

USING EBOLA EXPERIENCES TO HIGHLIGHT THE IMPORTANCE OF STANDARDS IMPLEMENTATION IN OUTBREAKS

Abstract:

When Ebolavirus disease (EVD) breaks out, managing the epidemic and saving lives takes priority. Outbreaks are rare but when they occur, efforts should be made to reuse data for research. CDISC data standards can facilitate data aggregation for cross-study analysis; however, the current CDISC standards were designed for prospective clinical trials, not epidemiology. The benefits of standards outweigh this limitation, and the World Health Organization (WHO) has recommended the use of the CDISC data collection standard, CDASH, during EVD outbreaks because these data will be easier to combine with standardized data collected in research settings, such as vaccine trials.

This poster outlines challenges and benefits associated with standards implementation during the 2014-2015 Ebola outbreak, and includes ongoing efforts to develop an EVD-specific therapeutic area standard to supplement available CDISC standards.

Introduction:

The EVD outbreak highlighted gaps with conducting research during an outbreak. The settings are inherently different from clinical trial settings, where the questions are tied to a few research objectives, usually within a regulatory framework, data collection is carefully regulated to support inferences on a population, and the results are strictly monitored. In an outbreak, especially for a poorly understood disease like EVD, the questions are less specific, monitoring is minimal and interventions are unpredictable. In-country resources to support research may be low, and regulatory concepts such as adverse event reporting do not apply. Yet, outbreaks present a unique opportunity to combine the two distinct areas of clinical research and public health to develop better treatments and improve response efforts.

There are challenges with implementing and developing standards during outbreak settings. In the case of EVD, a majority of the data was not primarily collected for reuse. At the beginning of the outbreak, there was no standard CRF, or set of required questions and information asked. This led to many data formats being generated by multiple stakeholders, including governments, national and international health organizations, pharmaceutical companies, and researchers; all with different uses for the data. During the standards development process, the lack of prior modeling or examples addressing how to represent data from observational and epidemiological studies became more apparent. These unknowns were only exacerbated by a lack of knowledge regarding long-term progression of the disease.

Efforts to address these challenges include standardizing data collection techniques, understanding the research capabilities within each country, and accounting for differences between clinical trials and observational studies, including how they overlap during outbreak situations. This led to a determination of methodology to apply when dealing with outbreak settings and observational studies.

Methodology:

A volunteer team of CDISC standards experts, public health officials, and researchers formed and followed the Coalition for Accelerating Standards and Therapies (CFAST) standards development process for therapeutic area standards.

1. Review CRFs being used for EVD Studies
2. Compare common fields and others requiring harmonization
3. Map fields to existing standards e.g. CDASH and SDTM
4. Conduct a gap analysis to identify fields not addressed with current standards e.g. epidemiological data, dose-vomit cycles, rehydration therapy
5. Follow the CDISC process to develop a new standard domain dedicated to collecting epidemiological data
6. Address form fields on CRFs and recommend CDASH specifications

The review and comparison of the CRFs led to the realization that risk factors related to contraction of EVD were collected on at least two forms we received. This information would be more useful if it could be aggregated and harmonized using standard variables, terms, and nomenclature.

Figure 1:

CRFs collecting epidemiological data with draft CDASH and SDTM annotations, exemplifying the new ER (Environmental Risk Factors) domain:

Public Health CRF:

Case Name: **ERCAT=SOURCE CASE INVESTIGATION** Outbreak Case ID:

Section 4. EREVLNT Epidemiological Risk Factors and Exposures

IN THE PAST ONE(1) MONTH PRIOR TO SYMPTOM ONSET: **ERTERM=CONTACT WITH KNOWN/ SUSPECT/SICK PERSON** **EROCCUR**

1. Did the patient have contact with a known or suspect case, or with any sick person before becoming ill? ☐ Yes ☐ No ☐ Unk

If yes, please complete one line of information for each sick source case:

Name of Source Case	Relation to Patient	Dates of Exposure (D, M, Yr)	Village	County	Was the person dead or alive?	Contact Types**
	ERSTDC		SUPPER.QVAL=VILLNAM		☐ Alive ☐ Dead, date of death: SUPPER.QVAL=CNCTCTYP	
	ERENDTC				☐ Alive ☐ Dead, date of death: (D, M, Yr)	
			SUPPER.QVAL=VILLNAM		☐ Alive ☐ Dead, date of death: (D, M, Yr)	

**Contact Types: (list all that apply)

- 1 - Touched the body fluids of the case (blood, vomit, saliva, urine, feces)
- 2 - Had direct physical contact with the body of the case (alive or dead)
- 3 - Touched or shared the linens, clothes, or dishes/eating utensils of the case
- 4 - Slept, ate, or spent time in the same household or room as the case

Information about the Source Case (e.g. relation, dead/alive, date of death) should be stored in the the appropriate AP dataset

Therapeutic CRF:

Diagnostic :

PENDANT LE MOIS PRÉCÉDENT LE DÉBUT DES SYMPTÔMES: **ERTERM=Contact with known/suspect/sick person**

17. A-t-il eu des contacts avec un malade Ebola ou avec une personne malade? ☐ Oui ☐ Non **EROCCUR**

17.1 Si oui, était-il/elle suivi(e) comme personne contact? ☐ Oui ☐ Non **EROCCUR**

18. A-t-il participé à des funérailles? **ERTERM=Funeral attendance** ☐ Oui ☐ Non **EROCCUR**

18.1 Si oui, a-t-il porté ou touché le corps? **ERTERM=Contact with body** ☐ Oui ☐ Non **EROCCUR**

19. Date du début des symptômes : **CECAT=Ebola Symptoms** **CESTDAT where CETERM=Onset of earliest symptom**

Figure 2:

WHO released a five-page standard core CRF for collecting data with admission of patients into clinics, but epidemiological information was not collected. This information may have been collected in a case management setting with a different set of forms dedicated to finding and testing contact and source cases. The team annotated the form using CDASH and SDTM standard domains and variables, and data that was collected with this form is already leading to a better understanding of EVD¹.

WHO Core CRF:

Date of birth (DD/MM/YYYY): **BRTHDAT** **AGEU** **VSTSTDTL**

OR Estimated age [AGE] years OR (if <2 years) [] months

Sex: ☐ Male ☐ Female **SEX** **VSORRES/VSORRESU where VSTESTCD=WEIGHT** Weight: [] [] [] kg ☐ Measured ☐ Estimated

If FEMALE: Is the patient pregnant? ☐ Yes ☐ No ☐ Unknown **RPORRES where RPTTESTCD=PREGST**

If PREGNANT: Gestation age of fetus (nearest week): [] **RPORRES where RPTTESTCD=GESTAGE**

Date of onset of first/earliest symptom (DD/MM/YYYY): [] [] [] [] [] [] **CESTDAT where CETERM=Onset of earliest symptom**

Benefits:

Implementing standards preemptively can lead to better data for reuse. If data collection is standardized at the start of the outbreak, while collecting information on interventions and disease progression, it will support more thorough and thoughtful analyses. Being able to share and combine these data ultimately leads to more effective treatments for patients, and a more comprehensive understanding of disease management.

Conclusion:

The application and use of standards is especially critical in outbreaks, because the number of patients during and across any given outbreak can be small. Measures should be in place, such as standardized forms, fields, and instructions for public health officials and clinical researchers in order to facilitate the collection of data for reuse. Epidemics present both opportunities and challenges. It is crucial to collect as much data as possible during an outbreak, so it is especially important that collection methods are streamlined and standardized.

¹ (Team, 2016)