Paper DH06

A Better Way: eCOA/ePRO Annotated Screen Reports (aSR) Provide Data Clarity from Data Collection to Submission

Frank Menius, YPrime, Raleigh, USA
Monali Khanna, YPrime, New Jersey, USA
Vincent Allibone, YPrime, Sandwich UK

ABSTRACT

With the adoption of electronic Clinical Outcome Assessments (eCOA) and electronic Patient Reported Outcomes (ePRO) for collection of questionnaire and patient clinical data there is a growing need to efficiently map raw data collection through the study life cycle on to submission and beyond. The proposed solution is the creation of annotated Screen Reports (aSR) for eCOA/ePRO. Like an annotated Case Report Form (aCRF) the annotated screen report file documents the location of collected data on a patient or clinician device to corresponding domains and variables included in intermediate and submitted datasets. The annotated screen report provides easy access to study metadata for programmers and statisticians plus can be submitted along with the aCRF to regulatory bodies to aid the reviewer. This presentation will highlight the many benefits of annotated screen reports for eCOA/ePRO, guidelines to creating them, as well as provide examples and use cases.

INTRODUCTION

As Clinical Research has become more digital it has embraced electronic data collection such as the electronic Clinical Outcome Assessment (eCOA) and electronic Patient Reported Outcomes (ePRO). These software and hardware packages transform paper assessments for digital collection. eCOA and ePRO along with other electronic sources have eased the burden on patients and clinicians, increased subject retention, improved subject compliance, and improved data quality. What is lacking, however, is a clear understanding of the collected data and their journey through the study data lifecycle. All stakeholders benefit from understanding the origins of collected data and how they move and change throughout the stages of a clinical trial. Vendors need to understand how collected data will be utilized and analyzed downstream. Statisticians, programmers, and reviewers need to understand how data were originally collected and linked together. To meet the need for efficient and detailed data traceability back to the electronic data source the annotated Screen Report (aSR) is an annotated document showing the source of electronic data and how they are mapped in later datasets.

BACKGROUND: THE ANNOTATED CASE REPORT FORM

The annotated Case Report Form or aCRF is a critical part of study documentation that links data collection fields used to capture data to their corresponding variables in study databases. The aCRF allows for traceability from data collection to creation of Tabulation and Analysis datasets, therefore they are a crucial link for all users and reviewers to understand study data collection and origin. This makes the aCRF a vital and standardized part of study submission to regulatory agencies.

Questionnaire data, those data most captured by eCOA and ePRO devices, when captured on paper forms are often included in the aCRF process. The Clinical Data Interchange Standards Consortium (CDISC) has developed a substantial number of supplemental guidance documents for the use of these questionnaire instruments in clinical research and their inclusion into Tabulation and Analysis datasets[1]. Along with these QRS supplements CDISC has provided examples of aCRF documents for inclusion in submission. Figure 1 illustrates a page from the aCRF of the European Quality of Life Five Dimension Five Level Scale (EQ-5D-5L), a quite common clinical trial instrument. Notice that the aCRF links the collected data to variables and controlled terminology used in Standard Data Tabulation Model (SDTM) datasets.

[1] https://www.cdisc.org/standards/foundational/qrs

Figure 1: EQ-5D-5L v1.2 aCFR Page 2[2]

QSEVINTX=TODAY

Under each heading, please check the ONE box that best describes your health TODAY

MOBILITY QSORRES when QSTESTCD=EQ5D0201

- I have no problems walking ❑
- I have slight problems walking ❑
- I have moderate problems walking ❑
- I have severe problems walking ❑
- I am unable to walk ❑

SELF-CARE QSORRES when QSTESTCD=EQ5D0202

- I have no problems washing or dressing myself ❑
- I have slight problems washing or dressing myself ❑
- I have moderate problems washing or dressing myself ❑
- I have severe problems washing or dressing myself ❑
- I am unable to wash or dress myself ❑

USUAL ACTIVITIES *(e.g. work, study, housework, family or leisure activities)* QSORRES when QSTESTCD=EQ5D0203

- I have no problems doing my usual activities ❑
- I have slight problems doing my usual activities ❑
- I have moderate problems doing my usual activities ❑
- I have severe problems doing my usual activities ❑
- I am unable to do my usual activities ❑

PAIN / DISCOMFORT QSORRES when QSTESTCD=EQ5D0204

- I have no pain or discomfort ❑
- I have slight pain or discomfort ❑
- I have moderate pain or discomfort ❑
- I have severe pain or discomfort ❑
- I have extreme pain or discomfort ❑

ANXIETY / DEPRESSION QSORRES when QSTESTCD=EQ5D0205

- I am not anxious or depressed ❑
- I am slightly anxious or depressed ❑
- I am moderately anxious or depressed ❑
- I am severely anxious or depressed ❑
- I am extremely anxious or depressed ❑

2

USA (English) © 2009 EuroQol Group. EQ-5D™ is a trade mark of the EuroQol Group

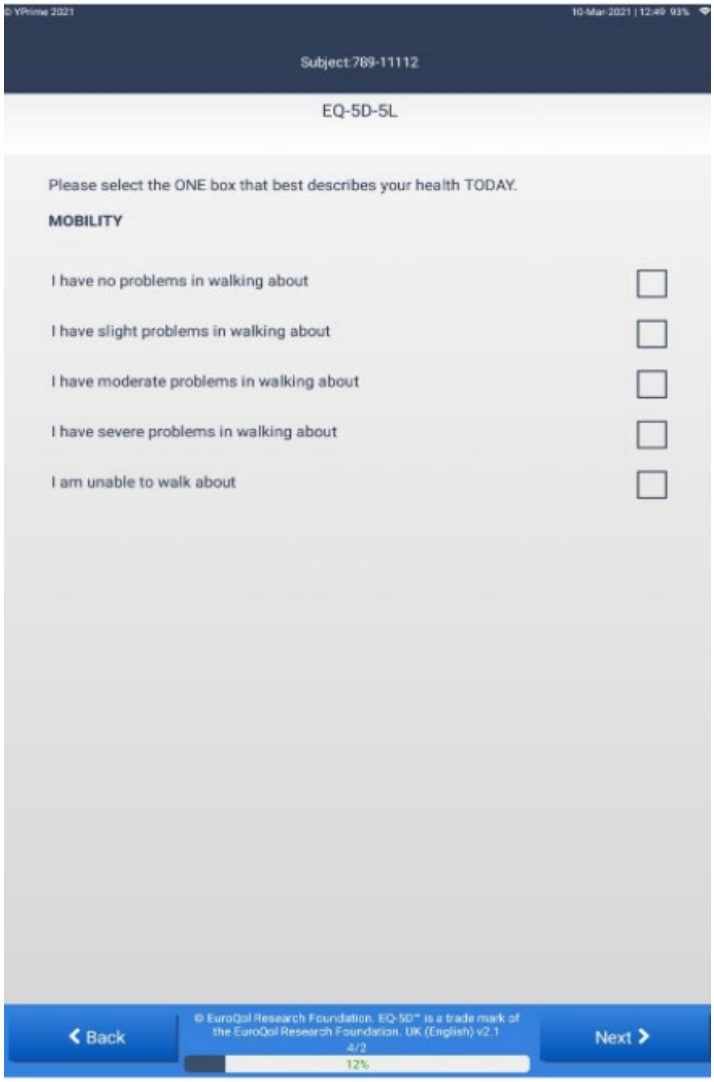
TRANSITIONING FROM PAPER TO DIGITAL

There are many reasons questionnaire instruments have transitioned from paper to digital including ease of use for clinicians and patients, increased participation, and improved data quality, just to name a few. This transition, however, took these instruments out of the aCRF process. Typically, when and instrument is chosen for conversion from paper to electronic there are a series steps that take place between the software/device provider, the study team, and the copyright holder for the instrument to ensure that nothing is lost or changed about the collected data. This culminates in a digital build of the instrument with screen shots or screen reports of every possible screen as it will be visible to the user. These screen reports are then approved by all stake holders including the copyright holder. The approved screen reports are provided to the study sponsor and are often included in the submission but are absent the value and traceability provided by the former aCRF.

[2] https://www.cdisc.org/system/files/members/standard/foundational/qrs/EQ-5D-5L%20v1.2%20Annotated%20CRF.pdf

If the approved screen reports have been modeled off the original instrument, then cannot the study just use the same aCRF as if this were a paper copy? In short, no. The electronic version of the instrument (eCOA/ePRO), while collecting the same data in an approved way, often has a different presentation of the instrument to the user that needs to be accounted for. As electronic devices come in a variety of sizes and formats, eCOA instruments must be optimized for use on these devices. This often means changed font or font size, fewer or more questions per screen, the inclusion or removal of instructions between questions. Figure 2 below shows the EQ-5D-5L from above as it is captured on a screen report. Notice this has been optimized for a handheld device and only shows the mobility question.

Figure 2. EQ-5D-5L Page 2 eCOA Screen Report



One other possible difference is the inclusion of sub-setting questions not necessarily captured in the original paper version. A questionnaire may have had a section that said, 'If you had a headache today, please mark its severity' In the paper version a subject without a headache would just skip that section. In an eCOA version however this may be optimized to ease the burden on the user or to improve data quality by preventing erroneous entries. The eCOA version may have the sub-setting question 'Did you have a headache today?' with 'Yes' or 'No' as answers. If the subject chooses 'Yes' then they will be presented with the severity question as before, but if they select 'No' then the system will skip to the next suitable question section. This Sub-setting question 'Do you have a headache today?' and the values of 'Yes' or 'No' are collected subject data that are not original to the paper version and therefore would not be present in the aCRF but should be collected and documented.

APPLYING THE PRINCIPLES OF THE ANNOTATED CASE REPORT FORM TO THE SCREEN REPORT

Due to the inherent changes that take place during the transition from paper to digital the need for a way to accurately provide the same traceability and usability as the aCRF has arisen in the eCOA/ePRO environment. Luckily, the fundamental principles that have been developed to annotate the CRF (Case Report Form) can readily be applied to the approved screen reports without change. For many instruments, the annotations and controlled terminology can

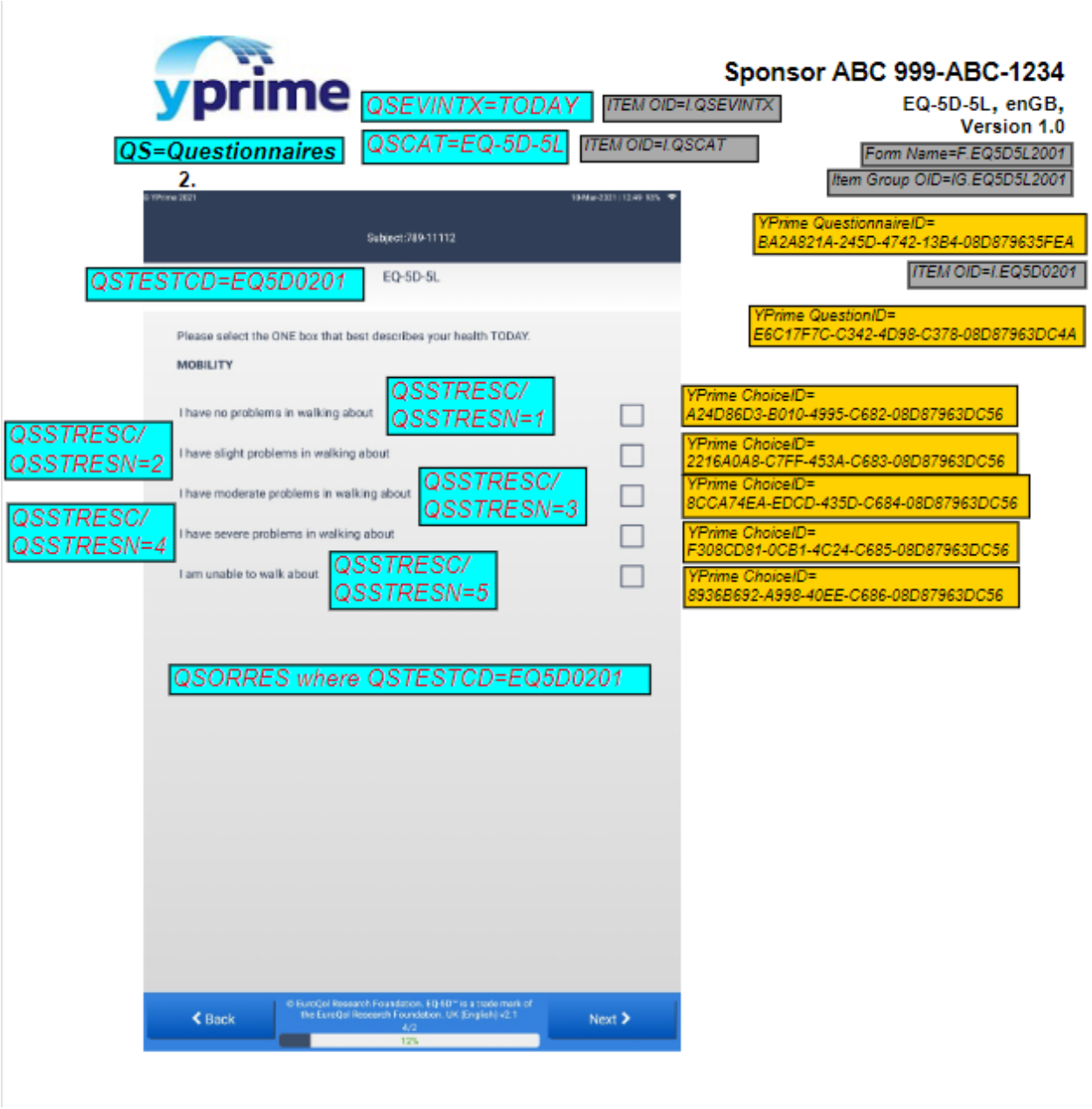
be copied directly from the already existing CDISC QRS supplements. Figure 3 below shows the same EQ-5D-5L screen report with the annotations from the QRS Supplement added in. This is the annotated Screen Report (aSR) which can be presented alongside other study aCRF documents to aid all stakeholders in understanding the study data. This example shows the SDTM domain as well as all variables collected from this page.

Figure 3. EQ-5D-5L Page 2 eCOA annotated Screen Report

CAN THE ANNOTATED SCREEN REPORT PROVIDE EVEN MORE TRACEABILITY?

The aSR in figure 3 shows traceability from the SDTM dataset to where those variables were collected on the eCOA instrument. There may be the desire to have more information presented on the screen report such as where these data were stored in the Vendor Database, perhaps where they were stored at an intermediate Data Management Clinical Research Organization, or how they were moved through an internal data warehouse and intermediate dataset. Information such as this can easily be added to the aSR. Figure 4. illustrates the same aSR from the 5Q-5D-5L with the addition of the unique vendor record identifiers (Yellow) and how these data may flow into a sponsor data warehouse (Gray). This improved granularity may be especially helpful to data management teams trying to reconcile databases.

Figure 4. EQ-5D-5L Page 2 aSR with data mapping



IMPLEMENTING THE ASR TODAY AND TOMORROW

A best practice recommendation is to create the aSR in much the same way as the aCRF, a data standards expert reviews the screen reports in addition to data for each questionnaire then manually adds standardized annotations to the .PDF file using a PDF writer. This process is manual, requires expertise, and several hours to complete. Despite this the future of the aSR is computer driven. While the industry embraces the use of data warehouses and questionnaire libraries to improve data quality and study build efficiency, the road to automating the annotation of the screen reports is also being paved. If data are being collected and delivered in near SDTM formats, then it becomes easy to create one SDTM aSR for use with multiple studies. In addition, the fact that the aSR is for electronic forms means that additional metadata exists for the screen reports that does not exist for paper case report forms. Every button and every piece of text on an eCOA screen report has an X, Y coordinate. These coordinates are already stored digitally and can be used to automatically place annotations on the screen report at build. These annotations could then be presented to stakeholders during the approval process for the build, giving more transparency to the study data lifecycle downstream from collection.

CONCLUSION

In recent years, regulatory agencies such as the FDA and EMA have increasingly promoted the use of eCOA solutions to capture patient data in the development and approval of investigational products. Annotated eCOA Screen Reports provide clear mapping of the collected eCOA data to the corresponding variables or discrete variable values. The annotated eCOA Screen Report facilitates clear and transparent review to help identify incorrect data mapping decisions that may delay the eventual analysis. The annotated Screen Report should become as vital a part of study documentation as the aCRF. The aSR fills the need of data traceability not only for reviewers at regulatory agencies but also for any stakeholders working with the data from collection to submission and beyond. It is easy to implement using existing standards and methods and has room for improvements with automation and the inclusion of additional metadata. It simplifies analysis but also has the potential to improve the study design. If introduced early the aSR can ensure that data collected meets the needs and expectations of data analysis. The aSR is the document the industry needs to bridge the gap left by digitalization.

REFERENCES (HEADER 1)

The Clinical Data Interchange Standards Consortium (CDISC), 2022, *QRS*, Accessed 07MAR2022, < https://www.cdisc.org/standards/foundational/qrs>

The Clinical Data Interchange Standards Consortium (CDISC), 2022, *EQ-5D-5L v1.2 Approved.pdf*, Accessed 07MAR2022, <https://www.cdisc.org/system/files/members/standard/foundational/qrs/EQ-5D-5L%20v1.2%20Annotated%20CRF.pdf>

CONTACT INFORMATION

Frank Menius
YPrime
3301 Benson Dr.
Raleigh, NC 27609
919-412-6537
fmenius@yprime.com
YPrime: https://www.yprime.com/
LinkedIn: https://www.linkedin.com/in/frank-menius/

Monali Khanna
YPrime
9 Great Valley Parkway, Malvern, PA 19355
Malvern, PA 19355
mkhanna@yprime.com
YPrime: https://www.yprime.com/
LinkedIn: https://www.linkedin.com/in/monali-k-a259a5178/

Vincent Allibone
YPrime
Sandwich Discovery Park
Sandwich, Kent
vallibone@yprime.com
YPrime: https://www.yprime.com