

# Learnings on Bring Your Own Device Uptake for eCOA Implementation

## A Tale of Two Studies

Kieran Carroll, Brad Sanderson, Bill Byrom, Antti Heikkilä, Jill Platko, Ethan Barnes, Jessica Turnbull, Raymond Fatto and Rauha Tulkki-Wilke

CRF Bracket, UK, Finland and USA.

### Abstract

#### OBJECTIVES

To understand site and subject behaviour towards use of “bring-your-own-device” (BYOD) and provisioned handsets, including usage and access behaviour, with reference to two large clinical trials.

#### METHODS

Participation and connectivity data from subjects participating in two large trials (Trial 1: n=2,000+, web-based solution, caregiver completion (estimated ages: 30 – 50 years), USA only; Trial 2: n=10,000+, app-based solution, subject completion – ages 50 to 85+ years, 20+ countries) collecting eCOA data using BYOD, with provisioned handsets for subjects unable/unwilling to use BYOD, was explored for insights to help inform future BYOD study implementation.

#### RESULTS

**Trial 1 (web):** eCOA compliance was 90.7%. The device provisioning rate was 11%. 84% accessed eCOA by mobile device (62.9%, 37.0% and 0.1%: Android, iOS and Windows/Blackberry respectively), 16% by laptop/PC (38.4%, 56.5% and 5.1%: Mac, Windows, or Linux/Unix respectively). **Trial 2 (app):** eCOA compliance was 83.5% (BYOD: 85%, Provisioned: 83%). The device provisioning rate (country figures) was 75.2% (29.3% (Finland) – 100% (Slovakia, Portugal)). Site provisioning rates varied from 0 to 100%. 100% provisioning was observed in 46.3% of sites (enrolling 1 – 137 subjects; 33% > 20 subjects). Country-specific BYOD uptake trends did not match smartphone market penetration data ( $r = 0.36$ ,  $p = 0.10$ , reported ownership rates: 34.4% – 88.0%). 59.7% and 40.3% of BYOD subjects used the iOS and Android apps respectively. Highest iOS use was observed in USA (63.7%), UK (63.6%) and Australia (62.3%); and highest Android use in South Korea (91.1%).

#### CONCLUSIONS

Factors influencing differences in BYOD uptake between the two studies may include: age and geography of participants, acceptance rates of web-browser use vs. app download. In the app study, a large proportion of sites used no BYOD, and country BYOD rates did not correspond to published smartphone ownership rates suggesting that site acceptance may also be a factor affecting BYOD uptake.

### Introduction

There is a drive to design more patient-centric trials that make study participation more engaging and more convenient for patients. One approach is to enable patients to use their own devices (“Bring Your Own Device” - BYOD) to run study apps (e.g., for ePRO), as opposed to being provided with a second device for the purposes of the study. This may be more convenient for the patient as it eliminates the burden of carrying and maintaining a second device for the duration of the study, may improve ePRO compliance rates, and may have other advantages due to increased familiarity compared to a provisioned device.

As we develop experience using BYOD we can use metadata generated by individual studies to add to our understanding of BYOD use and implementation. This is helpful in understanding the strengths and weaknesses of the approach, and to improve the way we implement based on this growing knowledge.

This work reviews experience from two large BYOD trials using different approaches – one study using web-based access (accessing the ePRO solution via a web browser) and the other app-based (accessing the ePRO system via an app downloaded onto a mobile device).

### Methods

#### Trial 1 (web, daily eCOA)

This completed study recruited over 2,000 paediatric participants. The eCOA solution was accessed by the patients’ caregiver, typically a parent, with user ages estimated to be 30 – 50 years based on patient ages. The ePRO system was accessed using a web-browser on a mobile device or personal computer. Provisioned devices were made available for users without suitable hardware or connectivity. The trial was conducted in the USA only.

#### Trial 2 (app, daily eCOA)

This ongoing study has currently recruited over 10,000 patients, aged 50 to 85+ years. Patients access the ePRO system via an app using their own mobile device or one provided to them by the study site if they do not have a suitable device, or are unwilling to use their own. The study is being conducted in over 20 countries worldwide.

### Results

#### TRIAL 1 (web)

##### eCOA Compliance

Overall eCOA compliance based on completed scheduled ePRO entries was 90.7%. Due to browser access, it was not possible to distinguish BYOD from provisioned device users to provide a comparison of compliance figures.

##### Device provisioning rate

Handsets were provided to 11% of patients (caregivers). The remaining 89% used their own mobile devices or personal computers to access the eCOA system.

##### Accessing device characteristics

Eighty-four per cent (84.4%) of system accesses were from a mobile device (Figure 1). Of these, 62.9% used Android mobile devices and 37% iOS (Apple) devices. A very small proportion of system accesses were from Windows or Blackberry devices (0.1%).

The remaining 15.6% of accesses were from web browsers on personal computers, of which 38.4%, 56.5% and 5.1% were from Mac, Windows or Linux/Unix computers respectively.

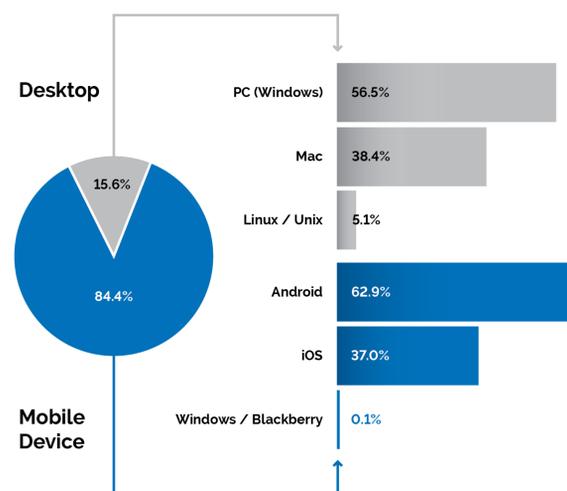


Figure 1. Accessing devices used in Trial 1 (web)

#### TRIAL 2 (app)

##### eCOA Compliance

Overall eCOA compliance was 83.5%, with little difference between BYOD and provisioned approaches (BYOD: 85%, Provisioned: 83%, Figure 2). The same trend was observed when comparing compliance rates within each country (Figure 3, only countries with at least 20 subjects in each device category included).

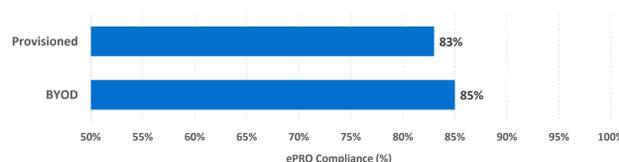


Figure 2. ePRO compliance rates for BYOD and provisioned device users

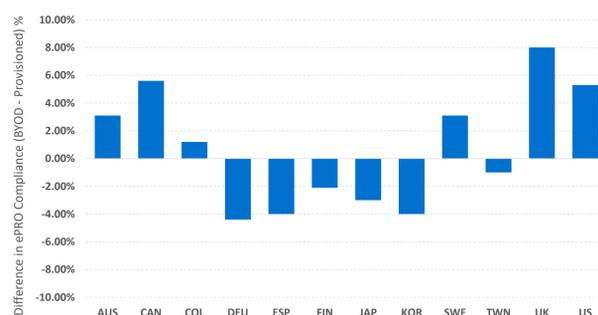


Figure 3. Difference in ePRO compliance rates by country

### Results cont.

#### TRIAL 2 (app) Cont.

##### Device provisioning rate

Handsets were provided to 75.2% of patients. The uptake of BYOD by country did not match reported country smartphone penetration rates ( $r = 0.36$ ,  $p = 0.10$ , reported ownership rates: 34.4% – 88.0%) [1-4] (Figure 4). Site provisioning rates varied from 0 to 100%, with 100% provisioning observed in 46.3% of sites (enrolling 1 – 137 subjects, 33% > 20 subjects, Figure 5).

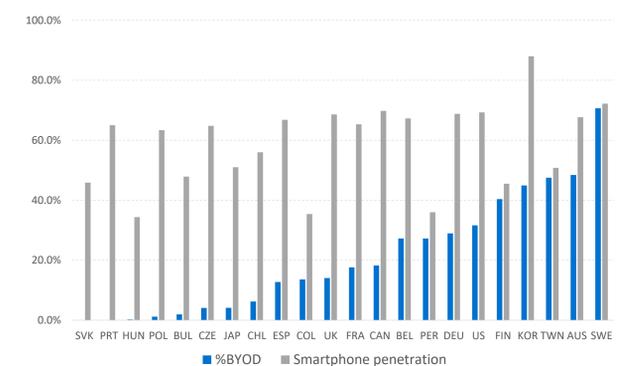


Figure 4. Country provisioning rates vs. smartphone penetration data

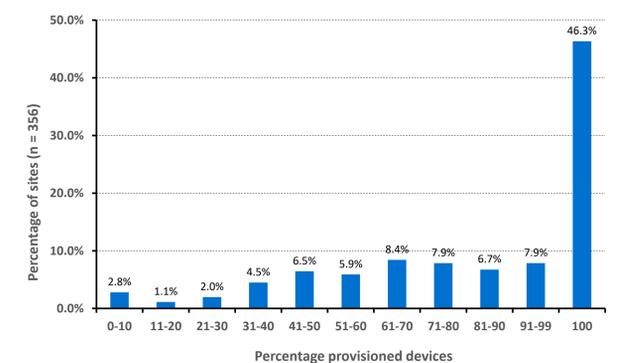


Figure 5. Distribution of site provisioning rates (300+ sites)

##### Accessing device characteristics

59.7% and 40.3% of BYOD subjects used the iOS and Android apps respectively. Highest iOS use was observed in USA (63.7%), UK (63.6%) and Australia (62.3%); and highest Android use in South Korea (91.1%).

### Discussion and conclusions

The two trials investigated in this research were very different in a number of ways. Trial 1 employed web access and did not require a download of software onto patient hardware; unlike Trial 2 (app-based). Trial 1 involved a younger patient population (est. 30 – 50 years) compared to Trial 2 (50 – 85+ years). These two factors may contribute to the large differences in BYOD uptake across the two studies.

Interestingly, in Trial 2 the uptake of BYOD did not match smartphone market penetration data, and the rate of supply of provisioned devices was 100% for almost half of all the 300+ sites (46.3%). This may be a result of lack of site “buy-in” to the BYOD approach. Busy sites may find it simpler to provide a pre-configured smartphone “off-the-shelf” as opposed to helping subjects download the study app onto their own mobile devices. Researchers seeking to employ BYOD approaches should pay attention to ensuring sites “buy-in” and understand the use of BYOD, and that all site staff are provided with sufficient training and support to ensure optimal BYOD uptake.

### References

- [1] Newzoo’s Global Mobile Market Report 2017.
- [2] Google. Uur Mobile Planet, 2013.
- [3] Pew Research Center, 2015.
- [4] Statista. Forecast of the smartphone user penetration rate in Bulgaria from 2015 to 2022.