VC as opposed to face-to-face appointments reduced 'time' in many ways, and this was a considerable benefit to patients, families, clinicians and the NHS service as a whole.

For example, clinicians felt that the 'time' used to conduct a VC sometimes took less time overall (although the consultation may take the same amount of time but time is saved on travelling). It was felt that much of this additional time could be combined into the overall virtual consultation, ultimately benefiting clinician's availability to attend to other patient needs and clinical tasks.

> *"Video consultation reduces time required the next day"* ***(Midwife, CVUHB)***

> *"Video consultation prior, ensures that less time on home visits"* ***(Health Visitor, SBUHB)***

In addition, the use of VC was perceived in some instances to have lowered the 'wait times' for patients in comparison to waiting for a face-to-face appointment.

> *"Fantastic way to be able to have an appointment without having to wait months"* ***(Parent of Patient, CTMUHB, under 12 years, Male, Doctor, Otolaryngology (ENT), First Appointment)***

> *"Reduces time required for next appointment"* ***(Audiovest Med, BCUHB)***

And the biggest saving of time, was that of 'travel time' or 'time off' school or work to attend a face-to-face appointment.

> *"Less travel and disruption of [patient] school day"* ***(Dietician, ABUHB)***

> *"Reduced massive travelling from distant part of Wales"* ***(Doctor, BCUHB)***

> *"Family did not need to return home from their holiday"* ***(Doctor, ABUHB)***

> *"I just had just finished a night shift, and live a fair distance from work, so doing a video call made my life a lot easier. So thank you"* ***(Patient, SBUHB, 45-64)***

"Not having to travel to the hospital and waiting in the waiting room was so much better, and there was no stress trying to get around everything all of the time" ***(Patient, CVUHB, 45-64)***

3.4 Clinical Value

Many clinicians suggest that VC can provide additional advantages, such as the ability to enhance a clinical session or determine clinical need. For example, some clinicians demonstrate opportunities to share visual resources immediately as they are already online. Others argue that VC allows for an effective triaging tool to determine the 'need' for a face-to-face appointment over that of remote consultations as an alternative.

"It also enhanced the clinical session because it added visual opportunity" ***(Speech and Language Therapy, CVUHB)***

"I could open investigations on screen easily, I shared few internet resources links to patient, and she got them on screen straight away" ***(Doctor, BCUHB)***

3.5 The Next Best Thing

Some patients and clinicians described VC as the next best thing to face-to-face appointments.

"The patient described it as next best thing to actual face to face meeting" ***(Nurse, PTHB)***

"I was surprised at how easy the process was. A video consultation is definitely the next best thing to a face-to-face meeting" ***(Patient, SBUHB, Male, 45-64, Physiotherapist, Advice)***

Others stated that they felt that the use of VC was much more efficient than telephone consultations, due to the visual aspects VC offers, and in some instances quicker and easier.

"*Seeing the face is brilliant - more reassurance given than voice call. Wife can see and understand a bit because deaf*" ***(Patient, ABUHB, 64-80, Male, Cardiology, Follow-up)***

"*Easier to understand movements compared with a telephone consultation*" ***(Patient, HDUHB, 45-64, Female, Physiotherapist, First Appointment)***

"*Having a video consultation is so much better than just a telephone call - it allows you to chat as if it was in person*" ***(Patient, PTHB, 64-80, Female, Nurse Respiratory Medicine, Advice)***

The ability to be able to visually 'see' the patient is considered imperative to clinicians, as for many healthcare conditions VC is needed to enable visual cues.

"*Better than just telephone call as could get non-verbal clues about emotions*" ***(Doctor, ABUHB)***

"*Really useful being able to see patient and daughter via system – really added to consultation, infinitely superior to telephone consultation*" ***(Doctor, SBUHB)***

3.6 Video Consulting is Not for Everyone or Everything

However, there are some clinical situations and personal circumstances which continue to necessitate the need for face-to-face consultations, where VC does not quite achieve the outcomes necessary, or suit the clinical condition or patient type.

"*Still needs face-to-face as cannot test hearing over VC*" ***(Audiovest Med, BCUHB)***

"*Only thing missing was ability to weigh and get height*" ***(Dietician, ABUHB)***

Theme 4: Technical Quality

4.1: Good vs. Bad Quality

Often, a high-quality rating of VC was paired with narrative suggesting that clinicians and patients had a good quality audio and visual picture when using VC for their appointments.

> *"Great connection. No glitches very smooth call"* ***(Parent of Patient, ABUHB, under 12 years, Female, Physiotherapist, First Appointment)***
>
> *"It was very good… no connection issues"* ***(Patient, HDUHB, 18-24, Female, Counsellor, Mental Health)***
>
> *"The video and picture was perfect, was able to hear the doctor clearly"* ***(Patient, CAVUHB, 45-64, Female, Doctor, Follow up)***
>
> *"First ever video call I have done. Clarity of picture & sound my end was very good considering I was using my mobile phone"* ***(Patient, HDUHB, 45-64, Plastic Surgery, First Appointment)***

However, in some cases, there were technological difficulties reported such as poor connectivity, thus impacting on their visuals and audio.

> *"Lag in audio/video sometimes causes miscommunication or difficulty with younger patients"* ***(SLT, CVUHB)***
>
> *"Some delay with video. Noticed a delay with audio"* ***(Psychologist, CVUHB)***
>
> *"Glitchy video and sound delay when adding others to the call"* ***(Physiotherapist, BCUHB)***
>
> *"The video was very choppy and when my therapist was talking it was delayed video with speech"* ***(Patient, CAVUHB, Female, 25-44, Counsellor, Mental Health, Therapy / Treatment)***

In some instances, technical issues were associated with specific device types and their perceived incompatibilities with the VC platform.

"The video call app did not give me the option of using my inner camera so I had to turn my phone around so the doctor could see me. Of course then I couldn't see them!" ***(Patient, BCUHB, 25-44, Ophthalmology, Advice)***

"Problems with Safari on iPad" ***(Health Visitor, SBUHB)***

"Session being done on Father's phone so screen obviously small for child to watch" ***(SLT, ABUHB)***

4.2 Clinical Innovation & Trouble-Shooting

Yet, despite these technological challenges, with the right amount of technical support and appropriate equipment available, clinicians report to be able to troubleshoot many of the issues and continue to use VC in most situations.

"Initially tried to do call with mobile phone and there were issues for the patient not being able to grant access for use of their mobile phone, but the consultation worked perfectly on their computer" ***(Dentist/Dental Nurse, BCUHB)***

"Issues at the start of the call with the audio but we disconnected and reconnected and it was then fine" ***(Nurse, SBUHB)***

With some clinicians reporting innovative or quick thinking techniques to make the consultation work best for them and their patients.

"I was unable to connect through the desktop in clinic due to computer being extremely slow.... I was luckily able to connect through my new Netbook via Wi-Fi, which now supports the platform" ***(SLT, CVUHB)***

"School initially struggling with internet connection but then able to move to a room with better signal and VC quality then good" ***(SLT, CVUHB)***

However, one problem that was reported by a small number of patients was associated to the virtual waiting time being exceedingly long, or that their appointment was missed by a clinician, or in some instances, where no clinician attended at all.

"Waited for over 40 minutes in the waiting room… My wife had to ring from a different line to speak with the nurse" ***(Parent of Patient, SBUHB, parent of child under 12 years, Paediatrics & Child Health, Follow-up)***

"We waited in the virtual waiting room for an hour and 30 minutes without anyone answering. We couldn't wait any longer and due to our poor internet connection in our area, I had to use all my monthly data" ***(Parent of Patient, ABUHB, Parent of child under 12 years, Male, Paediatrics & Child Health, Follow-up)***

Theme 5: Recommendations & Future Use

5.1 Clinical Recommendations

To be able to continue using VC appropriately in the future, and in conjunction, as a blended approach with face-to-face and telephone consultations, the clinician narrative revealed a number of recommendations for improvement.

One of these suggestions was improved infrastructure and resources for NHS clinical and administrative staff to have access to. It was felt that by having better equipment, they would deliver better patient care via VC. Not only this, but in some areas the sheer number of devices and access to workspace was limited, and needed significant improvement in the future.

"It would be useful to have 2 microphones so that I can share videos with my clients about EMDR therapy and PTSD" ***(Nurse, BCUHB)***

"Better workspace and monitors if doing repeated consultations" ***(Dietician, BCUHB)***

"Need appropriate screens and two monitors to view downloads and see patients, desk and chairs at right height" ***(Dietician, BCUHB)***

Clinicians also suggested that there needed to be an improvement with the technical support that was on offer across Health Boards in regard to VC.

"Being taught how to split the screen so we can write notes at the same time, rather than making paper notes and writing up after" ***(Occupational Therapist, BCUHB)***

This suggestion of technology support would ensure clinicians could use VC to the best of their ability, utilising all aspects of the platform such as screen-share. Some clinicians suggested new features that they felt would be useful to them in ensuring clinician/patient confidentiality and safety, whereas others suggested ideas on how improvement could be made to the VC platform for ease of use.

"To be able to blur/add a background when working from home" ***(Dietician, SBUHB)***

"I would like to be able to leave the call screen but still be able to see patient in a little pop-out screen" ***(SLT, BCUHB)***

Additional administrative support was also suggested for VC so that they could mirror the way standard face-to-face consultations were run.

"For this to work administrative clinic support needed to mirror that provided for face-to-face appointments" ***(Nurse, CVUHB)***

5.2 Patient Wants & Needs

Patients' narrative also suggested that technical and digital skills support would be useful in the future use of VC. Some patients were a bit unsure of how to use the technology needed to use VC and ran into some issues. By having support for this, it may lead to an increase in digital skills for future digital implementations and the move towards a new NHS digital strategy.

"I couldn't work out how to use the camera on the front of my phone to record me during the interview and wasn't sure how to connect via my computer to the appointment" ***(Patient, ABUHB, 25-44, Female, Mental Health, First Appointment)***

"I was unable to switch my camera to front facing, so did the whole appointment looking at the back of my phone, not being able to see who I was talking to" ***(Patient, CAVUHB, Female, 45-64, Nurse Otolaryngology (ENT),***

First Appointment)

While some patients provided narrative to suggest a blended approach of digital healthcare services and some stated that they would prefer face-to-face as opposed to VC, a large number or patients highlighted that VC provided numerous benefits, and believed VC was the way forward for the future of the NHS Wales.

> *"Great… Definitely the way forward for consultations, I live 100 miles away so for the purpose of consultation rather than treatment this is brilliant!"* ***(Patient, SBUHB, 45-64, Female, Doctor, Plastic Surgery)***

> *"I personally feel this is a fantastic way to conduct follow up appointments and results appointments in the future. Thanks so much for offering it"* ***(Patient, CTMUHB, 64-80, Female, Doctor, Follow-up)***

> *"I think this will be the future. I felt more relaxed being able to do it from my home"* ***(Patient, BCUHB, Female, 64-80, Doctor, Obstetrics & Gynaecology, First Appointment)***

Discussion

The qualitative analysis of the free-text comments captured in the live end of VC feedback from a large dataset of 22,978 clinician and patient submissions provided rich and meaningful data. Five dominant themes and 14 additional sub-dominant themes emerged. Each theme is presented based on the perspectives and voices of patients, families and clinicians using the NHS Wales VC service. These are supported with direct quotations throughout.

Due to the high response rate in free-text responses the analysis of the feedback data was able to be conducted using an in-depth thematic approach, thus providing a strong case for each theme and its perspective (for example, each theme has hundreds, if not thousands, of quotes supporting each argument). The themes that emerged in the analysis provide a strong sense that the NHS Wales VC Service is highly satisfactory, well accepted, and clinically suitable for a wide range of patient and clinical teams using the service.

The data provides a strong consensus that the VC platform currently being used in NHS Wales is 'easy to use' in both technical and experience terms, with the additional value of 'uniqueness' due to its ability to add others to the call, thus providing a multipronged participation approach to patient care. In addition, the data highlights the real life and personal aspects of VC lived experience, which suggests that patients who are using the Welsh NHS VC service, are more than just satisfied with using it, but rather provide expressions of empowerment and personalisation felt in their patient care. In addition, there is a heartfelt sense of patient appreciation and gratitude to their clinicians for their hard work and dedication to delivering patient care. Furthermore, the data demonstrates the many benefits and advantages that are associated to using VC. These benefits are felt by patients, families and clinicians, and believed to benefit the NHS service as a whole. The data also presents a comparison between good versus bad technical quality of the VC platform. There are a wide range of expressions ranging from excellent quality down to poor technical quality, with audio and visuals being the measures of its feat. Whilst good versus bad are always good comparatives within an evaluation, it is nevertheless essential to make sure that recommendations and improvements are made as a response to the evaluation. For example, it is recommended that more resources are made available to clinical teams, and that VC platform features are considered as priority for improvement. It is also noted that technical support is continued to ensure that VC can appropriately be used in the future, and possibly offered directly to patients to ensure that VC is used as a long-term blended approach to suit patient choice and preferences as we move forward. The data captured in this study is comparable to previous literature that suggests that the benefits of VC outweigh the challenges [12, 14]. The data contributes to the evidence base for VC, and provides a strong case for supporting the use and sustainability of VC in NHS healthcare services.

This paper presents the qualitative analysis of a large cross-sectional study conducted over a 6-month period. However, the quantitative findings provide additional support, specifically regarding patient representation. For example, a recent report by TEC Cymru (2021) concludes that regardless of patient age, gender, ethnicity, household income, health condition, disability or place (urban vs. rural), VC can provide a high standard of healthcare delivery across Wales [12, 14, 15].

Limitations

There are many strengths to this study, including its qualitative approach among a very large and representative sample for Wales. However, the study did have some limitations. For example, due to the voluntary and anonymised nature of the feedback data collection, it is unclear as to how often recurring participants completed the feedback, thus potentially skewing the sample. Furthermore, due to the size of the study it was not possible to present both the qualitative and quantitative findings together, however access to this data is readily available on the TEC Cymru website [12].

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Declaration of interest: none.

Statement of Data Sharing: All analysed data is published on the TEC Cymru website in the format of a full report of all data for the public to view. To access this reports please see https://digitalhealth.wales/tec-cymru**.** Other data can be requested as a reasonable request to the corresponding author.

Author contributions: GJ contributed to the main design of the study and development of the research questions, the main structure and write-up of the paper, and final amendments to the manuscript. GJ, BW & MW analysed the data, with AA, SK MO supervision. All authors discussed and interpreted the data once analysed and helped structure the manuscript. AA, SK and MO contributed to the clinical understanding of the findings and shaped the discussion, conclusions and recommendations. AA was responsible for overseeing the full development of the study design and data collection, the analysis and development and final sign-off of

manuscript from a clinical and programme perspective. All authors contributed to proof-reading and amendments of the final manuscript.

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Video Consulting Patient Copy

Survey 1:

1. Please rate the quality of your video consultation Rhowch sgôr i ansawdd eich galwad fideo

Poor Gwael	Okay Iawn	Good Da	Very Good Da iawn	Excellent Ardderchog
★	★	★	★	★

Any comments?

2. How would the patient describe themselves? Sut yw'r claf yn disgrifio ei hun?

	Age Old	Gender Rhyw
Demographics Demograffeg		

3. How many times have you used video for a health or social care consultation, and would you use it again? Sawl gwaith ydych chi wedi defnyddio fideo am ymgynghoriad iechyd neu ofal iechyd, a byddwch chi'n defnyddio eto?

	How many times have you used a video consultation? Sawl gwaith ydych chi wedi ei defnyddio?	Would you like to use video consultation again? Byddwch chi'n ei defnyddio eto?
Video Consultation Use Defnydd fideo		

4. What was your video consultation related to today? Beth oedd eich ymgynghoriad fideo yn ynghylch heddiw?

- First time appointment
  Awyntiad gyntaf
- Advice & support
  Cymorth neu gyngor
- Review of my health and/or results
  Adolygiad iechyd/ canlyniadau
- Final appointment & discharge
  Apwyntiad olaf neu ryddhad
- Therapy or treatment session
  Therapi neu sesiwn triniaeth

Other (please specify)

5. Do you feel that this video consultation prevented you needing a face-to-face appointment?

Wnaeth yr ymgynghoriad fideo osgoi'r angen i'r claf gael apwyntiad wyneb i wyneb?

- Yes ie
- No na
- I don't know ansicr

Comments?

6. For your video consultation today, what type of healthcare speciality and professional did you see? Am eich ymgynghoriad fideo heddiw, pa fath o arbenigwr a phroffesiwn gwelwch chi?

	Health Condition Speciality Arbenigrwydd cyflwr iechyd	Professional Phroffesiwn
Speciality & Professional Arbenigwr a Phroffesiwn		

Please state the health-related reason for your video consultation today?

7. How long would it typically take you to travel from your home to your consultation? (one way) Pa mor hir fyddai hi'n cymryd i chi deithio i'ch apwyntiad fel arfer?

Minutes (Traveling one-way)	
Miles (if known)	
Parking (at the site)	

8. Which Health Board Region are you in? O ba Ranbarth Bwrdd Iechyd ydych chi'n dod?

- Aneurin Bevan University Health Board
- Betsi Cadwaladr University Health Board
- Cardiff & Vale University Health Board
- Cwm Taf Morgannwg University Health Board
- Hywel Dda University Health Board
- Powys Teaching Health Board
- Swansea Bay University Health Board
- Velindre Cancer Centre

9. TEC Cymru's researchers will be running interviews with clinicians. Please leave your email below if you would like to take part, and we will contact you to arrange a date and time. Address

Email Address

10. Any other comments, questions or concerns?
Unrhyw sylwadau, cwesitynau neu bryderon eraill?

By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box [ ]

Survey 2: (Additional Questions Added)

11. Did you experience any difficulties with your video consultation today? Gwelwch chi unrhyw anawsterau gydag eich ymgynghoriad fideo heddiw?

	A lot llawer	Some Rhywfaint	A little Ychydig	Not at all Dim	N/A
Difficulties with a device Anawsterau Gyda dyfais	○	○	○	○	○
Difficulties with Internet connection Anawsterau gyda chysylltiad rhyngrwyd	○	○	○	○	○
Difficulties with video/picture Anawsterau gyda llun/ fideo	○	○	○	○	○
Difficulties with audio/sound Anawsterau gyda sain	○	○	○	○	○
Difficulties with privacy or a safe space Anawsteru gyda diogelwch neu pbeifatrwydd	○	○	○	○	○
Lack of confidence using video calls Diffyg hyder gyda defnydd fideo	○	○	○	○	○
Not suitable for clinical needs Anaddas am anghenion clinigol	○	○	○	○	○
Prefer face to face or telephone Mae'n well gen i wyneb yn wyneb neu dros y ffôn	○	○	○	○	○

12. How did your video consultation benefit you today? Sut aeth yr ymgynghoriad fideo buddio chi heddiw?

	Very beneficial Buddiol iawn	Beneficial Buddiol	Quite beneficial Eithaf Buddiol	Not beneficial Dim yn Buddies	Not at all beneficial Dim yn Buddiol o gwbl	N/A
Saved time & preparation Arbed Amser a Pharatoi	○	○	○	○	○	○
Saved travel & parking Arbed teithio	○	○	○	○	○	○
Saved the environment & co2 emissions Arbed yr amgylchedd ac allbwn co2	○	○	○	○	○	○
Saved taking time off school, work or other commitments Arbed amser o waith, ysgol neu ymrwymiadau	○	○	○	○	○	○
Saved money e.g., childcare, travel Arbed arian am ofal plant/ teithio	○	○	○	○	○	○
Improved access to care & waiting times Gwella mynediad i ofal ac amser aros	○	○	○	○	○	○
Improved convenience e.g., staying at home Gwella hwylustod e.e. aros adref	○	○	○	○	○	○
Improved family involvement & support Gwella cyfranogiad a chymorth teulu	○	○	○	○	○	○
Lowered rates of infection risk Lleihau cyfraddau haint	○	○	○	○	○	○
Lowered stress and anxiety Lleihau straen a phryder	○	○	○	○	○	○

By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box [ ]

Video Consulting Clinician Copy

Survey 1:

1. Please rate the quality of your video consultation? Rhowch sgôr i ansawdd eich galwad fideo?

Poor Gwael	Okay Iawn	Good Da	Very Good Da iawn	Excellent Ardderchog
☆	☆	☆	☆	☆

Comments?

2. What is your profession & speciality? Beth yw eich proffesiwn ac arbenigedd?

Please only enter 'other' if your profession/speciality is not on the list.

	Profession Proffesiwn	Speciality Arbenigedd
Profession & Speciality Proffesiwn & Arbenigedd		

Other (please specify)

3. What do you consider was the primary activity of this video consultation?

Beth oedd y prif weithgaredd yn yr ymgynghoriad fideo?

- ○ First Appointment apwyntiad cyntaf
- ○ Advice & Support cyngor a chymorth
- ○ Follow-up dilyniant
- ○ Feedback/Outcomes/Results adborth/ allbwn/ canlyniadau
- ○ Review adolygiad
- ○ Discharge rhyddhad
- ○ Therapy Session sesiwn therapi
- ○ Other (please specify)

4. Do you feel that this video consultation prevented the patient needing a face-to-face appointment?

Wnaeth yr ymgynghoriad fideo osgoi'r angen i'r claf gael apwyntiad wyneb i wyneb?

- ○ Yes ie
- ○ No na
- ○ Unable to say Methu dweud

Other (please specify)

5. Which Health Board Region are you in? O ba Ranbarth Bwrdd Iechyd ydych chi'n dod?

- ○ Aneurin Bevan University Health Board
- ○ Betsi Cadwaladr University Health Board
- ○ Cardiff & Vale University Health Board
- ○ Cwm Taf Morgannwg University Health Board
- ○ Hywel Dda University Health Board
- ○ Powys Teaching Health Board
- ○ Swansea Bay University Health Board
- ○ Velindre Cancer Centre

6. **ONLY ANSWER THIS QUESTION IF WORKING FROM HOME**

If you are working remotely, how long in minutes and miles would it typically take you to travel from home to work? (one-way)

Use numbers only e.g., 10 (for minutes and/or £ in expenses)

Minutes

Miles (if known)

7. Any other comments, questions or concerns?
Unrhyw sylwadau, cwesitynau neu bryderon eraill?

For example, is there additional support you may need? Or could anything be improved with the platform?

8. TEC Cymru's researchers will be running interviews with clinicians. Please leave your email below if you would like to take part, and we will contact you to arrange a date and time.

Email Address

CONSENT:
By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box { }

Survey 2: (Additional Questions Added)

9. Did you experience any issues or difficulties with your video consultation today? A wnaethoch chi brofi unrhyw broblemau neu anawsterau gyda'ch ymgynghoriad fideo heddiw?

	Very relevant	Relevant	Quite relevant	Not relevant	Not at all relevant	N/A
Issues with a device Mynediad at ddyfais	○	○	○	○	○	○
Issues with Internet connection Cysylltedd gwael â'r rhyngrwyd	○	○	○	○	○	○
Issues with video/picture Problemau gyda fideo	○	○	○	○	○	○
Issues with audio/sound Problemau gyda sain	○	○	○	○	○	○
Issues on the patients side e.g., their device, Internet or lack of confidence using video Problemau gydag ochr y claf	○	○	○	○	○	○
I lack the confidence using video consultation Diffyg hyder wrth ddefnyddio galwadau fideo	○	○	○	○	○	○
Not suitable for clinical needs Ddim yn briodol neu'n addas	○	○	○	○	○	○
I prefer face to face or telephone Mae'n well gen i wyneb yn wyneb neu dros y ffôn	○	○	○	○	○	○
The patient prefers face to face or telephone Mae'r claf yn cyfeirio wyneb yn wyneb neu dros y ffôn	○	○	○	○	○	○

Other (please specify)

10. What do you consider to be the benefits of your work or your service of using video consultation today? Beth yn eich barn chi yw buddion eich gwaith neu'ch gwasanaeth o ddefnyddio ymgynghoriad fideo heddiw?

	Very beneficial Buddiol iawn	Beneficial Buddiol	Quite beneficial Eithaf Buddiol	Not beneficial Dim yn Buddiol	Not at all beneficial Dim yn Buddiol o gwbl	N/A
More efficient use of clinical time & space Defnydd mwy effeithlon o amser a lle	○	○	○	○	○	○
Saved travel & parking Arbed teithio a pharcio	○	○	○	○	○	○
Saved the environment e.g., less paper waste, co2 emissions Arbed yr amgylchedd ac allbwn co2 a phapur	○	○	○	○	○	○
Improved access to care for patient Gwella mynediad i ofal am y claf	○	○	○	○	○	○
Reduced waiting times for patient Lleihau amseroedd aros i'r claf	○	○	○	○	○	○
Reduced likelihood of a DNA Lleihau'r siawns o DNA	○	○	○	○	○	○
Improved family involvement & support for patient Gwella cymorth a chyfranogiad i'r claf	○	○	○	○	○	○
Lowered rates of infection risk Lleihau'r gyfradd heintiad	○	○	○	○	○	○

Other (please specify)

CONSENT:

By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box { }

BMJ Open

Digital NHS Wales: A Reflexive Thematic Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

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Title Page

Digital NHS Wales: A Reflexive Thematic Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

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Up to five keywords or phrases suitable for use in an index. Digital Healthcare, Video Consulting; National Health Service (NHS), Service Improvement; Wales, United Kingdom.

Word count - excluding title page, abstract, references, statements, figures and tables. 5000 words.

Digital NHS Wales: A Reflexive Thematic Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

Introduction: *The use of video consulting (VC) in Wales United Kingdom (UK) has expanded rapidly. Previous VC evidence has been the subject of small-scale projects and evaluations. TEC Cymru are an All-Wales digital service and roll out digital interventions and evaluate on large scales, thus capturing representative datasets across Wales, and therefore a wide range of National Health Service (NHS) specialities.* ***Objective****: To extract and analyse narrative feedback from patients and clinicians using the NHS Wales VC Service for 6-months (September 2020 to March 2021).* ***Design****: A reflexive thematic analysis of a cross-sectional study was conducted, using Braun and Clark (2006) [1]* ***Setting****: From all Health Boards across Wales.* ***Participants****: NHS patients and clinicians across primary, secondary and community care settings in Wales.* ***Results****: Data was captured on benefits, challenges and sustainability of VC. A reflexive thematic analysis was used with six topic areas materialising to include: 'The Ease of VC'; 'The Personal Touches'; 'The Benefits of VC; 'The Challenges of VC'; 'Technical Quality',* and *'Recommendations & Future Use'. An additional 17 sub-topics are included. Direct quotations from patients and clinicians are provided for context.* ***Conclusions****: A total of 22,978 participants were included. This data helps to demonstrate that NHS remote service delivery, via the method of VC can be highly satisfactory, well-accepted and clinically suitable yielding many benefits. Despite this, the data is not without its challenges surrounding engagement and suitability for VC. The NHS Wales VC Service rolled out and evaluated at scale and demonstrates that VC has potential for long-term sustainability. For future use a 'blended approach' for NHS appointments that are clinically judged and centred on patient choice.*

Abstract Summary

Strengths & Limitations

- This paper presents patient and clinician free-text narrative boxes on a large scale considering experience of a relatively new digital service in NHS Wales.
- The study is representative of Wales, in that it is an all-Wales study, across all Health Boards.
- The study is a mix of patient and clinician voices across all types of NHS specialities.
- Due to the voluntary and anonymised nature of the feedback data, it is unclear as to how often recurring participants completed the feedback, thus potentially skewing the sample.
- Due to the size of the study sample it was not possible to present both the narrative and quantitative findings together, however access to this data is readily available on our website.

Background

Since 2020, the National Health Service (NHS) has seen a paradigm shift in the provision of healthcare services due to mandatory social distancing laws introduced because of the COVID-19 pandemic [2-4] As a result, the UK along with the NHS

observed a significant decrease in access to face-to-face appointments, and therefore, an increase in remote services [5].

Video Consulting (VC) has accelerated through health and social care as one of the most common remote methods for conducting appointments with patients throughout the NHS, especially in Wales [6, 7]. VC within health services has been internationally utilised for decades, yet the unprecedented circumstances of the pandemic brought to light its widespread ability, use, value, benefits and challenges [2].

There is growing evidence that VC can deliver safe and timely care in many settings and offer significant benefits to the users [8, 9]. The use of VC permits services to continue across a wide range of healthcare conditions, appointment types, sociodemographic groups, and health condition status [10]. Furthermore, it is sometimes considered more suitable for reaching underserved and isolated populations [5]. VC is reported to provide quality ensured, yet cost-effective care and treatment, while reducing patient waiting times and the likelihood of Did Not Attends (DNAs) and number of hospital admissions—ultimately relieving pressure on NHS staff and services [11].

However, the majority of evidence is based upon pilot studies, with small and often highly selected samples, ultimately casting speculation on its use, benefits and challenges across varied care sectors, specialities and circumstances [12].

There are often some concerns regarding the use of VC services within certain professions that rely on face-to-face physical examinations to make diagnoses. It can sometimes be challenging to obtain the same level of accuracy when taking clinical measures via VC compared with obtaining them face-to-face. Not only this, but personal preferences in clinicians and patients can dictate whether or not a VC is used.

Therefore, the current evidence-base suggests that there is a need to continuously evaluate on a national level to allow for sustainable VC platforms to be embedded for the long-term into health and social care systems where appropriate [13, 14]. Due to the need for a continual evaluation, Technology Enabled Care (TEC) Cymru as an All-Wales digital service, rolled out The NHS Wales Video Consulting (VC) Service as a national emergency response to the COVID-19 pandemic [15]. The evaluation spans a large and representative scale basis across a wide range of NHS healthcare sectors

across all Health Boards in Wales. To contribute to the current evidence-base, TEC Cymru work in partnership with the Welsh Government, academics, third sector and local Health Boards and Trusts in Wales to adopt a clinically driven and data informed approach to their digital service roll out, spread and evaluation.

Aims & Methods

The aim of this study was to explore the benefits, challenges and sustainability of VC from the perspective of Welsh NHS clinicians and patients by conducting a reflexive thematic analysis, and presenting the narrative feedback received from 22,978 participants during a 6-month period (September 2020 and March 2021). This period was chosen as a 'mid-point' from a larger, ongoing VC evaluation during the COVID-19 pandemic to gain a better understanding of VC without the influence of initial issues during the earlier months of VC being rolled out, and current changes such as VC being scaled up with a focus on blended consultation approaches.

METHODS:

Design, Setting, Participants

This paper presents the All-Wales data captured across all 7 Health Boards and 1 Trust (See Appendix 1) across a range of NHS healthcare settings within primary, secondary and community care (See Appendix 2-3). This is a reflexive thematic analysis of VC experience feedback captured in a larger cross-sectional study [16], held by the NHS Wales VC Service, TEC Cymru [15, 17]. Participant eligibility included NHS clinicians and patients using VC in NHS Wales (see Appendix 4-9).

Measures

This paper presents national (All-Wales) data from free-text narrative boxes from a cross-sectional feedback study. The feedback appeared as internet browser pop-ups at the end of each VC appointment – one per clinician and patient and completed immediately as live data to reflect the use, benefits, challenges, and sustainability of VC (see supplementary additions 1 and 2).

Sampling

Opportunity sampling was used due to accessibility of the VC intervention and ability to capture data at the end of each consultation via an online feedback link. There is acknowledgement of the risks surrounding sampling in this way, when considering the feedback being completed by those more willing, thus sharing potentially more extreme 'positive' or 'negative' data towards VC, potentially missing out 'neutral' responses of those individuals in the middle. To limit this, TEC Cymru conduct multiple phases of re-evaluation using a phased approach to their research and evaluation work (see supplement 1), which provides ample opportunity across their digital interventions to explore a wider range of methodologies and study types.

Ethics Approvals & Informed Consent

TEC Cymru obtained full ethical approvals and risk assessments from their host Health Board Aneurin Bevan University Health Board Research & Development Department (Reference Number: SA/1114/20), and then national approval was obtained from all other Health Boards in Wales.

At the end of each participant feedback link, a statement of consent and a compulsory tick box was required prior to feedback submission.

Patient and Public Involvement.

No patient or public involvement as survey work and during the emerging roll out did not have PPI team. Now have PPI team and young representatives.

Statistical Methods

For the data discussed in this paper, there are a total of 22,978 clinician and patient feedback narrative submissions. Using the steps outlined by Braun and Clarke [1] for a reflexive thematic analysis, the data was familiarised by three researchers of the TEC Cymru team [GJ, BW, MW], codes were manually identified and generated and placed into an excel sheet for manageable order (due to large numbers). Topics were

then generated from the data, reviewed, and defined and the report was produced following a recursive process of movement between the phases, ensuring quality and rigour, with an additional 20% validation check on all data by the National Clinical Lead for Wales [AA].

Results

A thematic analysis of the free-text narrative data collected at the end of the Video Consultation (VC) feedback was conducted. From the 22,978 patient and clinician responses captured during September 2020 and March 2021, six topics materialised with an additional 17 sub-topics. These include: The Ease of Video Consultations (VC); The Personal Touches; The Benefits of Video Consulting; The Challenges of Video Consulting; Technical Quality, and Recommendations & Future Use. Direct quotations from patients and clinicians are provided. Each quotation is referenced to describe either the *patient* by their age range, gender, Health Board/Trust, healthcare speciality and type of appointment (e.g., first appointment, follow-up), or the clinician by their professional occupation and the Health Board/Trust in Wales in which they are based. The topics are analysed in order of the most common comment/feedback due to the voluntary responses.

Topic1: Ease of Use

Patients and clinicians generally rate their VC as high in quality [14] and their free-text narratives reflect this level in terms of high satisfaction and acceptability in relation to both technical and overall experience. For example, when patients and clinicians rate their VC as 'excellent', 'very good' or 'good' this is often paired with positive comments in relation to either the VC's technical performance as a video consulting platform or the overall experience of using VC as a healthcare delivery service.

1.1 Ease of Technical Use

One of the most common sub-topics associated to the platform's technical performance was that of 'ease of use'. It was often stated that the VC platform used in NHS Wales (Attend Anywhere) was 'easy to use' for both patients and clinicians.

"Easy to use, lots of good information" ***(Parent of Patient under 12 years, ABUHB, Physiotherapist, Paediatrics & Child Health, Advice)***

"It was easy to use, and appropriate to use during the pandemic" ***(Patient, Female, HDUHB, 25-44, Midwife, Obstetrics & Gynaecology, First Appointment).***

In addition, this ease of use was expressed as a 'surprise' to some, in that both patients and clinicians found the VC platform much easier to use than they initially anticipated, and in some instances, this exceeded expectation.

"More effective than I expected a non-face to face appointment to be" ***(Patient, Male, 45-64, HDUHB)***

"This is my first experience of a video call, so I was pleasantly surprised" ***(Patient, Female, 64-80, BCUHB, Doctor, Follow-up)***

"First time to use video call I was very impressed, better than expected" ***(Patient, ABUHB, Podiatrist, Follow-up)***

1.2 Ease of Experience

For some clinicians, it was felt that having access to a VC platform was 'easier' for some of their patients than a face-to-face appointment would be. This was especially apparent in terms of patient experience and their personal circumstances, and those with access difficulties, anxiety issues, or complex home situations that were made more convenient with VC.

"Easier to access with social anxiety" ***(Doctor, CVUHB)***

"Very helpful for autistic patient" ***(Dentist/Dental Nurse, SBUHB)***

This was also expressed in more depth by the patients themselves, whom in addition felt VC was better than attending a face-to-face appointment, such as making the patient feel safer, less stressed and more empowered, as opposed to their prior experience of face-to-face appointments.

"Easier and safer than going to the hospital. I didn't have to take much time off work" ***(Patient, SBUHB, Female, 25-44, Dietician, First Appointment)***

"Just as good as a face-to-face meeting and to be honest I felt like I was being listened to far more than when I have been in face-to-face meetings on the same subject" ***(Parent of Patient, ABUHB, Female, under 12 years, Nurse, Mental Health, Advice)***

1.3: Ease & Unique for Collaborations

Clinicians comment that the 'ease' of the VC platform and its positive associations to patient experience provides an additional unique opportunity. This opportunity is the ability to link up others to the video call, thus enabling multi-disciplinary appointments to take place. This is felt to be unique in the sense that this collaborative approach would not have been possible if conducted face-to-face, thus in turn, produces additional advantages and improved outcomes for patient, families and clinicians.

"It was easy to join both my patients and other colleagues in" ***(Doctor, HDUHB)***

"Also, his Wife was able to join session – significant information shared by Wife today" **(SLT, BCUHB)**

It also means that in some instances, there is an increase in patient or parental onus which is perceived as an additional advantage to patient care.

"Parents have to take a more proactive role than they might in clinical session" ***(SLT, ABUHB)***

"Definitely helped with family involvement today" ***(Nurse, HDUHB)***

"Mum appears happy to support and possible not very involved until now" ***(SLT, ABUHB)***

Topic 2: The Personal Touches

The narrative data highlighted several incidences of where VC has been able to increase clinician to patient relations.

2.1: Communication, Personalisation & Rapport

Patients commonly expressed how VC helps them to communicate effectively, to receive a more personalised and patient-centred approach, and build rapport with their clinicians.

> *"Having a video call made it more personal for me the support given to me was excellent"* ***(Parent of Patient, CAVUHB, under 12 years, Paediatrics & Child Health, Advice)***

> *"We have built up a relationship with our clinician via VC"* ***(Patient, Male, 45-64, CAVUHB, Counsellor, Mental Health)***

2.2 Patient Positivity & Appreciation

A strong consensus of patient 'positivity' and 'appreciation' towards their clinicians is expressed widely in the narrative. This positive clinical presence led to many patients feeling safe, comfortable and supported during and after their VC. This was particularly evident across specialities such as mental health and therapies.

> *"Had a really tough week, but [name removed] was amazing and she listened to me. She gave me great support and was really kind to me"* ***(Patient, CAVUHB, 25-44, Psychologist, Mental Health, Therapy/ Treatment)***

> *"She was engaging, courteous and professional in explaining what she felt the issues were with my hand. I found the whole experience thoroughly satisfactory."* ***(Patient, CAVUHB, 45-64, Male, Occupational Therapist, Trauma & Ortho, First Appointment)***

> *"It was great to feel that someone was there to chat to, who could see a difference in [patient name removed], while at the same time supporting us as a family."* ***(Guardian/Carer of Patient, SBUHB, 25-44, Male, Mental Health, Follow-up)***

Topic 3: The Benefits of Video Consulting

The benefits associated to using VC were one of the most common topics that materialised in the data.

3.1 Convenience, Safety & Home Comforts

Many of the patients demonstrate the benefit of convenience when using VC as opposed to a traditional face-to-face appointment, with additional advantages such as improved safety and home comforts.

> *"As we live quite far away, the virtual meetings are a lot more convenient and it's nice to feel more comfortable at home. Thank you"* ***(Patient, CAVUHB Female, 25-44, Obstetrics & Gynaecology, Follow-up)***

> *"I felt really comfortable talking to [name removed]. I was able to get things off my chest, and talk about the assault more deeply than I have ever done"* ***(Patient, ABUHB, 45-64, Female, Counsellor, Mental Health, Therapy / Treatment)***

> *"Client is pregnant and so is vulnerable to the COVID virus. AA means she can continue with therapy without the additional risks"* ***(Mental Health, HDUHB)***

3.2 Flexibility of VC

For many patients, a benefit of using VC was the flexibility it allowed. For example, patients reported to be able to continue 'getting on with other things' whilst waiting in the 'virtual waiting room', which would not have been possible in a physical location.

> *"I felt it was good as I could start the call and then get on with things around the house while I waited"* ***(Parent of Patient, BCUHB, Female, under 12 years, Physiotherapist, Paediatrics & Child Health, Therapy / Treatment)***

> *"I think that it is excellent to have a consultation this way. It was easy to log on and saves so much time for both of us"* ***(Patient, ABUHB, 45-64, Female, Physiotherapist)***

In addition, having three modes of appointment (VC, telephone or face-to-face) provided the patient with a stronger sense of patient choice and flexibility. However, it was felt that VC, as opposed to a telephone consultation, allowed comparable aims and goals to be achieved similar to a face-to-face.

"VC let us achieve patient's 1st choice, which could not have been achieved over the phone" ***(Occupational therapist, SBUHB)***

"AA is a way of bridging direct face-to-face and a visual interaction can be helpful as part of the clinical assessment" ***(Nurse, HDUHB)***

"Having a video consultation is so much better than just a telephone call - it allows you to chat as if it was in person" ***(Patient, PTHB, 64-80, Female, Nurse Respiratory Medicine, Advice)***

The ability to be able to visually 'see' the patient is considered imperative to clinicians, as for many healthcare conditions VC is needed to enable visual cues.

"Better than just telephone call as could get non-verbal clues about emotions" ***(Doctor, ABUHB)***

"Really useful being able to see patient via system – really added to consultation, infinitely superior to telephone consultation" ***(Doctor, SBUHB)***

3.3 Time Savings

When using VC as opposed to face-to-face appointments many clinicians and patients expressed that they had saved time in several ways, and this was a considerable benefit to patients, families, clinicians and the NHS service as a whole.

For example, clinicians felt that the 'time' used to conduct a VC was reduced in comparison to the usual components of a face-to-face e.g., logistics. The time saved from travelling to and from appointments was able to be combined into the overall virtual consultation in some cases, ultimately benefiting clinicians' availability to attend to other patient needs and clinical tasks.

"Video consultation reduces time required the next day" ***(Midwife, CVUHB)***

"Video consultation prior, ensures that less time on home visits" ***(Health Visitor, SBUHB)***

In addition, the use of VC lowered the 'wait times' in some instances for patients, in comparison to waiting for a face-to-face appointment.

"Fantastic way to be able to have an appointment without having to wait months" ***(Parent of Patient, CTMUHB, under 12 years, Male, Doctor, Otolaryngology (ENT), First Appointment)***

"Reduces time required for next appointment" ***(Audiovest Med, BCUHB)***

From the data, 'travel time' or 'time off' work or school was perceived as the biggest saving of time in comparison to attending a face-to-face appointment for patients.

"Less travel and disruption of [patient] school day" ***(Dietician, ABUHB)***

"I just had just finished a night shift, and live a fair distance from work, so doing a video call made my life a lot easier" ***(Patient, SBUHB, 45-64)***

"Not having to travel to the hospital and waiting in the waiting room was much better, and there was no stress trying to get around everything all of the time" ***(Patient, CVUHB, 45-64)***

3.4 Clinical Value

Many clinicians suggested that VC has the ability to enhance a clinical session or determine clinical need. For example, some clinicians demonstrated opportunities to share visual resources immediately within the appointment. Others reported that VC allowed for an effective triaging tool to determine the 'need' for a face-to-face appointment as opposed to a remote consultation alternative.

"It enhanced the clinical session because it added visual opportunity" ***(Speech and Language Therapy, CVUHB)***

"I could open investigations on screen easily, I shared internet resources links to patient, and she got them on screen straight away" ***(Doctor, BCUHB)***

Topic 4: The Challenges of Video Consulting

While there are a number of evident benefits when considering VC, it is important to highlight the challenges faced to gain an overall picture of both patient and clinician experiences which are subject to subtle nuances.

4.1 Video Consulting is Not for Everyone or Everything

There are some clinical situations and personal circumstances which continue to necessitate the need for face-to-face consultations, where VC does not achieve the outcomes necessary, or suit the clinical condition or patient type.

> *"Still needs face-to-face as cannot test hearing over VC"* ***(Audiovest Med, BCUHB)***

> *"Only thing missing was ability to weigh and get height"* ***(Dietician, ABUHB)***

4.2 Patient and Clinician Digital Ability

Some issues with patient and clinician user abilities were also highlighted in the data, clinicians made note that on occasion patients struggled to undertake VC due to their lack of technological ability. This affected the potential quality of the VC and therefore impacted the patients' opportunity to receive care via VC.

> *"Client unable to get full screen. Client not familiar with using equipment at home"* ***(Counsellor, Psychiatry & MH, Mental Health, Secondary, SBUHB)***

> *"Patient didn't receive link so unable to do. I think it may be due to me being unfamiliar with new system in the end and it worked well"* ***(Physiotherapist, Paeds & Child Health, Therapies (AHP), CVUHB)***

4.3 Engagement over VC

Engagement was a further challenge that clinicians experienced when using VC. Within therapies for younger patients where parents were present, clinicians found it challenging to engage with children via video in the same way as face-to-face. Children were reported to be more distracted during these appointments as the concept of video was relatively new, therefore parents and clinicians had to attempt to engage with the child more than via face-to-face.

"Poor picture quality does not encourage children who already have attention/listening difficulties to take part" ***(Speech and Language Therapist, ABUHB)***

"Child had short attention span and parents had to work hard to keep him in front of camera" ***(Speech and Language Therapist, ABUHB)***

"Sound quality not adequate at times to determine success of target so reliant on adult feedback. Child however responding better than expected although once attention levels drop it is quite difficult to return to tasks" ***(Speech and Language Therapist, Paeds & Child Health, ABUHB)***

4.4 Waiting Room Issues

A problem that was reported by a small number of patients was associated to the virtual waiting time being exceedingly long, or that their appointment was missed by a clinician, or in some instances, where no clinician attended at all.

"Waited for over 40 minutes in the waiting room" ***(Parent of Patient, SBUHB, and parent of child under 12 years, Paediatrics & Child Health, Follow-up)***

"We waited in the virtual waiting room for an hour and 30 minutes without anyone answering. We couldn't wait any longer and due to our poor internet connection in our area, I had to use all my monthly data" ***(Parent of Patient, ABUHB, Parent of child under 12 years, Male, Paediatrics & Child Health, Follow-up)***

Topic 5: Technical Quality

When considering the technical aspects of VC, clinician and patient tended to rate their VC highly when the audio and visual picture were of good quality.

5.1: Good vs. Bad Quality

For high-quality ratings, these were paired with praise for VC in the free-text narrative box. Suggesting that the audio and visual elements of the VC were of high quality.

"Great connection. No glitches very smooth call" ***(Parent of Patient, ABUHB, under 12 years, Female, Physiotherapist, First Appointment)***

"The video and picture was perfect, was able to hear the doctor clearly" ***(Patient, CAVUHB, 45-64, Female, Doctor, Follow up)***

However, there were technological challenges reported within the narrative such as poor connectivity, thus impacting on visuals and audio.

> *"Lag in audio/video sometimes causes miscommunication or difficulty with younger patients"* ***(SLT, CVUHB)***

> *"The video was very choppy and when my therapist was talking it was delayed video with speech"* ***(Patient, CAVUHB, Female, 25-44, Counsellor, Mental Health, Therapy / Treatment)***

In some instances, technical issues were associated with specific device types and their perceived incompatibilities with the VC platform.

> *"The video call app did not give me the option of using my inner camera so I had to turn my phone around so the doctor could see me."* ***(Patient, BCUHB, 25-44, Ophthalmology, Advice)***

> *"Problems with Safari on iPad"* ***(Health Visitor, SBUHB)***

> *"Session being done on Father's phone so screen obviously small for child to watch"* ***(SLT, ABUHB)***

5.2 Clinical Innovation & Trouble-Shooting

Yet, despite these technological challenges, with the right amount of technical support and appropriate equipment available, clinicians report to be able to troubleshoot many issues and continue to use VC in most situations.

> *"Tried to do call with mobile phone and there were issues for the patient not being able to grant access for use on mobile phone, but the consultation worked perfectly on their computer"* ***(Dentist/Dental Nurse, BCUHB)***

> *"Issues at the start of the call with the audio but we disconnected and reconnected and it was then fine"* ***(Nurse, SBUHB)***

Some clinicians were able to trouble-shoot the problems easily to make the consultation work best for them and their patients.

"I was unable to connect through the desktop in clinic due to computer being extremely slow.... I was luckily able to connect through my Netbook which supports the platform" ***(SLT, CVUHB)***

"School initially struggling with internet connection but then able to move to a room with better signal and VC quality" ***(SLT, CVUHB)***

Topic 6: Recommendations & Future Use

When considering the experiences of both clinicians and patients using VC, it is important to consider how the narrative can be built upon to consider suggestions and recommendations to ensure that VC is suitable for future use and in conjunction, blended with face-to-face and telephone consultations.

6.1 Clinical Recommendations

One of these suggestions was improved infrastructure and resources for clinical and administrative staff to have access to. It was felt that by having better equipment, they would deliver better patient care via VC. Not only this, but in some areas the number of devices and access to workspace was limited and needed significant improvement in the future.

"It would be useful to have 2 microphones so I can share videos with my clients about EMDR therapy and PTSD" ***(Nurse, BCUHB)***

"Need appropriate screens and two monitors to view downloads and see patients, desk and chairs at right height" ***(Dietician, BCUHB)***

Clinicians also suggested that there needed to be an improvement with the technical support that was on offer across Health Boards regarding VC.

"Being taught how to split screen so we can write notes at the same time, rather than making paper notes and writing up after" ***(Occupational Therapist, BCUHB)***

This suggestion of technology support would ensure clinicians could use VC to the best of their ability, utilising all aspects of the platform. Some clinicians suggested new features that they felt would be useful in ensuring clinician/patient confidentiality and safety.

"To be able to blur/add a background when working from home" ***(Dietician, SBUHB)***

"I would like to be able to leave the call screen but still be able to see patient in a little pop-out screen" ***(SLT, BCUHB)***

Additional administrative support was also suggested for VC so that they could mirror the way standard face-to-face consultations were run.

"For this to work administrative clinic support needed to mirror that provided for face-to-face appointments" ***(Nurse, CVUHB)***

6.2 Patient Wants & Needs

Patients' narrative also suggested that technical and digital skills support would be useful in the future use of VC. Some patients were slightly unsure of how to use the technology needed for VC and ran into some issues. By having support for this, it may lead to an increase in digital skills for future digital implementations and the move towards a new NHS digital strategy.

"I couldn't work out how to use the camera on the front of my and wasn't sure how to connect via my computer to the appointment" ***(Patient, ABUHB, 25-44, Female, Mental Health, First Appointment)***

"I was unable to switch my camera to front facing, so not able to see who I was talking to" ***(Patient, CAVUHB, Female, 45-64, Nurse Otolaryngology (ENT), First Appointment)***

Patients provided narrative to suggest a blended approach of digital healthcare services was needed going forward. This was due to a large number of patients highlighting that VC provided numerous benefits, and help to supplement the quality of care received from clinicians, and believed a blended approach of VC and face-to-face was the way forward for the future of the NHS Wales support by clinicians.

"Definitely the way forward for consultations, I live 100 miles away so for the purpose of consultation rather than treatment this is brilliant!" ***(Patient, SBUHB, 45-64, Female, Doctor, Plastic Surgery)***

"I think this will be the future. I felt more relaxed being able to do it from my home" ***(Patient, BCUHB, Female, 64-80, Doctor, Obstetrics & Gynaecology, First Appointment)***

"Video consultations act as a useful complement to face-to-face sessions and home visits" ***(Audiologist, BCUHB)***

Discussion

The reflexive thematic analysis of the free-text narrative boxes captured at the end of VC provided feedback from a large dataset of 22,978 clinician and patient submissions expressing a vast and overall view of VC experiences in Wales. Six dominant topic areas and 17 additional sub topics materialised. Due to the high response rate in free-text narrative box responses, the analysis of the feedback data was able to be conducted using a reflexive thematic approach, thus providing context for each topic and its perspective, supported by patient and clinician quotation. The topics that materialised in the analysis provide a strong sense that the NHS Wales VC Service on a whole is highly satisfactory, well accepted, and clinically suitable for a wide range of patient and clinical teams using the service. Despite this, it is important to draw attention to the challenges that have also occurred for both clinicians and patients, such as VC not always being suitable for every individual or appointment.

The data provides a strong consensus that the VC platform currently being used in NHS Wales is 'easy to use' in both technical and experience terms, with the additional value of its ability of enhanced collaboration, thus providing a multidisciplinary approach to patient care. In addition, the data highlights the real life and personal aspects of VC experience, which suggests that patients who are using the VC service are satisfied with using it and provide narrative around its ease of use and personalisation felt in their patient care.

In addition, there is a heartfelt sense of patient appreciation and gratitude to their clinicians for their hard work and dedication to delivering patient care. Furthermore, the data demonstrates the benefits that are associated to using VC. These benefits are felt by patients, families and clinicians, and the NHS service. Challenges are also apparent within the data with VC not always being appropriate for all patients or

appointments. This is in combination with difficulties surrounding engagement, particularly with children via VC and issues with digital ability across clinician and patient populations. Although there were disparities of digital ability that sometimes hindered a VC appointment, and suggestive of a digital divide, in this data set and the wider evaluation [18] we did not find this to be the case. The quantitative findings that run alongside this data provide additional support, specifically regarding patient representation, concluding that regardless of patient age, gender, ethnicity, household income, health condition, disability or place (urban vs. rural), VC can provide a high standard of healthcare delivery across Wales [16, 19, 20]. Though apparent, the challenges were heavily outweighed by the number of benefits experienced from using VC.

The data also presents a comparison between good versus bad technical quality on the platform regarding audio and visuals for both patient and clinician. Improvements for future use should encapsulate recommendations such as more resources to be made available to clinical teams, and that VC platform features are considered as priority for improvement. It is also noted that increased technical support and education is provided to ensure that VC can appropriately be used in the future, and possibly offered directly to patients, so that VC is used as a long-term blended approach to suit patient choice and preferences moving forward. While challenges have been identified, the data captured in this study is comparable to previous literature that suggests that the benefits of VC outweigh these challenges [16, 19] and can support the use and sustainability of VC in NHS healthcare services.

Limitations and Conclusions

There are many strengths to this study, including its narrative approach among a very large and representative sample for Wales. However, the study did have some limitations. Due to the voluntary and anonymised nature of the feedback data collection, it is unclear as to how often recurring participants completed the feedback, thus potentially skewing the sample. Furthermore, due to the size of the study it was not possible to present both the qualitative and quantitative findings together, however access to this data is readily available [19].

Originally, the data was broken down into specialities, but was regrouped for the purpose of this narrative analysis as most of the data showed little difference between specialities. While the quotations used within this data are true of the narrative at the time of collection, it is important to note that these are fitting of a time during the pandemic and so reflect this period. Data is being captured in an ongoing evaluation of VC within Wales, and suggests that those using VC are still rating it positively.

While this paper does not cover specific clinical implications, VC is being used across various specialities and evaluation is ongoing to explore this further.

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Declaration of interest: none.

Statement of Data Sharing: All analysed data is published on the TEC Cymru website in the format of a full report of all data for the public to view. To access this reports please see https://digitalhealth.wales/tec-cymru. Other data can be requested as a reasonable request to the corresponding author.

Author contributions: GJ contributed to the main design of the study and development of the research questions, the main structure and write-up of the paper, and final amendments to the manuscript. GJ, BW, BT & MW analysed the data, with AA, SK MO supervision. All authors discussed and interpreted the data once analysed and helped structure the manuscript. AA, SK and MO contributed to the clinical understanding of the findings and shaped the discussion, conclusions and recommendations. AA was responsible for overseeing the full development of the study design and data collection, the analysis and development and final sign-off of manuscript from a clinical and programme perspective. All authors contributed to proof-reading and amendments of the final manuscript.

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Appendix

Appendix 1 here

Health Board and Trust Distribution

Distribution of responses per Health Board and Trust within Wales.

Appendix 2 here

Breakdown of Primary, Secondary and Community Care responses

Primary Care responses.

Appendix 3 here

Secondary and Community Care responses.

Patient and Clinician Demographics

Clinician Professions

Appendix 4 here

Clinician Specialities

Appendix 5 here

Patient Age

Appendix 6 here

Patient Gender

Appendix 7 here

Patient Ethnicity

Appendix 8 here

Patient Household Income

Appendix 9 here

Video Consulting Patient Copy

Survey 1:

1. Please rate the quality of your video consultation Rhowch sgôr i ansawdd eich galwad fideo

Poor Gwael	Okay Iawn	Good Da	Very Good Da iawn	Excellent Ardderchog
★	★	★	★	★

Any comments?

2. How would the patient describe themselves? Sut yw'r claf yn disgrifio ei hun?

	Age Old	Gender Rhyw
Demographics Demograffeg		

3. How many times have you used video for a health or social care consultation, and would you use it again? Sawl gwaith ydych chi wedi defnyddio fideo am ymgynghoriad iechyd neu ofal iechyd, a byddwch chi'n defnyddio eto?

	How many times have you used a video consultation? Sawl gwaith ydych chi wedi ei defnyddio?	Would you like to use video consultation again? Byddwch chi'n ei defnyddio eto?
Video Consultation Use Defnydd fideo		

4. What was your video consultation related to today? Beth oedd eich ymgynghoriad fideo yn ynghylch heddiw?

- First time appointment
  Awyntiad gyntaf
- Advice & support
  Cymorth neu gyngor
- Review of my health and/or results
  Adolygiad iechyd/ canlyniadau
- Final appointment & discharge
  Apwyntiad olaf neu ryddhad
- Therapy or treatment session
  Therapi neu sesiwn triniaeth

Other (please specify)

5. Do you feel that this video consultation prevented you needing a face-to-face appointment?

Wnaeth yr ymgynghoriad fideo osgoi'r angen i'r claf gael apwyntiad wyneb i wyneb?

- Yes le
- No na
- I don't know ansicr

Comments?

6. For your video consultation today, what type of healthcare speciality and professional did you see? Am eich ymgynghoriad fideo heddiw, pa fath o arbenigwr a phroffesiwn gwelwch chi?

	Health Condition Speciality Arbenigrwydd cyflwr iechyd	Professional Phroffesiwn
Speciality & Professional Arbenigwr a Phroffesiwn		

Please state the health-related reason for your video consultation today?

7. How long would it typically take you to travel from your home to your consultation? (one way) Pa mor hir fyddai hi'n cymryd i chi deithio i'ch apwyntiad fel arfer?

Minutes (Traveling one-way)	
Miles (if known)	
Parking (at the site)	

8. Which Health Board Region are you in? O ba Ranbarth Bwrdd Iechyd ydych chi'n dod?

- Aneurin Bevan University Health Board
- Betsi Cadwaladr University Health Board
- Cardiff & Vale University Health Board
- Cwm Taf Morgannwg University Health Board
- Hywel Dda University Health Board
- Powys Teaching Health Board
- Swansea Bay University Health Board
- Velindre Cancer Centre

9. TEC Cymru's researchers will be running interviews with clinicians. Please leave your email below if you would like to take part, and we will contact you to arrange a date and time. Address

Email Address

10. Any other comments, questions or concerns?
Unrhyw sylwadau, cwesitynau neu bryderon eraill?

By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box [ ]

Survey 2: (Additional Questions Added)

11. Did you experience any difficulties with your video consultation today? Gwelwch chi unrhyw anawsterau gydag eich ymgynghoriad fideo heddiw?

	A lot llawer	Some Rhywfaint	A little Ychydig	Not at all Dim	N/A
Difficulties with a device Anawsterau Gyda dyfais	○	○	○	○	○
Difficulties with Internet connection Anawsterau gyda chysylltiad rhyngrwyd	○	○	○	○	○
Difficulties with video/picture Anawsterau gyda llun/ fideo	○	○	○	○	○
Difficulties with audio/sound Anawsterau gyda sain	○	○	○	○	○
Difficulties with privacy or a safe space Anawsteru gyda diogelwch neu pbeifatrwydd	○	○	○	○	○
Lack of confidence using video calls Diffyg hyder gyda defnydd fideo	○	○	○	○	○
Not suitable for clinical needs Anaddas am anghenion clinigol	○	○	○	○	○
Prefer face to face or telephone Mae'n well gen i wyneb yn wyneb neu dros y ffôn	○	○	○	○	○

12. How did your video consultation benefit you today? Sut aeth yr ymgynghoriad fideo buddio chi heddiw?

	Very beneficial Buddiol iawn	Beneficial Buddiol	Quite beneficial Eithaf Buddiol	Not beneficial Dim yn Buddies	Not at all beneficial Dim yn Buddiol o gwbl	N/A
Saved time & preparation Arbed Amser a Pharatoi	○	○	○	○	○	○
Saved travel & parking Arbed teithio	○	○	○	○	○	○
Saved the environment & co2 emissions Arbed yr amgylchedd ac allbwn co2	○	○	○	○	○	○
Saved taking time off school, work or other commitments Arbed amser o waith, ysgol neu ymrwymiadau	○	○	○	○	○	○
Saved money e.g., childcare, travel Arbed arian am ofal plant/ teithio	○	○	○	○	○	○
Improved access to care & waiting times Gwella mynediad i ofal ac amser aros	○	○	○	○	○	○
Improved convenience e.g., staying at home Gwella hwylustod e.e. aros adref	○	○	○	○	○	○
Improved family involvement & support Gwella cyfranogiad a chymorth teulu	○	○	○	○	○	○
Lowered rates of infection risk Lleihau cyfraddau haint	○	○	○	○	○	○
Lowered stress and anxiety Lleihau straen a phryder	○	○	○	○	○	○

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Tick Box [ ]

Video Consulting Clinician Copy

Survey 1:

1. Please rate the quality of your video consultation? Rhowch sgôr i ansawdd eich galwad fideo?

Poor Gwael	Okay Iawn	Good Da	Very Good Da iawn	Excellent Ardderchog
☆	☆	☆	☆	☆

Comments?

2. What is your profession & speciality? Beth yw eich proffesiwn ac arbenigedd?

Please only enter 'other' if your profession/speciality is not on the list.

	Profession Proffesiwn	Speciality Arbenigedd
Profession & Speciality Proffesiwn & Arbenigedd		

Other (please specify)

3. What do you consider was the primary activity of this video consultation?

Beth oedd y prif weithgaredd yn yr ymgynghoriad fideo?

- ○ First Appointment apwyntiad cyntaf
- ○ Advice & Support cyngor a chymorth
- ○ Follow-up dilyniant
- ○ Feedback/Outcomes/Results adborth/ allbwn/ canlyniadau
- ○ Review adolygiad
- ○ Discharge rhyddhad
- ○ Therapy Session sesiwn therapi
- ○ Other (please specify)

4. Do you feel that this video consultation prevented the patient needing a face-to-face appointment?

Wnaeth yr ymgynghoriad fideo osgoi'r angen i'r claf gael apwyntiad wyneb i wyneb?

- ○ Yes ie
- ○ No na
- ○ Unable to say Methu dweud

Other (please specify)

5. Which Health Board Region are you in? O ba Ranbarth Bwrdd Iechyd ydych chi'n dod?

- ○ Aneurin Bevan University Health Board
- ○ Betsi Cadwaladr University Health Board
- ○ Cardiff & Vale University Health Board
- ○ Cwm Taf Morgannwg University Health Board
- ○ Hywel Dda University Health Board
- ○ Powys Teaching Health Board
- ○ Swansea Bay University Health Board
- ○ Velindre Cancer Centre

6. **ONLY ANSWER THIS QUESTION IF WORKING FROM HOME**

If you are working remotely, how long in minutes and miles would it typically take you to travel from home to work? (one-way)

Use numbers only e.g., 10 (for minutes and/or £ in expenses)

Minutes

Miles (if known)

7. Any other comments, questions or concerns?
Unrhyw sylwadau, cwesitynau neu bryderon eraill?

For example, is there additional support you may need? Or could anything be improved with the platform?

8. TEC Cymru's researchers will be running interviews with clinicians. Please leave your email below if you would like to take part, and we will contact you to arrange a date and time.

Email Address

CONSENT:
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Tick Box { }

Survey 2: (Additional Questions Added)

9. Did you experience any issues or difficulties with your video consultation today? A wnaethoch chi brofi unrhyw broblemau neu anawsterau gyda'ch ymgynghoriad fideo heddiw?

	Very relevant	Relevant	Quite relevant	Not relevant	Not at all relevant	N/A
Issues with a device Mynediad at ddyfais	○	○	○	○	○	○
Issues with Internet connection Cysylltedd gwael â'r rhyngrwyd	○	○	○	○	○	○
Issues with video/picture Problemau gyda fideo	○	○	○	○	○	○
Issues with audio/sound Problemau gyda sain	○	○	○	○	○	○
Issues on the patients side e.g., their device, Internet or lack of confidence using video Problemau gydag ochr y claf	○	○	○	○	○	○
I lack the confidence using video consultation Diffyg hyder wrth ddefnyddio galwadau fideo	○	○	○	○	○	○
Not suitable for clinical needs Ddim yn briodol neu'n addas	○	○	○	○	○	○
I prefer face to face or telephone Mae'n well gen i wyneb yn wyneb neu dros y ffôn	○	○	○	○	○	○
The patient prefers face to face or telephone Mae'r claf yn cyfeirio wyneb yn wyneb neu dros y ffôn	○	○	○	○	○	○

Other (please specify)

10. What do you consider to be the benefits of your work or your service of using video consultation today? Beth yn eich barn chi yw buddion eich gwaith neu'ch gwasanaeth o ddefnyddio ymgynghoriad fideo heddiw?

	Very beneficial Buddiol iawn	Beneficial Buddiol	Quite beneficial Eithaf Buddiol	Not beneficial Dim yn Buddiol	Not at all beneficial Dim yn Buddiol o gwbl	N/A
More efficient use of clinical time & space Defnydd mwy effeithlon o amser a lle	○	○	○	○	○	○
Saved travel & parking Arbed teithio a pharcio	○	○	○	○	○	○
Saved the environment e.g., less paper waste, co2 emissions Arbed yr amgylchedd ac allbwn co2 a phapur	○	○	○	○	○	○
Improved access to care for patient Gwella mynediad i ofal am y claf	○	○	○	○	○	○
Reduced waiting times for patient Lleihau amseroedd aros i'r claf	○	○	○	○	○	○
Reduced likelihood of a DNA Lleihau'r siawns o DNA	○	○	○	○	○	○
Improved family involvement & support for patient Gwella cymorth a chyfranogiad i'r claf	○	○	○	○	○	○
Lowered rates of infection risk Lleihau'r gyfradd heintiad	○	○	○	○	○	○

Other (please specify)

CONSENT:

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Tick Box { }

BMJ Open

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CYMRU

Research & Evaluation Framework

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Introduction

This Research and Service Evaluation Framework is developed by Technology Enabled Care (TEC) Cymru's research and evaluation team and is based upon the team's own knowledge and experiences. The framework has six sections:

Section 1: What is Research & Service Evaluation?
Section 2: What is Quality Improvement?
Section 3: TEC Cymru's Four-Step Phased Approach
Section 4: Using Mixed Methodologies
Section 5: Using Patient & Public Involvement (PPI)
Sections 6: Useful Links & Templates

The framework provides 'hyperlinks' throughout for additional information and points of reference.

1. What is Research & Service Evaluation?

Why use a Research and Evaluation Framework?

This framework has been created to support anyone undertaking a digital transformation in the use of research and service evaluation methods to inform decision making, justification, and to measure whether value has been achieved.

Historically, many projects and services have been undertaken without an approach to research and service evaluation, resulting in a lack of evidence, lessons learned, and documentation of their success (or failure) to inform future investment.

This framework will be shared, tested and iterated over time with digital transformation teams – it is a work in progress!

What is Research & Service Evaluation?

Research and service evaluation are often discussed in very similar ways, in that they both adopt similar methodologies to collect data and seek to answer a question. However, they are very different disciplines, with different aims, design, focus, motives and end-results, and therefore it is important to distinguish between the two to avoid confusion and complement overlap. As shown below in Table 2.

The Health Research Authority in the UK has a useful online decision-making tool to help people determine if their work sits under a research or service evaluation umbrella—see here.

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A helpful definition of research is: *"Research involves the attempt to extend the available knowledge by means of a systematically defensible process of enquiry."* (Clamp et al., 2004).

A helpful definition of evaluation is: *"Evaluation is a systematic assessment of the design, implementation and outcomes of an intervention"* (Magenta Book, 2020).

Table 2: Research & Evaluation

Research	Evaluation
To 'prove'	To 'improve'
To test theory and produce generalizable knowledge and findings (representative of populations)	To judge merit or worth of a single intervention/programme or model (representative of programme)
Scientific inquiry based on intellectual curiosity and expertise	Policy or intervention/programme interests of stakeholder paramount
Questions originate with expertise and disciplines	Questions originate with key stakeholders & primary intended 'users' of findings
Advances broad knowledge and theory	Provide information for decision making on specific intervention/programme
Controlled setting (e.g., people, timelines, resources)	Non-controlled setting Conducted within changeable settings (e.g., people, timelines, resources)
Quality & importance judged by peer-review & research expertise	Quality & importance judged by stakeholders & 'users' of findings to take action/make decisions
Ultimate test of 'value' is contribution of knowledge / to prove	Ultimate test of 'value' is usefulness to improvement
Did it work? (hypothesis)	Is it working? (key questions)

Research and service evaluation are similar, yet mutually independent. They share similar steps in their process and can complement each other well. As shown below in Diagram 1, the difference occurs at the start and finish of the process, whereas the similarities sit within the core (methods/analysis).

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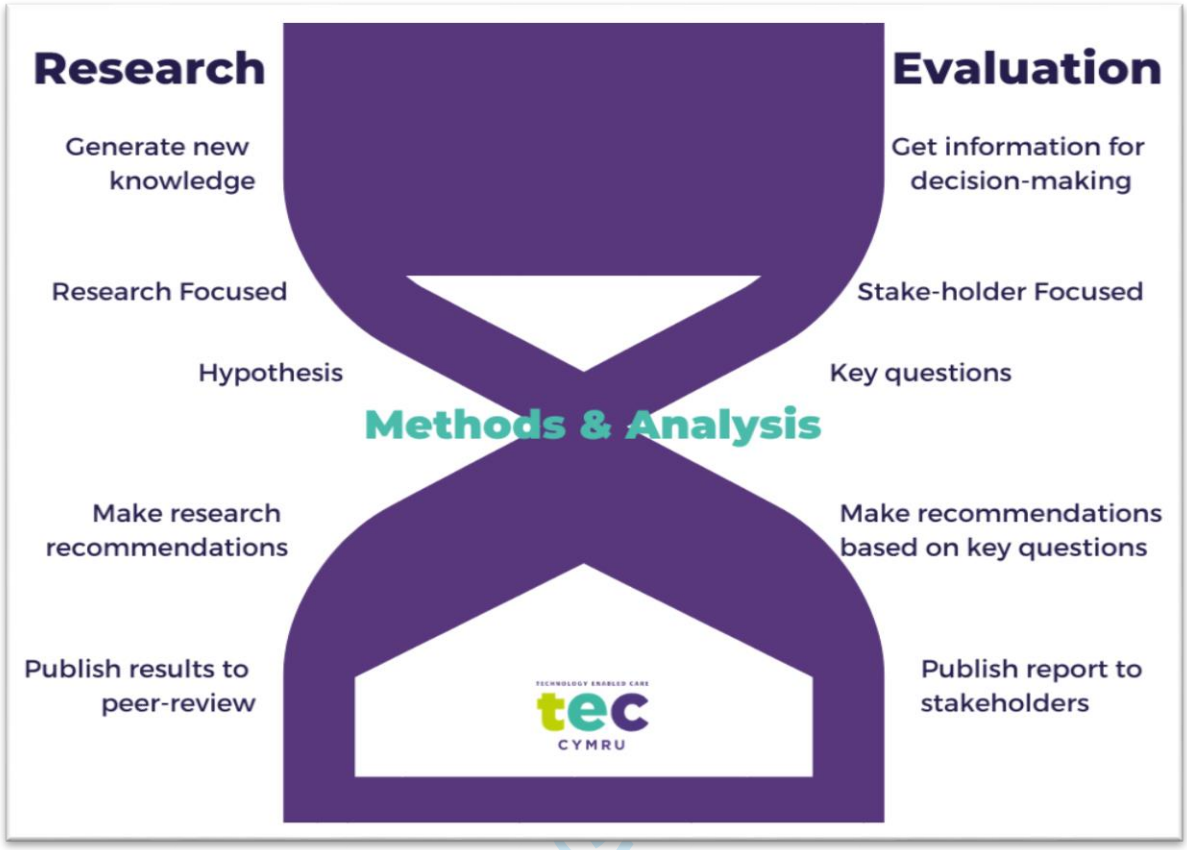
Diagram 1: Research & Evaluation Similarities and Differences



The aim of research is often focused on producing generalizable knowledge, which is empirical, theoretical, and controlled by the researchers (non-bias on findings). The aim of service evaluation is generally focused on specific and applied knowledge and aims to draw evaluative conclusions about quality or worth, and is controlled by those funding or commissioning the evaluation (more bias on findings). Evaluation has two main uses – accountability to funders and stakeholders by providing evidence of a project's overall impact and cost effectiveness; and learning by identifying what can be improved to gain greater understanding of a project and develop evidence for future projects.

To get the best out of a research and evaluation component of an intervention/programme, using both approaches can have many advantages, as standalone, they can have limitations, e.g., evaluation that is not research involves making judgements without systematic collection of data. Research that is not evaluation can take a lot of time and cost to design and prepare, and often unable to present any outcomes until the end of the process, which makes improvements along the way impossible. An example of an overlap methodology/analysis which complement each other well is a Four-Phased Quality Improvement (QI) Approach. This is discussed in the next sections.

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For more information on 'what is evaluation' and 'what to consider when planning an evaluation', watch these short videos:

What is Evaluation?

What to consider when planning an evaluation?

2. What is Quality Improvement (QI)?

Quality Improvement (QI) is a systematic approach to improvement that uses specific methods and techniques to improve quality. The Health Foundation's publication "*Quality Improvement Made Simple*" is a helpful read for those who are new to this way of working and can be found here. Also, see how QI is being used in Wales here.

An essential part of the success and sustainability of QI is the way it is implemented, and the approaches used. The key elements to achieve the best outcomes are the combination of 'change' (the improvement), the 'method' (the approach/the tools) and paying close attention to the 'context' and 'environment' in which the change is taking place (the people/the place).

There are many types or 'brands' of QI to choose from, using a wide range of methodologies and approaches, but many share the following principles to ensure that the 'change' is successfully implemented. These include:

- Understanding the problem (and existing data).
- Understanding the processes, systems and pathways within the service.
- Understanding the demand, capacity & flow of the service.
- Understanding the best approach/tools to bring about 'change' e.g., patient/professional participation, clinical engagements, leadership.
- Measurement for improvement, often using statistical process control charts.
- Evaluating the impact of the 'change' through qualitative and quantitative measures.
- Understanding the psychology of change and how to lead a change
- Understanding the impact of complexity and the adaptations required to meet cultural and contextual differences.

However, how the implementation of the 'change' is managed will depend on the 'context' of the service, and this in particular needs careful consideration, and 'quality' checks throughout.

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Six Dimensions of Improving Quality

The Institute of Medicine (IOM) suggests that improving quality in healthcare generally involves making it Safe; Effective; Patient-Centred; Timely; Efficient and Equitable.

Table 2 presents the six IOM dimensions and explains why they are considered primary priorities for any NHS intervention/programme and its Research & Evaluation component.

Table 2: Six Dimensions of Quality Improvement

SAFE:	Avoid harm to patients from care and services that is intended to help them.
EFFECTIVE:	Provide care and services based on robust evidence which produce clear benefit and improved outcomes.
PATIENT-CENTRED:	Establish equal partnerships between professionals and patients to ensure patients' needs and preferences are met, and their voices are heard.
TIMELY:	Reduces wait times and delays which may cause harm.
EFFICIENT:	Avoid wasting time, cost & resources.
EQUITABLE:	Provides care that does not vary in quality because of a person's characteristics – equal to all.

Please note: *To ensure that all the six QI dimensions are met, a four-phased research & evaluation approach (discussed in Section 3) would ideally be adopted, using mixed methodologies (discussed in Section 4) and patient and public involvement (PPI) (discussed in Section 5).*

Quality Improvement Approaches & Principles

There is a wealth of QI technical methodologies, many of which originated from use in the post war industry and have subsequently been adapted for use within healthcare. Despite the different names of the QI approaches, most approaches share underlying principles, and many QI methodologies use the same key tools, such as the simple Plan Do Study Act (PDSA) cycle that is described below. Some healthcare organisations choose to use a single systematic QI method, but most NHS organisations tend to choose the 'best fit' method for their context. In TEC Cymru some of the QI approaches and tools that are frequently used are also described below.

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Experience-Based Co-Design

This is a QI approach to 'improving patient's experience' of services, through patients and professional partnership to design services or pathways.

Data is gathered through surveys, in-depth interviews, observations and groups discussions (e.g., focus groups) and are analysed to identify 'touch points' (or themes) – which are aspects of the service that are of significance. A link to the toolkit and useful instruction videos is here.

Model for Improvement (including PDSA)

This is a QI approach to 'continuous improvement' where changes are tested in small cycles that involves planning, doing, studying, acting (PDSA), before returning to the planning, and so on. A link to a how to guide is here.

Each cycle starts with ideas and theories which evolve into knowledge that can inform action and intends to produce positive outcomes. To do this, these cycles are linked with three key questions:

- What are we trying to accomplish?
- How will we know that a change is an improvement?
- What changes can we make that will result in improvement?

Any change that is proposed should also be explained, discussed and communicated with the team.

Statistical Process Control

Statistical Process Control is a measurement technique that is frequently used in QI to chart data over time. It can help to visualise natural variation (common cause variation) and variation that has a special cause i.e., is not a result of natural variation (special cause variation). The approach uses control charts that display boundaries for acceptable variation in a process.

Data are collected over time to show whether a process is within agreed quality control limits in order to monitor performance and can be used to measure the impact of improvement ideas.

Data & Measurement for Improvement

Measurement and gathering data are vital in any attempt to improve performance or quality and are essential to assess its 'impact'. It is worth noting, however, that measuring for improvement differs across research & evaluation.

- Measuring for research – tests whether the intervention 'works'

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- Measuring for evaluation (or judgement) – helps key stakeholders gauge performance and to collate learning about the process.

When measuring for improvement in terms of QI, the learning develops through 'processes'. As a result of a process, the key questions or hypothesis will change throughout the project (unlike traditional research). As a result, the data is considered 'good enough' rather than 'perfect'. Instead of asking 'does it work?', QI asks, 'how it works, for whom, under which circumstances and to what extent?' Ultimately understanding 'what will constitute success?' It can be really helpful at the start of any improvement work to map out initial theories about how you will achieve the improvement aim, how you predict change will happen, and what inputs and outputs you expect. There are three useful tools to do this.

1. **Driver Diagram:** A driver diagram is a simple but effective tool that helps you to translate a high-level improvement aim into a logical set of underpinning goals ('drivers') and change ideas. It captures an entire project in a single diagram and also helps to provide a measurement framework for monitoring progress. An example of a driver diagram can be found here.

2. **Theory of Change Model**: A theory of change is a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context. It makes explicit the underlying assumptions about the project you want to evaluate and provides a visual representation of how your project will lead to the desired impact. It articulates how you expect change to happen and helps to describe the enablers and mechanisms of change. It is also a useful tool to build stakeholder relationships, as you can develop a theory of change collectively using co-production. It can help you communicate your project in a clear and simple way, showing your thinking about what the hoped-for outcome will be. This in turn helps to identify your evaluation and data needs. *"Developing a 'theory of change' can be useful way of articulating and providing a visual representation of the links between the various activities of service and how this will lead to the long term outcomes it is trying to achieve"* (NPC Guide to Developing Theory of Change) – see here.

3. **Logic Model:** Logic models describe the relationship between a project's inputs, activities, outputs, outcomes, and impacts. It can help you to see what you are putting into the project (the inputs), how the project uses the resources (the activities), what products are produced (the outputs), what change is predicted to be achieved as a result of this process (the outcomes) and the final intended and unintended changes that happened as a result of the intervention/programme (the impacts). A useful guide to developing a logic model can be found here.

This traditional QI approach does have limitations however, in that the 'does it work?' question still needs to be asked e.g., via a Randomised Controlled Trial. It is also important to

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measure change over time, using methods that make it possible to separate out improvement or deterioration, from the expected level of performance variations.

To do this, in TEC Cymru this process is split into 'four phases' across the time period of the intervention/programme. This is discussed in the next section.

To find out more on Quality Improvement approaches and principles see here.

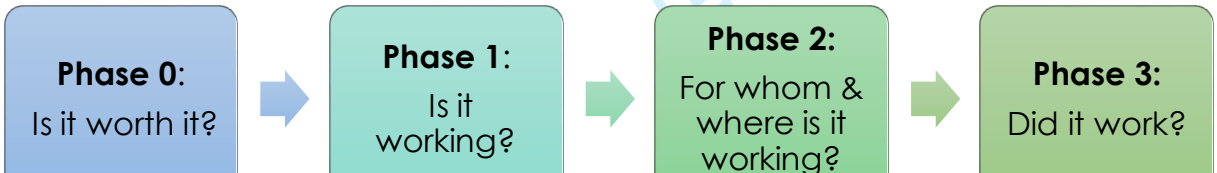
3. TEC Cymru's Four-Step Phased Approach

What is TEC Cymru's Four-Phase Approach?

TEC Cymru have developed a four-phase approach to their Research & Evaluation framework. This approach is tried and tested by TEC Cymru and is highly recommended as a robust method for data collection and analysis across a wide range of interventions/programmes.

In simple terms, **Phase 0** sets the stage; **Phase 1** and **Phase 2** captures data from adoption through to full implementation; and **Phase 3** tests it in its full form and determines long-term sustainability.

Phase Zero: 'Is it worth it?'



The Phase Zero is the 'discovery' phase of any intervention/programme within TEC Cymru. This phase sets out to understand its rationale and objectives in order to determine its value and worth for TEC Cymru as a programme, and the need for time and resources spent on research and evaluation.

At this phase, evidence is sought, literature reviews are conducted, appropriate ethical approvals are applied for and baseline data is captured to understand the 'public opinion' on the proposed intervention/programme, by way of baseline survey capture, public consultations or via patient and public involvement (PPI) – (discussed in Section 5). Access to the Welsh e-library can be found here.

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It is also important in this phase to consider *"The extent to which an activity or project can be evaluated in a reliable and credible fashion"* (OECD-DAC 2010; p.21) and to undertake an evaluability assessment. More information about how evaluability works and assessment templates can be found here. This can include structured engagement with stakeholders to clarify the goals of the intervention and how they might be achieved. It can be helpful to develop a driver diagram, logic model or theory of change to articulate a shared understanding of the work, which evaluation models will be used and to seek advice on whether or not an evaluation can be carried out at reasonable cost.

At the beginning of an intervention/programme, despite previous evidence and early baseline data capture, often very little is known about the targeted participant group required for the proposed intervention/programme, particularly in terms of the likely uptake of the intervention/programme, or its likely response or outcome. Therefore, at this point, very little is also likely to be known about the best method or approach to take to capture the best evidence from this targeted participant group.

From the perspective of TEC Cymru, it would be wasteful to spend several months on designing a flawless data collection method, instrument or measurement, and spending months applying for and awaiting the response of IRAS ethical approval to later realise that the participants were not willing to participate, or that the intervention/programme was to not demonstrate value/worth, and thus goes against the QIs dimensions (e.g., dimension 5 'efficiency' and dimension 1 'safety' by prolonging a service).

Due to this, TEC Cymru therefore suggest that if the intervention/programme has passed all necessary safety and quality checks, then holding its go-live/start date up due to research and evaluation delays may perhaps do more harm than good to its potential participants; but also, to go live without an evaluation component attached could do harm (or at least produce errors) to the evidence base.

TEC Cymru have therefore developed a four-phase approach to their Research & Evaluation strategy, which allows them as a team to determine the 'need' or requirements for further phases as they learn more and progress.

NOTE: *It is important to note that some of the phases or ethical approval applications will not be necessary for all types of interventions/programmes. This approach is merely an 'ideal guide' used by TEC Cymru.*

Phase 1: 'Is it working?'

By the time your intervention/programme reaches Phase 1, Phase Zero has led your team to believe that the proposed intervention/programme is of value and worth to the overarching intervention/programme and requires evaluation and research support.

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At Phase 1 you merely want to know **'Is it working?'**

In TEC Cymru, Phase 1 often attempts to answer this question by simply capturing data from service users (patients/families/professionals) via basic live feedback surveys (often attached to the intervention), which aim to capture measures such as the **'use' and 'value'** of the intervention/programme.

Often within the NHS, all is required to capture Phase 1-type data is Service Evaluation approval from a local Research & Development (R&D) department to begin 'early doors' evaluation. As Phase 1 progresses, and more is learned about the participant groups, additional ethical approvals (e.g., IRAS) and more in-depth planning and resources can proceed for the progression of further phases if needed.

From TEC Cymru experience, this phased approach allows for less waste, better planning, and provides a better understanding and awareness of the participant group, thus tailoring the next phases more appropriately. This ultimately improves the intervention/programme and its likely outcomes.

Phase 2: 'How is it working?'

By the time your intervention/programme reaches Phase 2, Phase 1 has led your team to believe it is working, but you are yet to understand **how it is working, for whom, under which circumstances and to which extent?**

In TEC Cymru, Phase 2 often attempts to answer this question by continuing to capture data from service users (patients/families/professionals) but by digging deeper. This is often via more in-depth feedback surveys which aim to capture measures around **'benefits and challenges'** of the intervention/programme and to begin to explore the longer-term **'sustainability'** of it.

TEC Cymru split their Phase 2 work into 3-6 month increments and refer to them as Phase 2a, b, c and so on. Ideally, TEC Cymru would suggest that Phase 2 would be an ongoing phase until the end of the intervention/programme to ensure there are no gaps in data capture moments/timeframes.

In addition, Phase 2 will seek to capture qualitative data to provide a richer understanding of its participant group, and the context for which the intervention/programme is based, e.g., via interviews and focus groups.

Phase 3: 'Did it work?'

By the time your intervention/programme reaches Phase 3, you should have a good understanding of your participant group and the context for which the

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intervention/programme is based. Phase 2 has led you to understand ***how it is working, for whom, under which circumstances and to which extent.*** But it's important to understand that this 'how' is still merely a judgment and still will not tell you if **it works**.

Phase 3 however, asks '**did it work?'**

Knowing if something officially **'works'** needs to be **'proven'**, and proof can only be derive from in-depth or experimental research testing measures such as **'efficacy and effectiveness'** e.g., cost or clinical effectiveness studies.

In TEC Cymru, Phase 3 often attempts to answer this question by working closely with service users and teams (relationships developed in Phases 1 & 2) to understand more specific areas of need and requirement for in-depth research. Then, reaching out and collaborating with others (e.g., academia, international experts) to apply for more advanced ethical approvals and conduct more in-depth or experimental research such as Randomised Controlled Trials (RCTs), cost effectiveness studies and more in-depth, research led qualitative approaches extending on specialised areas.

It is very important to note that, by the time you reach Phase 3, things need to shift up a gear and additional support and resources within your intervention/programme are needed.

For example:

- In Phases 1 and 2, key questions and requirements are generally based on intervention/programme 'remits' and 'must haves' (e.g., what the stakeholder has requested), Phase 3 however, operates more independently and as potential 'should haves' – in that it is now generating new knowledge which is distinctive and unique from original 'remits' (e.g., the unknown).

- Unlike the structure that Phases 1 & 2 allows, Phase 3 research requires the freedom and creativity of a research team to explore new themes that emerge from Phases 1 and 2, and therefore, at this point, need to be able to step outside of its original intervention/programme 'remit'. As you need to remember that there are likely to be newly emerging areas of interest and therefore unlikely to be in an original intervention/programme remit. In other words, if you attempt to 'restrict' natural data emergence and progression by preventing movement of 'intervention/programme remit change', you are potentially restricting true data findings which is the essence of research, and it is this essence that puts research over the top of evaluation in terms of error of judgement, non-bias, validity and reliability.

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- If your intervention/programme is unable to support the requirements of Phase 3, it should not be labelled as Research & Evaluation, but rather as a Service Evaluation component of a intervention/programme only, as the evidence in Phases 1 & 2 is merely provide a judgement on 'how to improve' and not as 'proven to work'.

- *Remember:* to 'improve' conduct service evaluation and to 'prove' conduct research; and to do it the TEC Cymru way – do both!

4. Using Mixed Methodologies

To expand the evidence-base as far as possible on any type of phased research and evaluation component of an intervention/programme, adopting a mixed methods approach is highly recommended by TEC Cymru.

Stakeholders and research funders strive to ensure high quality and safety for the public (and within the NHS, more specific to their patients, families and professionals). A mixed methods approach can do this – it can explore all types of trends and practices across participant groups and context and provide stakeholders a more rounded analysis and understanding of the problems and solutions.

What is Mixed Methods Research & Evaluation?

Mixed methods is an approach used to collect and analyse both quantitative and qualitative data within the same study (e.g., the intervention/programme).

A mixed methods approach is appropriate for answering questions that neither quantitative nor qualitative could answer alone.

Mixed methods approaches require a focused mixing of methods in data collection, analysis and interpretation of the evidence.

The key word here is **'mixed'**.

The important step in the mixed approach is the data 'linkage' or 'integration' at each appropriate stage of the Research & Evaluation process.

Data linkage/integration enables the research team to seek out a more 'inclusive (or panoramic) view and understanding' of the context and perspectives through different types of lenses.

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For example, in a mixed methods study, the quantitative data may provide knowledge on decisions, choices, change and outcomes, whereas the qualitative data provides the contextualised experiences attached to these measures, thus providing more in-depth information on the influential factors, triggers and true meaning associated to each of the measures. This type of mixed methods study can therefore provide an all-rounded understanding across the context and perspectives to answer a certain research question.

In other words, by using one method alone (e.g., a survey), can only partly answer a research question, but by using mixed methods, a fuller understanding is more likely to be captured, and therefore, more likely to answer the research question. If, as a researcher, you fail to answer the research question that you set out to answer, there will be a very high chance of producing significant gaps and misinterpretations in the data set, but also, there will be a need for more research in that area – ultimately producing a waste of time, resources and potentially additional external funding.

In addition, a mixed methods approach strengthens both the quantitative and qualitative methods allowing the research team to explore and compare diverse perspectives and uncover relationships that exist between the multifaceted key or research questions.

5. Using Patient & Public Involvement (PPI)

What is Patient & Public Involvement?

Patient and public involvement (or PPI for short) means actively working in partnership with patients and members of the public to plan, design, manage and carry out research and evaluation. This means that the research for a specific intervention/programme that is intended to improve or prove something for a patient or member of the public needs to be 'with' or 'by' them rather than 'to' or 'for' them.

The 'involvement' part of PPI is different to participation (e.g., taking part in research) and engagement (e.g., research dissemination).

Why is Patient & Public Involvement Important?

Involving patients and the public in research and evaluation strategies is very important to ensure that research design and management is relevant, and that its outcomes and outputs fit the needs of the intended audience (usually that of patients or members of the public).

PPI should be central to any Research & Evaluation intervention/programme and therefore, should sit centrally within each and every stage of its strategy, *and not just because* it is the 'right thing to do' – but input from lay people provides researchers with real life insight into what patients and the public 'want' and 'need' – which ultimately helps save time and resources on 'getting it right' for the user.

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The majority of research funding streams require applicants to clearly demonstrate how they plan to involve patients and the public in their research process and will require clear justification for not using them. This is also applicable for publications, in that PPI is now mandatory for many peer-reviewed journal submissions.

In other words, by neglecting PPI, you may be putting funding opportunities and dissemination outputs at risk.

What is the Patient & Public Involvement Process?

Patients and members of the public can be, and ideally should be, involved at each and every stage of the research process. This can include a wide range of approaches from bringing PPIs into the central team or attending pre-existing groups of PPI and raising issues and questions. Some examples are:

- **Identifying and prioritising** (e.g., hold an initial meeting with PPIs to discuss the best strategies)
- **Designing & Managing** (e.g., attend a pre-existing PPI groups to discuss design of data collection, and follow-up meeting on amendments or next phase designs)
- **Patient & Public-Researchers** (e.g., conducting data collection and analysis)
- **Dissemination** (e.g., co-authorship on publications and presentations)
- **Implementing** (e.g., involved in rolling out an intervention/programme)
- **Monitoring & Awareness** (e.g., gather views on and improve PPI impacts)

TEC Cymru suggest using different approaches to a PPI approach, including having central PPI members such as TEC Cymru Young Person Representatives, and also an Ad Hoc approach, e.g., attending pre-existing PPI groups and reach out to existing contacts to raise issues and capture feedback 'as and when' needed.

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6. Useful Links & Templates

NHS Health Board Service & Product Evaluation Application Forms
Contact your local R&D department for service or product evaluation application forms.

Integrated Research Application System (IRAS) Application Guidance
Follow link here

Information Governance & Data Protection Impact Assessments DPIA
Information Governance (IG) is a framework that brings together legal, ethical and quality standards that apply to the handling of information; it applies to all information and data especially sensitive and personal information. To find out more, contact your local Information Governance department.

TEC Cymru's Welsh/English Survey Design Example Template
Follow Link Here

TEC Cymru's Phase 1, 2 & 3 Reports, Publications & Presentations
Follow link here

TEC Cymru's Driver Diagram Example for Video Consulting Programme
See example copy attached p.18

TEC Cymru's Phase 0-2 Example Questions
See example copy attached p.19

TEC Cymru's PPI Contract (example of a TEC Cymru young person contract)
See example copy attached p.20-21

Further Reading and Helpful Links:

Clamp C, Gough S, Land L. Resources for Nursing: An Annotated Bibliography. 4th edn. London: Sage, 2004
http://www.nhsevaluationtoolkit.net/resources/case-studies/
https://www.betterevaluation.org/
https://www.informalscience.org/what-evaluation-0
https://www.rip.org.uk/resources/publications/evaluation-tools-and-guides/
https://www.nesta.org.uk/
https://www.wkkf.org/resource-directory/resources/2004/01/logic-model-development-guidehttps://www.gov.uk/government/publications/evaluation-in-health-and-wellbeing-guidance-summaries/evaluation-in-health-and-well-being-guidance-summaries
Evaluability Assessment | Better Evaluation
https://www.re-aim.org/about/what-is-re-aim/
https://www.gov.uk/government/publications/the-magenta-book
http://www.1000livesplus.wales.nhs.uk/sitesplus/documents/1011/Quality%20Improvement%20Guide%20-%203rd%20edition%20%28IQT%29%20WEB.pdf

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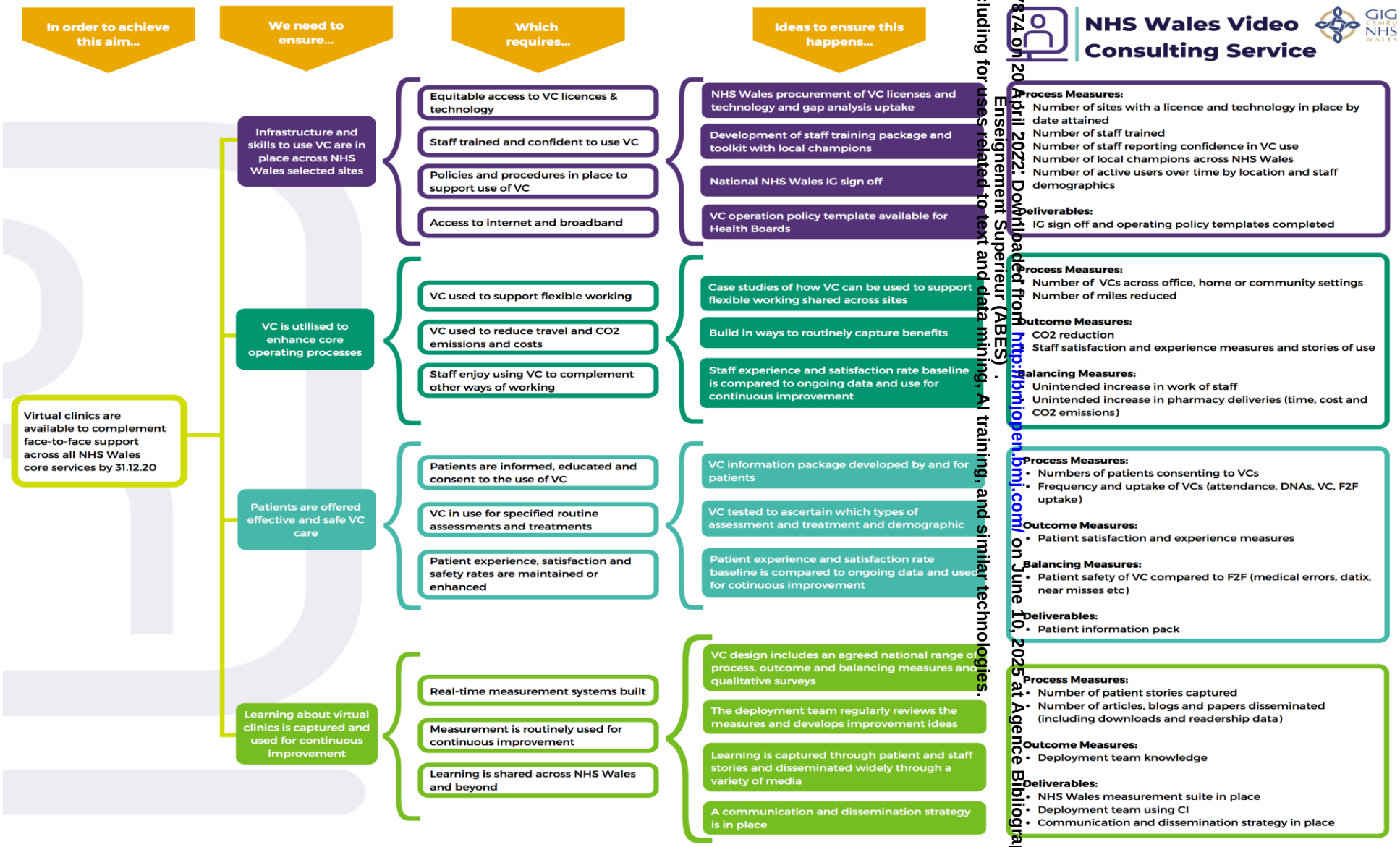

TECHNOLOGY ENABLED CARE

tec

Introduction

Technology Enabled Care (TEC) Cymru are a Welsh National Health Service (NHS) centre that enable the sustainable use, scale up and spread of technology in Wales.

TEC Cymru offers the patients and workforce of Wales a way to do more with less, by delivering benefits, and offering patient care closer to home.

TEC Cymru currently have three active programmes:

Becoming a TEC Cymru Young Person Representative

Opportunity & Role

Technology Enabled Care (TEC) Cymru offers young people in Wales, the opportunity to work alongside a national team and gain work experience across a range of programme, technical, clinical and research expertise. There will be a wide range of opportunities available to a young person representative, and these will be discussed and offered in the group meetings.

The role of the Young Person Representative is to represent young people in Wales to the adult's in TEC Cymru and their partners and stakeholders.

We promise to:

- Listen to your opinions and feedback
- Keep your safe
- Help you develop skills and expertise
- Respect and support you
- Provide you with recognition for your time at TEC Cymru (e.g., certificates, letters of recommendation).

Recruitment

The young people are recruited by the clinical lead and research lead of TEC Cymru, and will be part of the young person group panel on a one-year rolling contract (with the option to leave the contract at any time, if you wish).

If you know of anyone else who would like to be a young person representative for TEC Cymru, please forward their details to the group lead.

Group Attendance

TEC Cymru hold group discussions with young people using Microsoft Teams and each group meeting will last approximately 1-hour. Meetings will be set up by the group leader, and will be sent out in plenty of time before the group date/time.

We run our young person group discussions on an ad hoc basis (in other words, 'as and when' needed or necessary). This provides the flexibility to our young person to not feel tied to a commitment or a set schedule of fixed hours, but rather the ability to attend as and when they can.

Whilst these meetings are optional, we do encourage regular attendance for our young people to get the best out of the experience working with TEC Cymru.

As a TEC Cymru Young Representative we do ask you however to:

- Please inform the group lead if you are unable to attend a group meeting.
- Respond regularly to feedback requests, emails, and texts.
- Inform TEC Cymru of any changes to your contact details
- Inform TEC Cymru of any changes in circumstances that may impact on your role as a young representative.
- Inform TEC Cymru if you no longer wish to be a young person representative, so we can officially end your contract, and provide you with a final thanks and certification for your time at TEC Cymru.

Meeting Rules

The group meetings are informal and friendly, and allow for an open and honest discussion between group members.

But, we ask all group members to:

Group Dynamics

1. Be confident, and express opinions and points of view, but in a respectable and supportive manner.
2. To work as a team, share ideas and offer support and encouragement to other group members.
3. Make sure everyone has a chance to speak, and be respectful of other member's opinions.
4. If you are worried or concerned about anything that has been discussed in the group, please contact the group leader by email or text after the group session.

Physical 'Musts'

5. If you have a comment or question mid-conversation, please raise your 'virtual' hand or add a comment to the char box to let other members know you wish to talk, rather than interrupt.
6. Please do not record or take pictures of the group session or its members at any time.
7. Please do not share any personal stories or discussions that may arise with others outside of the group.
8. Please do not share anything discussed in the group on social media.
9. Ensure your own virtual space in a private and quiet room to allow the group to can run smoothly without too many distractions or interruptions.
10. Always remember to protect yourself and your identity, for example make sure that your video background doesn't show anything you are uncomfortable to share (e.g., personal photos, paperwork with personal information on)

Signed Consent

To become an official TEC Cymru Young Person Representative, you will need to provide consent by signing and dating below, and if you are under 18 years old, your parent/guardian will also need to provide consent by signing and dating below.

Signature of young person

Date

__ / __ / __

Signature of parent/guardian

Date

__ / __ / __

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Example Questions Phase 0-2

Phase Zero asks 'is it worth it?'
To answer the question, TEC Cymru often capture existing data by way of conducting:

- Literature Reviews
- Systematic or Meta-Analysis Reviews

This existing data capture would provide a broad understanding of the question asked, but less likely to know if it is worth it in a specific local area, for example.

If this is needed, then the next step in Phase 0 would then run baseline consultations, such as:

- Consultations (e.g., with professionals, clinicians, stakeholders)
- Patient/Public Involvement (PPI) group discussions
- Baseline Surveys
- Process Mapping Exercises.

The types of questions asked in Phase Zero may include:

1. What is the understanding of the proposed intervention/programme? (As a broad view, and local view).
2. Do they think the proposed intervention/programme would add use and value in that area?
3. Do they think the proposed intervention/programme would deliver benefits to the public/patients/professionals?
4. Do they see any significant challenges or barriers that would clearly outweigh the potential values or benefits?
5. For whom, under which circumstances and to what extent do they think the proposed intervention/programme would provide value and benefits?
6. Do they think the proposed intervention/programme would work?

These scoping questions aim to determine the next steps taken in the TEC Cymru phased approach. In other words, what other questions need asking?

Phase 1 asks 'is it working?'
To answer the question, TEC Cymru often capture existing data by way of conducting:

- Live Surveys (e.g., attached to intervention)
- Retrospective Surveys (e.g., request additional feedback)
- Interviews

The types of questions at this phase will be looking to measure **'use and value'** of the intervention/programme that is being evaluated.

The types of questions that would be asked in Phase 1 would be:

1. Rate the quality or value of the intervention/programme (using a star scale from excellent to poor).
2. What type of technology/device for example, was used to access the intervention/programme (using drop-down list).
3. Have you used the intervention/programme before, and if so, how many times?
4. Would you use the intervention/programme again? Probe for additional feedback as to 'why'.
5. Did the intervention/programme do something as an addition to a traditional method (e.g., a digital intervention may prevent the need for a face-to-face appointment).

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6. What type of clinical setting or reason are you using the intervention/programme for? (using drop-down list)
7. Request for a 'few' demographic questions – e.g., age, gender, Health Board.
8. Any other comments?

Phase Two asks 'who is it working for, under which circumstances and to what extent?'
To answer these questions, TEC Cymru often capture existing data by way of conducting similar approaches to Phase 1, just more in-depth.

- Live Surveys (e.g., attached to intervention)
- Retrospective Surveys (e.g., request additional feedback)
- Interviews & Focus groups

The types of questions at this phase will be looking to measure **'benefits, challenges & sustainability'** of the intervention/programme that is being evaluated. The types of questions that would be asked in Phase 2 would be:

1. Rate the quality of the intervention/programme (using a star scale from excellent to poor).
2. What type of technology/device for example, was used to access the intervention/programme (using drop-down list).
3. Did you experience any difficulties or challenges using the intervention/programme? (Perhaps use a matrix format, and list difficulties/challenges to select from, and their level of severity).
4. Did you experience any advantages or benefits using the intervention/programme? (Perhaps use a matrix format, and list advantages/benefits to select from, and their level of severity).
5. Have you used the intervention/programme before, and if so, how many times?
6. Would you use the intervention/programme again? Probe for additional feedback as to 'why'.
7. Did the intervention/programme do something as an addition to a traditional method (e.g., a digital intervention may prevent the need for a face-to-face appointment).
8. What type of clinical setting, professional or reason are you using the intervention/programme for? (using drop-down list)
9. Request more in-depth demographic questions – e.g., age, gender, ethnicity, household income, disability, Health Board and Local Authority,
10. Has the intervention/programme impacted on your clinical outcomes?
11. Any other comments?
12. Provide an opportunity for participants to take part in further research such as a follow-up interview (e.g., provide a contact email at the end of the survey for keen participants to reach out to you).

Please note: TEC Cymru will always recommend a mixed methods approach. Therefore, even in surveys, add lots of free-text 'comment' options to allow for additional individuality and opinion to be expressed by your participants. This narrative will likely provide rich and meaningful data that drop-down and tick boxes cannot do alone.

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Meet the Team

Gemma Johns, Research & Evaluation Lead

Gemma is TEC Cymru's Research and Evaluation Lead, who manages a team of Research Assistants across three programmes in TEC Cymru.

Gemma has a keen interest in the interface between health and social care and digital innovation. Gemma is also doing a PhD in Medical Sociology at Bristol University.

For more information about the framework or TEC Cymru's research & evaluation, please email Gemma at:
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Professor Alka Ahuja MBE, Consultant Psychiatrist & National Clinical Lead

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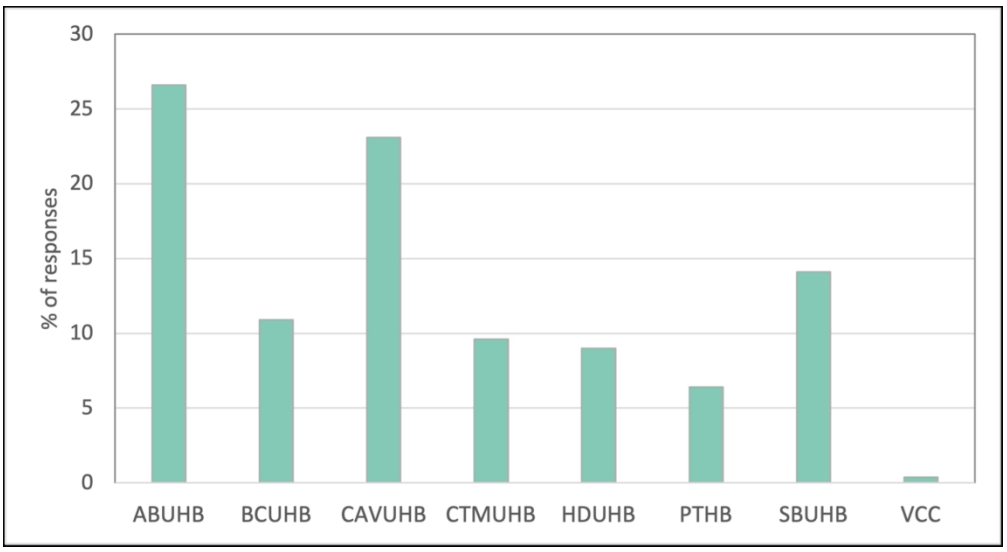
Anna trains and coaches staff from the NHS across the UK to lead complex quality improvement work and to scale and spread innovations.

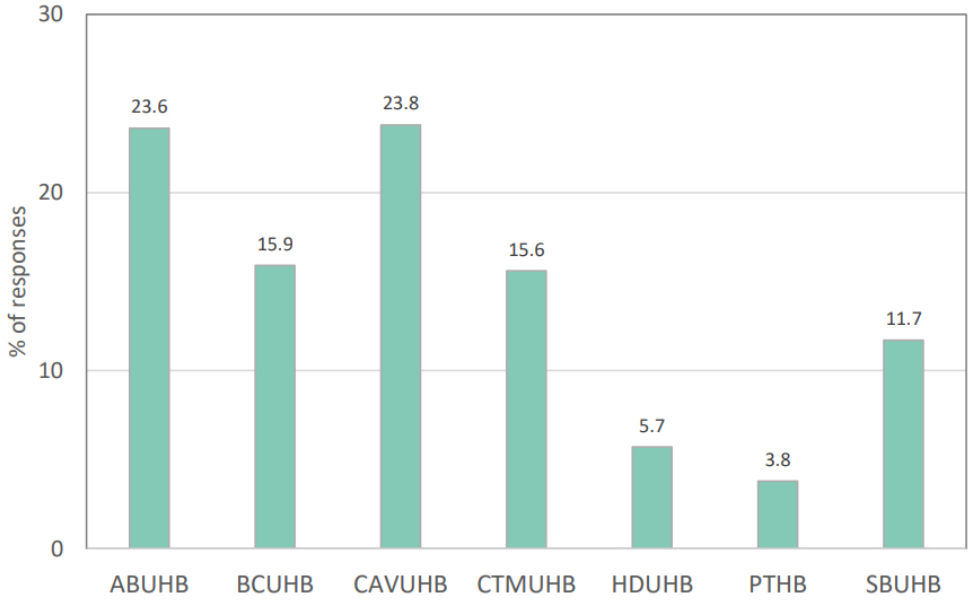
Anna is a qualified coach, Health Foundation Improvement Fellow, Ashridge Business School alumni in Leadership for Improvement and an Honorary Senior Research Fellow at the University of Bath Centre for Healthcare Innovation and Improvement and Chair of the Engagement and Involvement Advisory Board at The Health Improvement Science Institute at Cambridge University.

Alongside her work in improvement Anna maintains her clinical practice as a Consultant Child and Adolescent Psychotherapist in the NHS working with young people to innovate new approaches to wellbeing. Twitter @annaburhouse



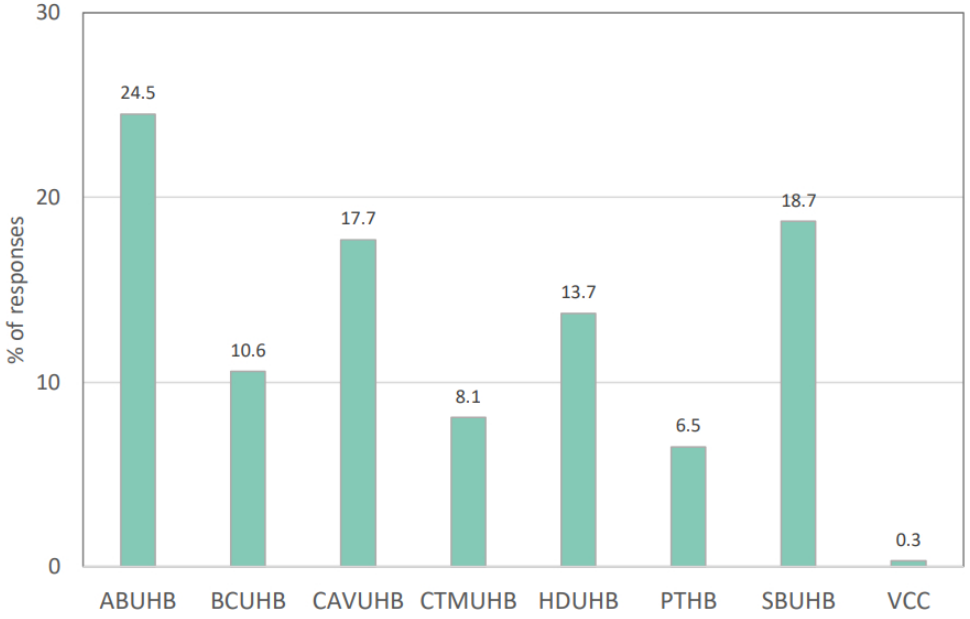
Appendix 1 Health Board and Trust Distribution

151x81mm (300 x 300 DPI)



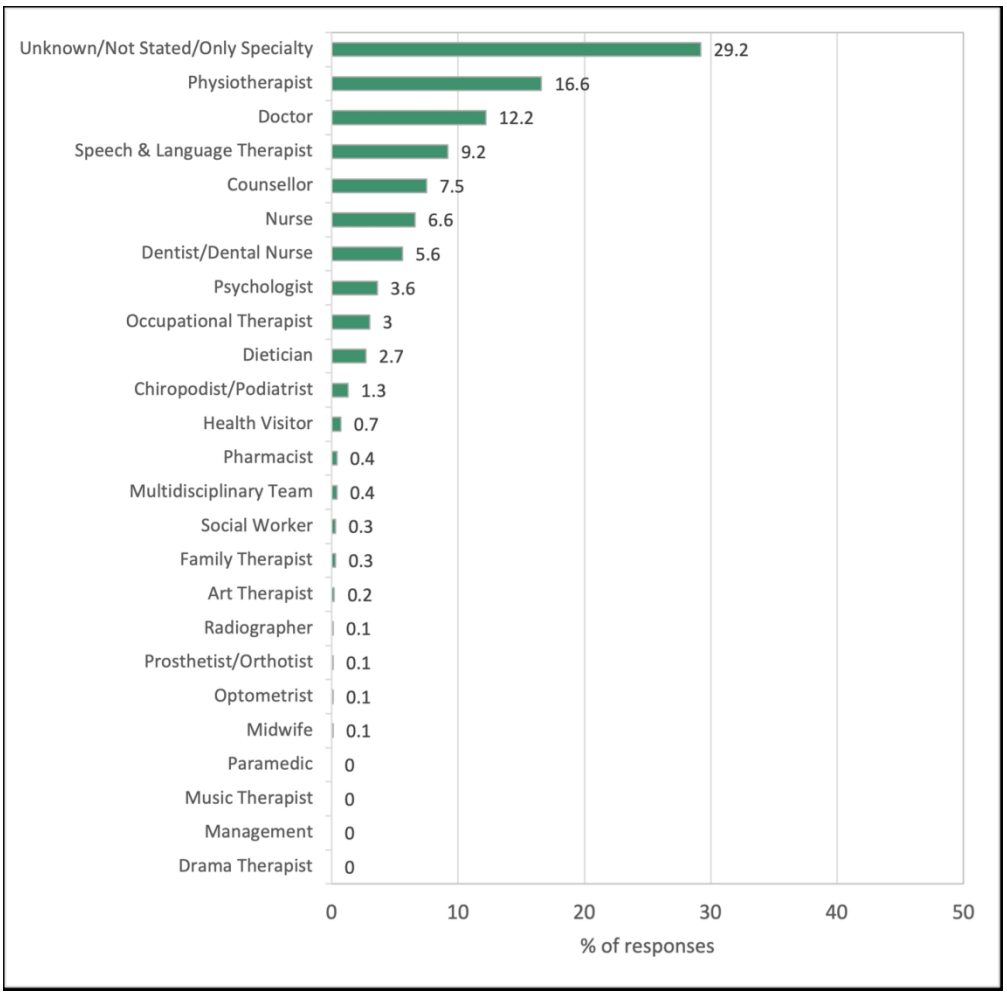
Appendix 2
Breakdown of Primary, Secondary and Community Care responses. Primary care responses

592x362mm (38 x 38 DPI)



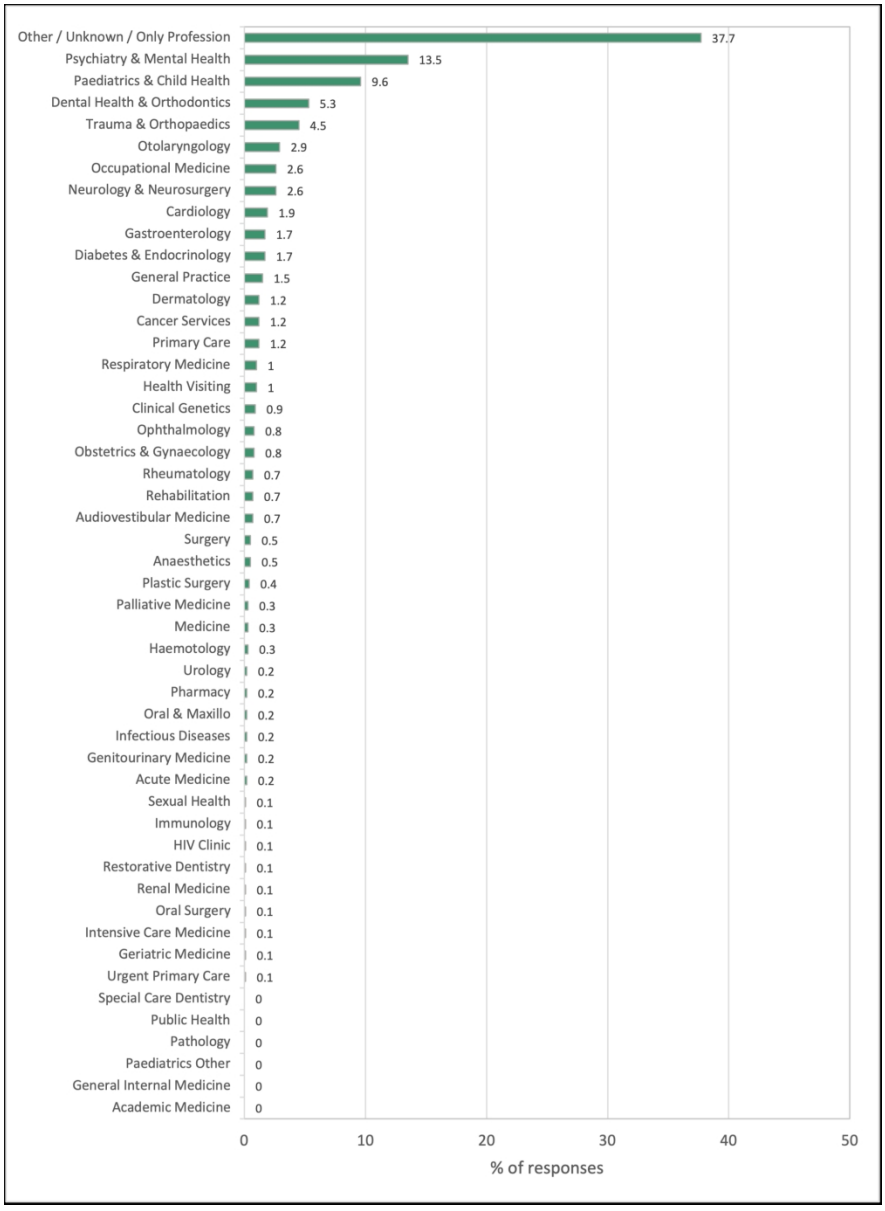
Appendix 3. Secondary and Community Care Responses

606x381mm (38 x 38 DPI)



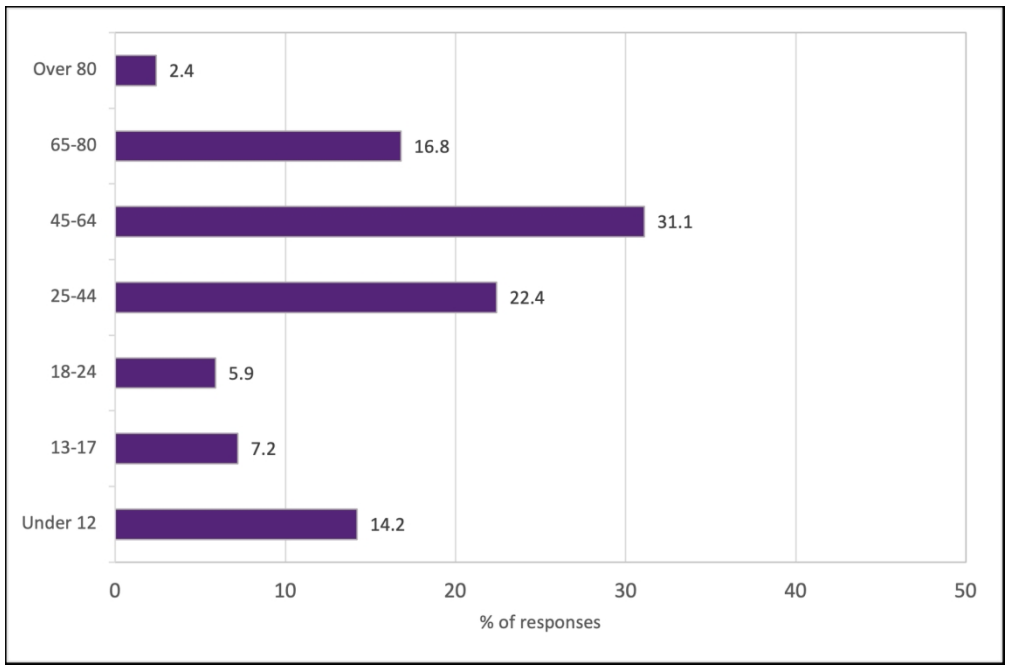
Appendix 4. Clinician Professions

159x157mm (300 x 300 DPI)



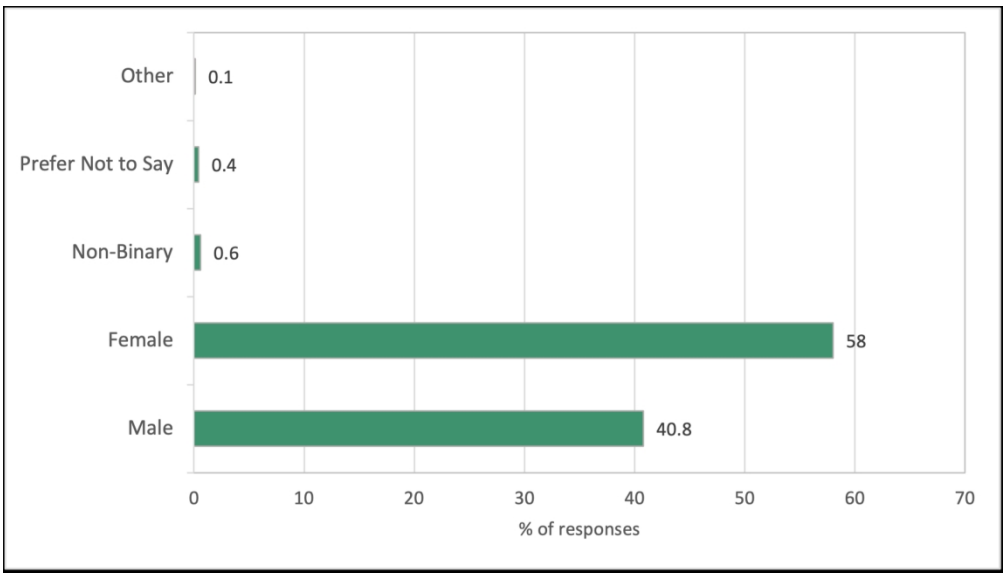
Appendix 5. Clinician Specialities

166x227mm (300 x 300 DPI)



Appendix 6. Patient Demographics. Patient Age

159x104mm (300 x 300 DPI)

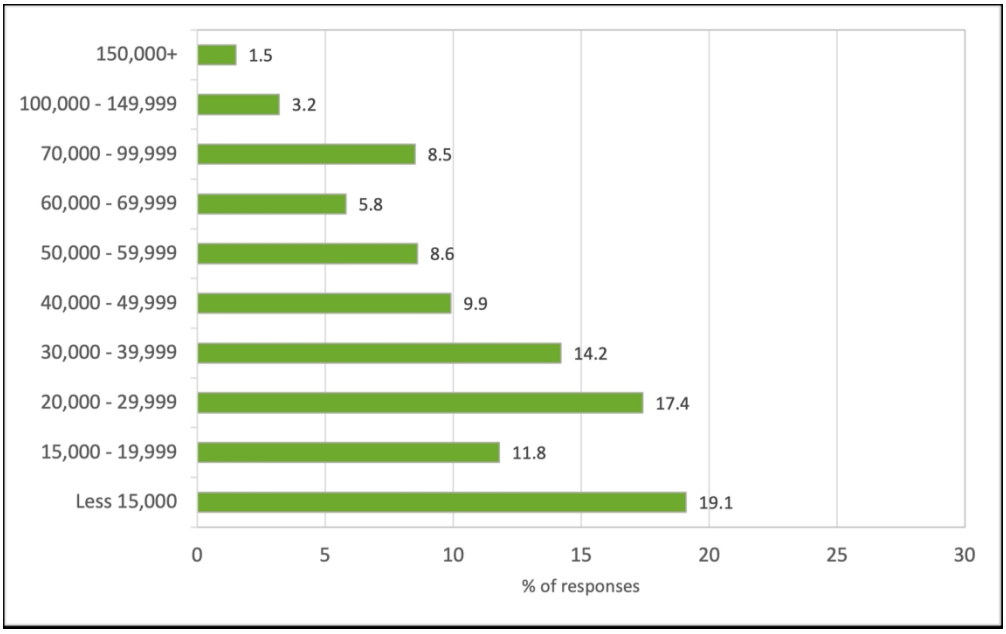


Appendix 7. Patient Demographics. Patient Gender

159x90mm (300 x 300 DPI)

Appendix 8. Patient Demographics. Patient Ethnicity

160x211mm (300 x 300 DPI)



Appendix 9. Patient Demographics. Household Income

163x102mm (300 x 300 DPI)

Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

	Page/line no(s).
Title and abstract	
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	P1,2-3
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	P2, 46-66
Introduction	
Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	P2, 70-98
Purpose or research question - Purpose of the study and specific objectives or questions	P3, 100-107
Methods	
Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	P3, 113-120
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	P20, 592-601
Context - Setting/site and salient contextual factors; rationale**	P4, 124-128
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	P4, 137-146
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	P5, 149-158
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	P5, 161-169

Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	P4, 32-35
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	P4, 124-129
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	P5, 61-69
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	P5, 62-69
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	P5, 65-69

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	P5, 72-83
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	P6, 86-513

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	P17, 516-562
Limitations - Trustworthiness and limitations of findings	P19, 565-579

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	P19, 585
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	P19, 582-583

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: 10.1097/ACM.0000000000000388

BMJ Open

Digital NHS Wales: A Coding Reliability Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

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Primary Subject Heading:	Health informatics
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Title Page

Digital NHS Wales: A Coding Reliability Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

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Up to five keywords or phrases suitable for use in an index. Digital Healthcare, Video Consulting; National Health Service (NHS), Service Improvement; Wales, United Kingdom.

Word count - excluding title page, abstract, references, statements, figures and tables. 5264 words.

Digital NHS Wales: A Reflexive Coding Reliability Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

Introduction: *The use of video consulting (VC) in Wales United Kingdom (UK) has expanded rapidly. Previous VC evidence has been the subject of small-scale projects and evaluations. TEC Cymru are an All-Wales digital service and roll out digital interventions and evaluate on large scales, thus capturing representative datasets across Wales, and therefore a wide range of National Health Service (NHS) specialities.* ***Objective****: To extract and analyse narrative feedback from patients and clinicians using the NHS Wales VC Service for 6-months (September 2020 to March 2021).* ***Design****: A coding reliability approach of a cross-sectional study was conducted.* ***Setting****: From all Health Boards across Wales.* ***Participants****: NHS patients and clinicians across primary, secondary and community care settings in Wales.* ***Results****: Data was captured on benefits, challenges and sustainability of VC. A coding reliability analysis was used with six domain summaries materialising to include: 'The Ease of VC'; 'The Personal Touches'; 'The Benefits of VC; 'The Challenges of VC'; 'Technical Quality',* and *'Recommendations & Future Use'. An additional 17 sub-domains are included. Direct quotations from patients and clinicians are provided for context.* ***Conclusions****: A total of 22,978 participants were included. This data helps to demonstrate that NHS remote service delivery, via the method of VC can be highly satisfactory, well-accepted and clinically suitable yielding many benefits. Despite this, the data is not without its challenges surrounding engagement and suitability for VC. The NHS Wales VC Service rolled out and evaluated at scale and demonstrates that VC has potential for long-term sustainability. For future use a 'blended approach' for NHS appointments that are clinically judged and centred on patient choice.*

Abstract Summary

Strengths & Limitations

- This paper presents patient and clinician free-text narrative boxes on a large scale considering experience of a relatively new digital service in NHS Wales.
- The study is representative of Wales, in that it is an all-Wales study, across all Health Boards.
- The study is a mix of patient and clinician voices across all types of NHS specialities.
- Due to the voluntary and anonymised nature of the feedback data, it is unclear as to how often recurring participants completed the feedback, thus potentially skewing the sample.
- Due to the size of the study sample it was not possible to present both the narrative and quantitative findings together, however access to this data is readily available on our website.

Background

Since 2020, the National Health Service (NHS) has seen a paradigm shift in the provision of healthcare services due to mandatory social distancing laws introduced because of the COVID-19 pandemic [1-3] As a result, the UK along with the NHS

observed a significant decrease in access to face-to-face appointments, and therefore, an increase in remote services [4].

Video Consulting (VC) has accelerated through health and social care as one of the most common remote methods for conducting appointments with patients throughout the NHS, especially in Wales [5, 6]. VC within health services has been internationally utilised for decades, yet the unprecedented circumstances of the pandemic brought to light its widespread ability, use, value, benefits and challenges [1].

There is growing evidence that VC can deliver safe and timely care in many settings and offer significant benefits to the users [7, 8]. The use of VC permits services to continue across a wide range of healthcare conditions, appointment types, sociodemographic groups, and health condition status [9]. Furthermore, it is sometimes considered more suitable for reaching underserved and isolated populations [4]. VC is reported to provide quality ensured, yet cost-effective care [10] and treatment, while reducing patient waiting times and the likelihood of Did Not Attends (DNAs) and number of hospital admissions—ultimately relieving pressure on NHS staff and services [11].

However, the majority of evidence is based upon pilot studies, with small and often highly selected samples, with limited questionnaire validity, ultimately casting speculation on its use, benefits and challenges across varied care sectors, specialities and circumstances [12, 13].

There are often some concerns regarding the use of VC services within certain professions that rely on face-to-face physical examinations to make diagnoses, and the increased level of risk associated [14]. These valid uncertainties highlight situations where sometimes it can be challenging to obtain the same level of accuracy when taking clinical measures via VC compared with obtaining them face-to-face. Not only this, but personal preferences in clinicians and patients can dictate whether or not a VC is used.

Therefore, the current evidence-base suggests that there is a need to continuously evaluate on a national level to allow for sustainable VC platforms to be embedded for the long-term into health and social care systems where appropriate [15, 16]. Due to the need for a continual evaluation, Technology Enabled Care (TEC) Cymru as an All-Wales digital service, rolled out The NHS Wales Video Consulting (VC) Service as a

national emergency response to the COVID-19 pandemic [17]. The evaluation spans a large and representative scale basis across a wide range of NHS healthcare sectors across all Health Boards in Wales. To contribute to the current evidence-base, TEC Cymru work in partnership with the Welsh Government, academics, third sector and local Health Boards and Trusts in Wales to adopt a clinically driven and data informed approach to their digital service roll out, spread and evaluation.

Aims & Methods

The aim of this study was to explore the benefits, challenges and sustainability of VC from the perspective of Welsh NHS clinicians and patients by conducting a coding reliability analysis, and presenting the narrative feedback received from 22,978 participants during a 6-month period (September 2020 and March 2021). This period was chosen as a 'mid-point' from a larger, ongoing VC evaluation during the COVID-19 pandemic to gain a better understanding of VC without the influence of initial issues during the earlier months of VC being rolled out, and current changes such as VC being scaled up with a focus on blended consultation approaches.

METHODS:

Design, Setting, Participants

This paper presents the All-Wales data captured across all 7 Health Boards and 1 Trust (See Appendix 1) across a range of NHS healthcare settings within primary, secondary and community care (See Appendix 2-3). This is a coding reliability analysis of VC experience feedback captured in a larger cross-sectional study [18], held by the NHS Wales VC Service, TEC Cymru [17, 19]. Participant eligibility included NHS clinicians and patients using VC in NHS Wales (see Appendix 4-9).

Measures

This paper presents national (All-Wales) data from free-text narrative boxes from a cross-sectional feedback study. The feedback appeared as internet browser pop-ups at the end of each VC appointment – one per clinician and patient and completed immediately as live data to reflect the use, benefits, challenges, and sustainability of VC (see supplementary files 1 and 2).

Sampling

Opportunity sampling was used due to accessibility of the VC intervention and ability to capture data at the end of each consultation via an online feedback link. There is acknowledgement of the risks surrounding sampling in this way, when considering the feedback being completed by those more willing, thus sharing potentially more extreme 'positive' or 'negative' data towards VC, potentially missing out 'neutral' responses of those individuals in the middle. To limit this, TEC Cymru conduct multiple phases of re-evaluation using a phased approach to their research and evaluation work (see supplement file 3), which provides ample opportunity across their digital interventions to explore a wider range of methodologies and study types.

Ethics Approvals & Informed Consent

TEC Cymru obtained full ethical approvals and risk assessments from their host Health Board Aneurin Bevan University Health Board Research & Development Department (Reference Number: SA/1114/20), and then national approval was obtained from all other Health Boards in Wales.

At the end of each participant feedback link, a statement of consent and a compulsory tick box was required prior to feedback submission.

Patient and Public Involvement

No patient or public involvement as survey work and during the emerging roll out did not have PPI team. Now have PPI team and young representatives.

Analysis

For the data discussed in this paper, there are a total of 22,978 clinician and patient feedback narrative submissions. Using steps for a coding reliability analysis, the data was familiarised by three researchers of the TEC Cymru team [GJ, BW, MW], codes were manually identified and generated and placed into an excel sheet for

manageable order (due to large numbers). Domain summaries were then generated from the data, reviewed, and defined and the report was produced following a recursive process of movement between the phases, ensuring quality and rigour, with an additional 20% validation check on all data by the National Clinical Lead for Wales [AA].

Results

A coding reliability analysis of the free-text narrative data collected at the end of the Video Consultation (VC) feedback was conducted. From the 22,978 patient and clinician responses captured during September 2020 and March 2021, six domain summaries materialised with an additional 17 sub-domains. These include: The Ease of Video Consultations (VC); The Personal Touches; The Benefits of Video Consulting; The Challenges of Video Consulting; Technical Quality, and Recommendations & Future Use. Direct quotations from patients and clinicians are provided. Each quotation is referenced to describe either the *patient* by their age range, gender, Health Board/Trust, healthcare speciality and type of appointment (e.g., first appointment, follow-up), or the clinician by their professional occupation and the Health Board/Trust in Wales in which they are based. The domains are analysed in order of the most common comment/feedback due to the voluntary responses.

Domain Summary 1: Ease of Use

Patients and clinicians generally rate their VC as high in quality [16] and their free-text narratives reflect this level in terms of high satisfaction and acceptability in relation to both technical and overall experience. For example, when patients and clinicians rate their VC as 'excellent', 'very good' or 'good' this is often paired with positive comments in relation to either the VC's technical performance as a video consulting platform or the overall experience of using VC as a healthcare delivery service.

1.1 Ease of Technical Use

One of the most common sub-domains associated to the platform's technical performance was that of 'ease of use'. It was often stated that the VC platform used in NHS Wales (Attend Anywhere) was 'easy to use' for both patients and clinicians.

"Easy to use, lots of good information" ***(Parent of Patient under 12 years, ABUHB, Physiotherapist, Paediatrics & Child Health, Advice)***

"It was easy to use, and appropriate to use during the pandemic" ***(Patient, Female, HDUHB, 25-44, Midwife, Obstetrics & Gynaecology, First Appointment).***

In addition, this ease of use was expressed as a 'surprise' to some, in that both patients and clinicians found the VC platform much easier to use than they initially anticipated, and in some instances, this exceeded expectation.

"More effective than I expected a non-face to face appointment to be" ***(Patient, Male, 45-64, HDUHB)***

"This is my first experience of a video call, so I was pleasantly surprised" ***(Patient, Female, 64-80, BCUHB, Doctor, Follow-up)***

"First time to use video call I was very impressed, better than expected" ***(Patient, ABUHB, Podiatrist, Follow-up)***

1.2 Ease of Experience

For some clinicians, it was felt that having access to a VC platform was 'easier' for some of their patients than a face-to-face appointment would be. This was especially apparent in terms of patient experience and their personal circumstances, and those with access difficulties, anxiety issues, or complex home situations that were made more convenient with VC.

"Easier to access with social anxiety" ***(Doctor, CVUHB)***

"Very helpful for autistic patient" ***(Dentist/Dental Nurse, SBUHB)***

This was also expressed in more depth by the patients themselves, whom in addition felt VC was better than attending a face-to-face appointment, such as making the patient feel safer, less stressed and more empowered, as opposed to their prior experience of face-to-face appointments.

"Easier and safer than going to the hospital. I didn't have to take much time off work" ***(Patient, SBUHB, Female, 25-44, Dietician, First Appointment)***

"Just as good as a face-to-face meeting and to be honest I felt like I was being listened to far more than when I have been in face-to-face meetings on the same subject" ***(Parent of Patient, ABUHB, Female, under 12 years, Nurse, Mental Health, Advice)***

1.3: Ease & Unique for Collaborations

Clinicians comment that the 'ease' of the VC platform and its positive associations to patient experience provides an additional unique opportunity. This opportunity is the ability to link up others to the video call, thus enabling multi-disciplinary appointments to take place. This is felt to be unique in the sense that this collaborative approach would not have been possible if conducted face-to-face, thus in turn, produces additional advantages and improved outcomes for patient, families and clinicians.

"It was easy to join both my patients and other colleagues in" ***(Doctor, HDUHB)***

"Also, his Wife was able to join session – significant information shared by Wife today" **(SLT, BCUHB)**

It also means that in some instances, there is an increase in patient or parental onus which is perceived as an additional advantage to patient care.

"Parents have to take a more proactive role than they might in clinical session" ***(SLT, ABUHB)***

"Definitely helped with family involvement today" ***(Nurse, HDUHB)***

"Mum appears happy to support and possible not very involved until now" ***(SLT, ABUHB)***

Domain Summary 2: The Personal Touches

The narrative data highlighted several incidences of where VC has been able to increase clinician to patient relations.

2.1: Communication, Personalisation & Rapport

Patients commonly expressed how VC helps them to communicate effectively, to receive a more personalised and patient-centred approach, and build rapport with their clinicians.

> *"Having a video call made it more personal for me the support given to me was excellent"* ***(Parent of Patient, CAVUHB, under 12 years, Paediatrics & Child Health, Advice)***

> *"We have built up a relationship with our clinician via VC"* ***(Patient, Male, 45-64, CAVUHB, Counsellor, Mental Health)***

2.2 Patient Positivity & Appreciation

A strong consensus of patient 'positivity' and 'appreciation' towards their clinicians is expressed widely in the narrative. This positive clinical presence led to many patients feeling safe, comfortable and supported during and after their VC. This was particularly evident across specialities such as mental health and therapies.

> *"Had a really tough week, but [name removed] was amazing and she listened to me. She gave me great support and was really kind to me"* ***(Patient, CAVUHB, 25-44, Psychologist, Mental Health, Therapy/ Treatment)***

> *"She was engaging, courteous and professional in explaining what she felt the issues were with my hand. I found the whole experience thoroughly satisfactory."* ***(Patient, CAVUHB, 45-64, Male, Occupational Therapist, Trauma & Ortho, First Appointment)***

> *"It was great to feel that someone was there to chat to, who could see a difference in [patient name removed], while at the same time supporting us as a family."* ***(Guardian/Carer of Patient, SBUHB, 25-44, Male, Mental Health, Follow-up)***

Domain Summary 3: The Benefits of Video Consulting

The benefits associated to using VC were one of the most common domains that materialised in the data.

3.1 Convenience, Safety & Home Comforts

Many of the patients demonstrate the benefit of convenience when using VC as opposed to a traditional face-to-face appointment, with additional advantages such as improved safety and home comforts.

> *"As we live quite far away, the virtual meetings are a lot more convenient and it's nice to feel more comfortable at home. Thank you"* ***(Patient, CAVUHB Female, 25-44, Obstetrics & Gynaecology, Follow-up)***

> *"I felt really comfortable talking to [name removed]. I was able to get things off my chest, and talk about the assault more deeply than I have ever done"* ***(Patient, ABUHB, 45-64, Female, Counsellor, Mental Health, Therapy / Treatment)***

> *"Client is pregnant and so is vulnerable to the COVID virus. AA means she can continue with therapy without the additional risks"* ***(Mental Health, HDUHB)***

3.2 Flexibility of VC

For many patients, a benefit of using VC was the flexibility it allowed. For example, patients reported to be able to continue 'getting on with other things' whilst waiting in the 'virtual waiting room', which would not have been possible in a physical location.

> *"I felt it was good as I could start the call and then get on with things around the house while I waited"* ***(Parent of Patient, BCUHB, Female, under 12 years, Physiotherapist, Paediatrics & Child Health, Therapy / Treatment)***

> *"I think that it is excellent to have a consultation this way. It was easy to log on and saves so much time for both of us"* ***(Patient, ABUHB, 45-64, Female, Physiotherapist)***

In addition, having three modes of appointment (VC, telephone or face-to-face) provided the patient with a stronger sense of patient choice and flexibility. However, it was felt that VC, as opposed to a telephone consultation, allowed comparable aims and goals to be achieved similar to a face-to-face.

"VC let us achieve patient's 1st choice, which could not have been achieved over the phone" ***(Occupational therapist, SBUHB)***

"AA is a way of bridging direct face-to-face and a visual interaction can be helpful as part of the clinical assessment" ***(Nurse, HDUHB)***

"Having a video consultation is so much better than just a telephone call - it allows you to chat as if it was in person" ***(Patient, PTHB, 64-80, Female, Nurse Respiratory Medicine, Advice)***

The ability to be able to visually 'see' the patient is considered imperative to clinicians, as for many healthcare conditions VC is needed to enable visual cues.

"Better than just telephone call as could get non-verbal clues about emotions" ***(Doctor, ABUHB)***

"Really useful being able to see patient via system – really added to consultation, infinitely superior to telephone consultation" ***(Doctor, SBUHB)***

3.3 Time Savings

When using VC as opposed to face-to-face appointments many clinicians and patients expressed that they had saved time in several ways, and this was a considerable benefit to patients, families, clinicians and the NHS service as a whole.

For example, clinicians felt that the 'time' used to conduct a VC was reduced in comparison to the usual components of a face-to-face e.g., logistics. The time saved from travelling to and from appointments was able to be combined into the overall virtual consultation in some cases, ultimately benefiting clinicians' availability to attend to other patient needs and clinical tasks.

"Video consultation reduces time required the next day" ***(Midwife, CVUHB)***

"Video consultation prior, ensures that less time on home visits" ***(Health Visitor, SBUHB)***

In addition, the use of VC lowered the 'wait times' in some instances for patients, in comparison to waiting for a face-to-face appointment.

"Fantastic way to be able to have an appointment without having to wait months" ***(Parent of Patient, CTMUHB, under 12 years, Male, Doctor, Otolaryngology (ENT), First Appointment)***

"Reduces time required for next appointment" ***(Audiovest Med, BCUHB)***

From the data, 'travel time' or 'time off' work or school was perceived as the biggest saving of time in comparison to attending a face-to-face appointment for patients.

"Less travel and disruption of [patient] school day" ***(Dietician, ABUHB)***

"I just had just finished a night shift, and live a fair distance from work, so doing a video call made my life a lot easier" ***(Patient, SBUHB, 45-64)***

"Not having to travel to the hospital and waiting in the waiting room was much better, and there was no stress trying to get around everything all of the time" ***(Patient, CVUHB, 45-64)***

3.4 Clinical Value

Many clinicians suggested that VC has the ability to enhance a clinical session or determine clinical need. For example, some clinicians demonstrated opportunities to share visual resources immediately within the appointment. Others reported that VC allowed for an effective triaging tool to determine the 'need' for a face-to-face appointment as opposed to a remote consultation alternative.

"It enhanced the clinical session because it added visual opportunity" ***(Speech and Language Therapy, CVUHB)***

"I could open investigations on screen easily, I shared internet resources links to patient, and she got them on screen straight away" ***(Doctor, BCUHB)***

Domain Summary 4: The Challenges of Video Consulting

While there are a number of evident benefits when considering VC, it is important to highlight the challenges faced to gain an overall picture of both patient and clinician experiences which are subject to subtle nuances.

4.1 Video Consulting is Not for Everyone or Everything

There are some clinical situations and personal circumstances which continue to necessitate the need for face-to-face consultations, where VC does not achieve the outcomes necessary, or suit the clinical condition or patient type.

> *"Still needs face-to-face as cannot test hearing over VC"* ***(Audiovest Med, BCUHB)***

> *"Only thing missing was ability to weigh and get height"* ***(Dietician, ABUHB)***

4.2 Patient and Clinician Digital Ability

Some issues with patient and clinician user abilities were also highlighted in the data, clinicians made note that on occasion patients struggled to undertake VC due to their lack of technological ability. This affected the potential quality of the VC and therefore impacted the patients' opportunity to receive care via VC.

> *"Client unable to get full screen. Client not familiar with using equipment at home"* ***(Counsellor, Psychiatry & MH, Mental Health, Secondary, SBUHB)***

> *"Patient didn't receive link so unable to do. I think it may be due to me being unfamiliar with new system in the end and it worked well"* ***(Physiotherapist, Paeds & Child Health, Therapies (AHP), CVUHB)***

4.3 Engagement over VC

Engagement was a further challenge that clinicians experienced when using VC. Within therapies for younger patients where parents were present, clinicians found it challenging to engage with children via video in the same way as face-to-face. Children were reported to be more distracted during these appointments as the concept of video was relatively new, therefore parents and clinicians had to attempt to engage with the child more than via face-to-face.

"Poor picture quality does not encourage children who already have attention/listening difficulties to take part" ***(Speech and Language Therapist, ABUHB)***

"Child had short attention span and parents had to work hard to keep him in front of camera" ***(Speech and Language Therapist, ABUHB)***

"Sound quality not adequate at times to determine success of target so reliant on adult feedback. Child however responding better than expected although once attention levels drop it is quite difficult to return to tasks" ***(Speech and Language Therapist, Paeds & Child Health, ABUHB)***

4.4 Waiting Room Issues

A problem that was reported by a small number of patients was associated to the virtual waiting time being exceedingly long, or that their appointment was missed by a clinician, or in some instances, where no clinician attended at all.

"Waited for over 40 minutes in the waiting room" ***(Parent of Patient, SBUHB, and parent of child under 12 years, Paediatrics & Child Health, Follow-up)***

"We waited in the virtual waiting room for an hour and 30 minutes without anyone answering. We couldn't wait any longer and due to our poor internet connection in our area, I had to use all my monthly data" ***(Parent of Patient, ABUHB, Parent of child under 12 years, Male, Paediatrics & Child Health, Follow-up)***

Domain Summary 5: Technical Quality

When considering the technical aspects of VC, clinician and patient tended to rate their VC highly when the audio and visual picture were of good quality.

5.1: Good vs. Bad Quality

For high-quality ratings, these were paired with praise for VC in the free-text narrative box. Suggesting that the audio and visual elements of the VC were of high quality.

"Great connection. No glitches very smooth call" ***(Parent of Patient, ABUHB, under 12 years, Female, Physiotherapist, First Appointment)***

"The video and picture was perfect, was able to hear the doctor clearly" ***(Patient, CAVUHB, 45-64, Female, Doctor, Follow up)***

However, there were technological challenges reported within the narrative such as poor connectivity, thus impacting on visuals and audio.

> *"Lag in audio/video sometimes causes miscommunication or difficulty with younger patients"* ***(SLT, CVUHB)***

> *"The video was very choppy and when my therapist was talking it was delayed video with speech"* ***(Patient, CAVUHB, Female, 25-44, Counsellor, Mental Health, Therapy / Treatment)***

In some instances, technical issues were associated with specific device types and their perceived incompatibilities with the VC platform.

> *"The video call app did not give me the option of using my inner camera so I had to turn my phone around so the doctor could see me."* ***(Patient, BCUHB, 25-44, Ophthalmology, Advice)***

> *"Problems with Safari on iPad"* ***(Health Visitor, SBUHB)***

> *"Session being done on Father's phone so screen obviously small for child to watch"* ***(SLT, ABUHB)***

5.2 Clinical Innovation & Trouble-Shooting

Yet, despite these technological challenges, with the right amount of technical support and appropriate equipment available, clinicians report to be able to troubleshoot many issues and continue to use VC in most situations.

> *"Tried to do call with mobile phone and there were issues for the patient not being able to grant access for use on mobile phone, but the consultation worked perfectly on their computer"* ***(Dentist/Dental Nurse, BCUHB)***

> *"Issues at the start of the call with the audio but we disconnected and reconnected and it was then fine"* ***(Nurse, SBUHB)***

Some clinicians were able to trouble-shoot the problems easily to make the consultation work best for them and their patients.

"I was unable to connect through the desktop in clinic due to computer being extremely slow.... I was luckily able to connect through my Netbook which supports the platform" ***(SLT, CVUHB)***

"School initially struggling with internet connection but then able to move to a room with better signal and VC quality" ***(SLT, CVUHB)***

Domain Summary 6: Recommendations & Future Use

When considering the experiences of both clinicians and patients using VC, it is important to consider how the narrative can be built upon to consider suggestions and recommendations to ensure that VC is suitable for future use and in conjunction, blended with face-to-face and telephone consultations.

6.1 Clinical Recommendations

One of these suggestions was improved infrastructure and resources for clinical and administrative staff to have access to. It was felt that by having better equipment, they would deliver better patient care via VC. Not only this, but in some areas the number of devices and access to workspace was limited and needed significant improvement in the future.

"It would be useful to have 2 microphones so I can share videos with my clients about EMDR therapy and PTSD" ***(Nurse, BCUHB)***

"Need appropriate screens and two monitors to view downloads and see patients, desk and chairs at right height" ***(Dietician, BCUHB)***

Clinicians also suggested that there needed to be an improvement with the technical support that was on offer across Health Boards regarding VC.

"Being taught how to split screen so we can write notes at the same time, rather than making paper notes and writing up after" ***(Occupational Therapist, BCUHB)***

This suggestion of technology support would ensure clinicians could use VC to the best of their ability, utilising all aspects of the platform. Some clinicians suggested new features that they felt would be useful in ensuring clinician/patient confidentiality and safety.

"To be able to blur/add a background when working from home" ***(Dietician, SBUHB)***

"I would like to be able to leave the call screen but still be able to see patient in a little pop-out screen" ***(SLT, BCUHB)***

Additional administrative support was also suggested for VC so that they could mirror the way standard face-to-face consultations were run.

"For this to work administrative clinic support needed to mirror that provided for face-to-face appointments" ***(Nurse, CVUHB)***

6.2 Patient Wants & Needs

Patients' narrative also suggested that technical and digital skills support would be useful in the future use of VC. Some patients were slightly unsure of how to use the technology needed for VC and ran into some issues. By having support for this, it may lead to an increase in digital skills for future digital implementations and the move towards a new NHS digital strategy.

"I couldn't work out how to use the camera on the front of my and wasn't sure how to connect via my computer to the appointment" ***(Patient, ABUHB, 25-44, Female, Mental Health, First Appointment)***

"I was unable to switch my camera to front facing, so not able to see who I was talking to" ***(Patient, CAVUHB, Female, 45-64, Nurse Otolaryngology (ENT), First Appointment)***

Patients provided narrative to suggest a blended approach of digital healthcare services was needed going forward. This was due to a large number of patients highlighting that VC provided numerous benefits, and help to supplement the quality of care received from clinicians, and believed a blended approach of VC and face-to-face was the way forward for the future of the NHS Wales support by clinicians.

"Definitely the way forward for consultations, I live 100 miles away so for the purpose of consultation rather than treatment this is brilliant!" ***(Patient, SBUHB, 45-64, Female, Doctor, Plastic Surgery)***

"I think this will be the future. I felt more relaxed being able to do it from my home" ***(Patient, BCUHB, Female, 64-80, Doctor, Obstetrics & Gynaecology, First Appointment)***

"Video consultations act as a useful complement to face-to-face sessions and home visits" ***(Audiologist, BCUHB)***

Discussion

The coding reliability analysis of the free-text narrative boxes captured at the end of VC provided feedback from a large dataset of 22,978 clinician and patient submissions expressing a vast and overall view of VC experiences in Wales. Six dominant domain summaries and 17 additional sub domains materialised. Due to the high response rate in free-text narrative box responses, the analysis of the feedback data was able to be conducted using a coding reliability approach, thus providing context for each domain and its perspective, supported by patient and clinician quotation. The domains that materialised in the analysis provide a strong sense that the NHS Wales VC Service on a whole is highly satisfactory, well accepted, and clinically suitable for a wide range of patient and clinical teams using the service. Despite this, it is important to draw attention to the challenges that have also occurred for both clinicians and patients, such as VC not always being suitable for every individual or appointment.

The data provides a strong consensus that the VC platform currently being used in NHS Wales is 'easy to use' in both technical and experience terms, with the additional value of its ability of enhanced collaboration, thus providing a multidisciplinary approach to patient care. In addition, the data highlights the real life and personal aspects of VC experience, which suggests that patients who are using the VC service are satisfied with using it and provide narrative around its ease of use and personalisation felt in their patient care.

In addition, there is a heartfelt sense of patient appreciation and gratitude to their clinicians for their hard work and dedication to delivering patient care. Furthermore, the data demonstrates the benefits that are associated to using VC. These benefits are felt by patients, families and clinicians, and the NHS service. Challenges are also apparent within the data with VC not always being appropriate for all patients or

appointments. This is in combination with difficulties surrounding engagement, particularly with children via VC and issues with digital ability across clinician and patient populations. Although there were disparities of digital ability that sometimes hindered a VC appointment, and suggestive of a digital divide, in this data set and the wider evaluation [20] we did not find this to be the case. The quantitative findings that run alongside this data provide additional support, specifically regarding patient representation, concluding that regardless of patient age, gender, ethnicity, household income, health condition, disability or place (urban vs. rural), VC can provide a high standard of healthcare delivery across Wales [18, 21, 22]. Though apparent, the challenges were heavily outweighed by the number of benefits experienced from using VC.

The data also presents a comparison between good versus bad technical quality on the platform regarding audio and visuals for both patient and clinician. Improvements for future use should encapsulate recommendations such as more resources to be made available to clinical teams, and that VC platform features are considered as priority for improvement. It is also noted that increased technical support and education is provided to ensure that VC can appropriately be used in the future, and possibly offered directly to patients, so that VC is used as a long-term blended approach to suit patient choice and preferences moving forward. While challenges have been identified, the data captured in this study is comparable to previous literature that suggests that the benefits of VC outweigh these challenges [18, 21] and can support the use and sustainability of VC in NHS healthcare services. As discussed within the result section VC is not seen to be used for everything within healthcare, despite the benefits highlighted within this study. The need to ensure that VC is offered within every healthcare environment is pertinent to its sustainable future use along with shared decisions between clinician and patient [23].

Limitations and Conclusions

There are many strengths to this study, including its narrative approach among a very large and representative sample for Wales. However, the study did have some limitations. Due to the voluntary and anonymised nature of the feedback data collection, it is unclear as to how often recurring participants completed the

feedback, thus potentially skewing the sample. Furthermore, due to the size of the study it was not possible to present both the qualitative and quantitative findings together, however access to this data is readily available [21].

Originally, the data was broken down into specialities, but was regrouped for the purpose of this narrative analysis as most of the data showed little difference between specialities. While the quotations used within this data are true of the narrative at the time of collection, it is important to note that these are fitting of a time during the pandemic and so reflect this period. Data is being captured in an ongoing evaluation of VC within Wales, and suggests that those using VC are still rating it positively.

While this paper does not cover specific clinical implications, VC is being used across various specialities and evaluation is ongoing to explore this further.

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Statement of Data Sharing: All analysed data is published on the TEC Cymru website in the format of a full report of all data for the public to view. To access this reports please see https://digitalhealth.wales/tec-cymru**.** Other data can be requested as a reasonable request to the corresponding author.

Author contributions: GJ contributed to the main design of the study and development of the research questions, the main structure and write-up of the paper, and final amendments to the manuscript. GJ, BW, BT & MW analysed the data, with AA, SK MO supervision. All authors discussed and interpreted the data once analysed and helped structure the manuscript. AA, SK and MO contributed to the clinical understanding of the findings and shaped the discussion, conclusions and recommendations. AA was responsible for overseeing the full development of the

study design and data collection, the analysis and development and final sign-off of manuscript from a clinical and programme perspective. All authors contributed to proof-reading and amendments of the final manuscript.

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Appendix

Appendix 1 here

Health Board and Trust Distribution

Distribution of responses per Health Board and Trust within Wales.

Appendix 2 here

Breakdown of Primary, Secondary and Community Care responses

Primary Care responses.

Appendix 3 here

Secondary and Community Care responses.

Patient and Clinician Demographics

Clinician Professions

Appendix 4 here

Clinician Specialities

Appendix 5 here

Patient Age

Appendix 6 here

Patient Gender

Appendix 7 here

Patient Ethnicity

Appendix 8 here

Patient Household Income

Appendix 9 here

Video Consulting Patient Copy

Survey 1:

1. Please rate the quality of your video consultation Rhowch sgôr i ansawdd eich galwad fideo

Poor Gwael	Okay Iawn	Good Da	Very Good Da iawn	Excellent Ardderchog
★	★	★	★	★

Any comments?

2. How would the patient describe themselves? Sut yw'r claf yn disgrifio ei hun?

	Age Old	Gender Rhyw
Demographics Demograffeg		

3. How many times have you used video for a health or social care consultation, and would you use it again? Sawl gwaith ydych chi wedi defnyddio fideo am ymgynghoriad iechyd neu ofal iechyd, a byddwch chi'n defnyddio eto?

	How many times have you used a video consultation? Sawl gwaith ydych chi wedi ei defnyddio?	Would you like to use video consultation again? Byddwch chi'n ei defnyddio eto?
Video Consultation Use Defnydd fideo		

4. What was your video consultation related to today? Beth oedd eich ymgynghoriad fideo yn ynghylch heddiw?

- First time appointment
  Awyntiad gyntaf
- Advice & support
  Cymorth neu gyngor
- Review of my health and/or results
  Adolygiad iechyd/ canlyniadau
- Final appointment & discharge
  Apwyntiad olaf neu ryddhad
- Therapy or treatment session
  Therapi neu sesiwn triniaeth

Other (please specify)

5. Do you feel that this video consultation prevented you needing a face-to-face appointment?

Wnaeth yr ymgynghoriad fideo osgoi'r angen i'r claf gael apwyntiad wyneb i wyneb?

- Yes le
- No na
- I don't know ansicr

Comments?

6. For your video consultation today, what type of healthcare speciality and professional did you see? Am eich ymgynghoriad fideo heddiw, pa fath o arbenigwr a phroffesiwn gwelwch chi?

	Health Condition Speciality Arbenigrwydd cyflwr iechyd	Professional Phroffesiwn
Speciality & Professional Arbenigwr a Phroffesiwn		

Please state the health-related reason for your video consultation today?

7. How long would it typically take you to travel from your home to your consultation? (one way) Pa mor hir fyddai hi'n cymryd i chi deithio i'ch apwyntiad fel arfer?

Minutes (Traveling one-way)	
Miles (if known)	
Parking (at the site)	

8. Which Health Board Region are you in? O ba Ranbarth Bwrdd Iechyd ydych chi'n dod?

- Aneurin Bevan University Health Board
- Betsi Cadwaladr University Health Board
- Cardiff & Vale University Health Board
- Cwm Taf Morgannwg University Health Board
- Hywel Dda University Health Board
- Powys Teaching Health Board
- Swansea Bay University Health Board
- Velindre Cancer Centre

9. TEC Cymru's researchers will be running interviews with clinicians. Please leave your email below if you would like to take part, and we will contact you to arrange a date and time. Address

Email Address

10. Any other comments, questions or concerns?
Unrhyw sylwadau, cwesitynau neu bryderon eraill?

By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box [ ]

Survey 2: (Additional Questions Added)

11. Did you experience any difficulties with your video consultation today? Gwelwch chi unrhyw anawsterau gydag eich ymgynghoriad fideo heddiw?

	A lot llawer	Some Rhywfaint	A little Ychydig	Not at all Dim	N/A
Difficulties with a device Anawsterau Gyda dyfais	○	○	○	○	○
Difficulties with Internet connection Anawsterau gyda chysylltiad rhyngrwyd	○	○	○	○	○
Difficulties with video/picture Anawsterau gyda llun/ fideo	○	○	○	○	○
Difficulties with audio/sound Anawsterau gyda sain	○	○	○	○	○
Difficulties with privacy or a safe space Anawsteru gyda diogelwch neu pbeifatrwydd	○	○	○	○	○
Lack of confidence using video calls Diffyg hyder gyda defnydd fideo	○	○	○	○	○
Not suitable for clinical needs Anaddas am anghenion clinigol	○	○	○	○	○
Prefer face to face or telephone Mae'n well gen i wyneb yn wyneb neu dros y ffôn	○	○	○	○	○

12. How did your video consultation benefit you today? Sut aeth yr ymgynghoriad fideo buddio chi heddiw?

	Very beneficial Buddiol iawn	Beneficial Buddiol	Quite beneficial Eithaf Buddiol	Not beneficial Dim yn Buddies	Not at all beneficial Dim yn Buddiol o gwbl	N/A
Saved time & preparation Arbed Amser a Pharatoi	○	○	○	○	○	○
Saved travel & parking Arbed teithio	○	○	○	○	○	○
Saved the environment & co2 emissions Arbed yr amgylchedd ac allbwn co2	○	○	○	○	○	○
Saved taking time off school, work or other commitments Arbed amser o waith, ysgol neu ymrwymiadau	○	○	○	○	○	○
Saved money e.g., childcare, travel Arbed arian am ofal plant/ teithio	○	○	○	○	○	○
Improved access to care & waiting times Gwella mynediad i ofal ac amser aros	○	○	○	○	○	○
Improved convenience e.g., staying at home Gwella hwylustod e.e. aros adref	○	○	○	○	○	○
Improved family involvement & support Gwella cyfranogiad a chymorth teulu	○	○	○	○	○	○
Lowered rates of infection risk Lleihau cyfraddau haint	○	○	○	○	○	○
Lowered stress and anxiety Lleihau straen a phryder	○	○	○	○	○	○

By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box [ ]

Video Consulting Clinician Copy

Survey 1:

1. Please rate the quality of your video consultation? Rhowch sgôr i ansawdd eich galwad fideo?

Poor Gwael	Okay Iawn	Good Da	Very Good Da iawn	Excellent Ardderchog
☆	☆	☆	☆	☆

Comments?

2. What is your profession & speciality? Beth yw eich proffesiwn ac arbenigedd?

Please only enter 'other' if your profession/speciality is not on the list.

	Profession Proffesiwn	Speciality Arbenigedd
Profession & Speciality Proffesiwn & Arbenigedd		

Other (please specify)

3. What do you consider was the primary activity of this video consultation?

Beth oedd y prif weithgaredd yn yr ymgynghoriad fideo?

- ○ First Appointment apwyntiad cyntaf
- ○ Advice & Support cyngor a chymorth
- ○ Follow-up dilyniant
- ○ Feedback/Outcomes/Results adborth/ allbwn/ canlyniadau
- ○ Review adolygiad
- ○ Discharge rhyddhad
- ○ Therapy Session sesiwn therapi
- ○ Other (please specify)

4. Do you feel that this video consultation prevented the patient needing a face-to-face appointment?

Wnaeth yr ymgynghoriad fideo osgoi'r angen i'r claf gael apwyntiad wyneb i wyneb?

- ○ Yes ie
- ○ No na
- ○ Unable to say Methu dweud

Other (please specify)

5. Which Health Board Region are you in? O ba Ranbarth Bwrdd Iechyd ydych chi'n dod?

- ○ Aneurin Bevan University Health Board
- ○ Betsi Cadwaladr University Health Board
- ○ Cardiff & Vale University Health Board
- ○ Cwm Taf Morgannwg University Health Board
- ○ Hywel Dda University Health Board
- ○ Powys Teaching Health Board
- ○ Swansea Bay University Health Board
- ○ Velindre Cancer Centre

6. **ONLY ANSWER THIS QUESTION IF WORKING FROM HOME**

If you are working remotely, how long in minutes and miles would it typically take you to travel from home to work? (one-way)

Use numbers only e.g., 10 (for minutes and/or £ in expenses)

Minutes

Miles (if known)

7. Any other comments, questions or concerns?
Unrhyw sylwadau, cwesitynau neu bryderon eraill?

For example, is there additional support you may need? Or could anything be improved with the platform?

8. TEC Cymru's researchers will be running interviews with clinicians. Please leave your email below if you would like to take part, and we will contact you to arrange a date and time.

Email Address

CONSENT:
By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box { }

Survey 2: (Additional Questions Added)

9. Did you experience any issues or difficulties with your video consultation today? A wnaethoch chi brofi unrhyw broblemau neu anawsterau gyda'ch ymgynghoriad fideo heddiw?

	Very relevant	Relevant	Quite relevant	Not relevant	Not at all relevant	N/A
Issues with a device Mynediad at ddyfais	○	○	○	○	○	○
Issues with Internet connection Cysylltedd gwael â'r rhyngrwyd	○	○	○	○	○	○
Issues with video/picture Problemau gyda fideo	○	○	○	○	○	○
Issues with audio/sound Problemau gyda sain	○	○	○	○	○	○
Issues on the patients side e.g., their device, Internet or lack of confidence using video Problemau gydag ochr y claf	○	○	○	○	○	○
I lack the confidence using video consultation Diffyg hyder wrth ddefnyddio galwadau fideo	○	○	○	○	○	○
Not suitable for clinical needs Ddim yn briodol neu'n addas	○	○	○	○	○	○
I prefer face to face or telephone Mae'n well gen i wyneb yn wyneb neu dros y ffôn	○	○	○	○	○	○
The patient prefers face to face or telephone Mae'r claf yn cyfeirio wyneb yn wyneb neu dros y ffôn	○	○	○	○	○	○

Other (please specify)

10. What do you consider to be the benefits of your work or your service of using video consultation today? Beth yn eich barn chi yw buddion eich gwaith neu'ch gwasanaeth o ddefnyddio ymgynghoriad fideo heddiw?

	Very beneficial Buddiol iawn	Beneficial Buddiol	Quite beneficial Eithaf Buddiol	Not beneficial Dim yn Buddiol	Not at all beneficial Dim yn Buddiol o gwbl	N/A
More efficient use of clinical time & space Defnydd mwy effeithlon o amser a lle	○	○	○	○	○	○
Saved travel & parking Arbed teithio a pharcio	○	○	○	○	○	○
Saved the environment e.g., less paper waste, co2 emissions Arbed yr amgylchedd ac allbwn co2 a phapur	○	○	○	○	○	○
Improved access to care for patient Gwella mynediad i ofal am y claf	○	○	○	○	○	○
Reduced waiting times for patient Lleihau amseroedd aros i'r claf	○	○	○	○	○	○
Reduced likelihood of a DNA Lleihau'r siawns o DNA	○	○	○	○	○	○
Improved family involvement & support for patient Gwella cymorth a chyfranogiad i'r claf	○	○	○	○	○	○
Lowered rates of infection risk Lleihau'r gyfradd heintiad	○	○	○	○	○	○

Other (please specify)

CONSENT:

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Tick Box { }

BMJ Open

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Research & Evaluation Framework

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Introduction

This Research and Service Evaluation Framework is developed by Technology Enabled Care (TEC) Cymru's research and evaluation team and is based upon the team's own knowledge and experiences. The framework has six sections:

Section 1: What is Research & Service Evaluation?
Section 2: What is Quality Improvement?
Section 3: TEC Cymru's Four-Step Phased Approach
Section 4: Using Mixed Methodologies
Section 5: Using Patient & Public Involvement (PPI)
Sections 6: Useful Links & Templates

The framework provides 'hyperlinks' throughout for additional information and points of reference.

1. What is Research & Service Evaluation?

Why use a Research and Evaluation Framework?

This framework has been created to support anyone undertaking a digital transformation in the use of research and service evaluation methods to inform decision making, justification, and to measure whether value has been achieved.

Historically, many projects and services have been undertaken without an approach to research and service evaluation, resulting in a lack of evidence, lessons learned, and documentation of their success (or failure) to inform future investment.

This framework will be shared, tested and iterated over time with digital transformation teams – it is a work in progress!

What is Research & Service Evaluation?

Research and service evaluation are often discussed in very similar ways, in that they both adopt similar methodologies to collect data and seek to answer a question. However, they are very different disciplines, with different aims, design, focus, motives and end-results, and therefore it is important to distinguish between the two to avoid confusion and complement overlap. As shown below in Table 2.

The Health Research Authority in the UK has a useful online decision-making tool to help people determine if their work sits under a research or service evaluation umbrella—see here.

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A helpful definition of research is: *"Research involves the attempt to extend the available knowledge by means of a systematically defensible process of enquiry."* (Clamp et al., 2004).

A helpful definition of evaluation is: *"Evaluation is a systematic assessment of the design, implementation and outcomes of an intervention"* (Magenta Book, 2020).

Table 2: Research & Evaluation

Research	Evaluation
To 'prove'	To 'improve'
To test theory and produce generalizable knowledge and findings (representative of populations)	To judge merit or worth of a single intervention/programme or model (representative of programme)
Scientific inquiry based on intellectual curiosity and expertise	Policy or intervention/programme interests of stakeholder paramount
Questions originate with expertise and disciplines	Questions originate with key stakeholders & primary intended 'users' of findings
Advances broad knowledge and theory	Provide information for decision making on specific intervention/programme
Controlled setting (e.g., people, timelines, resources)	Non-controlled setting Conducted within changeable settings (e.g., people, timelines, resources)
Quality & importance judged by peer-review & research expertise	Quality & importance judged by stakeholders & 'users' of findings to take action/make decisions
Ultimate test of 'value' is contribution of knowledge / to prove	Ultimate test of 'value' is usefulness to improvement
Did it work? (hypothesis)	Is it working? (key questions)

Research and service evaluation are similar, yet mutually independent. They share similar steps in their process and can complement each other well. As shown below in Diagram 1, the difference occurs at the start and finish of the process, whereas the similarities sit within the core (methods/analysis).

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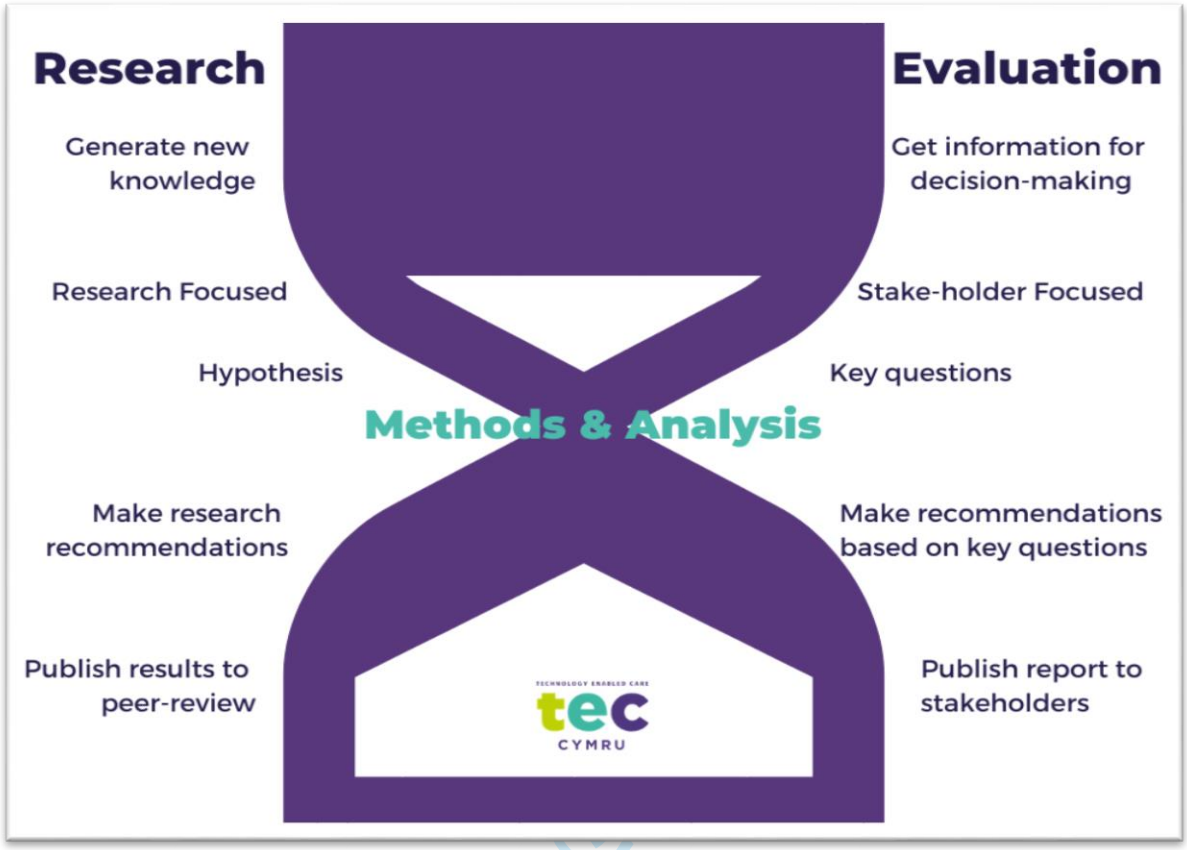
Diagram 1: Research & Evaluation Similarities and Differences



The aim of research is often focused on producing generalizable knowledge, which is empirical, theoretical, and controlled by the researchers (non-bias on findings). The aim of service evaluation is generally focused on specific and applied knowledge and aims to draw evaluative conclusions about quality or worth, and is controlled by those funding or commissioning the evaluation (more bias on findings). Evaluation has two main uses – accountability to funders and stakeholders by providing evidence of a project's overall impact and cost effectiveness; and learning by identifying what can be improved to gain greater understanding of a project and develop evidence for future projects.

To get the best out of a research and evaluation component of an intervention/programme, using both approaches can have many advantages, as standalone, they can have limitations, e.g., evaluation that is not research involves making judgements without systematic collection of data. Research that is not evaluation can take a lot of time and cost to design and prepare, and often unable to present any outcomes until the end of the process, which makes improvements along the way impossible. An example of an overlap methodology/analysis which complement each other well is a Four-Phased Quality Improvement (QI) Approach. This is discussed in the next sections.

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For more information on 'what is evaluation' and 'what to consider when planning an evaluation', watch these short videos:

What is Evaluation?

What to consider when planning an evaluation?

2. What is Quality Improvement (QI)?

Quality Improvement (QI) is a systematic approach to improvement that uses specific methods and techniques to improve quality. The Health Foundation's publication "*Quality Improvement Made Simple*" is a helpful read for those who are new to this way of working and can be found here. Also, see how QI is being used in Wales here.

An essential part of the success and sustainability of QI is the way it is implemented, and the approaches used. The key elements to achieve the best outcomes are the combination of 'change' (the improvement), the 'method' (the approach/the tools) and paying close attention to the 'context' and 'environment' in which the change is taking place (the people/the place).

There are many types or 'brands' of QI to choose from, using a wide range of methodologies and approaches, but many share the following principles to ensure that the 'change' is successfully implemented. These include:

- Understanding the problem (and existing data).
- Understanding the processes, systems and pathways within the service.
- Understanding the demand, capacity & flow of the service.
- Understanding the best approach/tools to bring about 'change' e.g., patient/professional participation, clinical engagements, leadership.
- Measurement for improvement, often using statistical process control charts.
- Evaluating the impact of the 'change' through qualitative and quantitative measures.
- Understanding the psychology of change and how to lead a change
- Understanding the impact of complexity and the adaptations required to meet cultural and contextual differences.

However, how the implementation of the 'change' is managed will depend on the 'context' of the service, and this in particular needs careful consideration, and 'quality' checks throughout.

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Six Dimensions of Improving Quality

The Institute of Medicine (IOM) suggests that improving quality in healthcare generally involves making it Safe; Effective; Patient-Centred; Timely; Efficient and Equitable.

Table 2 presents the six IOM dimensions and explains why they are considered primary priorities for any NHS intervention/programme and its Research & Evaluation component.

Table 2: Six Dimensions of Quality Improvement

SAFE:	Avoid harm to patients from care and services that is intended to help them.
EFFECTIVE:	Provide care and services based on robust evidence which produce clear benefit and improved outcomes.
PATIENT-CENTRED:	Establish equal partnerships between professionals and patients to ensure patients' needs and preferences are met, and their voices are heard.
TIMELY:	Reduces wait times and delays which may cause harm.
EFFICIENT:	Avoid wasting time, cost & resources.
EQUITABLE:	Provides care that does not vary in quality because of a person's characteristics – equal to all.

Please note: *To ensure that all the six QI dimensions are met, a four-phased research & evaluation approach (discussed in Section 3) would ideally be adopted, using mixed methodologies (discussed in Section 4) and patient and public involvement (PPI) (discussed in Section 5).*

Quality Improvement Approaches & Principles

There is a wealth of QI technical methodologies, many of which originated from use in the post war industry and have subsequently been adapted for use within healthcare. Despite the different names of the QI approaches, most approaches share underlying principles, and many QI methodologies use the same key tools, such as the simple Plan Do Study Act (PDSA) cycle that is described below. Some healthcare organisations choose to use a single systematic QI method, but most NHS organisations tend to choose the 'best fit' method for their context. In TEC Cymru some of the QI approaches and tools that are frequently used are also described below.

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Experience-Based Co-Design

This is a QI approach to 'improving patient's experience' of services, through patients and professional partnership to design services or pathways.

Data is gathered through surveys, in-depth interviews, observations and groups discussions (e.g., focus groups) and are analysed to identify 'touch points' (or themes) – which are aspects of the service that are of significance. A link to the toolkit and useful instruction videos is here.

Model for Improvement (including PDSA)

This is a QI approach to 'continuous improvement' where changes are tested in small cycles that involves planning, doing, studying, acting (PDSA), before returning to the planning, and so on. A link to a how to guide is here.

Each cycle starts with ideas and theories which evolve into knowledge that can inform action and intends to produce positive outcomes. To do this, these cycles are linked with three key questions:

- What are we trying to accomplish?
- How will we know that a change is an improvement?
- What changes can we make that will result in improvement?

Any change that is proposed should also be explained, discussed and communicated with the team.

Statistical Process Control

Statistical Process Control is a measurement technique that is frequently used in QI to chart data over time. It can help to visualise natural variation (common cause variation) and variation that has a special cause i.e., is not a result of natural variation (special cause variation). The approach uses control charts that display boundaries for acceptable variation in a process.

Data are collected over time to show whether a process is within agreed quality control limits in order to monitor performance and can be used to measure the impact of improvement ideas.

Data & Measurement for Improvement

Measurement and gathering data are vital in any attempt to improve performance or quality and are essential to assess its 'impact'. It is worth noting, however, that measuring for improvement differs across research & evaluation.

- Measuring for research – tests whether the intervention 'works'

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- Measuring for evaluation (or judgement) – helps key stakeholders gauge performance and to collate learning about the process.

When measuring for improvement in terms of QI, the learning develops through 'processes'. As a result of a process, the key questions or hypothesis will change throughout the project (unlike traditional research). As a result, the data is considered 'good enough' rather than 'perfect'. Instead of asking 'does it work?', QI asks, 'how it works, for whom, under which circumstances and to what extent?' Ultimately understanding 'what will constitute success?' It can be really helpful at the start of any improvement work to map out initial theories about how you will achieve the improvement aim, how you predict change will happen, and what inputs and outputs you expect. There are three useful tools to do this.

1. **Driver Diagram:** A driver diagram is a simple but effective tool that helps you to translate a high-level improvement aim into a logical set of underpinning goals ('drivers') and change ideas. It captures an entire project in a single diagram and also helps to provide a measurement framework for monitoring progress. An example of a driver diagram can be found here.

2. **Theory of Change Model**: A theory of change is a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context. It makes explicit the underlying assumptions about the project you want to evaluate and provides a visual representation of how your project will lead to the desired impact. It articulates how you expect change to happen and helps to describe the enablers and mechanisms of change. It is also a useful tool to build stakeholder relationships, as you can develop a theory of change collectively using co-production. It can help you communicate your project in a clear and simple way, showing your thinking about what the hoped-for outcome will be. This in turn helps to identify your evaluation and data needs. *"Developing a 'theory of change' can be useful way of articulating and providing a visual representation of the links between the various activities of service and how this will lead to the long term outcomes it is trying to achieve"* (NPC Guide to Developing Theory of Change) – see here.

3. **Logic Model:** Logic models describe the relationship between a project's inputs, activities, outputs, outcomes, and impacts. It can help you to see what you are putting into the project (the inputs), how the project uses the resources (the activities), what products are produced (the outputs), what change is predicted to be achieved as a result of this process (the outcomes) and the final intended and unintended changes that happened as a result of the intervention/programme (the impacts). A useful guide to developing a logic model can be found here.

This traditional QI approach does have limitations however, in that the 'does it work?' question still needs to be asked e.g., via a Randomised Controlled Trial. It is also important to

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measure change over time, using methods that make it possible to separate out improvement or deterioration, from the expected level of performance variations.

To do this, in TEC Cymru this process is split into 'four phases' across the time period of the intervention/programme. This is discussed in the next section.

To find out more on Quality Improvement approaches and principles see here.

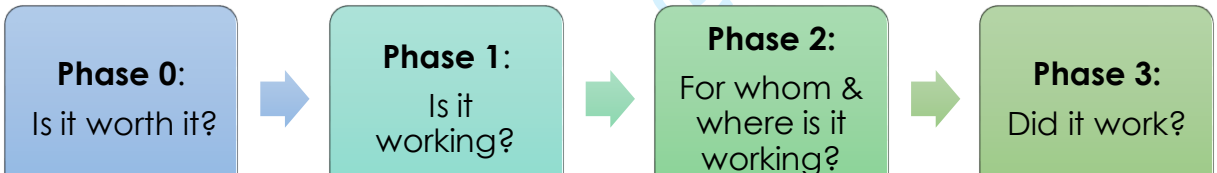
3. TEC Cymru's Four-Step Phased Approach

What is TEC Cymru's Four-Phase Approach?

TEC Cymru have developed a four-phase approach to their Research & Evaluation framework. This approach is tried and tested by TEC Cymru and is highly recommended as a robust method for data collection and analysis across a wide range of interventions/programmes.

In simple terms, **Phase 0** sets the stage; **Phase 1** and **Phase 2** captures data from adoption through to full implementation; and **Phase 3** tests it in its full form and determines long-term sustainability.

Phase Zero: 'Is it worth it?'



The Phase Zero is the 'discovery' phase of any intervention/programme within TEC Cymru. This phase sets out to understand its rationale and objectives in order to determine its value and worth for TEC Cymru as a programme, and the need for time and resources spent on research and evaluation.

At this phase, evidence is sought, literature reviews are conducted, appropriate ethical approvals are applied for and baseline data is captured to understand the 'public opinion' on the proposed intervention/programme, by way of baseline survey capture, public consultations or via patient and public involvement (PPI) – (discussed in Section 5). Access to the Welsh e-library can be found here.

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It is also important in this phase to consider *"The extent to which an activity or project can be evaluated in a reliable and credible fashion"* (OECD-DAC 2010; p.21) and to undertake an evaluability assessment. More information about how evaluability works and assessment templates can be found here. This can include structured engagement with stakeholders to clarify the goals of the intervention and how they might be achieved. It can be helpful to develop a driver diagram, logic model or theory of change to articulate a shared understanding of the work, which evaluation models will be used and to seek advice on whether or not an evaluation can be carried out at reasonable cost.

At the beginning of an intervention/programme, despite previous evidence and early baseline data capture, often very little is known about the targeted participant group required for the proposed intervention/programme, particularly in terms of the likely uptake of the intervention/programme, or its likely response or outcome. Therefore, at this point, very little is also likely to be known about the best method or approach to take to capture the best evidence from this targeted participant group.

From the perspective of TEC Cymru, it would be wasteful to spend several months on designing a flawless data collection method, instrument or measurement, and spending months applying for and awaiting the response of IRAS ethical approval to later realise that the participants were not willing to participate, or that the intervention/programme was to not demonstrate value/worth, and thus goes against the QIs dimensions (e.g., dimension 5 'efficiency' and dimension 1 'safety' by prolonging a service).

Due to this, TEC Cymru therefore suggest that if the intervention/programme has passed all necessary safety and quality checks, then holding its go-live/start date up due to research and evaluation delays may perhaps do more harm than good to its potential participants; but also, to go live without an evaluation component attached could do harm (or at least produce errors) to the evidence base.

TEC Cymru have therefore developed a four-phase approach to their Research & Evaluation strategy, which allows them as a team to determine the 'need' or requirements for further phases as they learn more and progress.

NOTE: *It is important to note that some of the phases or ethical approval applications will not be necessary for all types of interventions/programmes. This approach is merely an 'ideal guide' used by TEC Cymru.*

Phase 1: 'Is it working?'

By the time your intervention/programme reaches Phase 1, Phase Zero has led your team to believe that the proposed intervention/programme is of value and worth to the overarching intervention/programme and requires evaluation and research support.

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At Phase 1 you merely want to know **'Is it working?'**

In TEC Cymru, Phase 1 often attempts to answer this question by simply capturing data from service users (patients/families/professionals) via basic live feedback surveys (often attached to the intervention), which aim to capture measures such as the **'use' and 'value'** of the intervention/programme.

Often within the NHS, all is required to capture Phase 1-type data is Service Evaluation approval from a local Research & Development (R&D) department to begin 'early doors' evaluation. As Phase 1 progresses, and more is learned about the participant groups, additional ethical approvals (e.g., IRAS) and more in-depth planning and resources can proceed for the progression of further phases if needed.

From TEC Cymru experience, this phased approach allows for less waste, better planning, and provides a better understanding and awareness of the participant group, thus tailoring the next phases more appropriately. This ultimately improves the intervention/programme and its likely outcomes.

Phase 2: 'How is it working?'

By the time your intervention/programme reaches Phase 2, Phase 1 has led your team to believe it is working, but you are yet to understand **how it is working, for whom, under which circumstances and to which extent?**

In TEC Cymru, Phase 2 often attempts to answer this question by continuing to capture data from service users (patients/families/professionals) but by digging deeper. This is often via more in-depth feedback surveys which aim to capture measures around **'benefits and challenges'** of the intervention/programme and to begin to explore the longer-term **'sustainability'** of it.

TEC Cymru split their Phase 2 work into 3-6 month increments and refer to them as Phase 2a, b, c and so on. Ideally, TEC Cymru would suggest that Phase 2 would be an ongoing phase until the end of the intervention/programme to ensure there are no gaps in data capture moments/timeframes.

In addition, Phase 2 will seek to capture qualitative data to provide a richer understanding of its participant group, and the context for which the intervention/programme is based, e.g., via interviews and focus groups.

Phase 3: 'Did it work?'

By the time your intervention/programme reaches Phase 3, you should have a good understanding of your participant group and the context for which the

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intervention/programme is based. Phase 2 has led you to understand ***how it is working, for whom, under which circumstances and to which extent.*** But it's important to understand that this 'how' is still merely a judgment and still will not tell you if **it works**.

Phase 3 however, asks '**did it work?'**

Knowing if something officially **'works'** needs to be **'proven'**, and proof can only be derive from in-depth or experimental research testing measures such as **'efficacy and effectiveness'** e.g., cost or clinical effectiveness studies.

In TEC Cymru, Phase 3 often attempts to answer this question by working closely with service users and teams (relationships developed in Phases 1 & 2) to understand more specific areas of need and requirement for in-depth research. Then, reaching out and collaborating with others (e.g., academia, international experts) to apply for more advanced ethical approvals and conduct more in-depth or experimental research such as Randomised Controlled Trials (RCTs), cost effectiveness studies and more in-depth, research led qualitative approaches extending on specialised areas.

It is very important to note that, by the time you reach Phase 3, things need to shift up a gear and additional support and resources within your intervention/programme are needed.

For example:

- In Phases 1 and 2, key questions and requirements are generally based on intervention/programme 'remits' and 'must haves' (e.g., what the stakeholder has requested), Phase 3 however, operates more independently and as potential 'should haves' – in that it is now generating new knowledge which is distinctive and unique from original 'remits' (e.g., the unknown).

- Unlike the structure that Phases 1 & 2 allows, Phase 3 research requires the freedom and creativity of a research team to explore new themes that emerge from Phases 1 and 2, and therefore, at this point, need to be able to step outside of its original intervention/programme 'remit'. As you need to remember that there are likely to be newly emerging areas of interest and therefore unlikely to be in an original intervention/programme remit. In other words, if you attempt to 'restrict' natural data emergence and progression by preventing movement of 'intervention/programme remit change', you are potentially restricting true data findings which is the essence of research, and it is this essence that puts research over the top of evaluation in terms of error of judgement, non-bias, validity and reliability.

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- If your intervention/programme is unable to support the requirements of Phase 3, it should not be labelled as Research & Evaluation, but rather as a Service Evaluation component of a intervention/programme only, as the evidence in Phases 1 & 2 is merely provide a judgement on 'how to improve' and not as 'proven to work'.

- *Remember:* to 'improve' conduct service evaluation and to 'prove' conduct research; and to do it the TEC Cymru way – do both!

4. Using Mixed Methodologies

To expand the evidence-base as far as possible on any type of phased research and evaluation component of an intervention/programme, adopting a mixed methods approach is highly recommended by TEC Cymru.

Stakeholders and research funders strive to ensure high quality and safety for the public (and within the NHS, more specific to their patients, families and professionals). A mixed methods approach can do this – it can explore all types of trends and practices across participant groups and context and provide stakeholders a more rounded analysis and understanding of the problems and solutions.

What is Mixed Methods Research & Evaluation?

Mixed methods is an approach used to collect and analyse both quantitative and qualitative data within the same study (e.g., the intervention/programme).

A mixed methods approach is appropriate for answering questions that neither quantitative nor qualitative could answer alone.

Mixed methods approaches require a focused mixing of methods in data collection, analysis and interpretation of the evidence.

The key word here is **'mixed'**.

The important step in the mixed approach is the data 'linkage' or 'integration' at each appropriate stage of the Research & Evaluation process.

Data linkage/integration enables the research team to seek out a more 'inclusive (or panoramic) view and understanding' of the context and perspectives through different types of lenses.

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For example, in a mixed methods study, the quantitative data may provide knowledge on decisions, choices, change and outcomes, whereas the qualitative data provides the contextualised experiences attached to these measures, thus providing more in-depth information on the influential factors, triggers and true meaning associated to each of the measures. This type of mixed methods study can therefore provide an all-rounded understanding across the context and perspectives to answer a certain research question.

In other words, by using one method alone (e.g., a survey), can only partly answer a research question, but by using mixed methods, a fuller understanding is more likely to be captured, and therefore, more likely to answer the research question. If, as a researcher, you fail to answer the research question that you set out to answer, there will be a very high chance of producing significant gaps and misinterpretations in the data set, but also, there will be a need for more research in that area – ultimately producing a waste of time, resources and potentially additional external funding.

In addition, a mixed methods approach strengthens both the quantitative and qualitative methods allowing the research team to explore and compare diverse perspectives and uncover relationships that exist between the multifaceted key or research questions.

5. Using Patient & Public Involvement (PPI)

What is Patient & Public Involvement?

Patient and public involvement (or PPI for short) means actively working in partnership with patients and members of the public to plan, design, manage and carry out research and evaluation. This means that the research for a specific intervention/programme that is intended to improve or prove something for a patient or member of the public needs to be 'with' or 'by' them rather than 'to' or 'for' them.

The 'involvement' part of PPI is different to participation (e.g., taking part in research) and engagement (e.g., research dissemination).

Why is Patient & Public Involvement Important?

Involving patients and the public in research and evaluation strategies is very important to ensure that research design and management is relevant, and that its outcomes and outputs fit the needs of the intended audience (usually that of patients or members of the public).

PPI should be central to any Research & Evaluation intervention/programme and therefore, should sit centrally within each and every stage of its strategy, *and not just because* it is the 'right thing to do' – but input from lay people provides researchers with real life insight into what patients and the public 'want' and 'need' – which ultimately helps save time and resources on 'getting it right' for the user.

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The majority of research funding streams require applicants to clearly demonstrate how they plan to involve patients and the public in their research process and will require clear justification for not using them. This is also applicable for publications, in that PPI is now mandatory for many peer-reviewed journal submissions.

In other words, by neglecting PPI, you may be putting funding opportunities and dissemination outputs at risk.

What is the Patient & Public Involvement Process?

Patients and members of the public can be, and ideally should be, involved at each and every stage of the research process. This can include a wide range of approaches from bringing PPIs into the central team or attending pre-existing groups of PPI and raising issues and questions. Some examples are:

- **Identifying and prioritising** (e.g., hold an initial meeting with PPIs to discuss the best strategies)
- **Designing & Managing** (e.g., attend a pre-existing PPI groups to discuss design of data collection, and follow-up meeting on amendments or next phase designs)
- **Patient & Public-Researchers** (e.g., conducting data collection and analysis)
- **Dissemination** (e.g., co-authorship on publications and presentations)
- **Implementing** (e.g., involved in rolling out an intervention/programme)
- **Monitoring & Awareness** (e.g., gather views on and improve PPI impacts)

TEC Cymru suggest using different approaches to a PPI approach, including having central PPI members such as TEC Cymru Young Person Representatives, and also an Ad Hoc approach, e.g., attending pre-existing PPI groups and reach out to existing contacts to raise issues and capture feedback 'as and when' needed.

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6. Useful Links & Templates

NHS Health Board Service & Product Evaluation Application Forms
Contact your local R&D department for service or product evaluation application forms.

Integrated Research Application System (IRAS) Application Guidance
Follow link here

Information Governance & Data Protection Impact Assessments DPIA
Information Governance (IG) is a framework that brings together legal, ethical and quality standards that apply to the handling of information; it applies to all information and data especially sensitive and personal information. To find out more, contact your local Information Governance department.

TEC Cymru's Welsh/English Survey Design Example Template
Follow Link Here

TEC Cymru's Phase 1, 2 & 3 Reports, Publications & Presentations
Follow link here

TEC Cymru's Driver Diagram Example for Video Consulting Programme
See example copy attached p.18

TEC Cymru's Phase 0-2 Example Questions
See example copy attached p.19

TEC Cymru's PPI Contract (example of a TEC Cymru young person contract)
See example copy attached p.20-21

Further Reading and Helpful Links:

Clamp C, Gough S, Land L. Resources for Nursing: An Annotated Bibliography. 4th edn. London: Sage, 2004
http://www.nhsevaluationtoolkit.net/resources/case-studies/
https://www.betterevaluation.org/
https://www.informalscience.org/what-evaluation-0
https://www.rip.org.uk/resources/publications/evaluation-tools-and-guides/
https://www.nesta.org.uk/
https://www.wkkf.org/resource-directory/resources/2004/01/logic-model-development-guidehttps://www.gov.uk/government/publications/evaluation-in-health-and-wellbeing-guidance-summaries/evaluation-in-health-and-well-being-guidance-summaries
Evaluability Assessment | Better Evaluation
https://www.re-aim.org/about/what-is-re-aim/
https://www.gov.uk/government/publications/the-magenta-book
http://www.1000livesplus.wales.nhs.uk/sitesplus/documents/1011/Quality%20Improvement%20Guide%20-%203rd%20edition%20%28IQT%29%20WEB.pdf

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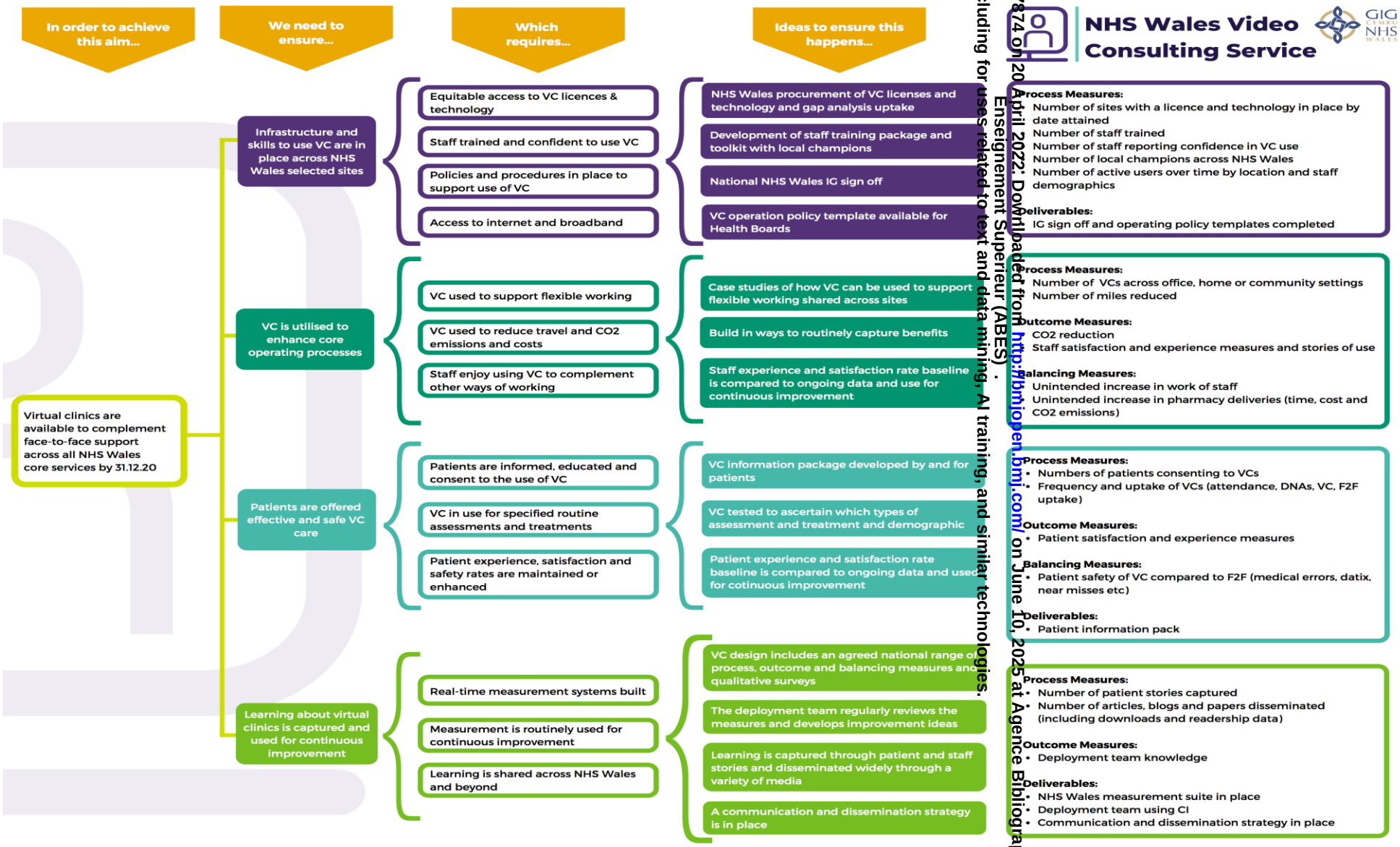

TECHNOLOGY ENABLED CARE

tec

Introduction

Technology Enabled Care (TEC) Cymru are a Welsh National Health Service (NHS) centre that enable the sustainable use, scale up and spread of technology in Wales.

TEC Cymru offers the patients and workforce of Wales a way to do more with less, by delivering benefits, and offering patient care closer to home.

TEC Cymru currently have three active programmes:

Becoming a TEC Cymru Young Person Representative

Opportunity & Role

Technology Enabled Care (TEC) Cymru offers young people in Wales, the opportunity to work alongside a national team and gain work experience across a range of programme, technical, clinical and research expertise. There will be a wide range of opportunities available to a young person representative, and these will be discussed and offered in the group meetings.

The role of the Young Person Representative is to represent young people in Wales to the adult's in TEC Cymru and their partners and stakeholders.

We promise to:

- Listen to your opinions and feedback
- Keep your safe
- Help you develop skills and expertise
- Respect and support you
- Provide you with recognition for your time at TEC Cymru (e.g., certificates, letters of recommendation).

Recruitment

The young people are recruited by the clinical lead and research lead of TEC Cymru, and will be part of the young person group panel on a one-year rolling contract (with the option to leave the contract at any time, if you wish).

If you know of anyone else who would like to be a young person representative for TEC Cymru, please forward their details to the group lead.

Group Attendance

TEC Cymru hold group discussions with young people using Microsoft Teams and each group meeting will last approximately 1-hour. Meetings will be set up by the group leader, and will be sent out in plenty of time before the group date/time.

We run our young person group discussions on an ad hoc basis (in other words, 'as and when' needed or necessary). This provides the flexibility to our young person to not feel tied to a commitment or a set schedule of fixed hours, but rather the ability to attend as and when they can.

Whilst these meetings are optional, we do encourage regular attendance for our young people to get the best out of the experience working with TEC Cymru.

As a TEC Cymru Young Representative we do ask you however to:

- Please inform the group lead if you are unable to attend a group meeting.
- Respond regularly to feedback requests, emails, and texts.
- Inform TEC Cymru of any changes to your contact details
- Inform TEC Cymru of any changes in circumstances that may impact on your role as a young representative.
- Inform TEC Cymru if you no longer wish to be a young person representative, so we can officially end your contract, and provide you with a final thanks and certification for your time at TEC Cymru.

Meeting Rules

The group meetings are informal and friendly, and allow for an open and honest discussion between group members.

But, we ask all group members to:

Group Dynamics

1. Be confident, and express opinions and points of view, but in a respectable and supportive manner.
2. To work as a team, share ideas and offer support and encouragement to other group members.
3. Make sure everyone has a chance to speak, and be respectful of other member's opinions.
4. If you are worried or concerned about anything that has been discussed in the group, please contact the group leader by email or text after the group session.

Physical 'Musts'

5. If you have a comment or question mid-conversation, please raise your 'virtual' hand or add a comment to the char box to let other members know you wish to talk, rather than interrupt.
6. Please do not record or take pictures of the group session or its members at any time.
7. Please do not share any personal stories or discussions that may arise with others outside of the group.
8. Please do not share anything discussed in the group on social media.
9. Ensure your own virtual space in a private and quiet room to allow the group to can run smoothly without too many distractions or interruptions.
10. Always remember to protect yourself and your identity, for example make sure that your video background doesn't show anything you are uncomfortable to share (e.g., personal photos, paperwork with personal information on)

Signed Consent

To become an official TEC Cymru Young Person Representative, you will need to provide consent by signing and dating below, and if you are under 18 years old, your parent/guardian will also need to provide consent by signing and dating below.

Signature of young person

Date

__ / __ / __

Signature of parent/guardian

Date

__ / __ / __

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Example Questions Phase 0-2

Phase Zero asks 'is it worth it?'
To answer the question, TEC Cymru often capture existing data by way of conducting:

- Literature Reviews
- Systematic or Meta-Analysis Reviews

This existing data capture would provide a broad understanding of the question asked, but less likely to know if it is worth it in a specific local area, for example.

If this is needed, then the next step in Phase 0 would then run baseline consultations, such as:

- Consultations (e.g., with professionals, clinicians, stakeholders)
- Patient/Public Involvement (PPI) group discussions
- Baseline Surveys
- Process Mapping Exercises.

The types of questions asked in Phase Zero may include:

1. What is the understanding of the proposed intervention/programme? (As a broad view, and local view).
2. Do they think the proposed intervention/programme would add use and value in that area?
3. Do they think the proposed intervention/programme would deliver benefits to the public/patients/professionals?
4. Do they see any significant challenges or barriers that would clearly outweigh the potential values or benefits?
5. For whom, under which circumstances and to what extent do they think the proposed intervention/programme would provide value and benefits?
6. Do they think the proposed intervention/programme would work?

These scoping questions aim to determine the next steps taken in the TEC Cymru phased approach. In other words, what other questions need asking?

Phase 1 asks 'is it working?'
To answer the question, TEC Cymru often capture existing data by way of conducting:

- Live Surveys (e.g., attached to intervention)
- Retrospective Surveys (e.g., request additional feedback)
- Interviews

The types of questions at this phase will be looking to measure **'use and value'** of the intervention/programme that is being evaluated.

The types of questions that would be asked in Phase 1 would be:

1. Rate the quality or value of the intervention/programme (using a star scale from excellent to poor).
2. What type of technology/device for example, was used to access the intervention/programme (using drop-down list).
3. Have you used the intervention/programme before, and if so, how many times?
4. Would you use the intervention/programme again? Probe for additional feedback as to 'why'.
5. Did the intervention/programme do something as an addition to a traditional method (e.g., a digital intervention may prevent the need for a face-to-face appointment).

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6. What type of clinical setting or reason are you using the intervention/programme for? (using drop-down list)
7. Request for a 'few' demographic questions – e.g., age, gender, Health Board.
8. Any other comments?

Phase Two asks 'who is it working for, under which circumstances and to what extent?'
To answer these questions, TEC Cymru often capture existing data by way of conducting similar approaches to Phase 1, just more in-depth.

- Live Surveys (e.g., attached to intervention)
- Retrospective Surveys (e.g., request additional feedback)
- Interviews & Focus groups

The types of questions at this phase will be looking to measure **'benefits, challenges & sustainability'** of the intervention/programme that is being evaluated. The types of questions that would be asked in Phase 2 would be:

1. Rate the quality of the intervention/programme (using a star scale from excellent to poor).
2. What type of technology/device for example, was used to access the intervention/programme (using drop-down list).
3. Did you experience any difficulties or challenges using the intervention/programme? (Perhaps use a matrix format, and list difficulties/challenges to select from, and their level of severity).
4. Did you experience any advantages or benefits using the intervention/programme? (Perhaps use a matrix format, and list advantages/benefits to select from, and their level of severity).
5. Have you used the intervention/programme before, and if so, how many times?
6. Would you use the intervention/programme again? Probe for additional feedback as to 'why'.
7. Did the intervention/programme do something as an addition to a traditional method (e.g., a digital intervention may prevent the need for a face-to-face appointment).
8. What type of clinical setting, professional or reason are you using the intervention/programme for? (using drop-down list)
9. Request more in-depth demographic questions – e.g., age, gender, ethnicity, household income, disability, Health Board and Local Authority,
10. Has the intervention/programme impacted on your clinical outcomes?
11. Any other comments?
12. Provide an opportunity for participants to take part in further research such as a follow-up interview (e.g., provide a contact email at the end of the survey for keen participants to reach out to you).

Please note: TEC Cymru will always recommend a mixed methods approach. Therefore, even in surveys, add lots of free-text 'comment' options to allow for additional individuality and opinion to be expressed by your participants. This narrative will likely provide rich and meaningful data that drop-down and tick boxes cannot do alone.

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Meet the Team

Gemma Johns, Research & Evaluation Lead

Gemma is TEC Cymru's Research and Evaluation Lead, who manages a team of Research Assistants across three programmes in TEC Cymru.

Gemma has a keen interest in the interface between health and social care and digital innovation. Gemma is also doing a PhD in Medical Sociology at Bristol University.

For more information about the framework or TEC Cymru's research & evaluation, please email Gemma at:
Gemma.Johns3@wales.nhs.uk

Professor Alka Ahuja MBE, Consultant Psychiatrist & National Clinical Lead

Alka is a Consultant Child and Adolescent Psychiatrist at Aneurin Bevan University Health Board. Alka is the National Clinical lead for the Welsh Government Technology Enabled Care Programme. She is the incoming Vice chair of the Child and Adolescent Faculty of the Royal College of Psychiatrists and the Public Education lead, Royal College of Psychiatrists in Wales. Also a Visiting Professor at University of South Wales and an Honorary Professor at Cardiff University.

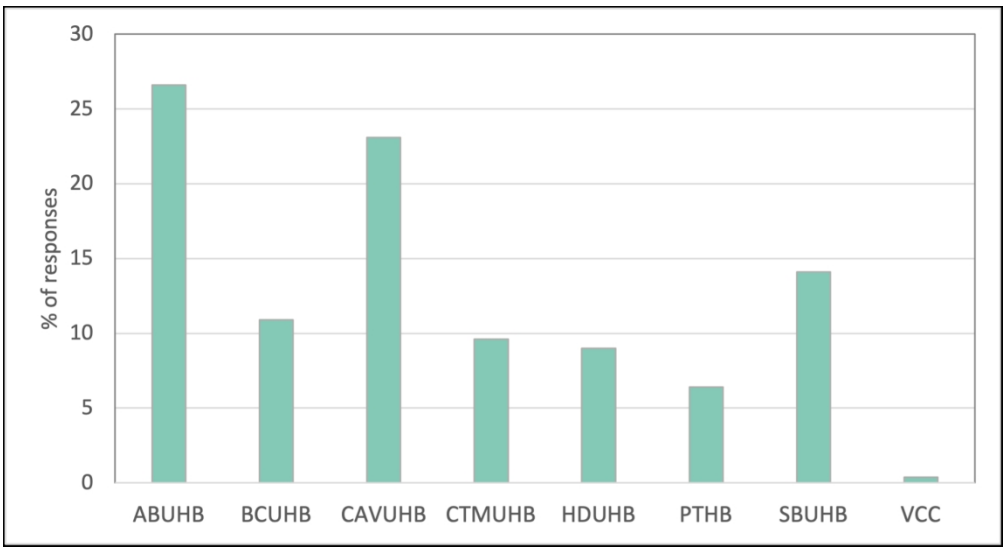
She has expertise in qualitative research methodology and her areas of special interest include neurodevelopmental disorders including autism and ADHD, user and carer involvement in healthcare services and employment of digital technology in healthcare. Twitter: @AlkaSashin

Anna Burhouse, Director of Quality Development Northumbria Healthcare NHS FT

Anna trains and coaches staff from the NHS across the UK to lead complex quality improvement work and to scale and spread innovations.

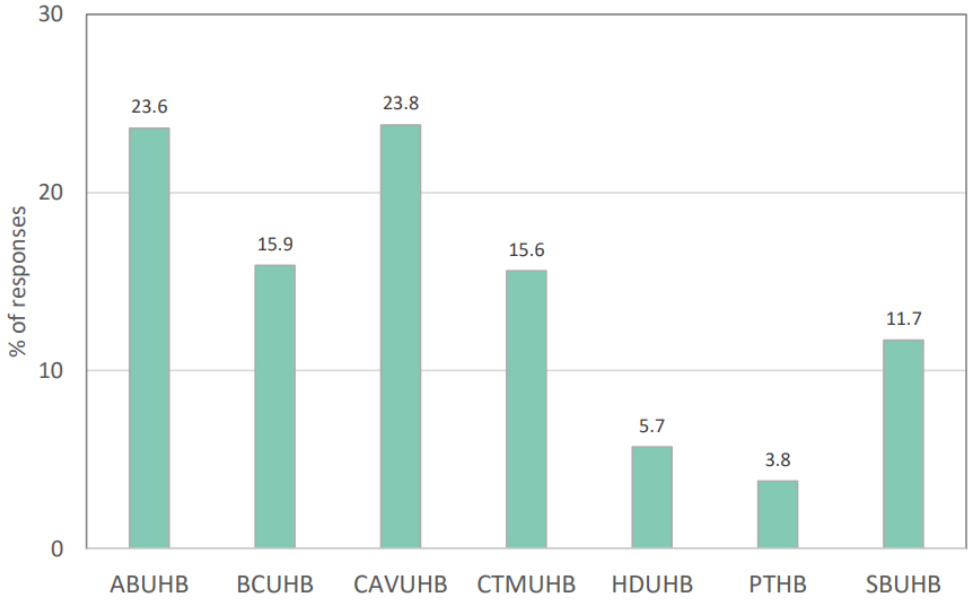
Anna is a qualified coach, Health Foundation Improvement Fellow, Ashridge Business School alumni in Leadership for Improvement and an Honorary Senior Research Fellow at the University of Bath Centre for Healthcare Innovation and Improvement and Chair of the Engagement and Involvement Advisory Board at The Health Improvement Science Institute at Cambridge University.

Alongside her work in improvement Anna maintains her clinical practice as a Consultant Child and Adolescent Psychotherapist in the NHS working with young people to innovate new approaches to wellbeing. Twitter @annaburhouse



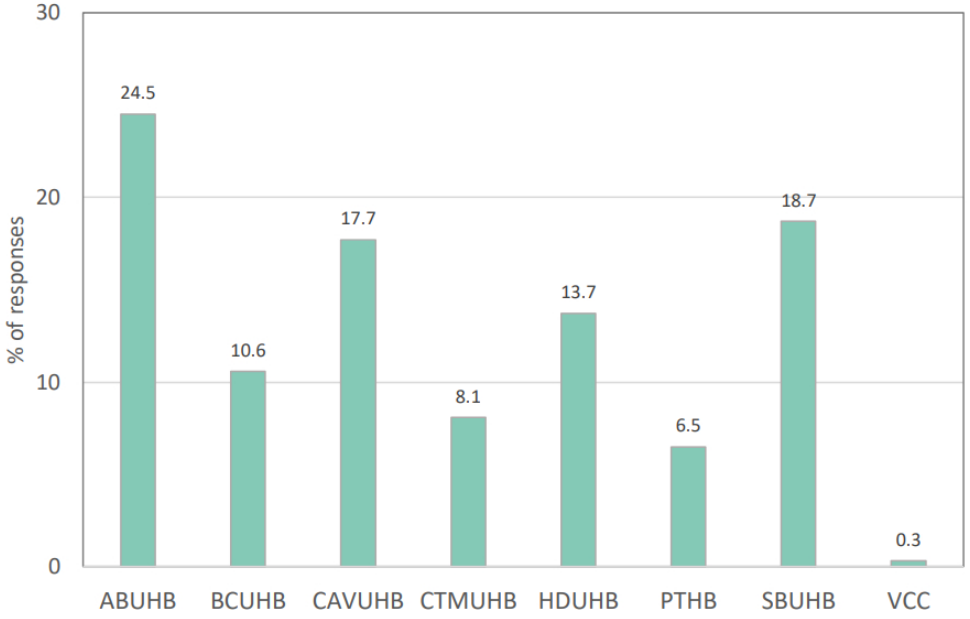
Appendix 1 Health Board and Trust Distribution

151x81mm (330 x 330 DPI)



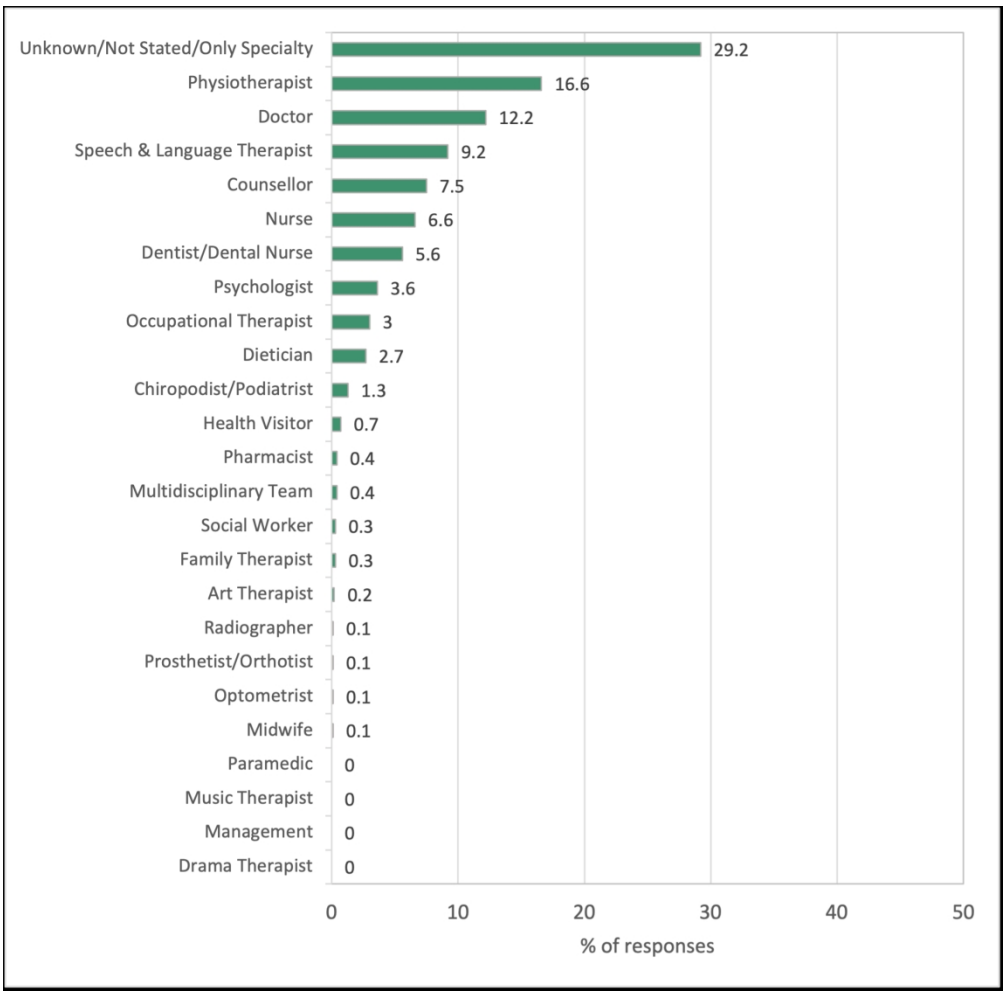
Appendix 2
Breakdown of Primary, Secondary and Community Care responses. Primary care responses

592x362mm (38 x 38 DPI)



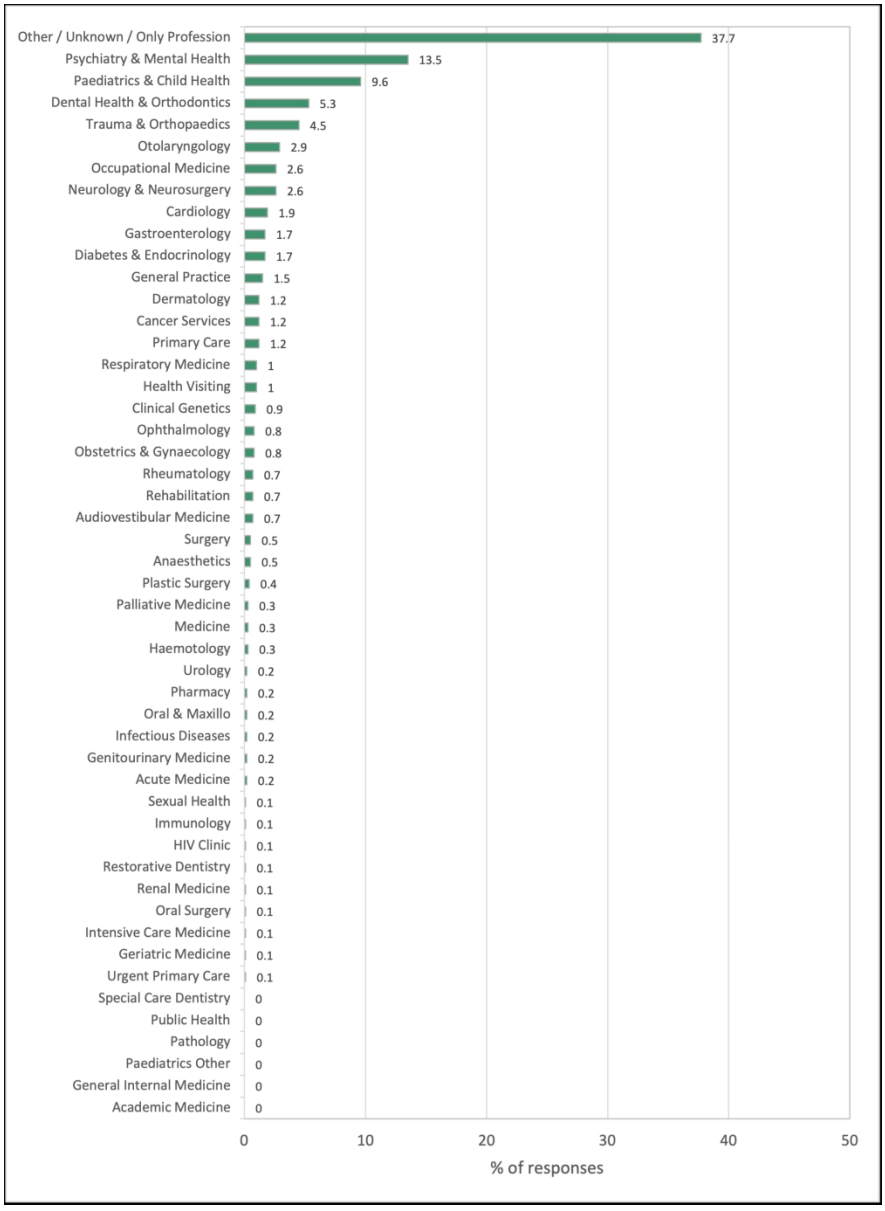
Appendix 3. Secondary and Community Care Responses

606x381mm (38 x 38 DPI)



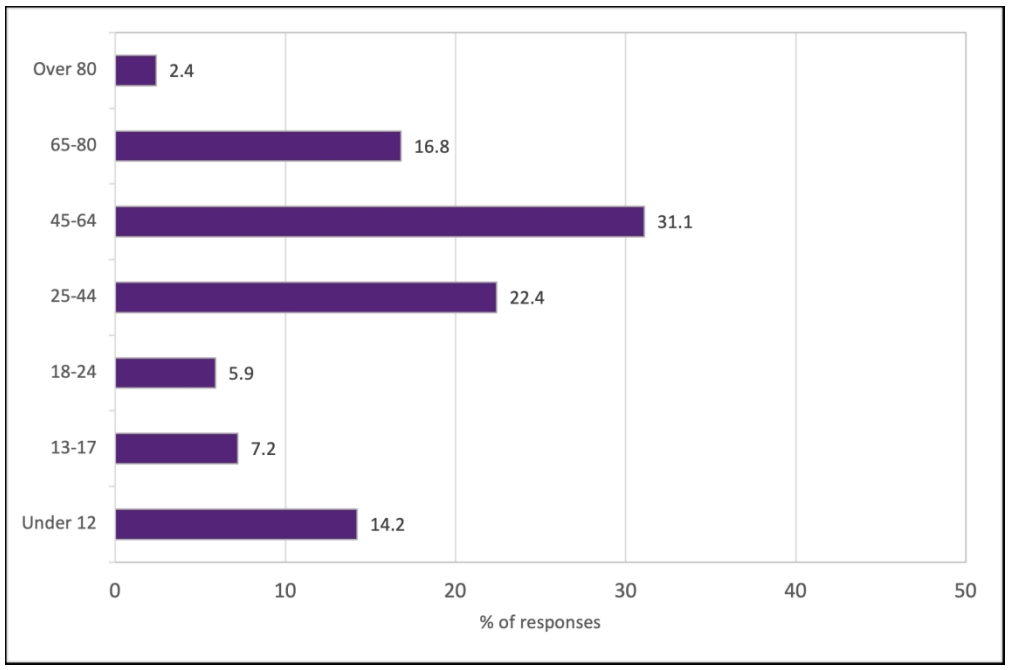
Appendix 4. Clinician Professions

159x157mm (330 x 330 DPI)



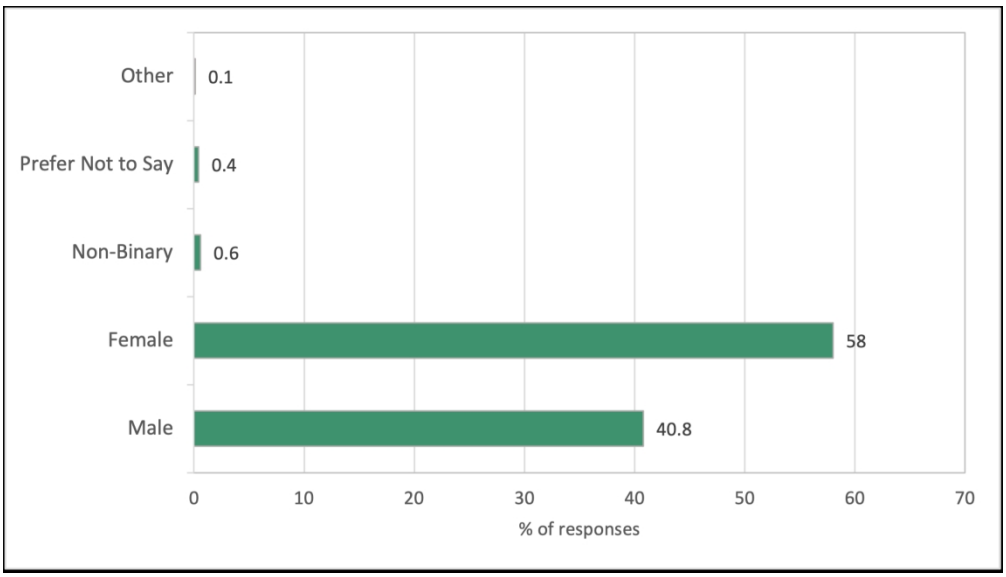
Appendix 5. Clinician Specialities

166x227mm (330 x 330 DPI)



Appendix 6. Patient Demographics. Patient Age

159x105mm (330 x 330 DPI)



Appendix 7. Patient Demographics. Patient Gender

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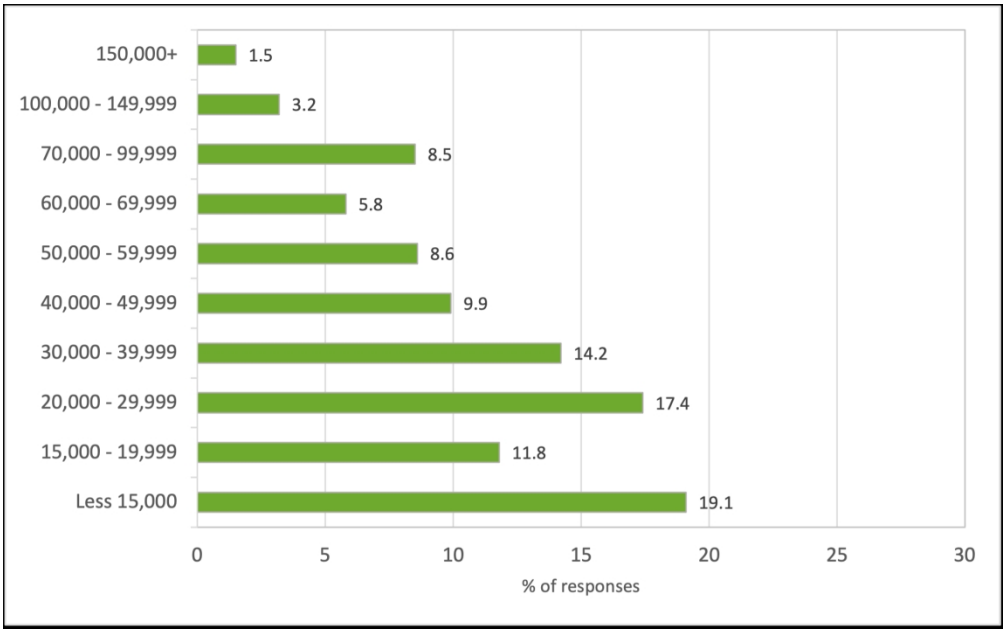
Appendix 8. Patient Demographics. Patient Ethnicity

160x211mm (330 x 330 DPI)



Appendix 9. Patient Demographics. Household Income

163x102mm (330 x 330 DPI)

Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

	Page/line no(s).
Title and abstract	
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	P1,2-3
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	P2, 46-66
Introduction	
Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	P2, 70-98
Purpose or research question - Purpose of the study and specific objectives or questions	P3, 100-107
Methods	
Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	P3, 113-120
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	P20, 592-601
Context - Setting/site and salient contextual factors; rationale**	P4, 124-128
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	P4, 137-146
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	P5, 149-158
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	P5, 161-169

Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	P4, 32-35
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	P4, 124-129
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	P5, 61-69
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	P5, 62-69
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	P5, 65-69

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	P5, 72-83
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	P6, 86-513

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	P17, 516-562
Limitations - Trustworthiness and limitations of findings	P19, 565-579

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	P19, 585
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	P19, 582-583

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: 10.1097/ACM.0000000000000388

BMJ Open

Digital NHS Wales: A Coding Reliability Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

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Primary Subject Heading:	Health informatics
Secondary Subject Heading:	Health informatics, Health services research, Public health, Qualitative research, Research methods
Keywords:	COVID-19, Health informatics < BIOTECHNOLOGY & BIOINFORMATICS, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Information technology < BIOTECHNOLOGY & BIOINFORMATICS, QUALITATIVE RESEARCH

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Title Page

Digital NHS Wales: A Coding Reliability Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

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Digital NHS Wales: A Reflexive Coding Reliability Analysis based on the Voices of 22,978 Patients & Clinicians on the Benefits, Challenges & Sustainability of Video Consulting.

Introduction: *The use of video consulting (VC) in Wales United Kingdom (UK) has expanded rapidly. Previous VC evidence has been the subject of small-scale projects and evaluations. TEC Cymru are an All-Wales digital service and roll out digital interventions and evaluate on large scales, thus capturing representative datasets across Wales, and therefore a wide range of National Health Service (NHS) specialities.* ***Objective****: To extract and analyse narrative feedback from patients and clinicians using the NHS Wales VC Service for 6-months (September 2020 to March 2021).* ***Design****: A coding reliability approach of a cross-sectional study was conducted.* ***Setting****: From all Health Boards across Wales.* ***Participants****: NHS patients and clinicians across primary, secondary and community care settings in Wales.* ***Results****: Data was captured on benefits, challenges and sustainability of VC. A coding reliability analysis was used with six domain summaries materialising to include: 'The Ease of VC'; 'The Personal Touches'; 'The Benefits of VC; 'The Challenges of VC'; 'Technical Quality',* and *'Recommendations & Future Use'. An additional 17 sub-domains are included. Direct quotations from patients and clinicians are provided for context.* ***Conclusions****: A total of 22,978 participants were included. This data helps to demonstrate that NHS remote service delivery, via the method of VC can be highly satisfactory, well-accepted and clinically suitable yielding many benefits. Despite this, the data is not without its challenges surrounding engagement and suitability for VC. The NHS Wales VC Service rolled out and evaluated at scale and demonstrates that VC has potential for long-term sustainability. For future use a 'blended approach' for NHS appointments that are clinically judged and centred on patient choice.*

Abstract Summary

Strengths & Limitations

- This paper presents patient and clinician free-text narrative boxes on a large scale considering experience of a relatively new digital service in NHS Wales.
- The study is representative of Wales, in that it is an all-Wales study, across all Health Boards.
- The study is a mix of patient and clinician voices across all types of NHS specialities.
- Due to the voluntary and anonymised nature of the feedback data, it is unclear as to how often recurring participants completed the feedback, thus potentially skewing the sample.
- Due to the size of the study sample it was not possible to present both the narrative and quantitative findings together, however access to this data is readily available on our website.

Background

Since 2020, the National Health Service (NHS) has seen a paradigm shift in the provision of healthcare services due to mandatory social distancing laws introduced because of the COVID-19 pandemic [1-3] As a result, the UK along with the NHS

observed a significant decrease in access to face-to-face appointments, and therefore, an increase in remote services [4].

Video Consulting (VC) has accelerated through health and social care as one of the most common remote methods for conducting appointments with patients throughout the NHS, especially in Wales [5, 6]. VC within health services has been internationally utilised for decades, yet the unprecedented circumstances of the pandemic brought to light its widespread ability, use, value, benefits and challenges [1].

There is growing evidence that VC can deliver safe and timely care in many settings and offer significant benefits to the users [7, 8]. The use of VC permits services to continue across a wide range of healthcare conditions, appointment types, sociodemographic groups, and health condition status [9]. Furthermore, it is sometimes considered more suitable for reaching underserved and isolated populations [4]. VC is reported to provide quality ensured, yet cost-effective care [10] and treatment, while reducing patient waiting times and the likelihood of Did Not Attends (DNAs) and number of hospital admissions—ultimately relieving pressure on NHS staff and services [11].

However, the majority of evidence is based upon pilot studies, with small and often highly selected samples, with limited questionnaire validity, ultimately casting speculation on its use, benefits and challenges across varied care sectors, specialities and circumstances [12, 13].

There are often some concerns regarding the use of VC services within certain professions that rely on face-to-face physical examinations to make diagnoses, and the increased level of risk associated [14]. These valid uncertainties highlight situations where sometimes it can be challenging to obtain the same level of accuracy when taking clinical measures via VC compared with obtaining them face-to-face. Not only this, but personal preferences in clinicians and patients can dictate whether or not a VC is used.

Therefore, the current evidence-base suggests that there is a need to continuously evaluate on a national level to allow for sustainable VC platforms to be embedded for the long-term into health and social care systems where appropriate [15, 16]. Due to the need for a continual evaluation, Technology Enabled Care (TEC) Cymru as an All-Wales digital service, rolled out The NHS Wales Video Consulting (VC) Service as a

national emergency response to the COVID-19 pandemic [17]. The evaluation spans a large and representative scale basis across a wide range of NHS healthcare sectors across all Health Boards in Wales. To contribute to the current evidence-base, TEC Cymru work in partnership with the Welsh Government, academics, third sector and local Health Boards and Trusts in Wales to adopt a clinically driven and data informed approach to their digital service roll out, spread and evaluation.

Aims & Methods

The aim of this study was to explore the benefits, challenges and sustainability of VC from the perspective of Welsh NHS clinicians and patients by conducting a coding reliability analysis, and presenting the narrative feedback received from 22,978 participants during a 6-month period (September 2020 and March 2021). This period was chosen as a 'mid-point' from a larger, ongoing VC evaluation during the COVID-19 pandemic to gain a better understanding of VC without the influence of initial issues during the earlier months of VC being rolled out, and current changes such as VC being scaled up with a focus on blended consultation approaches.

METHODS:

Design, Setting, Participants

This paper presents the All-Wales data captured across all 7 Health Boards and 1 Trust (See Appendix 1) across a range of NHS healthcare settings within primary, secondary and community care (See Appendix 2-3). This is a coding reliability analysis of VC experience feedback captured in a larger cross-sectional study [18], held by the NHS Wales VC Service, TEC Cymru [17, 19]. Participant eligibility included NHS clinicians and patients using VC in NHS Wales (see Appendix 4-9).

Measures

This paper presents national (All-Wales) data from free-text narrative boxes from a cross-sectional feedback study. The feedback appeared as internet browser pop-ups at the end of each VC appointment – one per clinician and patient and completed immediately as live data to reflect the use, benefits, challenges, and sustainability of VC (see supplementary files 1 and 2).

Sampling

Opportunity sampling was used due to accessibility of the VC intervention and ability to capture data at the end of each consultation via an online feedback link. There is acknowledgement of the risks surrounding sampling in this way, when considering the feedback being completed by those more willing, thus sharing potentially more extreme 'positive' or 'negative' data towards VC, potentially missing out 'neutral' responses of those individuals in the middle. To limit this, TEC Cymru conduct multiple phases of re-evaluation using a phased approach to their research and evaluation work (see supplement file 3), which provides ample opportunity across their digital interventions to explore a wider range of methodologies and study types.

Ethics Approvals & Informed Consent

TEC Cymru obtained full ethical approvals and risk assessments from their host Health Board Aneurin Bevan University Health Board Research & Development Department (Reference Number: SA/1114/20), and then national approval was obtained from all other Health Boards in Wales.

At the end of each participant feedback link, a statement of consent and a compulsory tick box was required prior to feedback submission.

Patient and Public Involvement

No patient or public involvement as survey work and during the emerging roll out did not have PPI team. Now have PPI team and young representatives.

Analysis

For the data discussed in this paper, there are a total of 22,978 clinician and patient feedback narrative submissions. Using steps for a coding reliability analysis [20], the data was familiarised by three researchers of the TEC Cymru team [GJ, BW, MW], codes were manually identified and generated and placed into an excel sheet for

manageable order (due to large numbers). Domain summaries were then generated from the data, reviewed, and defined and the report was produced following a recursive process of movement between the phases, ensuring quality and rigour, with an additional 20% validation check on all data by the National Clinical Lead for Wales [AA].

Results

A coding reliability analysis of the free-text narrative data collected at the end of the Video Consultation (VC) feedback was conducted. From the 22,978 patient and clinician responses captured during September 2020 and March 2021, six domain summaries materialised with an additional 17 sub-domains. These include: The Ease of Video Consultations (VC); The Personal Touches; The Benefits of Video Consulting; The Challenges of Video Consulting; Technical Quality, and Recommendations & Future Use. Direct quotations from patients and clinicians are provided. Each quotation is referenced to describe either the *patient* by their age range, gender, Health Board/Trust, healthcare speciality and type of appointment (e.g., first appointment, follow-up), or the clinician by their professional occupation and the Health Board/Trust in Wales in which they are based. The domains are analysed in order of the most common comment/feedback due to the voluntary responses.

Domain Summary 1: Ease of Use

Patients and clinicians generally rate their VC as high in quality [16] and their free-text narratives reflect this level in terms of high satisfaction and acceptability in relation to both technical and overall experience. For example, when patients and clinicians rate their VC as 'excellent', 'very good' or 'good' this is often paired with positive comments in relation to either the VC's technical performance as a video consulting platform or the overall experience of using VC as a healthcare delivery service.

1.1 Ease of Technical Use

One of the most common sub-domains associated to the platform's technical performance was that of 'ease of use'. It was often stated that the VC platform used in NHS Wales (Attend Anywhere) was 'easy to use' for both patients and clinicians.

"Easy to use, lots of good information" ***(Parent of Patient under 12 years, ABUHB, Physiotherapist, Paediatrics & Child Health, Advice)***

"It was easy to use, and appropriate to use during the pandemic" ***(Patient, Female, HDUHB, 25-44, Midwife, Obstetrics & Gynaecology, First Appointment).***

In addition, this ease of use was expressed as a 'surprise' to some, in that both patients and clinicians found the VC platform much easier to use than they initially anticipated, and in some instances, this exceeded expectation.

"More effective than I expected a non-face to face appointment to be" ***(Patient, Male, 45-64, HDUHB)***

"This is my first experience of a video call, so I was pleasantly surprised" ***(Patient, Female, 64-80, BCUHB, Doctor, Follow-up)***

"First time to use video call I was very impressed, better than expected" ***(Patient, ABUHB, Podiatrist, Follow-up)***

1.2 Ease of Experience

For some clinicians, it was felt that having access to a VC platform was 'easier' for some of their patients than a face-to-face appointment would be. This was especially apparent in terms of patient experience and their personal circumstances, and those with access difficulties, anxiety issues, or complex home situations that were made more convenient with VC.

"Easier to access with social anxiety" ***(Doctor, CVUHB)***

"Very helpful for autistic patient" ***(Dentist/Dental Nurse, SBUHB)***

This was also expressed in more depth by the patients themselves, whom in addition felt VC was better than attending a face-to-face appointment, such as making the patient feel safer, less stressed and more empowered, as opposed to their prior experience of face-to-face appointments.

"Easier and safer than going to the hospital. I didn't have to take much time off work" ***(Patient, SBUHB, Female, 25-44, Dietician, First Appointment)***

"Just as good as a face-to-face meeting and to be honest I felt like I was being listened to far more than when I have been in face-to-face meetings on the same subject" ***(Parent of Patient, ABUHB, Female, under 12 years, Nurse, Mental Health, Advice)***

1.3: Ease & Unique for Collaborations

Clinicians comment that the 'ease' of the VC platform and its positive associations to patient experience provides an additional unique opportunity. This opportunity is the ability to link up others to the video call, thus enabling multi-disciplinary appointments to take place. This is felt to be unique in the sense that this collaborative approach would not have been possible if conducted face-to-face, thus in turn, produces additional advantages and improved outcomes for patient, families and clinicians.

"It was easy to join both my patients and other colleagues in" ***(Doctor, HDUHB)***

"Also, his Wife was able to join session – significant information shared by Wife today" **(SLT, BCUHB)**

It also means that in some instances, there is an increase in patient or parental onus which is perceived as an additional advantage to patient care.

"Parents have to take a more proactive role than they might in clinical session" ***(SLT, ABUHB)***

"Definitely helped with family involvement today" ***(Nurse, HDUHB)***

"Mum appears happy to support and possible not very involved until now" ***(SLT, ABUHB)***

Domain Summary 2: The Personal Touches

The narrative data highlighted several incidences of where VC has been able to increase clinician to patient relations.

2.1: Communication, Personalisation & Rapport

Patients commonly expressed how VC helps them to communicate effectively, to receive a more personalised and patient-centred approach, and build rapport with their clinicians.

> *"Having a video call made it more personal for me the support given to me was excellent"* ***(Parent of Patient, CAVUHB, under 12 years, Paediatrics & Child Health, Advice)***

> *"We have built up a relationship with our clinician via VC"* ***(Patient, Male, 45-64, CAVUHB, Counsellor, Mental Health)***

2.2 Patient Positivity & Appreciation

A strong consensus of patient 'positivity' and 'appreciation' towards their clinicians is expressed widely in the narrative. This positive clinical presence led to many patients feeling safe, comfortable and supported during and after their VC. This was particularly evident across specialities such as mental health and therapies.

> *"Had a really tough week, but [name removed] was amazing and she listened to me. She gave me great support and was really kind to me"* ***(Patient, CAVUHB, 25-44, Psychologist, Mental Health, Therapy/ Treatment)***

> *"She was engaging, courteous and professional in explaining what she felt the issues were with my hand. I found the whole experience thoroughly satisfactory."* ***(Patient, CAVUHB, 45-64, Male, Occupational Therapist, Trauma & Ortho, First Appointment)***

> *"It was great to feel that someone was there to chat to, who could see a difference in [patient name removed], while at the same time supporting us as a family."* ***(Guardian/Carer of Patient, SBUHB, 25-44, Male, Mental Health, Follow-up)***

Domain Summary 3: The Benefits of Video Consulting

The benefits associated to using VC were one of the most common domains that materialised in the data.

3.1 Convenience, Safety & Home Comforts

Many of the patients demonstrate the benefit of convenience when using VC as opposed to a traditional face-to-face appointment, with additional advantages such as improved safety and home comforts.

> *"As we live quite far away, the virtual meetings are a lot more convenient and it's nice to feel more comfortable at home. Thank you"* ***(Patient, CAVUHB Female, 25-44, Obstetrics & Gynaecology, Follow-up)***

> *"I felt really comfortable talking to [name removed]. I was able to get things off my chest, and talk about the assault more deeply than I have ever done"* ***(Patient, ABUHB, 45-64, Female, Counsellor, Mental Health, Therapy / Treatment)***

> *"Client is pregnant and so is vulnerable to the COVID virus. AA means she can continue with therapy without the additional risks"* ***(Mental Health, HDUHB)***

3.2 Flexibility of VC

For many patients, a benefit of using VC was the flexibility it allowed. For example, patients reported to be able to continue 'getting on with other things' whilst waiting in the 'virtual waiting room', which would not have been possible in a physical location.

> *"I felt it was good as I could start the call and then get on with things around the house while I waited"* ***(Parent of Patient, BCUHB, Female, under 12 years, Physiotherapist, Paediatrics & Child Health, Therapy / Treatment)***

> *"I think that it is excellent to have a consultation this way. It was easy to log on and saves so much time for both of us"* ***(Patient, ABUHB, 45-64, Female, Physiotherapist)***

In addition, having three modes of appointment (VC, telephone or face-to-face) provided the patient with a stronger sense of patient choice and flexibility. However, it was felt that VC, as opposed to a telephone consultation, allowed comparable aims and goals to be achieved similar to a face-to-face.

"VC let us achieve patient's 1st choice, which could not have been achieved over the phone" ***(Occupational therapist, SBUHB)***

"AA is a way of bridging direct face-to-face and a visual interaction can be helpful as part of the clinical assessment" ***(Nurse, HDUHB)***

"Having a video consultation is so much better than just a telephone call - it allows you to chat as if it was in person" ***(Patient, PTHB, 64-80, Female, Nurse Respiratory Medicine, Advice)***

The ability to be able to visually 'see' the patient is considered imperative to clinicians, as for many healthcare conditions VC is needed to enable visual cues.

"Better than just telephone call as could get non-verbal clues about emotions" ***(Doctor, ABUHB)***

"Really useful being able to see patient via system – really added to consultation, infinitely superior to telephone consultation" ***(Doctor, SBUHB)***

3.3 Time Savings

When using VC as opposed to face-to-face appointments many clinicians and patients expressed that they had saved time in several ways, and this was a considerable benefit to patients, families, clinicians and the NHS service as a whole.

For example, clinicians felt that the 'time' used to conduct a VC was reduced in comparison to the usual components of a face-to-face e.g., logistics. The time saved from travelling to and from appointments was able to be combined into the overall virtual consultation in some cases, ultimately benefiting clinicians' availability to attend to other patient needs and clinical tasks.

"Video consultation reduces time required the next day" ***(Midwife, CVUHB)***

"Video consultation prior, ensures that less time on home visits" ***(Health Visitor, SBUHB)***

In addition, the use of VC lowered the 'wait times' in some instances for patients, in comparison to waiting for a face-to-face appointment.

"Fantastic way to be able to have an appointment without having to wait months" ***(Parent of Patient, CTMUHB, under 12 years, Male, Doctor, Otolaryngology (ENT), First Appointment)***

"Reduces time required for next appointment" ***(Audiovest Med, BCUHB)***

From the data, 'travel time' or 'time off' work or school was perceived as the biggest saving of time in comparison to attending a face-to-face appointment for patients.

"Less travel and disruption of [patient] school day" ***(Dietician, ABUHB)***

"I just had just finished a night shift, and live a fair distance from work, so doing a video call made my life a lot easier" ***(Patient, SBUHB, 45-64)***

"Not having to travel to the hospital and waiting in the waiting room was much better, and there was no stress trying to get around everything all of the time" ***(Patient, CVUHB, 45-64)***

3.4 Clinical Value

Many clinicians suggested that VC has the ability to enhance a clinical session or determine clinical need. For example, some clinicians demonstrated opportunities to share visual resources immediately within the appointment. Others reported that VC allowed for an effective triaging tool to determine the 'need' for a face-to-face appointment as opposed to a remote consultation alternative.

"It enhanced the clinical session because it added visual opportunity" ***(Speech and Language Therapy, CVUHB)***

"I could open investigations on screen easily, I shared internet resources links to patient, and she got them on screen straight away" ***(Doctor, BCUHB)***

Domain Summary 4: The Challenges of Video Consulting

While there are a number of evident benefits when considering VC, it is important to highlight the challenges faced to gain an overall picture of both patient and clinician experiences which are subject to subtle nuances.

4.1 Video Consulting is Not for Everyone or Everything

There are some clinical situations and personal circumstances which continue to necessitate the need for face-to-face consultations, where VC does not achieve the outcomes necessary, or suit the clinical condition or patient type.

> *"Still needs face-to-face as cannot test hearing over VC"* ***(Audiovest Med, BCUHB)***

> *"Only thing missing was ability to weigh and get height"* ***(Dietician, ABUHB)***

4.2 Patient and Clinician Digital Ability

Some issues with patient and clinician user abilities were also highlighted in the data, clinicians made note that on occasion patients struggled to undertake VC due to their lack of technological ability. This affected the potential quality of the VC and therefore impacted the patients' opportunity to receive care via VC.

> *"Client unable to get full screen. Client not familiar with using equipment at home"* ***(Counsellor, Psychiatry & MH, Mental Health, Secondary, SBUHB)***

> *"Patient didn't receive link so unable to do. I think it may be due to me being unfamiliar with new system in the end and it worked well"* ***(Physiotherapist, Paeds & Child Health, Therapies (AHP), CVUHB)***

4.3 Engagement over VC

Engagement was a further challenge that clinicians experienced when using VC. Within therapies for younger patients where parents were present, clinicians found it challenging to engage with children via video in the same way as face-to-face. Children were reported to be more distracted during these appointments as the concept of video was relatively new, therefore parents and clinicians had to attempt to engage with the child more than via face-to-face.

"Poor picture quality does not encourage children who already have attention/listening difficulties to take part" ***(Speech and Language Therapist, ABUHB)***

"Child had short attention span and parents had to work hard to keep him in front of camera" ***(Speech and Language Therapist, ABUHB)***

"Sound quality not adequate at times to determine success of target so reliant on adult feedback. Child however responding better than expected although once attention levels drop it is quite difficult to return to tasks" ***(Speech and Language Therapist, Paeds & Child Health, ABUHB)***

4.4 Waiting Room Issues

A problem that was reported by a small number of patients was associated to the virtual waiting time being exceedingly long, or that their appointment was missed by a clinician, or in some instances, where no clinician attended at all.

"Waited for over 40 minutes in the waiting room" ***(Parent of Patient, SBUHB, and parent of child under 12 years, Paediatrics & Child Health, Follow-up)***

"We waited in the virtual waiting room for an hour and 30 minutes without anyone answering. We couldn't wait any longer and due to our poor internet connection in our area, I had to use all my monthly data" ***(Parent of Patient, ABUHB, Parent of child under 12 years, Male, Paediatrics & Child Health, Follow-up)***

Domain Summary 5: Technical Quality

When considering the technical aspects of VC, clinician and patient tended to rate their VC highly when the audio and visual picture were of good quality.

5.1: Good vs. Bad Quality

For high-quality ratings, these were paired with praise for VC in the free-text narrative box. Suggesting that the audio and visual elements of the VC were of high quality.

"Great connection. No glitches very smooth call" ***(Parent of Patient, ABUHB, under 12 years, Female, Physiotherapist, First Appointment)***

"The video and picture was perfect, was able to hear the doctor clearly" ***(Patient, CAVUHB, 45-64, Female, Doctor, Follow up)***

However, there were technological challenges reported within the narrative such as poor connectivity, thus impacting on visuals and audio.

> *"Lag in audio/video sometimes causes miscommunication or difficulty with younger patients"* ***(SLT, CVUHB)***

> *"The video was very choppy and when my therapist was talking it was delayed video with speech"* ***(Patient, CAVUHB, Female, 25-44, Counsellor, Mental Health, Therapy / Treatment)***

In some instances, technical issues were associated with specific device types and their perceived incompatibilities with the VC platform.

> *"The video call app did not give me the option of using my inner camera so I had to turn my phone around so the doctor could see me."* ***(Patient, BCUHB, 25-44, Ophthalmology, Advice)***

> *"Problems with Safari on iPad"* ***(Health Visitor, SBUHB)***

> *"Session being done on Father's phone so screen obviously small for child to watch"* ***(SLT, ABUHB)***

5.2 Clinical Innovation & Trouble-Shooting

Yet, despite these technological challenges, with the right amount of technical support and appropriate equipment available, clinicians report to be able to troubleshoot many issues and continue to use VC in most situations.

> *"Tried to do call with mobile phone and there were issues for the patient not being able to grant access for use on mobile phone, but the consultation worked perfectly on their computer"* ***(Dentist/Dental Nurse, BCUHB)***

> *"Issues at the start of the call with the audio but we disconnected and reconnected and it was then fine"* ***(Nurse, SBUHB)***

Some clinicians were able to trouble-shoot the problems easily to make the consultation work best for them and their patients.

"I was unable to connect through the desktop in clinic due to computer being extremely slow.... I was luckily able to connect through my Netbook which supports the platform" ***(SLT, CVUHB)***

"School initially struggling with internet connection but then able to move to a room with better signal and VC quality" ***(SLT, CVUHB)***

Domain Summary 6: Recommendations & Future Use

When considering the experiences of both clinicians and patients using VC, it is important to consider how the narrative can be built upon to consider suggestions and recommendations to ensure that VC is suitable for future use and in conjunction, blended with face-to-face and telephone consultations.

6.1 Clinical Recommendations

One of these suggestions was improved infrastructure and resources for clinical and administrative staff to have access to. It was felt that by having better equipment, they would deliver better patient care via VC. Not only this, but in some areas the number of devices and access to workspace was limited and needed significant improvement in the future.

"It would be useful to have 2 microphones so I can share videos with my clients about EMDR therapy and PTSD" ***(Nurse, BCUHB)***

"Need appropriate screens and two monitors to view downloads and see patients, desk and chairs at right height" ***(Dietician, BCUHB)***

Clinicians also suggested that there needed to be an improvement with the technical support that was on offer across Health Boards regarding VC.

"Being taught how to split screen so we can write notes at the same time, rather than making paper notes and writing up after" ***(Occupational Therapist, BCUHB)***

This suggestion of technology support would ensure clinicians could use VC to the best of their ability, utilising all aspects of the platform. Some clinicians suggested new features that they felt would be useful in ensuring clinician/patient confidentiality and safety.

"To be able to blur/add a background when working from home" ***(Dietician, SBUHB)***

"I would like to be able to leave the call screen but still be able to see patient in a little pop-out screen" ***(SLT, BCUHB)***

Additional administrative support was also suggested for VC so that they could mirror the way standard face-to-face consultations were run.

"For this to work administrative clinic support needed to mirror that provided for face-to-face appointments" ***(Nurse, CVUHB)***

6.2 Patient Wants & Needs

Patients' narrative also suggested that technical and digital skills support would be useful in the future use of VC. Some patients were slightly unsure of how to use the technology needed for VC and ran into some issues. By having support for this, it may lead to an increase in digital skills for future digital implementations and the move towards a new NHS digital strategy.

"I couldn't work out how to use the camera on the front of my and wasn't sure how to connect via my computer to the appointment" ***(Patient, ABUHB, 25-44, Female, Mental Health, First Appointment)***

"I was unable to switch my camera to front facing, so not able to see who I was talking to" ***(Patient, CAVUHB, Female, 45-64, Nurse Otolaryngology (ENT), First Appointment)***

Patients provided narrative to suggest a blended approach of digital healthcare services was needed going forward. This was due to a large number of patients highlighting that VC provided numerous benefits, and help to supplement the quality of care received from clinicians, and believed a blended approach of VC and face-to-face was the way forward for the future of the NHS Wales support by clinicians.

"Definitely the way forward for consultations, I live 100 miles away so for the purpose of consultation rather than treatment this is brilliant!" ***(Patient, SBUHB, 45-64, Female, Doctor, Plastic Surgery)***

"I think this will be the future. I felt more relaxed being able to do it from my home" ***(Patient, BCUHB, Female, 64-80, Doctor, Obstetrics & Gynaecology, First Appointment)***

"Video consultations act as a useful complement to face-to-face sessions and home visits" ***(Audiologist, BCUHB)***

Discussion

The coding reliability analysis of the free-text narrative boxes captured at the end of VC provided feedback from a large dataset of 22,978 clinician and patient submissions expressing a vast and overall view of VC experiences in Wales. Six dominant domain summaries and 17 additional sub domains materialised. Due to the high response rate in free-text narrative box responses, the analysis of the feedback data was able to be conducted using a coding reliability approach, thus providing context for each domain and its perspective, supported by patient and clinician quotation. The domains that materialised in the analysis provide a strong sense that the NHS Wales VC Service on a whole is highly satisfactory, well accepted, and clinically suitable for a wide range of patient and clinical teams using the service. Despite this, it is important to draw attention to the challenges that have also occurred for both clinicians and patients, such as VC not always being suitable for every individual or appointment.

The data provides a strong consensus that the VC platform currently being used in NHS Wales is 'easy to use' in both technical and experience terms, with the additional value of its ability of enhanced collaboration, thus providing a multidisciplinary approach to patient care. In addition, the data highlights the real life and personal aspects of VC experience, which suggests that patients who are using the VC service are satisfied with using it and provide narrative around its ease of use and personalisation felt in their patient care.

In addition, there is a heartfelt sense of patient appreciation and gratitude to their clinicians for their hard work and dedication to delivering patient care. Furthermore, the data demonstrates the benefits that are associated to using VC. These benefits are felt by patients, families and clinicians, and the NHS service. Challenges are also apparent within the data with VC not always being appropriate for all patients or

appointments. This is in combination with difficulties surrounding engagement, particularly with children via VC and issues with digital ability across clinician and patient populations. Although there were disparities of digital ability that sometimes hindered a VC appointment, and suggestive of a digital divide, in this data set and the wider evaluation [21] we did not find this to be the case. The quantitative findings that run alongside this data provide additional support, specifically regarding patient representation, concluding that regardless of patient age, gender, ethnicity, household income, health condition, disability or place (urban vs. rural), VC can provide a high standard of healthcare delivery across Wales [18, 22, 23]. Though apparent, the challenges were heavily outweighed by the number of benefits experienced from using VC.

The data also presents a comparison between good versus bad technical quality on the platform regarding audio and visuals for both patient and clinician. Improvements for future use should encapsulate recommendations such as more resources to be made available to clinical teams, and that VC platform features are considered as priority for improvement. It is also noted that increased technical support and education is provided to ensure that VC can appropriately be used in the future, and possibly offered directly to patients, so that VC is used as a long-term blended approach to suit patient choice and preferences moving forward. While challenges have been identified, the data captured in this study is comparable to previous literature that suggests that the benefits of VC outweigh these challenges [18, 22] and can support the use and sustainability of VC in NHS healthcare services. As discussed within the result section VC is not seen to be used for everything within healthcare, despite the benefits highlighted within this study. The need to ensure that VC is offered within every healthcare environment is pertinent to its sustainable future use along with shared decisions between clinician and patient [24].

Limitations and Conclusions

There are many strengths to this study, including its narrative approach among a very large and representative sample for Wales. However, the study did have some limitations. Due to the voluntary and anonymised nature of the feedback data collection, it is unclear as to how often recurring participants completed the

feedback, thus potentially skewing the sample. Furthermore, due to the size of the study it was not possible to present both the qualitative and quantitative findings together, however access to this data is readily available [22].

Originally, the data was broken down into specialities, but was regrouped for the purpose of this narrative analysis as most of the data showed little difference between specialities. While the quotations used within this data are true of the narrative at the time of collection, it is important to note that these are fitting of a time during the pandemic and so reflect this period. Data is being captured in an ongoing evaluation of VC within Wales, and suggests that those using VC are still rating it positively.

While this paper does not cover specific clinical implications, VC is being used across various specialities and evaluation is ongoing to explore this further.

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Declaration of interest: none.

Statement of Data Sharing: All analysed data is published on the TEC Cymru website in the format of a full report of all data for the public to view. To access these reports please see https://digitalhealth.wales/tec-cymru**.** Other data can be requested as a reasonable request to the corresponding author.

Author contributions: GJ contributed to the main design of the study and development of the research questions, the main structure and write-up of the paper, and final amendments to the manuscript. GJ, BW, BT & MW analysed the data, with AA, SK MO supervision. All authors discussed and interpreted the data once analysed and helped structure the manuscript. AA, SK and MO contributed to the clinical understanding of the findings and shaped the discussion, conclusions and recommendations. AA was responsible for overseeing the full development of the

study design and data collection, the analysis and development and final sign-off of manuscript from a clinical and programme perspective. All authors contributed to proof-reading and amendments of the final manuscript.

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Appendix

Appendix 1 here

Health Board and Trust Distribution

Distribution of responses per Health Board and Trust within Wales.

Appendix 2 here

Breakdown of Primary, Secondary and Community Care responses

Primary Care responses.

Appendix 3 here

Secondary and Community Care responses.

Patient and Clinician Demographics

Clinician Professions

Appendix 4 here

Clinician Specialities

Appendix 5 here

Patient Age

Appendix 6 here

Patient Gender

Appendix 7 here

Patient Ethnicity

Appendix 8 here

Patient Household Income

Appendix 9 here

Video Consulting Patient Copy

Survey 1:

1. Please rate the quality of your video consultation Rhowch sgôr i ansawdd eich galwad fideo

Poor Gwael	Okay Iawn	Good Da	Very Good Da iawn	Excellent Ardderchog
★	★	★	★	★

Any comments?

2. How would the patient describe themselves? Sut yw'r claf yn disgrifio ei hun?

	Age Old	Gender Rhyw
Demographics Demograffeg		

3. How many times have you used video for a health or social care consultation, and would you use it again? Sawl gwaith ydych chi wedi defnyddio fideo am ymgynghoriad iechyd neu ofal iechyd, a byddwch chi'n defnyddio eto?

	How many times have you used a video consultation? Sawl gwaith ydych chi wedi ei defnyddio?	Would you like to use video consultation again? Byddwch chi'n ei defnyddio eto?
Video Consultation Use Defnydd fideo		

4. What was your video consultation related to today? Beth oedd eich ymgynghoriad fideo yn ynghylch heddiw?

- First time appointment
  Awyntiad gyntaf
- Advice & support
  Cymorth neu gyngor
- Review of my health and/or results
  Adolygiad iechyd/ canlyniadau
- Final appointment & discharge
  Apwyntiad olaf neu ryddhad
- Therapy or treatment session
  Therapi neu sesiwn triniaeth

Other (please specify)

5. Do you feel that this video consultation prevented you needing a face-to-face appointment?

Wnaeth yr ymgynghoriad fideo osgoi'r angen i'r claf gael apwyntiad wyneb i wyneb?

- Yes le
- No na
- I don't know ansicr

Comments?

6. For your video consultation today, what type of healthcare speciality and professional did you see? Am eich ymgynghoriad fideo heddiw, pa fath o arbenigwr a phroffesiwn gwelwch chi?

	Health Condition Speciality Arbenigrwydd cyflwr iechyd	Professional Phroffesiwn
Speciality & Professional Arbenigwr a Phroffesiwn		

Please state the health-related reason for your video consultation today?

7. How long would it typically take you to travel from your home to your consultation? (one way) Pa mor hir fyddai hi'n cymryd i chi deithio i'ch apwyntiad fel arfer?

Minutes (Traveling one-way)	
Miles (if known)	
Parking (at the site)	

8. Which Health Board Region are you in? O ba Ranbarth Bwrdd Iechyd ydych chi'n dod?

- Aneurin Bevan University Health Board
- Betsi Cadwaladr University Health Board
- Cardiff & Vale University Health Board
- Cwm Taf Morgannwg University Health Board
- Hywel Dda University Health Board
- Powys Teaching Health Board
- Swansea Bay University Health Board
- Velindre Cancer Centre

9. TEC Cymru's researchers will be running interviews with clinicians. Please leave your email below if you would like to take part, and we will contact you to arrange a date and time. Address

Email Address

10. Any other comments, questions or concerns?
Unrhyw sylwadau, cwesitynau neu bryderon eraill?

By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box [ ]

Survey 2: (Additional Questions Added)

11. Did you experience any difficulties with your video consultation today? Gwelwch chi unrhyw anawsterau gydag eich ymgynghoriad fideo heddiw?

	A lot llawer	Some Rhywfaint	A little Ychydig	Not at all Dim	N/A
Difficulties with a device Anawsterau Gyda dyfais	○	○	○	○	○
Difficulties with Internet connection Anawsterau gyda chysylltiad rhyngrwyd	○	○	○	○	○
Difficulties with video/picture Anawsterau gyda llun/ fideo	○	○	○	○	○
Difficulties with audio/sound Anawsterau gyda sain	○	○	○	○	○
Difficulties with privacy or a safe space Anawsteru gyda diogelwch neu pbeifatrwydd	○	○	○	○	○
Lack of confidence using video calls Diffyg hyder gyda defnydd fideo	○	○	○	○	○
Not suitable for clinical needs Anaddas am anghenion clinigol	○	○	○	○	○
Prefer face to face or telephone Mae'n well gen i wyneb yn wyneb neu dros y ffôn	○	○	○	○	○

12. How did your video consultation benefit you today? Sut aeth yr ymgynghoriad fideo buddio chi heddiw?

	Very beneficial Buddiol iawn	Beneficial Buddiol	Quite beneficial Eithaf Buddiol	Not beneficial Dim yn Buddies	Not at all beneficial Dim yn Buddiol o gwbl	N/A
Saved time & preparation Arbed Amser a Pharatoi	○	○	○	○	○	○
Saved travel & parking Arbed teithio	○	○	○	○	○	○
Saved the environment & co2 emissions Arbed yr amgylchedd ac allbwn co2	○	○	○	○	○	○
Saved taking time off school, work or other commitments Arbed amser o waith, ysgol neu ymrwymiadau	○	○	○	○	○	○
Saved money e.g., childcare, travel Arbed arian am ofal plant/ teithio	○	○	○	○	○	○
Improved access to care & waiting times Gwella mynediad i ofal ac amser aros	○	○	○	○	○	○
Improved convenience e.g., staying at home Gwella hwylustod e.e. aros adref	○	○	○	○	○	○
Improved family involvement & support Gwella cyfranogiad a chymorth teulu	○	○	○	○	○	○
Lowered rates of infection risk Lleihau cyfraddau haint	○	○	○	○	○	○
Lowered stress and anxiety Lleihau straen a phryder	○	○	○	○	○	○

By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box [ ]

Video Consulting Clinician Copy

Survey 1:

1. Please rate the quality of your video consultation? Rhowch sgôr i ansawdd eich galwad fideo?

Poor Gwael	Okay Iawn	Good Da	Very Good Da iawn	Excellent Ardderchog
☆	☆	☆	☆	☆

Comments?

2. What is your profession & speciality? Beth yw eich proffesiwn ac arbenigedd?

Please only enter 'other' if your profession/speciality is not on the list.

	Profession Proffesiwn	Speciality Arbenigedd
Profession & Speciality Proffesiwn & Arbenigedd		

Other (please specify)

3. What do you consider was the primary activity of this video consultation?

Beth oedd y prif weithgaredd yn yr ymgynghoriad fideo?

- ○ First Appointment apwyntiad cyntaf
- ○ Advice & Support cyngor a chymorth
- ○ Follow-up dilyniant
- ○ Feedback/Outcomes/Results adborth/ allbwn/ canlyniadau
- ○ Review adolygiad
- ○ Discharge rhyddhad
- ○ Therapy Session sesiwn therapi
- ○ Other (please specify)

4. Do you feel that this video consultation prevented the patient needing a face-to-face appointment?

Wnaeth yr ymgynghoriad fideo osgoi'r angen i'r claf gael apwyntiad wyneb i wyneb?

- ○ Yes ie
- ○ No na
- ○ Unable to say Methu dweud

Other (please specify)

5. Which Health Board Region are you in? O ba Ranbarth Bwrdd Iechyd ydych chi'n dod?

- ○ Aneurin Bevan University Health Board
- ○ Betsi Cadwaladr University Health Board
- ○ Cardiff & Vale University Health Board
- ○ Cwm Taf Morgannwg University Health Board
- ○ Hywel Dda University Health Board
- ○ Powys Teaching Health Board
- ○ Swansea Bay University Health Board
- ○ Velindre Cancer Centre

6. **ONLY ANSWER THIS QUESTION IF WORKING FROM HOME**

If you are working remotely, how long in minutes and miles would it typically take you to travel from home to work? (one-way)

Use numbers only e.g., 10 (for minutes and/or £ in expenses)

Minutes

Miles (if known)

7. Any other comments, questions or concerns?
Unrhyw sylwadau, cwesitynau neu bryderon eraill?

For example, is there additional support you may need? Or could anything be improved with the platform?

8. TEC Cymru's researchers will be running interviews with clinicians. Please leave your email below if you would like to take part, and we will contact you to arrange a date and time.

Email Address

CONSENT:
By submitting this survey I provide full consent for the data provided to be used anonymously in publications and presentations by the TEC Cymru team working in the NHS.

Tick Box { }

Survey 2: (Additional Questions Added)

9. Did you experience any issues or difficulties with your video consultation today? A wnaethoch chi brofi unrhyw broblemau neu anawsterau gyda'ch ymgynghoriad fideo heddiw?

	Very relevant	Relevant	Quite relevant	Not relevant	Not at all relevant	N/A
Issues with a device Mynediad at ddyfais	○	○	○	○	○	○
Issues with Internet connection Cysylltedd gwael â'r rhyngrwyd	○	○	○	○	○	○
Issues with video/picture Problemau gyda fideo	○	○	○	○	○	○
Issues with audio/sound Problemau gyda sain	○	○	○	○	○	○
Issues on the patients side e.g., their device, Internet or lack of confidence using video Problemau gydag ochr y claf	○	○	○	○	○	○
I lack the confidence using video consultation Diffyg hyder wrth ddefnyddio galwadau fideo	○	○	○	○	○	○
Not suitable for clinical needs Ddim yn briodol neu'n addas	○	○	○	○	○	○
I prefer face to face or telephone Mae'n well gen i wyneb yn wyneb neu dros y ffôn	○	○	○	○	○	○
The patient prefers face to face or telephone Mae'r claf yn cyfeirio wyneb yn wyneb neu dros y ffôn	○	○	○	○	○	○

Other (please specify)

10. What do you consider to be the benefits of your work or your service of using video consultation today? Beth yn eich barn chi yw buddion eich gwaith neu'ch gwasanaeth o ddefnyddio ymgynghoriad fideo heddiw?

	Very beneficial Buddiol iawn	Beneficial Buddiol	Quite beneficial Eithaf Buddiol	Not beneficial Dim yn Buddiol	Not at all beneficial Dim yn Buddiol o gwbl	N/A
More efficient use of clinical time & space Defnydd mwy effeithlon o amser a lle	○	○	○	○	○	○
Saved travel & parking Arbed teithio a pharcio	○	○	○	○	○	○
Saved the environment e.g., less paper waste, co2 emissions Arbed yr amgylchedd ac allbwn co2 a phapur	○	○	○	○	○	○
Improved access to care for patient Gwella mynediad i ofal am y claf	○	○	○	○	○	○
Reduced waiting times for patient Lleihau amseroedd aros i'r claf	○	○	○	○	○	○
Reduced likelihood of a DNA Lleihau'r siawns o DNA	○	○	○	○	○	○
Improved family involvement & support for patient Gwella cymorth a chyfranogiad i'r claf	○	○	○	○	○	○
Lowered rates of infection risk Lleihau'r gyfradd heintiad	○	○	○	○	○	○

Other (please specify)

CONSENT:

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Tick Box { }

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Research & Evaluation Framework

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Introduction

This Research and Service Evaluation Framework is developed by Technology Enabled Care (TEC) Cymru's research and evaluation team and is based upon the team's own knowledge and experiences. The framework has six sections:

Section 1: What is Research & Service Evaluation?
Section 2: What is Quality Improvement?
Section 3: TEC Cymru's Four-Step Phased Approach
Section 4: Using Mixed Methodologies
Section 5: Using Patient & Public Involvement (PPI)
Sections 6: Useful Links & Templates

The framework provides 'hyperlinks' throughout for additional information and points of reference.

1. What is Research & Service Evaluation?

Why use a Research and Evaluation Framework?

This framework has been created to support anyone undertaking a digital transformation in the use of research and service evaluation methods to inform decision making, justification, and to measure whether value has been achieved.

Historically, many projects and services have been undertaken without an approach to research and service evaluation, resulting in a lack of evidence, lessons learned, and documentation of their success (or failure) to inform future investment.

This framework will be shared, tested and iterated over time with digital transformation teams – it is a work in progress!

What is Research & Service Evaluation?

Research and service evaluation are often discussed in very similar ways, in that they both adopt similar methodologies to collect data and seek to answer a question. However, they are very different disciplines, with different aims, design, focus, motives and end-results, and therefore it is important to distinguish between the two to avoid confusion and complement overlap. As shown below in Table 2.

The Health Research Authority in the UK has a useful online decision-making tool to help people determine if their work sits under a research or service evaluation umbrella—see here.

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A helpful definition of research is: *"Research involves the attempt to extend the available knowledge by means of a systematically defensible process of enquiry."* (Clamp et al., 2004).

A helpful definition of evaluation is: *"Evaluation is a systematic assessment of the design, implementation and outcomes of an intervention"* (Magenta Book, 2020).

Table 2: Research & Evaluation

Research	Evaluation
To 'prove'	To 'improve'
To test theory and produce generalizable knowledge and findings (representative of populations)	To judge merit or worth of a single intervention/programme or model (representative of programme)
Scientific inquiry based on intellectual curiosity and expertise	Policy or intervention/programme interests of stakeholder paramount
Questions originate with expertise and disciplines	Questions originate with key stakeholders & primary intended 'users' of findings
Advances broad knowledge and theory	Provide information for decision making on specific intervention/programme
Controlled setting (e.g., people, timelines, resources)	Non-controlled setting Conducted within changeable settings (e.g., people, timelines, resources)
Quality & importance judged by peer-review & research expertise	Quality & importance judged by stakeholders & 'users' of findings to take action/make decisions
Ultimate test of 'value' is contribution of knowledge / to prove	Ultimate test of 'value' is usefulness to improvement
Did it work? (hypothesis)	Is it working? (key questions)

Research and service evaluation are similar, yet mutually independent. They share similar steps in their process and can complement each other well. As shown below in Diagram 1, the difference occurs at the start and finish of the process, whereas the similarities sit within the core (methods/analysis).

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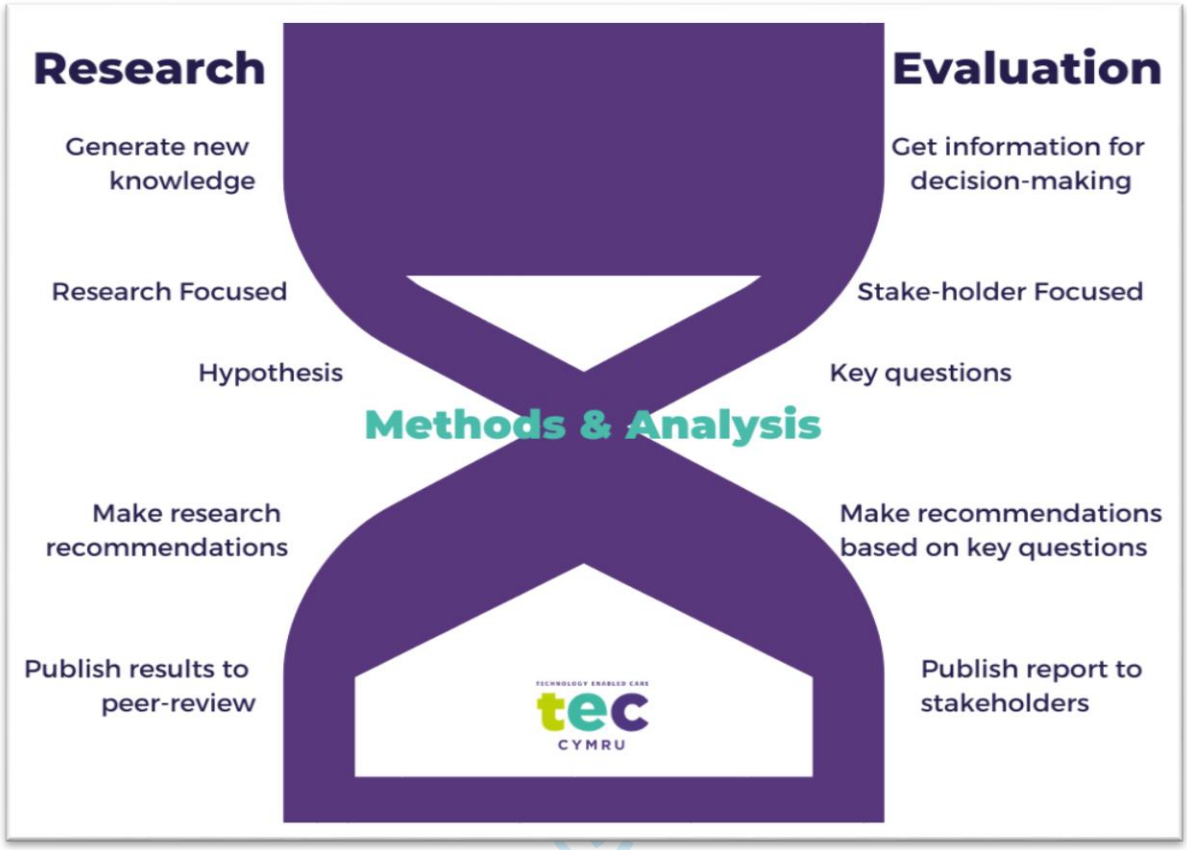
Diagram 1: Research & Evaluation Similarities and Differences



The aim of research is often focused on producing generalizable knowledge, which is empirical, theoretical, and controlled by the researchers (non-bias on findings). The aim of service evaluation is generally focused on specific and applied knowledge and aims to draw evaluative conclusions about quality or worth, and is controlled by those funding or commissioning the evaluation (more bias on findings). Evaluation has two main uses – accountability to funders and stakeholders by providing evidence of a project's overall impact and cost effectiveness; and learning by identifying what can be improved to gain greater understanding of a project and develop evidence for future projects.

To get the best out of a research and evaluation component of an intervention/programme, using both approaches can have many advantages, as standalone, they can have limitations, e.g., evaluation that is not research involves making judgements without systematic collection of data. Research that is not evaluation can take a lot of time and cost to design and prepare, and often unable to present any outcomes until the end of the process, which makes improvements along the way impossible. An example of an overlap methodology/analysis which complement each other well is a Four-Phased Quality Improvement (QI) Approach. This is discussed in the next sections.

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For more information on 'what is evaluation' and 'what to consider when planning an evaluation', watch these short videos:

What is Evaluation?

What to consider when planning an evaluation?

2. What is Quality Improvement (QI)?

Quality Improvement (QI) is a systematic approach to improvement that uses specific methods and techniques to improve quality. The Health Foundation's publication "*Quality Improvement Made Simple*" is a helpful read for those who are new to this way of working and can be found here. Also, see how QI is being used in Wales here.

An essential part of the success and sustainability of QI is the way it is implemented, and the approaches used. The key elements to achieve the best outcomes are the combination of 'change' (the improvement), the 'method' (the approach/the tools) and paying close attention to the 'context' and 'environment' in which the change is taking place (the people/the place).

There are many types or 'brands' of QI to choose from, using a wide range of methodologies and approaches, but many share the following principles to ensure that the 'change' is successfully implemented. These include:

- Understanding the problem (and existing data).
- Understanding the processes, systems and pathways within the service.
- Understanding the demand, capacity & flow of the service.
- Understanding the best approach/tools to bring about 'change' e.g., patient/professional participation, clinical engagements, leadership.
- Measurement for improvement, often using statistical process control charts.
- Evaluating the impact of the 'change' through qualitative and quantitative measures.
- Understanding the psychology of change and how to lead a change
- Understanding the impact of complexity and the adaptations required to meet cultural and contextual differences.

However, how the implementation of the 'change' is managed will depend on the 'context' of the service, and this in particular needs careful consideration, and 'quality' checks throughout.

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Six Dimensions of Improving Quality

The Institute of Medicine (IOM) suggests that improving quality in healthcare generally involves making it Safe; Effective; Patient-Centred; Timely; Efficient and Equitable.

Table 2 presents the six IOM dimensions and explains why they are considered primary priorities for any NHS intervention/programme and its Research & Evaluation component.

Table 2: Six Dimensions of Quality Improvement

SAFE:	Avoid harm to patients from care and services that is intended to help them.
EFFECTIVE:	Provide care and services based on robust evidence which produce clear benefit and improved outcomes.
PATIENT-CENTRED:	Establish equal partnerships between professionals and patients to ensure patients' needs and preferences are met, and their voices are heard.
TIMELY:	Reduces wait times and delays which may cause harm.
EFFICIENT:	Avoid wasting time, cost & resources.
EQUITABLE:	Provides care that does not vary in quality because of a person's characteristics – equal to all.

Please note: *To ensure that all the six QI dimensions are met, a four-phased research & evaluation approach (discussed in Section 3) would ideally be adopted, using mixed methodologies (discussed in Section 4) and patient and public involvement (PPI) (discussed in Section 5).*

Quality Improvement Approaches & Principles

There is a wealth of QI technical methodologies, many of which originated from use in the post war industry and have subsequently been adapted for use within healthcare. Despite the different names of the QI approaches, most approaches share underlying principles, and many QI methodologies use the same key tools, such as the simple Plan Do Study Act (PDSA) cycle that is described below. Some healthcare organisations choose to use a single systematic QI method, but most NHS organisations tend to choose the 'best fit' method for their context. In TEC Cymru some of the QI approaches and tools that are frequently used are also described below.

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Experience-Based Co-Design

This is a QI approach to 'improving patient's experience' of services, through patients and professional partnership to design services or pathways.

Data is gathered through surveys, in-depth interviews, observations and groups discussions (e.g., focus groups) and are analysed to identify 'touch points' (or themes) – which are aspects of the service that are of significance. A link to the toolkit and useful instruction videos is here.

Model for Improvement (including PDSA)

This is a QI approach to 'continuous improvement' where changes are tested in small cycles that involves planning, doing, studying, acting (PDSA), before returning to the planning, and so on. A link to a how to guide is here.

Each cycle starts with ideas and theories which evolve into knowledge that can inform action and intends to produce positive outcomes. To do this, these cycles are linked with three key questions:

- What are we trying to accomplish?
- How will we know that a change is an improvement?
- What changes can we make that will result in improvement?

Any change that is proposed should also be explained, discussed and communicated with the team.

Statistical Process Control

Statistical Process Control is a measurement technique that is frequently used in QI to chart data over time. It can help to visualise natural variation (common cause variation) and variation that has a special cause i.e., is not a result of natural variation (special cause variation). The approach uses control charts that display boundaries for acceptable variation in a process.

Data are collected over time to show whether a process is within agreed quality control limits in order to monitor performance and can be used to measure the impact of improvement ideas.

Data & Measurement for Improvement

Measurement and gathering data are vital in any attempt to improve performance or quality and are essential to assess its 'impact'. It is worth noting, however, that measuring for improvement differs across research & evaluation.

- Measuring for research – tests whether the intervention 'works'

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- Measuring for evaluation (or judgement) – helps key stakeholders gauge performance and to collate learning about the process.

When measuring for improvement in terms of QI, the learning develops through 'processes'. As a result of a process, the key questions or hypothesis will change throughout the project (unlike traditional research). As a result, the data is considered 'good enough' rather than 'perfect'. Instead of asking 'does it work?', QI asks, 'how it works, for whom, under which circumstances and to what extent?' Ultimately understanding 'what will constitute success?' It can be really helpful at the start of any improvement work to map out initial theories about how you will achieve the improvement aim, how you predict change will happen, and what inputs and outputs you expect. There are three useful tools to do this.

1. **Driver Diagram:** A driver diagram is a simple but effective tool that helps you to translate a high-level improvement aim into a logical set of underpinning goals ('drivers') and change ideas. It captures an entire project in a single diagram and also helps to provide a measurement framework for monitoring progress. An example of a driver diagram can be found here.

2. **Theory of Change Model**: A theory of change is a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context. It makes explicit the underlying assumptions about the project you want to evaluate and provides a visual representation of how your project will lead to the desired impact. It articulates how you expect change to happen and helps to describe the enablers and mechanisms of change. It is also a useful tool to build stakeholder relationships, as you can develop a theory of change collectively using co-production. It can help you communicate your project in a clear and simple way, showing your thinking about what the hoped-for outcome will be. This in turn helps to identify your evaluation and data needs. *"Developing a 'theory of change' can be useful way of articulating and providing a visual representation of the links between the various activities of service and how this will lead to the long term outcomes it is trying to achieve"* (NPC Guide to Developing Theory of Change) – see here.

3. **Logic Model:** Logic models describe the relationship between a project's inputs, activities, outputs, outcomes, and impacts. It can help you to see what you are putting into the project (the inputs), how the project uses the resources (the activities), what products are produced (the outputs), what change is predicted to be achieved as a result of this process (the outcomes) and the final intended and unintended changes that happened as a result of the intervention/programme (the impacts). A useful guide to developing a logic model can be found here.

This traditional QI approach does have limitations however, in that the 'does it work?' question still needs to be asked e.g., via a Randomised Controlled Trial. It is also important to

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measure change over time, using methods that make it possible to separate out improvement or deterioration, from the expected level of performance variations.

To do this, in TEC Cymru this process is split into 'four phases' across the time period of the intervention/programme. This is discussed in the next section.

To find out more on Quality Improvement approaches and principles see here.

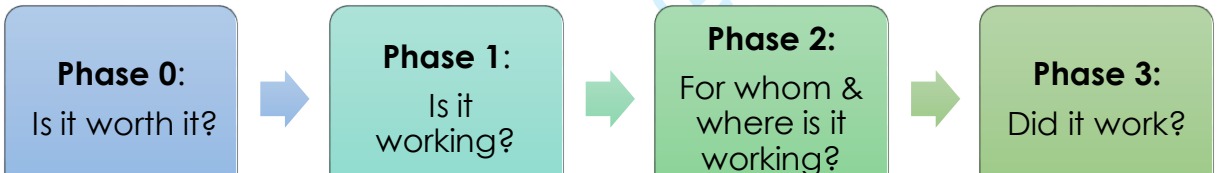
3. TEC Cymru's Four-Step Phased Approach

What is TEC Cymru's Four-Phase Approach?

TEC Cymru have developed a four-phase approach to their Research & Evaluation framework. This approach is tried and tested by TEC Cymru and is highly recommended as a robust method for data collection and analysis across a wide range of interventions/programmes.

In simple terms, **Phase 0** sets the stage; **Phase 1** and **Phase 2** captures data from adoption through to full implementation; and **Phase 3** tests it in its full form and determines long-term sustainability.

Phase Zero: 'Is it worth it?'



The Phase Zero is the 'discovery' phase of any intervention/programme within TEC Cymru. This phase sets out to understand its rationale and objectives in order to determine its value and worth for TEC Cymru as a programme, and the need for time and resources spent on research and evaluation.

At this phase, evidence is sought, literature reviews are conducted, appropriate ethical approvals are applied for and baseline data is captured to understand the 'public opinion' on the proposed intervention/programme, by way of baseline survey capture, public consultations or via patient and public involvement (PPI) – (discussed in Section 5). Access to the Welsh e-library can be found here.

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It is also important in this phase to consider *"The extent to which an activity or project can be evaluated in a reliable and credible fashion"* (OECD-DAC 2010; p.21) and to undertake an evaluability assessment. More information about how evaluability works and assessment templates can be found here. This can include structured engagement with stakeholders to clarify the goals of the intervention and how they might be achieved. It can be helpful to develop a driver diagram, logic model or theory of change to articulate a shared understanding of the work, which evaluation models will be used and to seek advice on whether or not an evaluation can be carried out at reasonable cost.

At the beginning of an intervention/programme, despite previous evidence and early baseline data capture, often very little is known about the targeted participant group required for the proposed intervention/programme, particularly in terms of the likely uptake of the intervention/programme, or its likely response or outcome. Therefore, at this point, very little is also likely to be known about the best method or approach to take to capture the best evidence from this targeted participant group.

From the perspective of TEC Cymru, it would be wasteful to spend several months on designing a flawless data collection method, instrument or measurement, and spending months applying for and awaiting the response of IRAS ethical approval to later realise that the participants were not willing to participate, or that the intervention/programme was to not demonstrate value/worth, and thus goes against the QIs dimensions (e.g., dimension 5 'efficiency' and dimension 1 'safety' by prolonging a service).

Due to this, TEC Cymru therefore suggest that if the intervention/programme has passed all necessary safety and quality checks, then holding its go-live/start date up due to research and evaluation delays may perhaps do more harm than good to its potential participants; but also, to go live without an evaluation component attached could do harm (or at least produce errors) to the evidence base.

TEC Cymru have therefore developed a four-phase approach to their Research & Evaluation strategy, which allows them as a team to determine the 'need' or requirements for further phases as they learn more and progress.

NOTE: *It is important to note that some of the phases or ethical approval applications will not be necessary for all types of interventions/programmes. This approach is merely an 'ideal guide' used by TEC Cymru.*

Phase 1: 'Is it working?'

By the time your intervention/programme reaches Phase 1, Phase Zero has led your team to believe that the proposed intervention/programme is of value and worth to the overarching intervention/programme and requires evaluation and research support.

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At Phase 1 you merely want to know **'Is it working?'**

In TEC Cymru, Phase 1 often attempts to answer this question by simply capturing data from service users (patients/families/professionals) via basic live feedback surveys (often attached to the intervention), which aim to capture measures such as the **'use' and 'value'** of the intervention/programme.

Often within the NHS, all is required to capture Phase 1-type data is Service Evaluation approval from a local Research & Development (R&D) department to begin 'early doors' evaluation. As Phase 1 progresses, and more is learned about the participant groups, additional ethical approvals (e.g., IRAS) and more in-depth planning and resources can proceed for the progression of further phases if needed.

From TEC Cymru experience, this phased approach allows for less waste, better planning, and provides a better understanding and awareness of the participant group, thus tailoring the next phases more appropriately. This ultimately improves the intervention/programme and its likely outcomes.

Phase 2: 'How is it working?'

By the time your intervention/programme reaches Phase 2, Phase 1 has led your team to believe it is working, but you are yet to understand **how it is working, for whom, under which circumstances and to which extent?**

In TEC Cymru, Phase 2 often attempts to answer this question by continuing to capture data from service users (patients/families/professionals) but by digging deeper. This is often via more in-depth feedback surveys which aim to capture measures around **'benefits and challenges'** of the intervention/programme and to begin to explore the longer-term **'sustainability'** of it.

TEC Cymru split their Phase 2 work into 3-6 month increments and refer to them as Phase 2a, b, c and so on. Ideally, TEC Cymru would suggest that Phase 2 would be an ongoing phase until the end of the intervention/programme to ensure there are no gaps in data capture moments/timeframes.

In addition, Phase 2 will seek to capture qualitative data to provide a richer understanding of its participant group, and the context for which the intervention/programme is based, e.g., via interviews and focus groups.

Phase 3: 'Did it work?'

By the time your intervention/programme reaches Phase 3, you should have a good understanding of your participant group and the context for which the

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intervention/programme is based. Phase 2 has led you to understand ***how it is working, for whom, under which circumstances and to which extent.*** But it's important to understand that this 'how' is still merely a judgment and still will not tell you if **it works**.

Phase 3 however, asks '**did it work?'**

Knowing if something officially **'works'** needs to be **'proven'**, and proof can only be derive from in-depth or experimental research testing measures such as **'efficacy and effectiveness'** e.g., cost or clinical effectiveness studies.

In TEC Cymru, Phase 3 often attempts to answer this question by working closely with service users and teams (relationships developed in Phases 1 & 2) to understand more specific areas of need and requirement for in-depth research. Then, reaching out and collaborating with others (e.g., academia, international experts) to apply for more advanced ethical approvals and conduct more in-depth or experimental research such as Randomised Controlled Trials (RCTs), cost effectiveness studies and more in-depth, research led qualitative approaches extending on specialised areas.

It is very important to note that, by the time you reach Phase 3, things need to shift up a gear and additional support and resources within your intervention/programme are needed.

For example:

- In Phases 1 and 2, key questions and requirements are generally based on intervention/programme 'remits' and 'must haves' (e.g., what the stakeholder has requested), Phase 3 however, operates more independently and as potential 'should haves' – in that it is now generating new knowledge which is distinctive and unique from original 'remits' (e.g., the unknown).

- Unlike the structure that Phases 1 & 2 allows, Phase 3 research requires the freedom and creativity of a research team to explore new themes that emerge from Phases 1 and 2, and therefore, at this point, need to be able to step outside of its original intervention/programme 'remit'. As you need to remember that there are likely to be newly emerging areas of interest and therefore unlikely to be in an original intervention/programme remit. In other words, if you attempt to 'restrict' natural data emergence and progression by preventing movement of 'intervention/programme remit change', you are potentially restricting true data findings which is the essence of research, and it is this essence that puts research over the top of evaluation in terms of error of judgement, non-bias, validity and reliability.

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- If your intervention/programme is unable to support the requirements of Phase 3, it should not be labelled as Research & Evaluation, but rather as a Service Evaluation component of a intervention/programme only, as the evidence in Phases 1 & 2 is merely provide a judgement on 'how to improve' and not as 'proven to work'.

- *Remember:* to 'improve' conduct service evaluation and to 'prove' conduct research; and to do it the TEC Cymru way – do both!

4. Using Mixed Methodologies

To expand the evidence-base as far as possible on any type of phased research and evaluation component of an intervention/programme, adopting a mixed methods approach is highly recommended by TEC Cymru.

Stakeholders and research funders strive to ensure high quality and safety for the public (and within the NHS, more specific to their patients, families and professionals). A mixed methods approach can do this – it can explore all types of trends and practices across participant groups and context and provide stakeholders a more rounded analysis and understanding of the problems and solutions.

What is Mixed Methods Research & Evaluation?

Mixed methods is an approach used to collect and analyse both quantitative and qualitative data within the same study (e.g., the intervention/programme).

A mixed methods approach is appropriate for answering questions that neither quantitative nor qualitative could answer alone.

Mixed methods approaches require a focused mixing of methods in data collection, analysis and interpretation of the evidence.

The key word here is **'mixed'**.

The important step in the mixed approach is the data 'linkage' or 'integration' at each appropriate stage of the Research & Evaluation process.

Data linkage/integration enables the research team to seek out a more 'inclusive (or panoramic) view and understanding' of the context and perspectives through different types of lenses.

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For example, in a mixed methods study, the quantitative data may provide knowledge on decisions, choices, change and outcomes, whereas the qualitative data provides the contextualised experiences attached to these measures, thus providing more in-depth information on the influential factors, triggers and true meaning associated to each of the measures. This type of mixed methods study can therefore provide an all-rounded understanding across the context and perspectives to answer a certain research question.

In other words, by using one method alone (e.g., a survey), can only partly answer a research question, but by using mixed methods, a fuller understanding is more likely to be captured, and therefore, more likely to answer the research question. If, as a researcher, you fail to answer the research question that you set out to answer, there will be a very high chance of producing significant gaps and misinterpretations in the data set, but also, there will be a need for more research in that area – ultimately producing a waste of time, resources and potentially additional external funding.

In addition, a mixed methods approach strengthens both the quantitative and qualitative methods allowing the research team to explore and compare diverse perspectives and uncover relationships that exist between the multifaceted key or research questions.

5. Using Patient & Public Involvement (PPI)

What is Patient & Public Involvement?

Patient and public involvement (or PPI for short) means actively working in partnership with patients and members of the public to plan, design, manage and carry out research and evaluation. This means that the research for a specific intervention/programme that is intended to improve or prove something for a patient or member of the public needs to be 'with' or 'by' them rather than 'to' or 'for' them.

The 'involvement' part of PPI is different to participation (e.g., taking part in research) and engagement (e.g., research dissemination).

Why is Patient & Public Involvement Important?

Involving patients and the public in research and evaluation strategies is very important to ensure that research design and management is relevant, and that its outcomes and outputs fit the needs of the intended audience (usually that of patients or members of the public).

PPI should be central to any Research & Evaluation intervention/programme and therefore, should sit centrally within each and every stage of its strategy, *and not just because* it is the 'right thing to do' – but input from lay people provides researchers with real life insight into what patients and the public 'want' and 'need' – which ultimately helps save time and resources on 'getting it right' for the user.

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The majority of research funding streams require applicants to clearly demonstrate how they plan to involve patients and the public in their research process and will require clear justification for not using them. This is also applicable for publications, in that PPI is now mandatory for many peer-reviewed journal submissions.

In other words, by neglecting PPI, you may be putting funding opportunities and dissemination outputs at risk.

What is the Patient & Public Involvement Process?

Patients and members of the public can be, and ideally should be, involved at each and every stage of the research process. This can include a wide range of approaches from bringing PPIs into the central team or attending pre-existing groups of PPI and raising issues and questions. Some examples are:

- **Identifying and prioritising** (e.g., hold an initial meeting with PPIs to discuss the best strategies)
- **Designing & Managing** (e.g., attend a pre-existing PPI groups to discuss design of data collection, and follow-up meeting on amendments or next phase designs)
- **Patient & Public-Researchers** (e.g., conducting data collection and analysis)
- **Dissemination** (e.g., co-authorship on publications and presentations)
- **Implementing** (e.g., involved in rolling out an intervention/programme)
- **Monitoring & Awareness** (e.g., gather views on and improve PPI impacts)

TEC Cymru suggest using different approaches to a PPI approach, including having central PPI members such as TEC Cymru Young Person Representatives, and also an Ad Hoc approach, e.g., attending pre-existing PPI groups and reach out to existing contacts to raise issues and capture feedback 'as and when' needed.

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6. Useful Links & Templates

NHS Health Board Service & Product Evaluation Application Forms
Contact your local R&D department for service or product evaluation application forms.

Integrated Research Application System (IRAS) Application Guidance
Follow link here

Information Governance & Data Protection Impact Assessments DPIA
Information Governance (IG) is a framework that brings together legal, ethical and quality standards that apply to the handling of information; it applies to all information and data especially sensitive and personal information. To find out more, contact your local Information Governance department.

TEC Cymru's Welsh/English Survey Design Example Template
Follow Link Here

TEC Cymru's Phase 1, 2 & 3 Reports, Publications & Presentations
Follow link here

TEC Cymru's Driver Diagram Example for Video Consulting Programme
See example copy attached p.18

TEC Cymru's Phase 0-2 Example Questions
See example copy attached p.19

TEC Cymru's PPI Contract (example of a TEC Cymru young person contract)
See example copy attached p.20-21

Further Reading and Helpful Links:

Clamp C, Gough S, Land L. Resources for Nursing: An Annotated Bibliography. 4th edn. London: Sage, 2004
http://www.nhsevaluationtoolkit.net/resources/case-studies/
https://www.betterevaluation.org/
https://www.informalscience.org/what-evaluation-0
https://www.rip.org.uk/resources/publications/evaluation-tools-and-guides/
https://www.nesta.org.uk/
https://www.wkkf.org/resource-directory/resources/2004/01/logic-model-development-guidehttps://www.gov.uk/government/publications/evaluation-in-health-and-wellbeing-guidance-summaries/evaluation-in-health-and-well-being-guidance-summaries
Evaluability Assessment | Better Evaluation
https://www.re-aim.org/about/what-is-re-aim/
https://www.gov.uk/government/publications/the-magenta-book
http://www.1000livesplus.wales.nhs.uk/sitesplus/documents/1011/Quality%20Improvement%20Guide%20-%203rd%20edition%20%28IQT%29%20WEB.pdf

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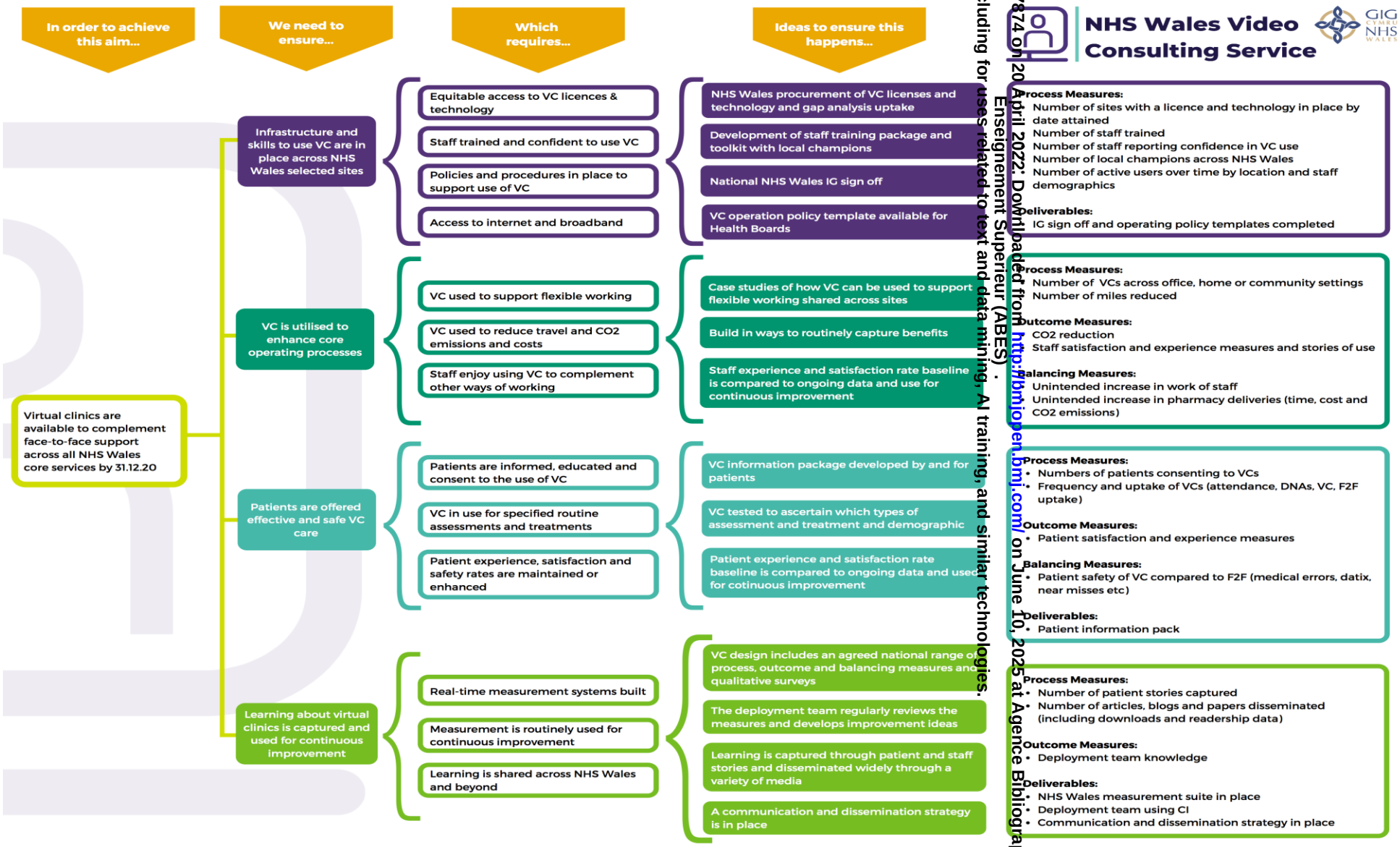

TECHNOLOGY ENABLED CARE

tec

Introduction

Technology Enabled Care (TEC) Cymru are a Welsh National Health Service (NHS) centre that enable the sustainable use, scale up and spread of technology in Wales.

TEC Cymru offers the patients and workforce of Wales a way to do more with less, by delivering benefits, and offering patient care closer to home.

TEC Cymru currently have three active programmes:

Becoming a TEC Cymru Young Person Representative

Opportunity & Role

Technology Enabled Care (TEC) Cymru offers young people in Wales, the opportunity to work alongside a national team and gain work experience across a range of programme, technical, clinical and research expertise. There will be a wide range of opportunities available to a young person representative, and these will be discussed and offered in the group meetings.

The role of the Young Person Representative is to represent young people in Wales to the adult's in TEC Cymru and their partners and stakeholders.

We promise to:

- Listen to your opinions and feedback
- Keep your safe
- Help you develop skills and expertise
- Respect and support you
- Provide you with recognition for your time at TEC Cymru (e.g., certificates, letters of recommendation).

Recruitment

The young people are recruited by the clinical lead and research lead of TEC Cymru, and will be part of the young person group panel on a one-year rolling contract (with the option to leave the contract at any time, if you wish).

If you know of anyone else who would like to be a young person representative for TEC Cymru, please forward their details to the group lead.

Group Attendance

TEC Cymru hold group discussions with young people using Microsoft Teams and each group meeting will last approximately 1-hour. Meetings will be set up by the group leader, and will be sent out in plenty of time before the group date/time.

We run our young person group discussions on an ad hoc basis (in other words, 'as and when' needed or necessary). This provides the flexibility to our young person to not feel tied to a commitment or a set schedule of fixed hours, but rather the ability to attend as and when they can.

Whilst these meetings are optional, we do encourage regular attendance for our young people to get the best out of the experience working with TEC Cymru.

As a TEC Cymru Young Representative we do ask you however to:

- Please inform the group lead if you are unable to attend a group meeting.
- Respond regularly to feedback requests, emails, and texts.
- Inform TEC Cymru of any changes to your contact details
- Inform TEC Cymru of any changes in circumstances that may impact on your role as a young representative.
- Inform TEC Cymru if you no longer wish to be a young person representative, so we can officially end your contract, and provide you with a final thanks and certification for your time at TEC Cymru.

Meeting Rules

The group meetings are informal and friendly, and allow for an open and honest discussion between group members.

But, we ask all group members to:

Group Dynamics

1. Be confident, and express opinions and points of view, but in a respectable and supportive manner.
2. To work as a team, share ideas and offer support and encouragement to other group members.
3. Make sure everyone has a chance to speak, and be respectful of other member's opinions.
4. If you are worried or concerned about anything that has been discussed in the group, please contact the group leader by email or text after the group session.

Physical 'Musts'

5. If you have a comment or question mid-conversation, please raise your 'virtual' hand or add a comment to the char box to let other members know you wish to talk, rather than interrupt.
6. Please do not record or take pictures of the group session or its members at any time.
7. Please do not share any personal stories or discussions that may arise with others outside of the group.
8. Please do not share anything discussed in the group on social media.
9. Ensure your own virtual space in a private and quiet room to allow the group to can run smoothly without too many distractions or interruptions.
10. Always remember to protect yourself and your identity, for example make sure that your video background doesn't show anything you are uncomfortable to share (e.g., personal photos, paperwork with personal information on)

Signed Consent

To become an official TEC Cymru Young Person Representative, you will need to provide consent by signing and dating below, and if you are under 18 years old, your parent/guardian will also need to provide consent by signing and dating below.

Signature of young person

Date

__ / __ / __

Signature of parent/guardian

Date

__ / __ / __

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Example Questions Phase 0-2

Phase Zero asks 'is it worth it?'
To answer the question, TEC Cymru often capture existing data by way of conducting:

- Literature Reviews
- Systematic or Meta-Analysis Reviews

This existing data capture would provide a broad understanding of the question asked, but less likely to know if it is worth it in a specific local area, for example.

If this is needed, then the next step in Phase 0 would then run baseline consultations, such as:

- Consultations (e.g., with professionals, clinicians, stakeholders)
- Patient/Public Involvement (PPI) group discussions
- Baseline Surveys
- Process Mapping Exercises.

The types of questions asked in Phase Zero may include:

1. What is the understanding of the proposed intervention/programme? (As a broad view, and local view).
2. Do they think the proposed intervention/programme would add use and value in that area?
3. Do they think the proposed intervention/programme would deliver benefits to the public/patients/professionals?
4. Do they see any significant challenges or barriers that would clearly outweigh the potential values or benefits?
5. For whom, under which circumstances and to what extent do they think the proposed intervention/programme would provide value and benefits?
6. Do they think the proposed intervention/programme would work?

These scoping questions aim to determine the next steps taken in the TEC Cymru phased approach. In other words, what other questions need asking?

Phase 1 asks 'is it working?'
To answer the question, TEC Cymru often capture existing data by way of conducting:

- Live Surveys (e.g., attached to intervention)
- Retrospective Surveys (e.g., request additional feedback)
- Interviews

The types of questions at this phase will be looking to measure **'use and value'** of the intervention/programme that is being evaluated.

The types of questions that would be asked in Phase 1 would be:

1. Rate the quality or value of the intervention/programme (using a star scale from excellent to poor).
2. What type of technology/device for example, was used to access the intervention/programme (using drop-down list).
3. Have you used the intervention/programme before, and if so, how many times?
4. Would you use the intervention/programme again? Probe for additional feedback as to 'why'.
5. Did the intervention/programme do something as an addition to a traditional method (e.g., a digital intervention may prevent the need for a face-to-face appointment).

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6. What type of clinical setting or reason are you using the intervention/programme for? (using drop-down list)
7. Request for a 'few' demographic questions – e.g., age, gender, Health Board.
8. Any other comments?

Phase Two asks 'who is it working for, under which circumstances and to what extent?'
To answer these questions, TEC Cymru often capture existing data by way of conducting similar approaches to Phase 1, just more in-depth.

- Live Surveys (e.g., attached to intervention)
- Retrospective Surveys (e.g., request additional feedback)
- Interviews & Focus groups

The types of questions at this phase will be looking to measure **'benefits, challenges & sustainability'** of the intervention/programme that is being evaluated. The types of questions that would be asked in Phase 2 would be:

1. Rate the quality of the intervention/programme (using a star scale from excellent to poor).
2. What type of technology/device for example, was used to access the intervention/programme (using drop-down list).
3. Did you experience any difficulties or challenges using the intervention/programme? (Perhaps use a matrix format, and list difficulties/challenges to select from, and their level of severity).
4. Did you experience any advantages or benefits using the intervention/programme? (Perhaps use a matrix format, and list advantages/benefits to select from, and their level of severity).
5. Have you used the intervention/programme before, and if so, how many times?
6. Would you use the intervention/programme again? Probe for additional feedback as to 'why'.
7. Did the intervention/programme do something as an addition to a traditional method (e.g., a digital intervention may prevent the need for a face-to-face appointment).
8. What type of clinical setting, professional or reason are you using the intervention/programme for? (using drop-down list)
9. Request more in-depth demographic questions – e.g., age, gender, ethnicity, household income, disability, Health Board and Local Authority,
10. Has the intervention/programme impacted on your clinical outcomes?
11. Any other comments?
12. Provide an opportunity for participants to take part in further research such as a follow-up interview (e.g., provide a contact email at the end of the survey for keen participants to reach out to you).

Please note: TEC Cymru will always recommend a mixed methods approach. Therefore, even in surveys, add lots of free-text 'comment' options to allow for additional individuality and opinion to be expressed by your participants. This narrative will likely provide rich and meaningful data that drop-down and tick boxes cannot do alone.

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Meet the Team

Gemma Johns, Research & Evaluation Lead

Gemma is TEC Cymru's Research and Evaluation Lead, who manages a team of Research Assistants across three programmes in TEC Cymru.

Gemma has a keen interest in the interface between health and social care and digital innovation. Gemma is also doing a PhD in Medical Sociology at Bristol University.

For more information about the framework or TEC Cymru's research & evaluation, please email Gemma at:
Gemma.Johns3@wales.nhs.uk

Professor Alka Ahuja MBE, Consultant Psychiatrist & National Clinical Lead

Alka is a Consultant Child and Adolescent Psychiatrist at Aneurin Bevan University Health Board. Alka is the National Clinical lead for the Welsh Government Technology Enabled Care Programme. She is the incoming Vice chair of the Child and Adolescent Faculty of the Royal College of Psychiatrists and the Public Education lead, Royal College of Psychiatrists in Wales. Also a Visiting Professor at University of South Wales and an Honorary Professor at Cardiff University.

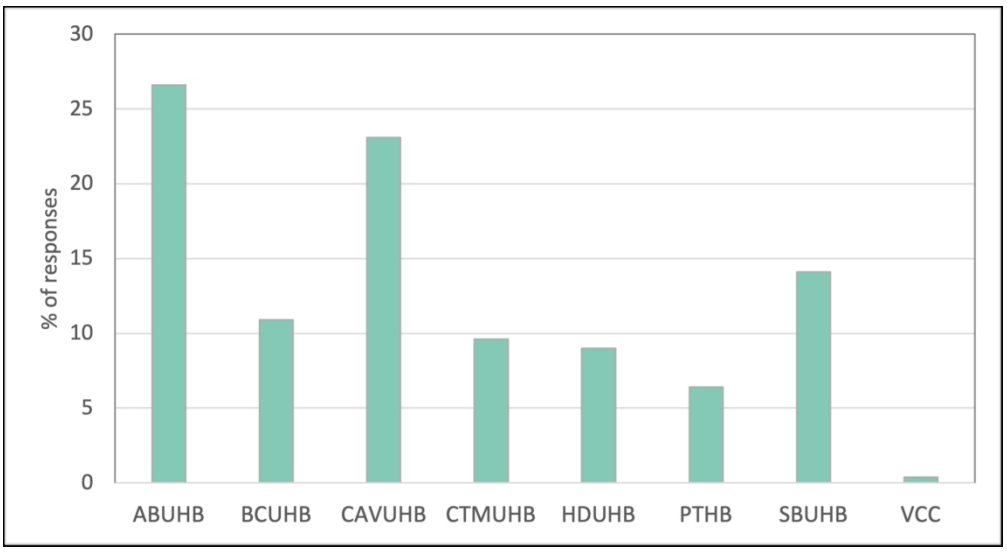
She has expertise in qualitative research methodology and her areas of special interest include neurodevelopmental disorders including autism and ADHD, user and carer involvement in healthcare services and employment of digital technology in healthcare. Twitter: @AlkaSashin

Anna Burhouse, Director of Quality Development Northumbria Healthcare NHS FT

Anna trains and coaches staff from the NHS across the UK to lead complex quality improvement work and to scale and spread innovations.

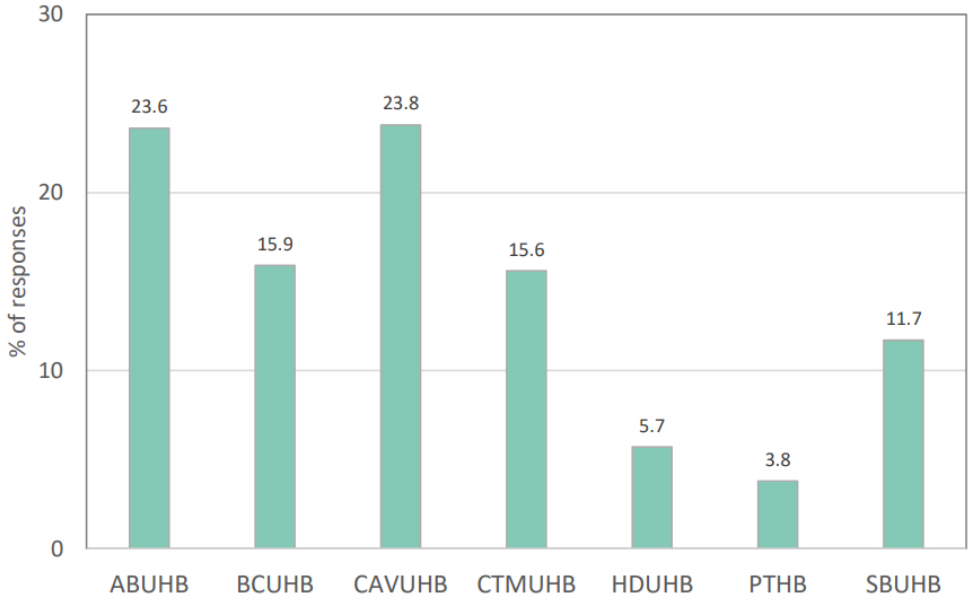
Anna is a qualified coach, Health Foundation Improvement Fellow, Ashridge Business School alumni in Leadership for Improvement and an Honorary Senior Research Fellow at the University of Bath Centre for Healthcare Innovation and Improvement and Chair of the Engagement and Involvement Advisory Board at The Health Improvement Science Institute at Cambridge University.

Alongside her work in improvement Anna maintains her clinical practice as a Consultant Child and Adolescent Psychotherapist in the NHS working with young people to innovate new approaches to wellbeing. Twitter @annaburhouse



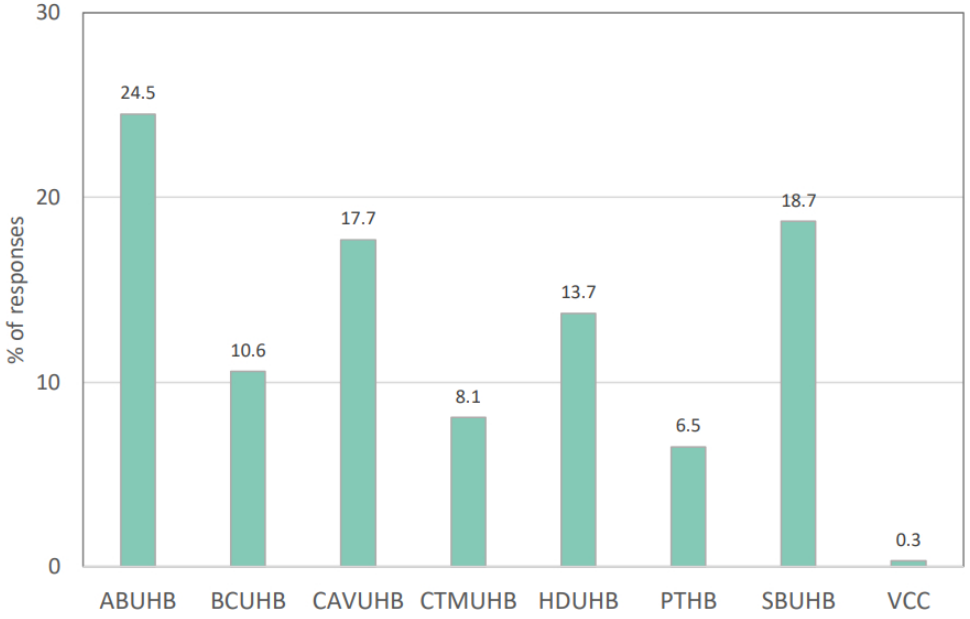
Appendix 1 Health Board and Trust Distribution

151x81mm (330 x 330 DPI)



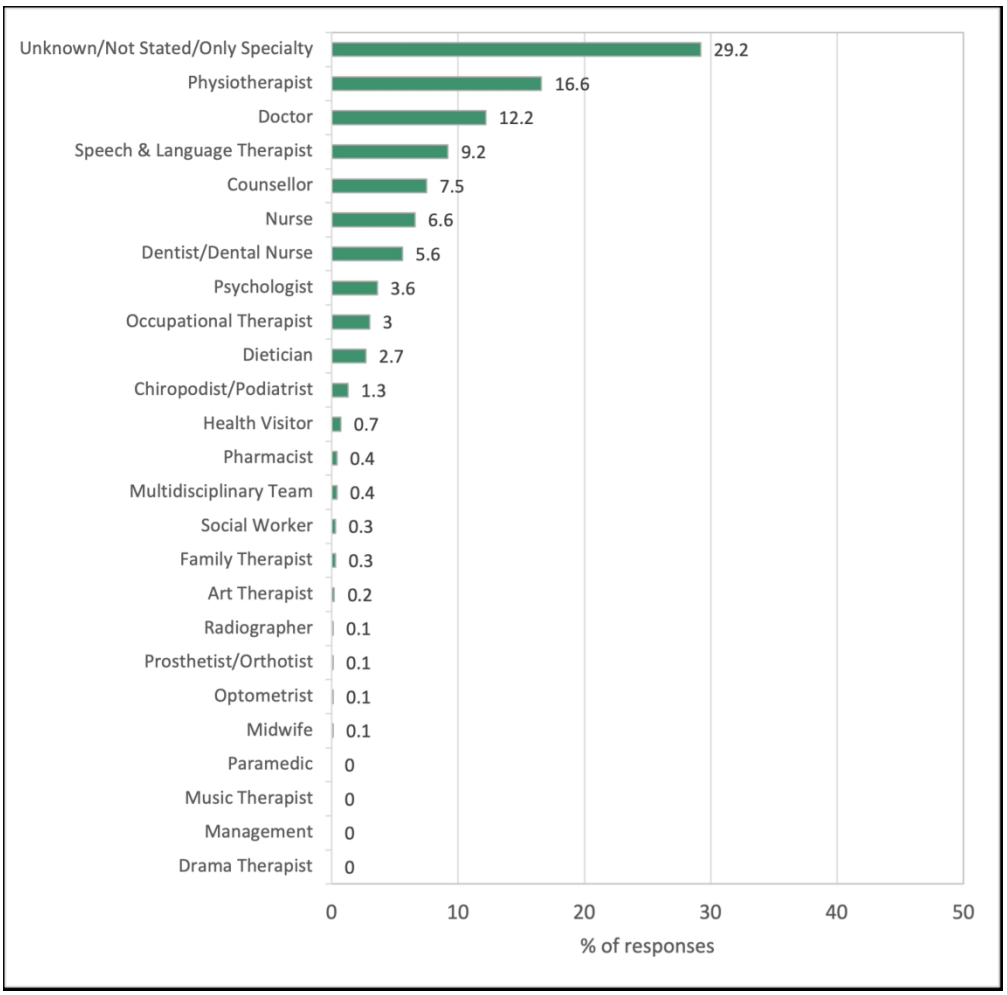
Appendix 2
Breakdown of Primary, Secondary and Community Care responses. Primary care responses

592x362mm (38 x 38 DPI)



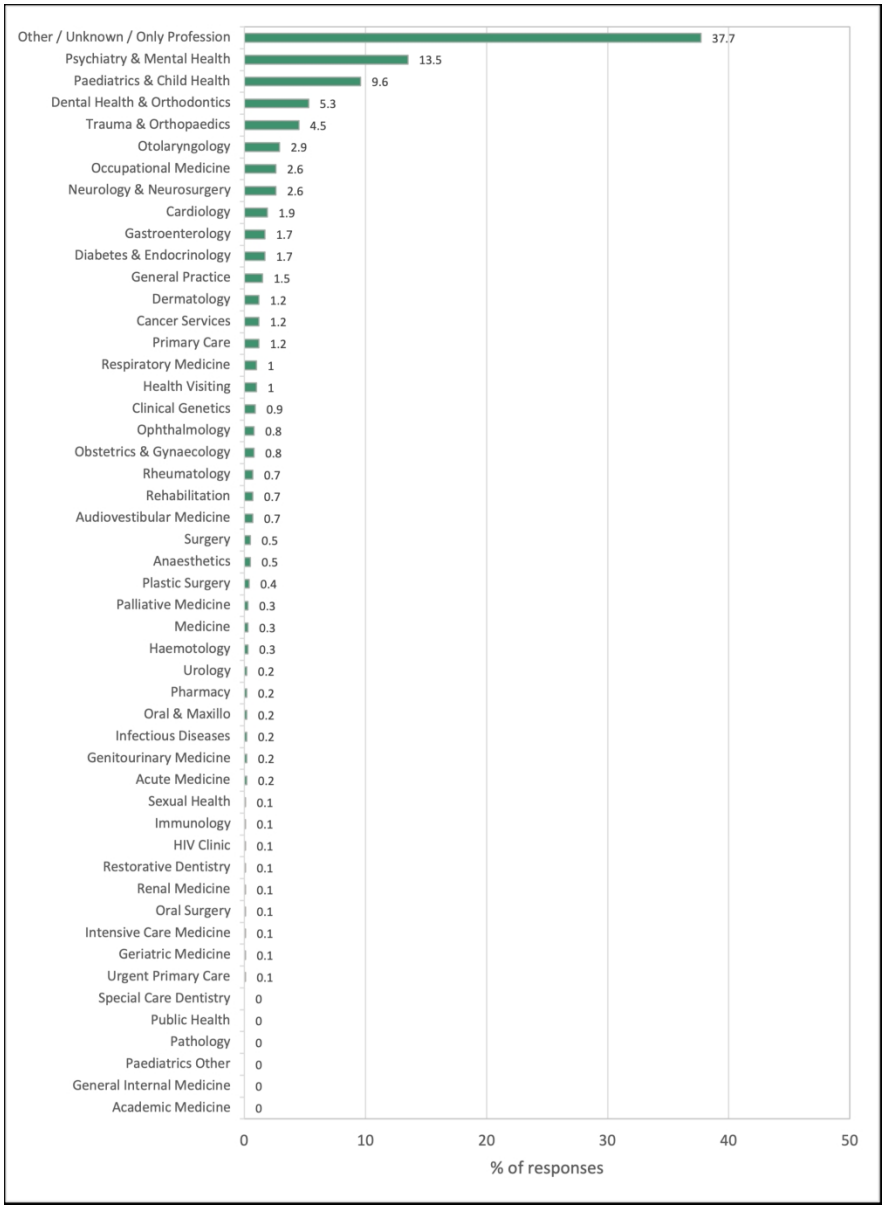
Appendix 3. Secondary and Community Care Responses

606x381mm (38 x 38 DPI)



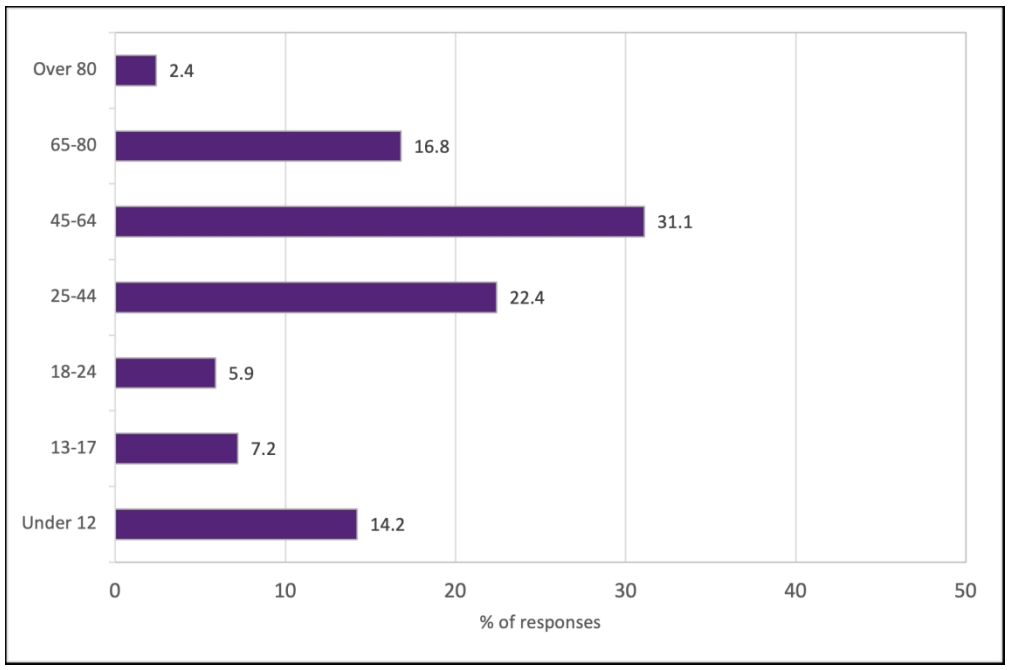
Appendix 4. Clinician Professions

159x157mm (330 x 330 DPI)



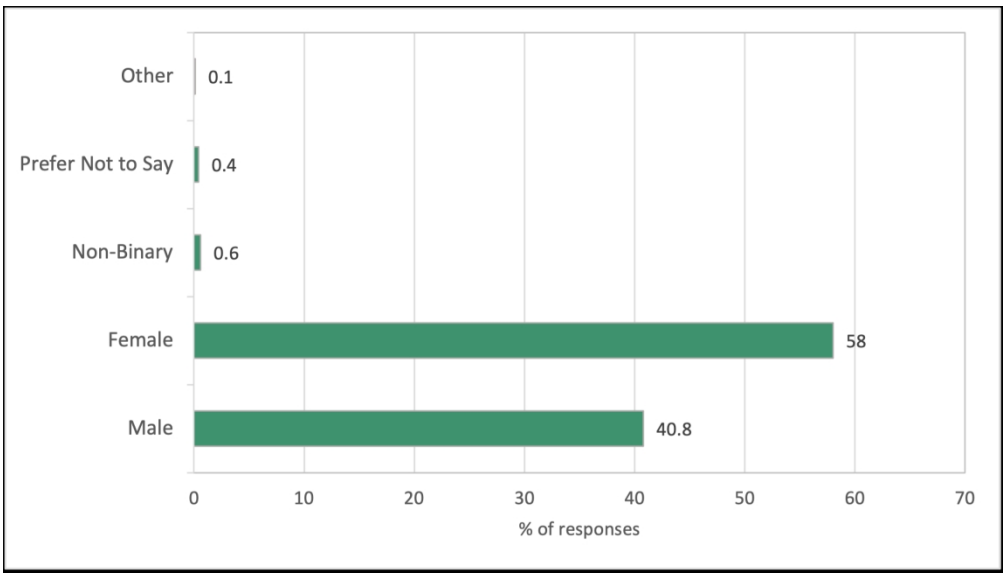
Appendix 5. Clinician Specialities

166x227mm (330 x 330 DPI)



Appendix 6. Patient Demographics. Patient Age

159x105mm (330 x 330 DPI)

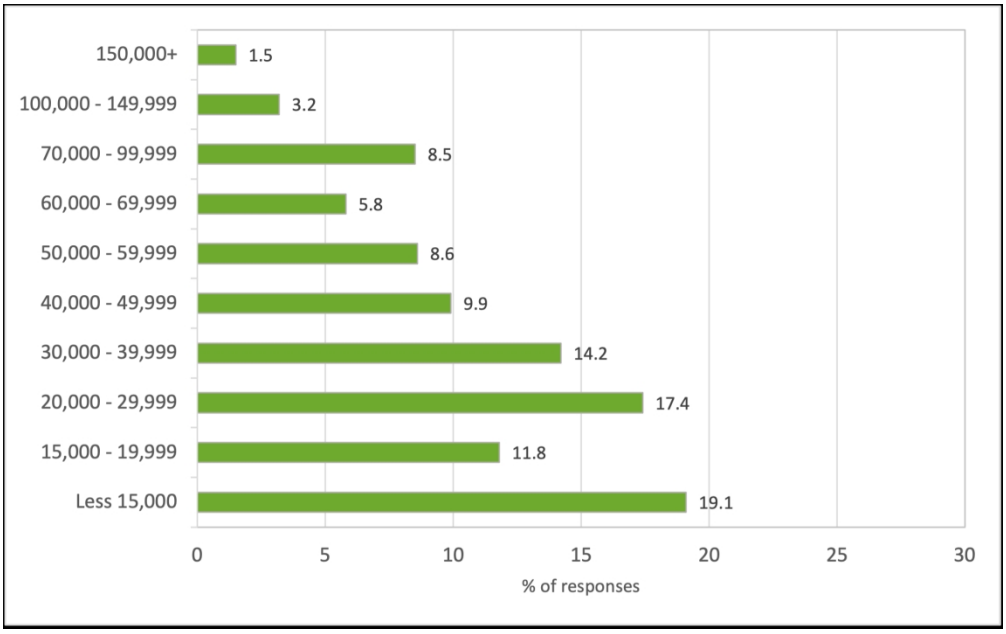


Appendix 7. Patient Demographics. Patient Gender

159x90mm (330 x 330 DPI)

Appendix 8. Patient Demographics. Patient Ethnicity

160x211mm (330 x 330 DPI)



Appendix 9. Patient Demographics. Household Income

163x102mm (330 x 330 DPI)

Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

	Page/line no(s).
Title and abstract	
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	P1,2-3
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	P2, 46-66
Introduction	
Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	P2, 70-98
Purpose or research question - Purpose of the study and specific objectives or questions	P3, 100-107
Methods	
Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	P3, 113-120
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	P20, 592-601
Context - Setting/site and salient contextual factors; rationale**	P4, 124-128
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	P4, 137-146
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	P5, 149-158
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	P5, 161-169

Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	P4, 32-35
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	P4, 124-129
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	P5, 61-69
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	P5, 62-69
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	P5, 65-69

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	P5, 72-83
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	P6, 86-513

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	P17, 516-562
Limitations - Trustworthiness and limitations of findings	P19, 565-579

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	P19, 585
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	P19, 582-583

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: 10.1097/ACM.0000000000000388