TransCelerate BIOPHARMA INC.

TransCelerate eSource

Workstream Overview

Rakesh Maniar, Novartis
August 2020

For presentation at the Learning Health Community eSource Symposium.

Current state of organization

2012
TransCelerate Founded

10 MEMBER COMPANIES

5 INITIAL INITIATIVES

2016
BioCelerate Founded

BioCelerate
focus on preclinical research

Today

20 MEMBER COMPANIES
Bayer most recent member

30+ INITIATIVES
including 5 pharmacovigilance initiatives

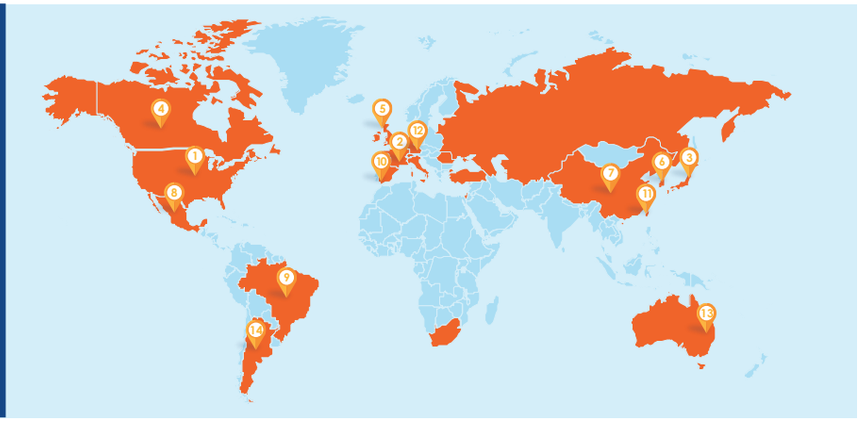
BREADTH & DEPTH
Over 60 solutions being delivered across 25+ initiatives, across 3 strategic priorities

ENHANCING INDUSTRY COLLABORATION
With an effective and proven governance structure have increased the ease and desire to collaborate

FACILITATING FUTURE PLATFORM TRIALS
12+ initiatives deliver solutions that facilitate future platform trials

DataCelerate
platform to enable data sharing

Our Country Network spans **30** COUNTRIES, and **14** GLOBAL REGULATORY AUTHORITIES have engaged with TransCelerate.



1 FDA 2 EMA 3 PMDA 4 Health Canada 5 MHRA 6 MFDS 7 NMPA 8 COFEPRIS 9 ANVISA 10 AEMPS 11 TFDA 12 BfArM 13 TGA 14 ANMAT

The Reach of our Global Membership is Expanding

Membership is available to biopharmaceutical research and development organizations that engage in innovative discovery, development and manufacturing of new medicines*.

abbvie
AMGEN
astellas
AstraZeneca
BAYER
Boehringer Ingelheim
Bristol Myers Squibb
Merck KGaA
Darmstadt, Germany
gsk GlaxoSmithKline
Johnson & Johnson
Lilly
MSD INVENTING FOR LIFE
novo nordisk
NOVARTIS
Pfizer
REGENERON SCIENCE TO MEDICINE
Roche
SANOFI
SHIONOGI
ucb

Thousands of people have contributed to the design, development and deployment of TransCelerate solutions

* to be eligible for membership, companies must meet specified eligibility criteria.

External Collaboration will continue to play a critical role in achieving our future state

TransCelerate BioPharma and FDA/NIH

COLLABORATE

on Aligned Common Protocol Template

Society for Clinical Research Sites Announces TransCelerate BioPharma's Ongoing

FOCUS ON SITES

by launching SCRS Site Advocacy Groups

CDISC and TransCelerate Announce New Standard for Breast Cancer to

SUPPORT DATA SHARING for Oncology Research

As a single stakeholder organization, we understand the value of robust collaboration with key stakeholders* across the R&D ecosystem which provide unique and important insights and perspectives.

INVESTIGATOR SITES*

ACRP Association of Clinical Research Professionals

AACI Association of American Cancer Institutes

SCRS Our Voice. Our Community. Society for Clinical Research Sites

RESEARCH AND CRO COMMUNITY*

ACRO Association of Clinical Research Organizations

JCROA Japan CRO Association

NIH National Institutes of Health Turning Discovery Into Health

CROForum

PATIENT ADVOCACY GROUPS*

CISCRP The Center for Information Study on Clinical Research Participation

International Alliance of Patients' Organizations

OTHER ASSOCIATIONS*

Bio Biotechnology Industry Organization

CDISC

Clinical Trials Transformation Initiative

DIA

efpia

PhRMA Research · Progress · Hope

imi

HEALTH AUTHORITIES*

FDA

European Medicines Agency Science Medicines Health

Health Canada

Pmda Japan

* Representative organizations, not exhaustive

How TransCelerate is working to make the vision a reality

Change how information is captured, structured and moves through its lifecycle

eSource

- Moving point of data digitization closer to the point of collection
- Enable capture of electronic source data to sponsor's database
- To get standards to start working across healthcare and clinical research
- HL7 Accelerator : Project Vulcan founded

Clinical Content and Reuse (CC&R)

- Encourages automated content reuse throughout the project lifecycle
- Transform document content into data

Digital Data Flow (DDF)

- Automating configuration and enabling flow of information
- Automate how systems are prepared and how information is moved

TransCelerate describes eSource and its four different modalities as…

"Electronic source data are data initially recorded in electronic format."

Non-CRF
The collection and transfer of electronic data from internal sponsor sources or external vendors into clinical research data repositories/warehouses without entering the data into a Case Report Form (CRF).

Devices and Apps
The collection and management of clinical data from non-site personnel, wearables, and sensors.

DDC
The direct entry of clinical data by site staff into a mobile application or EDC system.

EHR
The collection and reuse of data for use in clinical research from site/patient electronic health record systems

**The eSource team recognizes that some technologies cross these boundaries and that these categories will likely evolve over time due to technological advances*

TransCelerate eSource Workstream

The eSource Initiative works towards the advancement of the digitalization of clinical development for patients, sites, and sponsors

2015
Workstream founded

2016
Understand and Align

Uncovered the common aspirations to modernize the data collection

Identified sponsors' priorities in adoption of eSource Modalities

2017
Awareness and Action

Revealed technology vendor willingness to engage with pharma

Exposed primary barrier to eSource advancement as a people and process issue

Prompted CDISC mapping to FHIR and EDC Vendors to participate in HL7 FHIR Connectathon work

2018
Focus and Initiate

Initiated TransCelerate-directed mapping to FHIR

Connected Duke with Member Companies for EHR to EDC Pilot

Identified need of site training and understanding of eSource capabilities

Proposed pharma as a trusted entity in the exchange framework to enable scalable EHR

2019
Engage and Accelerate

Engage with global regulatory agencies

Accelerate the maturity of EHR as an eSource for Clinical Research to create a scalable solution

Publish Sponsor call to action for change

Describe pharma needs to vendors through Logical Architecture and Data flow Diagram in collaboration with Tech council

2020
Focus on Sites and Regulatory

Engage with Site Advocacy Groups

Collaborate with Standards Setting Organizations e.g. HL7)

Future State Interoperability: Explosion of FHIR

Pharma companies have yet to invest significate resources to solve the EHR interoperability issue

Changes in policy, emerging technologies, and advances in EHR data are transforming healthcare

These advances have the potential to provide great value to both patient care and Clinical Research

Amazon, Google, IBM, Microsoft, Oracle and Salesforce pledge to remove interoperability barriers

At the White House, technology heavy
work together improving data exchan
the Argonaut Project and more.

https://www.healthcareitnews.com/news/amazon-goo
salesforce-pledge-remove-interoperability-barriers

A FHIR Future Burns Brightly for Population Health Management

As the healthcare industry warms up to FHIR, population health management and health data interoperability may be in for some significant improvements.

https://healthitanalytics.com/features/a-fhir-future-burns-brightly-for-population-health-management

SMART on FHIR app uses machine learning to help dermatologists make diagnos

Physicians at one Missouri health system are using the
quickly reach conclusions and move forward with the b
care options, its CMIO says.

http://www.healthcareitnews.com/news/smart-fhir-app-uses-machine
learning-help-dermatologists-make-diagnoses

UPDATE
JANUARY 24, 2018

Apple announces effortless solution bringing health records to iPhone

Health Records Brings Together Hospitals, Clinics and the Existing Health App to Give a Fuller Snapshot of Health

https://www.apple.com/newsroom/2018/01/apple-announces-effortless-solution-bringing-health-records-to-iPhone/

Fast Healthcare Interoperability Resources

An HL7 data standard for exchanging healthcare information electronically amongst hospitals, caregivers, patients, etc. FHIR aims to simplify implementation without sacrificing information integrity

TransCelerate eSource Initiative, to date and beyond

Various eSource Assets and Industry Resources can be found at the eSource Website (Link to eSource Assets Page)

Knowledge Insights

- **eSource Sponsor Landscape** *(published)*
- **eSource Technical Landscape** *(published)*
- **Best Practices for non-CRF Data**
- **Roadmap to eSource Adoption: A TransCelerate Perspective** *(published)*
- **Technology Considerations for the Future State** *(published)*

Tools & Solutions

- **eSource Site Capability Questionnaire**
- **CDISC Lab Semantics in FHIR Implementation Guide**
- **eSource Site Maturity Curve** *(published)*
- **Regulatory Landscape Assessment** *(pending)*

- **Engage with Site Advocacy Groups**
- **Collaborate with Standards Setting Organizations (e.g. HL7)**
- **Complete regulatory analysis, confirm findings**
- **Share and align information at industry events and conferences**

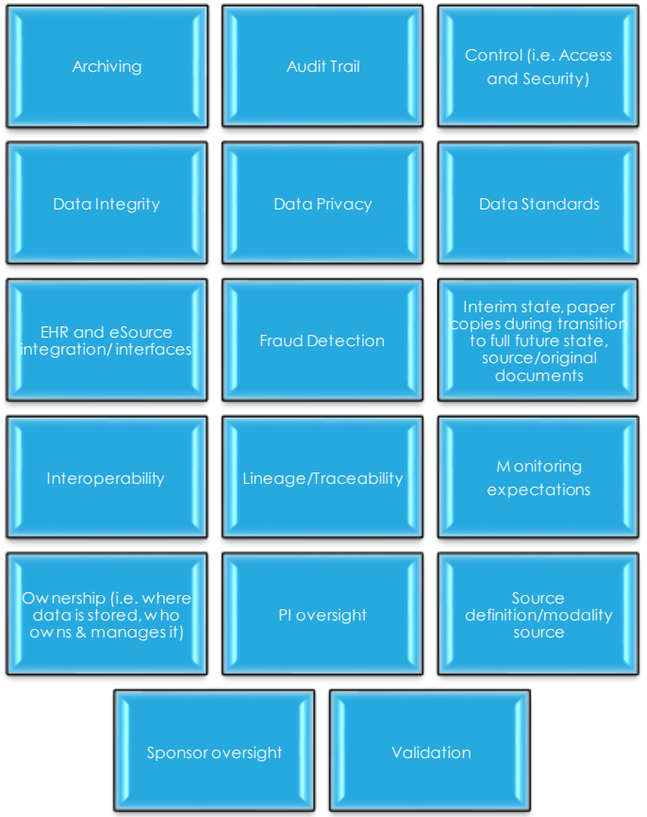
TransCelerate eSource Regulatory Landscape Assessment

Why?

- eSource has a huge potential for transforming clinical trials, with new ways of capturing data and improving on quality.
- New opportunities also come with new challenges
- We wanted to understand what expectations regulatory agencies and industry bodies have expressed in their 'guidance' documents on the use of new eSource technologies.
- How aligned are the guidelines for the purpose of doing global trials?

What we did

- **The team was expanded with operational data management experts to define key topics of relevance to eSource. The list is shown to the right**
- **The regulatory expert team identified the relevant sections in the guidelines covering the topics**
- **This was summarised and line referenced in a common spreadsheet**
- **Topics were assigned two reviewers each to review the summaries and amend as needed.**
- **Reviewers independently evaluated each topic, and highlighted where the available guidelines are:**
  - In consensus
  - Have differences
  - Have gaps (topic was not covered or topic could benefit from more guidance)
- **During a team meeting we conducted a deep-dive discussion and concluded on a final review summary for each topic**



Preliminary Results by Topic

Global State	Topic	Note
Gap	Archiving	EDC centric Consensus. Technology gap for eSource
Differences	Audit Trail	EDC centric guidance, ambiguity for eSource
Consensus	Control	Clear ICH defined expectations
Consensus	Data Integrity	Differences in level of details
Consensus	Data Privacy	Governed by local laws
Gap	Data Standards	No guidance
Differences	EHR and eSource Integration	No common guidance around integration
Gap	Fraud Detection	No guidance around eSource fraud detection
Consensus	Interim State	Clear on certified copy; difference in level of detail
Gap	Interoperability	Interoperability is encouraged yet no guidance on expectations
Consensus	Lineage/Traceability	Sufficient guidance exists
Gap	Monitoring Expectations	Paper and EDC centric vs eSource data volume
Gap	Ownership	Technology gap around apps and devices
Consensus	PI Oversight	Clear ICH defined expectations
Consensus	Source Definition	Clear definitions; lacks clarity around 3rd party storage
Consensus	Sponsor Oversight	Increased expectations of data transfer oversight
Differences	Validation	Specific for EHR

Preliminary Results – Examples

CONSENSUS

Topic: Control (access and security)

Observations:

- In general, all regions in alignment with ICH

DIFFERENCES

Topic: Validation

Observations:

- General consensus that validation of eSource systems is needed, and validation of data transfers is needed.
- There is distinct difference with FDA having ONC certification defined in: "FDA Use of Electronic Health Records Data in Clinical Investigations"
- Other regions do not have an equivalent.

GAP (TECHNOLOGY)

Topic: Archiving

Observations:

- Consensus across regions around archiving in general but there is a technology gap around archiving eSource data and subsequent retrieval of the data.
- This gap impacts both sponsor and sites to be inspection ready. Data is not suitable for PDF files as archive format.

eSource Logical Architecture