SIGNANT HEALTH
THE EVIDENCE GENERATION COMPANY™

eBOOK

ELECTRONIC PATIENT-REPORTED OUTCOME (ePRO) MEASURES FOR OLDER STUDY PARTICIPANTS

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The clinical trial industry is adopting technology to improve the efficiency and quality of trials, including electronic clinical outcome assessments and specifically, electronic patient-reported outcome assessments (ePRO). ePRO is now an accepted method of data collection in clinical trials. However, sponsors sometimes ask whether older people can manage electronic data collection. Signant Health conducted qualitative research to better understand how older study participants interact with technology.

Our research found that the younger individuals within this age group shared experiences and attitudes towards mobile devices as the rest of the population. While older participants expressed some reluctance toward unfamiliar technology, all participants accepted and used the electronic tools. This eBook describes Signant Health's research, offers considerations for implementation, and outlines ePRO best practices for this participant population. The full article on our research is published in the *Journal of Comparative Effectiveness*.[1]

INTRODUCTION: ePRO & OLDER PARTICIPANTS

A patient-reported outcome (PRO) measures a patient's perception of their symptoms, mental state, or the effects of a disease, condition, or medical treatment as reported by the patient themselves. PROs may be the best method to collect certain insights (e.g., pain intensity, nausea, moods, and feelings). Today's regulatory guidelines strongly encourage clinical trial sponsors to adopt electronic methods over traditional, paper questionnaires. In fact, eCOA (electronic clinical outcome assessment) is now a widely accepted method of data collection.

WHY IS eCOA IMPORTANT?

eCOA employs technology to allow patients, clinicians, and caregivers to directly report clinical outcomes. Electronic collection is associated with greater data quality and integrity compared to pen and paper, providing a better understanding of the patient experience and simplifying the approval process. Additionally, eCOA solutions are often tailored to best support patients throughout the trial. For example, built-in reminders alert patients of assignments due and configurations ensure all questions are completed.

While older participants have successfully used ePRO applications during clinical studies[2,3], some practitioners remain concerned that older populations will not be capable of managing the mobile technology. In general, sponsors and study teams are concerned the older participants face physical challenges, such as deteriorating eyesight. The biggest concern though is the unfamiliarity and proficiency with mobile technology.

WHY IS THIS POPULATION IMPORTANT?

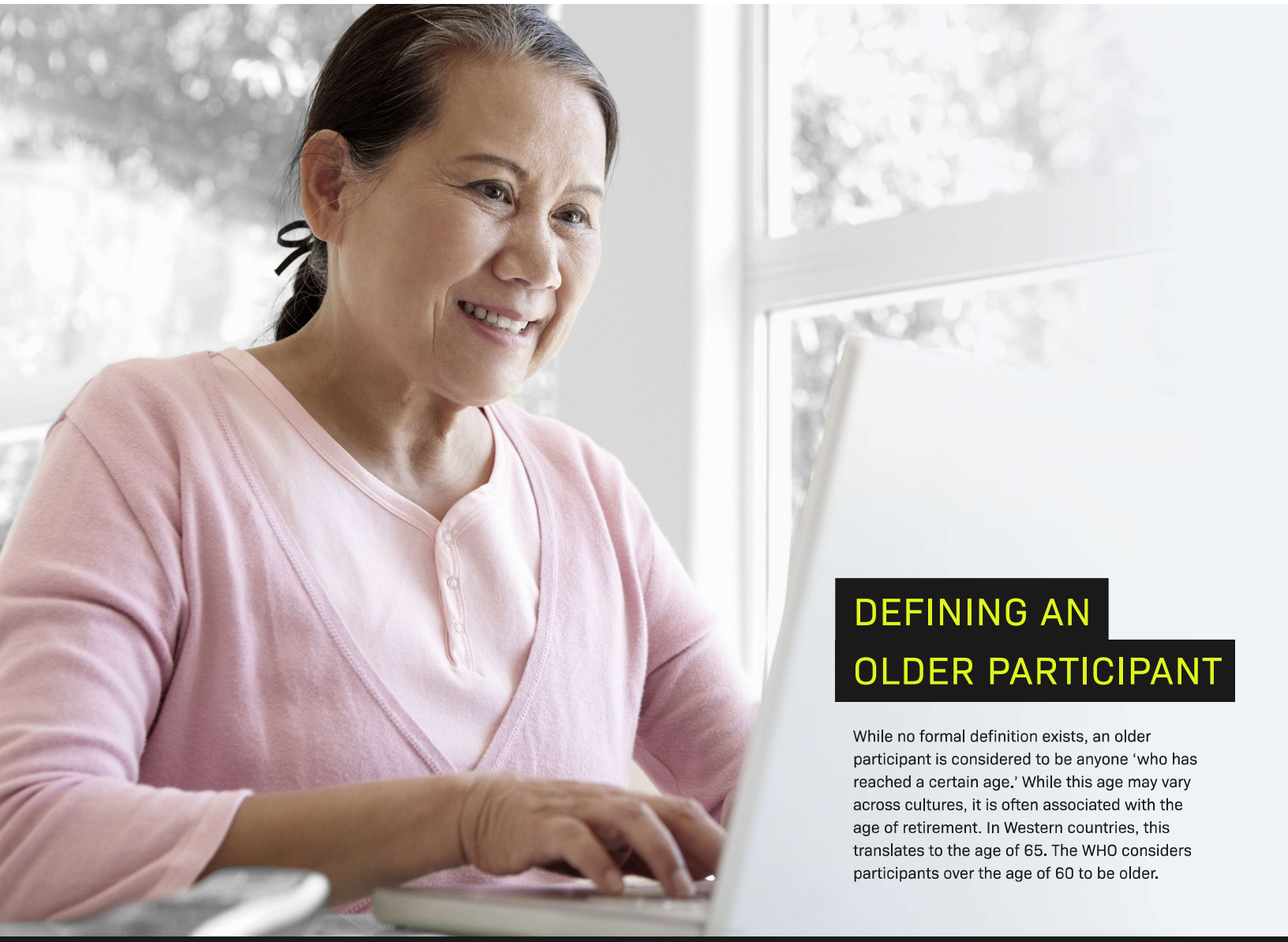
Older study participants are important as they represent a significant segment of patients. The world's population aged 60 and over will more than double with absolute numbers of 900 million in 2015 to 2100 million in 2050.[4]

In addition, the eCOA market is predicted to grow as the benefits of completeness of data, timeliness, accuracy, and attributability are proven. Regulators will continue to recommend the electronic data collection.[5]

Older users can be involved in trials across the spectrum of therapeutic areas. Some common indications that are particularly relevant for this demographic include rheumatoid and osteo-arthritis, type II diabetes, respiratory conditions, cancer, cardiovascular conditions, and central nervous system diseases.

The effect of drugs should be studied in all age groups. Poor representation of older patients in clinical trials leads to inadequate evidence and knowledge regarding drug therapy in older populations.[6] Regulatory bodies such as the European Medicines Agency (EMA) and the Food and Drug Administration (FDA) play an important role in protecting the health of citizens of all ages. Recognizing the importance of fair inclusion, regulators and other organizations should be mindful to not exclude the older generation from their research.

One active group in this field is PREDICT (Increasing the Participation of the Elderly in Clinical Trials), a consortium funded by the European Union to study the participation of older people in clinical trials and propose ways of boosting recruitment. Many guidelines and recommendations, including those issued by the Food and Drug Administration (FDA), state that technology should not prevent study participation, but they also advocate for the use of mobile technologies.



DEFINING AN OLDER PARTICIPANT

While no formal definition exists, an older participant is considered to be anyone 'who has reached a certain age.' While this age may vary across cultures, it is often associated with the age of retirement. In Western countries, this translates to the age of 65. The WHO considers participants over the age of 60 to be older.

AGE-SPECIFIC CONCERNS

There is sometimes a perception that older patients will be unable to use ePRO systems.
Signant Health has noted that some sponsors and study teams have raised general concerns such as:

"How will older people manage in the trial?"

"The older population simply won't use it."

THEY HAVE ALSO MENTIONED THE FOLLOWING SPECIFIC CONCERNS:

CONCERN	OUTCOME
Deteriorating eyesight	Difficulty getting to site and difficulty reading PRO assessments
Reduced hearing	Difficulty hearing personnel during site visits or diary reminder alarms when at home
Lack of digital proficiency	Poor ePRO compliance
Memory loss	Forgetting to visit the site or complete assessments/questionnaires
Low tolerance to fatigue	Difficulty completing long or complex assessments
Reduced dexterity	Difficulty holding a mobile device & selecting responses using a touchscreen
Reduced mobility	Difficulty getting to the site

SOME OF THESE CONCERNS ARE SPECIFIC TO ePRO TECHNOLOGY. HOWEVER, MANY APPLY EQUALLY OR MORE SIGNIFICANTLY TO TRADITIONAL, PAPER-BASED COLLECTION METHODS.

SIGNANT HEALTH RESEARCH

We conducted a study to better understand how older participants interact with mobile technology.

To do this, we investigated the experience and attitudes of older participants toward mobile technology. Then we used the data to generate recommendations for ePRO usage with older clinical trial participants.

RESEARCH METHODS

An interview guide was prepared by the user experience team at Signant Health in order to explore three high-level areas:

1. Experience and considerations relating to electronic media
2. Attitudes towards remote clinical consultations and whether telephone or video consultations can be effectively conducted
3. Preferred, educational features that make the learning process easier

Participants were recruited from a community and social group for older people in the UK. The research project was described to members at a meeting and volunteers were invited to be interviewed.

The study aimed to recruit participants of both sexes over the age of 60. The sample was supplemented with participants recruited via personal networks. The participants were interviewed either in person or over the telephone by an experienced, qualitative interviewer. Interviews ranged from 30 minutes to 1 hour. Participants discussed their eyesight, hearing, and dexterity, so that the study team would have the context to better assess the challenges.

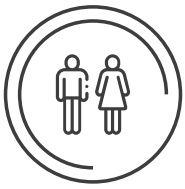
Interview findings were coded in Word and then the findings were grouped into themes in Excel.

Key quotations were extracted from the interview notes.

RESEARCH FINDINGS: GENERAL

Participants were between 65 and 83 years old

The mean age was 72.6 years old



Both men and women participated

100% reported at least one physical limitation

Deteriorating eyesight was reported by all participants. However, they all had their sight corrected with glasses and many knew how to increase the size of the text on their mobile devices

"If the text is small, I enlarge it especially when my eyes get tired and blurry. The enlarging function is useful."
Age 70

30% reported hearing difficulties

0% reported significant dexterity issues

Other physical challenges reported included the loss of one eye, age-related macular degeneration, and type II diabetes

CURRENT MOBILE TECHNOLOGY USE

Age is not the most important factor in terms of interacting with technology – general health and attitude are. The younger participants within this demographic shared similar experiences and attitudes towards touchscreen devices as the rest of the general population. This group had a positive attitude towards technology.

- 90% used touchscreen devices
- All participants had a mobile phone
  - 70% had a smartphone
  - 30% had a feature phone (a mobile phone with buttons and no touchscreen that doesn't connect to the internet)
- Feature phone users were at least 75 years old
- 70% reported having a tablet device
- Some found that tablets were easier to use and read than smartphones due to their screen size
- 80% found mobile devices easy to interact with. One participant said they found it 'okay' and would increase the size of the text if it was too small. One said that they sometimes found it hard to read toward the end of the day once their eyes were tired
- All had internet at home
- None of the participants reported problems with charging devices although one participant (age 83) stated that they sometimes forget and couldn't always find the charger. In regards to keeping devices charged:

  "No problems. I have a system. The charger is always plugged in in the same place and I charge it every night, overnight." *Age 70*
- The participants under 75 used their smartphones to keep in touch with family and friends, research information, play games, and shop online:

  "I use an iPad to read and send emails and do online shopping. I use internet sites like YouTube to look at songs and song layouts for the guitar." *Age 65*

  "I want to be able to use technology to send emails to people that I don't see so often and keep in touch with them twice a year." *Age 75*
- 30% used a large touchscreen device to register for appointments
- 20% order prescriptions online:

  "I do always order my prescriptions over the internet, which works well. You just register to the site and it's all done, really easy and much better than messing about with the surgery." *Age 81*
- Positive attitudes were expressed toward technology that they were already using and in one case (age 81) there was positive enthusiasm; others were more pragmatic. In regards to using touchscreen devices:

  "Yes, it keeps me sane." *Age 81*

  "I neither enjoy it or don't enjoy it. I just do it. They are a helpful tool for accessing so much extra knowledge, the knowledge and the access is the enjoyable bit." *Age 65*

PREFERENCE FOR SIMPLICITY & FAMILIARITY

- The participants expressed a preference for simplicity, with a slight reluctance toward unfamiliar technology:

  "Simplicity is key." *Age 75*

- One participant used a tablet every day instead of her mobile feature phone. She said she didn't want a mobile phone, but it was useful for updating her daughter when traveling:

  "I can't really get on with it. I want an idiot-proof phone with no rigmarole – you just press the buttons and speak to someone." *Age 83*

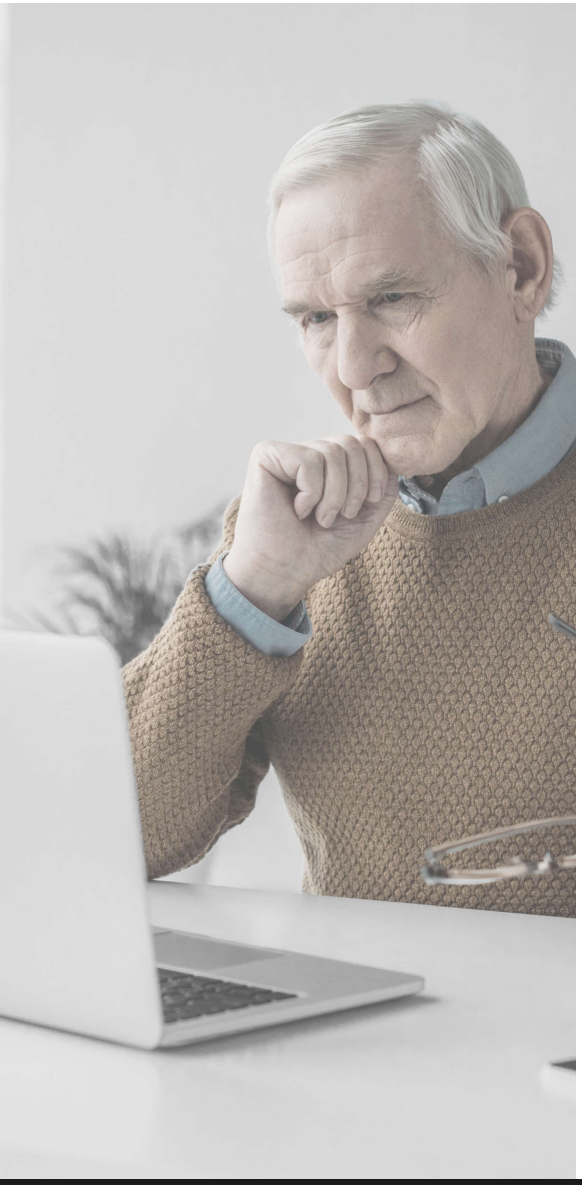
- One participant shared that her son can become frustrated with her use of technology, saying:

  "You don't even press the buttons to see what happens." *Age 75*

- Some participants perceived that they might not be able to manage a new piece of technology:

  "Yes. I would do user testing, but I wouldn't be very good at it and I would feel overly worried about doing the wrong thing and looking stupid." *Age 70*

- 90% of participants gave specific examples of a new technology that they had learned to use
- One of the oldest participants was enthusiastic about new technology



LEARNING PREFERENCES & TRAINING MATERIALS

Participants told us how they preferred to learn and remember new things. Methods considered included video, written materials, and audio recordings.

- 60% preferred video training with supplementary written instructions
- 10% preferred audio recordings
- All had the desire to learn and a personal interest
- Most preferred learning by doing
- Participants typically recalled a recent learning experience that gave a sense of achievement

HOW DO YOU LEARN AND REMEMBER NEW THINGS BEST?

"From the TV and speaking to people and if I want to know more, I Google it. I like to talk to Google 'Google, can you tell me. . . ?'" Age 81

"I like to have a leaflet. Leaflets are easy to refer back to, I like anything visual but not really audio so much. Of course, it depends on the quality of the writing." Age 65

WHEN WAS THE LAST TIME YOU HAD TO LEARN A NEW TECHNOLOGY? HOW DID YOU LEARN HOW TO USE IT?

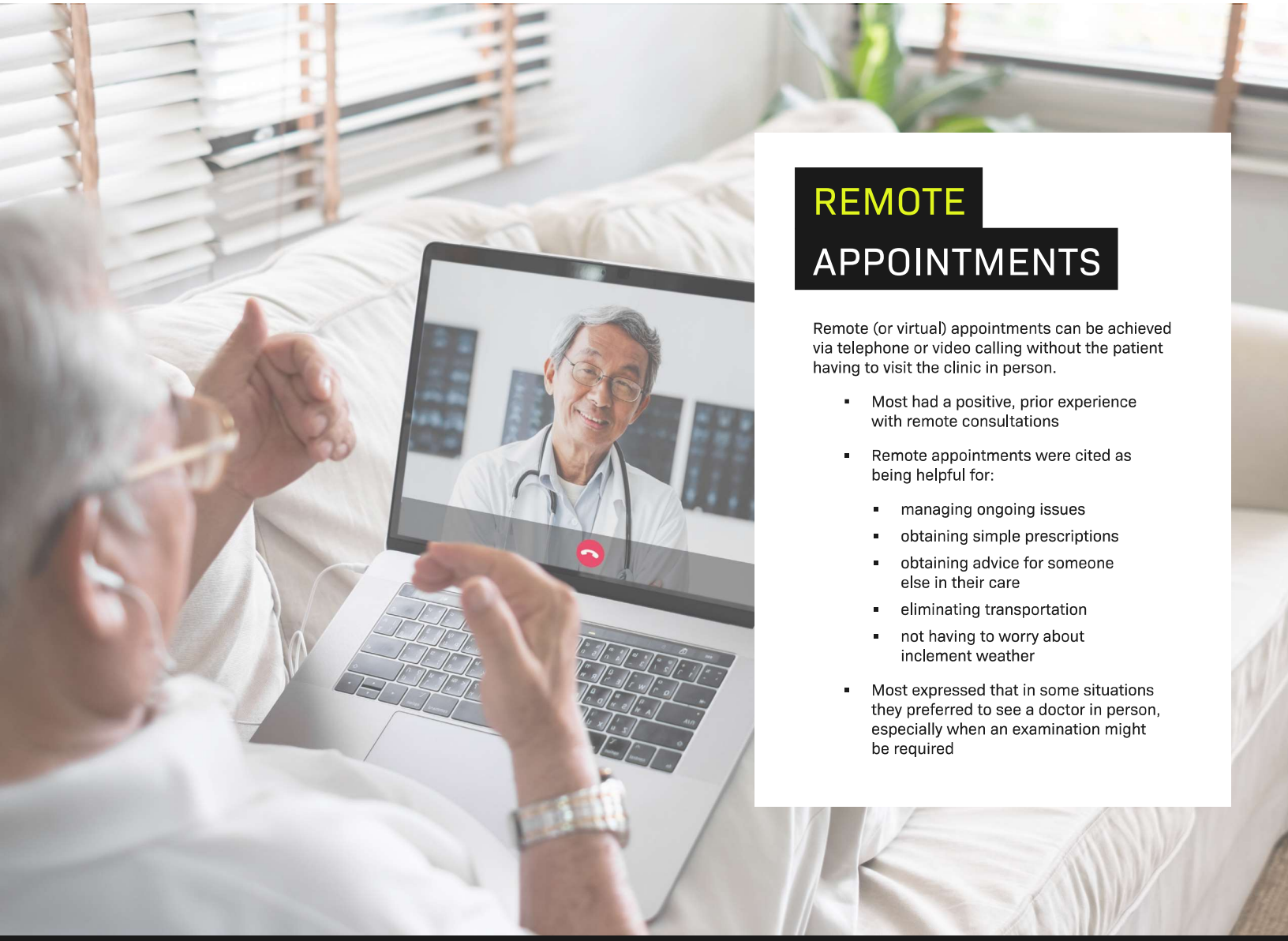
"Catch up TV. My son taught me and asked me questions like, 'Can you see the box at the top?' It was quite interactive, I had to do it myself with his guidance." Age 75

AUTHORITY

In order to understand their attitudes and acceptance toward new technology, we asked the participants how they would feel if their doctor asked them to use a new electronic medical device.

- All expressed reluctant acceptance but would use the new device
- 90% had experience with electronic medical devices at the request of their doctor
- Only one participant reported any difficulties in using a device provided by their doctor:

"Not very good at stuff like that, would probably think, oh, that's a bit of a bother, oh gosh it's another thing to do but if it was all automatic then it might be easier in some ways." *Age 75*



REMOTE APPOINTMENTS

Remote (or virtual) appointments can be achieved via telephone or video calling without the patient having to visit the clinic in person.

- Most had a positive, prior experience with remote consultations
- Remote appointments were cited as being helpful for:
  - managing ongoing issues
  - obtaining simple prescriptions
  - obtaining advice for someone else in their care
  - eliminating transportation
  - not having to worry about inclement weather
- Most expressed that in some situations they preferred to see a doctor in person, especially when an examination might be required

BEST PRACTICES

This study enables teams to identify and resolve common issues prior to ePRO implementation.

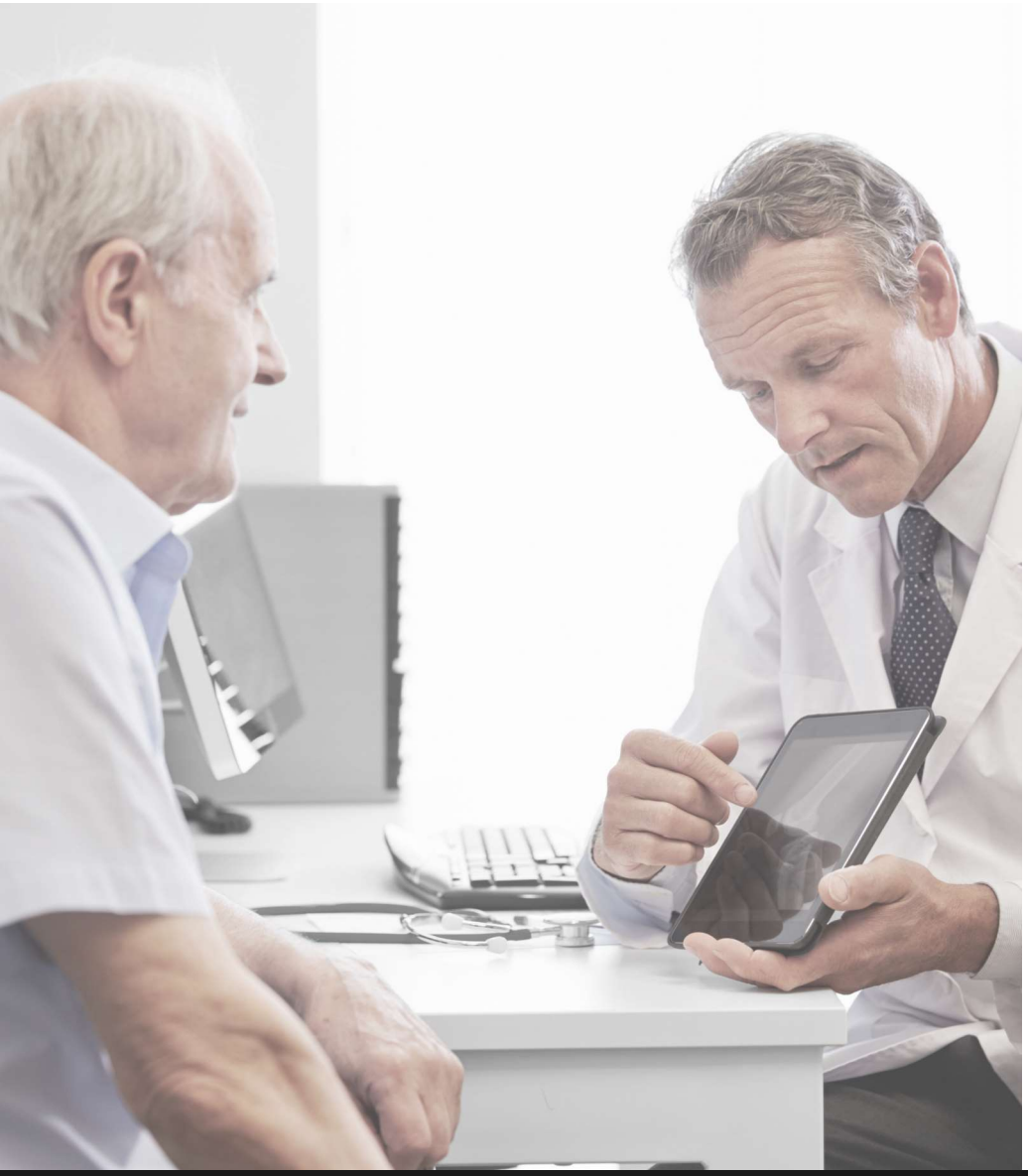
The best practices detail how ePRO can be tailored to suit older participants.

01 SEGMENT BY AGE

With the knowledge that all older participants share the same experience and attitude toward technology, sponsors may find it useful to segment the older demographic in the same way they would for pediatric participants.

AGE RANGE	DEFINITION
55-74	Younger older people
75-84	Middle-age older people
85 and over	Oldest older people

Visit the WHO website for more details and defined age ranges.[7]

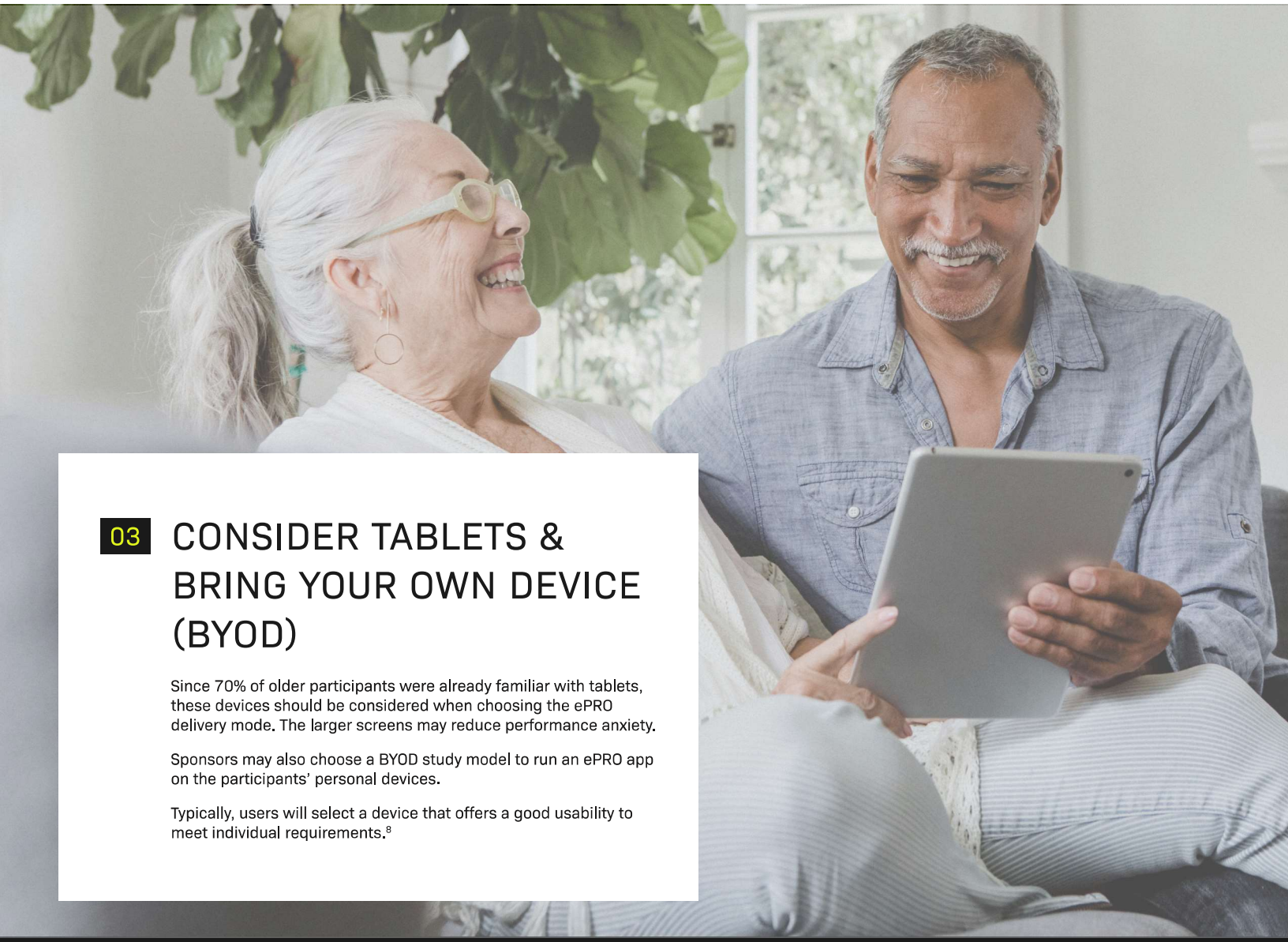


02 PRIORITIZE TRAINING

Proper training can make older participants more confident when using the technology.

Sponsors can mitigate performance anxiety through hands-on practice and repetition. These training methods will ensure participants can confidently use the technology unsupervised at home.

Training should be clearly marked and accessible at all times.

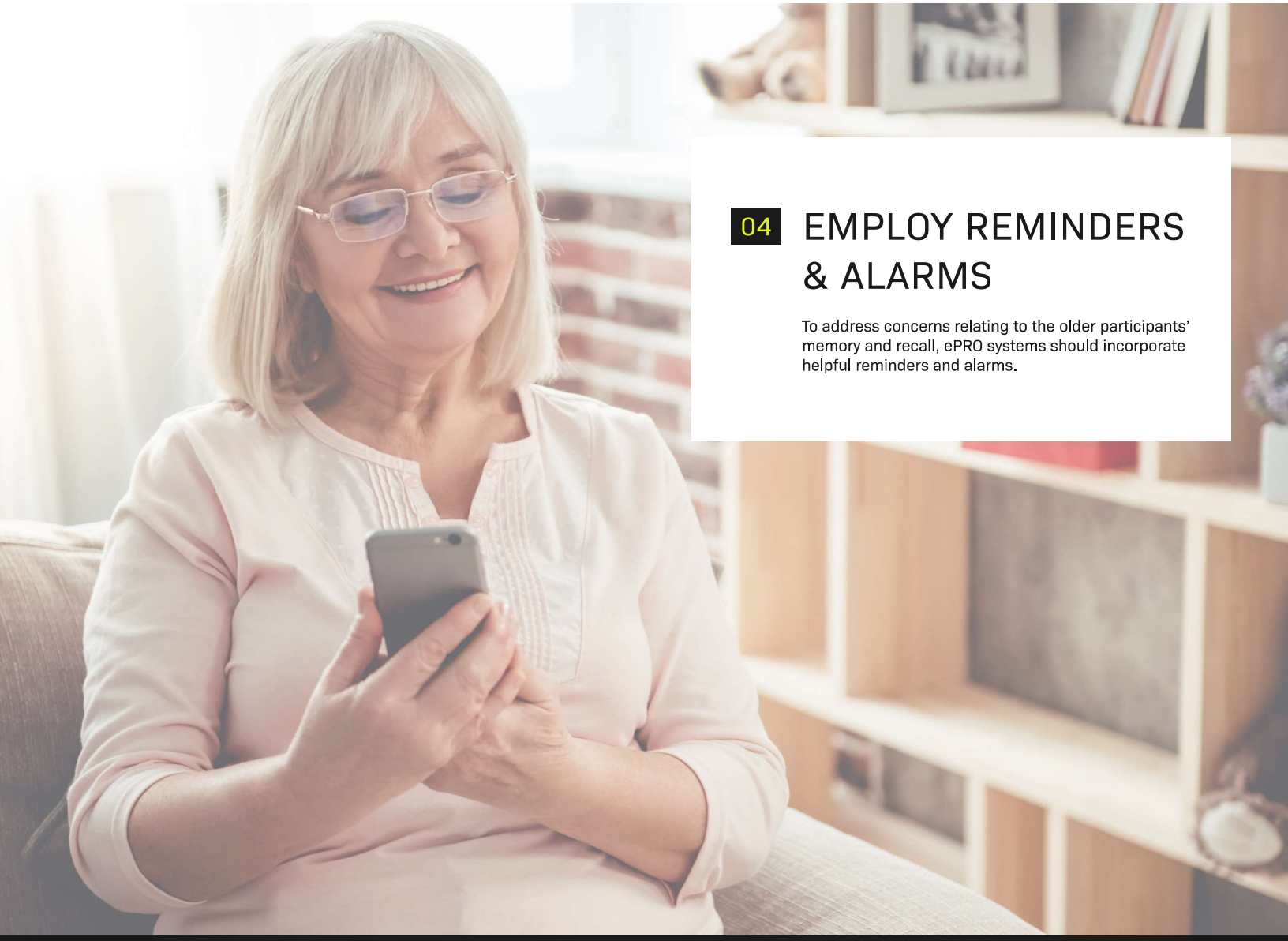


03 CONSIDER TABLETS & BRING YOUR OWN DEVICE (BYOD)

Since 70% of older participants were already familiar with tablets, these devices should be considered when choosing the ePRO delivery mode. The larger screens may reduce performance anxiety.

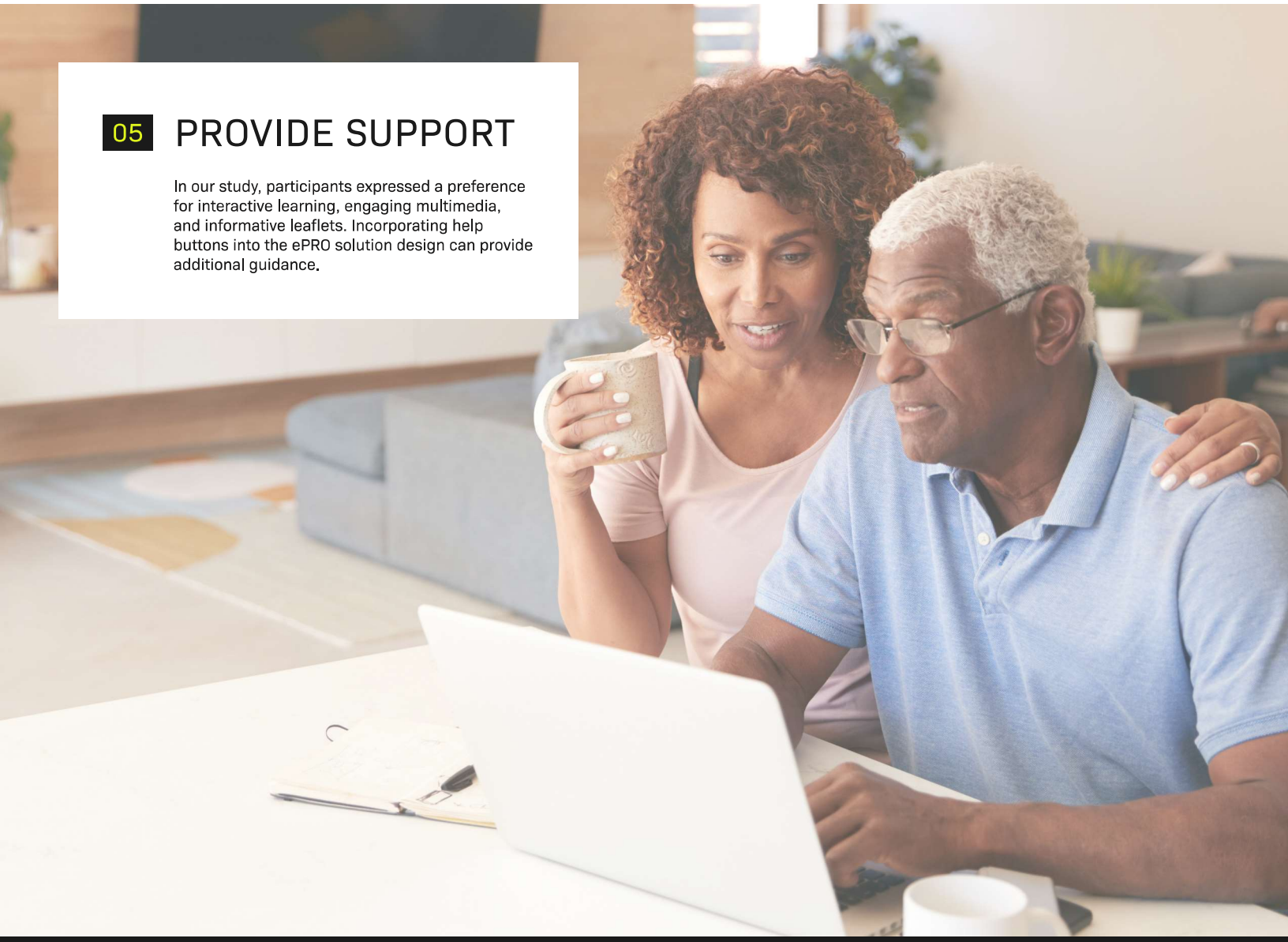
Sponsors may also choose a BYOD study model to run an ePRO app on the participants' personal devices.

Typically, users will select a device that offers a good usability to meet individual requirements.[8]



04 EMPLOY REMINDERS & ALARMS

To address concerns relating to the older participants' memory and recall, ePRO systems should incorporate helpful reminders and alarms.



05 PROVIDE SUPPORT

In our study, participants expressed a preference for interactive learning, engaging multimedia, and informative leaflets. Incorporating help buttons into the ePRO solution design can provide additional guidance.

ePRO SOLUTIONS FOR OLDER USERS

The ePRO mobile technologies present an opportunity to reduce or resolve some of the challenges faced by this population. It's important that users are able to access the settings or preferences to make the necessary adjustments.

Table 1. Concerns and solutions for older people using ePRO

CONCERN	SOLUTION
Deteriorating eyesight	Large screens Large answer buttons Adjustable brightness Large or adjustable font size
Reduced hearing	Written materials that can be re-read at any time Adjustable volume settings & visual messages
Difficulties with dexterity	Larger screens & answer buttons Accept knuckle tap No pen or stylus needed Ability to rest on table or lap rather than be held Shorter completion times for those with poor dexterity
Difficulty with recall / memory	Instructions & reminders that walk patients through the process
Reduced mobility / difficulty getting to the site to complete assessments	Remote, at-home assessments Avoid transportation and inclement weather
Lack of ability / confidence / performance anxiety with technology	Hands-on training to increase confidence and familiarity Clear instructions and intuitive screen flow Provisioned devices for participants who don't own a personal device
Low tolerance to fatigue	Shorter completion times

ACHIEVE COMPLIANCE

Adherence to data completion schedules can be used as a proxy measure of the technology's acceptability.

An analysis of 196 clinical trials that used a smartphone or tablet to collect ePRO data indicated that older participants are among the most compliant. Pooled ePRO completion compliance was 84.1% overall, with the highest in older populations (88.0%) and infant caretakers (93.2%).

AGE GROUP	AVERAGE COMPLIANCE %	NO. SCREENED PATIENTS
Infant caregiver	93.2%	7,860
Older people	88.0%	9,854
Adult	83.4%	73,107
Teenage	79.5%	19,342
Pediatric	71.1%	2,685

EMBRACING ePRO TECHNOLOGY

Technology enables sponsors to improve clinical trial processes and overall efficiencies. Today, eCOA is a widely accepted data collection method that's proven to reduce burdens, automate scoring, avoid errors, and capture all the data required.

Configurable ePRO solutions benefit the participants, the data quality, and the success of the study.

Older populations do not require a dramatically different ePRO solution. However, the population does need a clear, easy-to-read screen, decent font size, and straightforward software.

Keep the ePRO solution format simple:

1. Enter a PIN code
2. Answer the question
3. Hit Next
4. Submit

Technology and electronic system concerns must be addressed for the aging population. Unlike paper-based methods, ePRO technologies have a dynamic nature. Technical features, software design, and study delivery help users with a more patient-centric approach.

SUMMARY

- Sponsors have concerns using mobile technology with older participant populations, but studies show that this demographic is already using the technology in their everyday life.
- The biggest challenge is overcoming potential performance anxiety.
- Training is critical to overcome uncertainty and anxiety with the new technology.
- Training should be engaging, foster regular practice, and supported by a written reference.
- Instructions, options, and explanations should be clear.
- Multimedia elements can be adapted to suit the audience for the best accessibility and flexibility.
- Deploying a remote solution that is interactive is extremely valuable.

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ADDITIONAL RESOURCES

'Can Senior's Use Electronic Clinical Outcome Assessments (eCOA)?' Jill Platko. Signant Health video. http://resources.crfhealth.com/solution-videos/can-seniors-use-electronic-clinical-outcome-assessments-ecoa

'Can Seniors Use eConsent?' Sam Sather. Signant Health video. http://resources.crfhealth.com/electronic-informed-consent/can-seniors-use-econsent

FOR FURTHER INFORMATION, PLEASE CONTACT SIGNANT HEALTH AT **INFO@SIGNANTHEALTH.COM** OR VISIT **SIGNANTHEALTH.COM**

WHO IS SIGNANT HEALTH?

The best technology succeeds in the background. Signant Health provides solutions that simplify every step of the patient journey to make it easier for people to participate in, and for sites and study teams to run, clinical trials. Signant unites eCOA, eConsent, Patient Engagement, IRT, Clinical Supplies and Endpoint Quality into the industry's most comprehensive patient-centric suite – an evolution built on more than 20 years of proven clinical research technology. Our intense focus on the patient experience, deep therapeutic area expertise and global operational scale enable hundreds of sponsors and CROs (including all Top 20 pharma) to extend the reach of drug development, expand patient opportunities and improve data quality – helping them bring life-changing therapies to our families and communities around the world. Take a significant step toward patient-centricity at signanthealth.com.

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