Collaboration Proclamation

The combination of EHR, sensor and biomarker data is working to break down traditional barriers to collaboration among top-flight HEOR researchers. Dan Housman explains

The field of health economics and outcomes research (HEOR) has long labored as a shared service executing analysis on behalf of R&D, commercial teams and medical affairs. But today HEOR has stepped up as a core capability, as opposed to a resource/shared services center. The field is quickly adopting new forms of collaboration in responding to a new delivery and regulatory environment that generates more complex data sets along with higher expectations for evidence.

The increasing personalization of treatments through new diagnostics, biomarker assays and personal sensors is driving evidence generation deeper into the clinical enterprise, even to the point of engaging patients quantifying their own journey. New forms of data are now available to researchers in achieving the goal of a precision-based health system.

Payors and governments reimbursing for new treatments have accordingly increased their expectations for evidence of value following regulatory approval. That means HEOR teams are taking on a leadership role throughout the research, development and commercial life cycle in making products with better articulated outcomes and value propositions. All of the data and evidence extensions are pushing groups that were already working in a world of large data sets containing years and tens of millions of patients into a new level of complexity in working with the institutions collecting it.

In short, the era of collaboration is establishing new ways to work. And all of this can make collaboration the next big wave in HEOR as organizations huddle together to derive new perspectives on the patient experience. These collaborations are coming in three major forms: consortia, open source and strategic infrastructure (*figure 1*).

Consortia

The proliferation of clinical data from electronic health records, patient-reported outcomes and biomarker data requires close contact with the health systems generating the data. Unlike claims data sets that hold a narrow field of information stored in procedures, diagnoses and prescriptions, EHR data sets from healthcare providers are more nuanced and complex. They may include, for example, information on allergies, vital signs, laboratory results, pathology studies, flow sheets, imaging and observational notes. The data are also more susceptible to a HIPAA violation because of the lack of structure to many of the fields, such as a clinical note.

So the old model of shipping a large aggregated licensed data set may not work well. What can work are new consortia models that allow health systems and life sciences groups to work together in answering key questions. Options for these include public-private partnerships, commercial research networks and disease-advocacy networks.
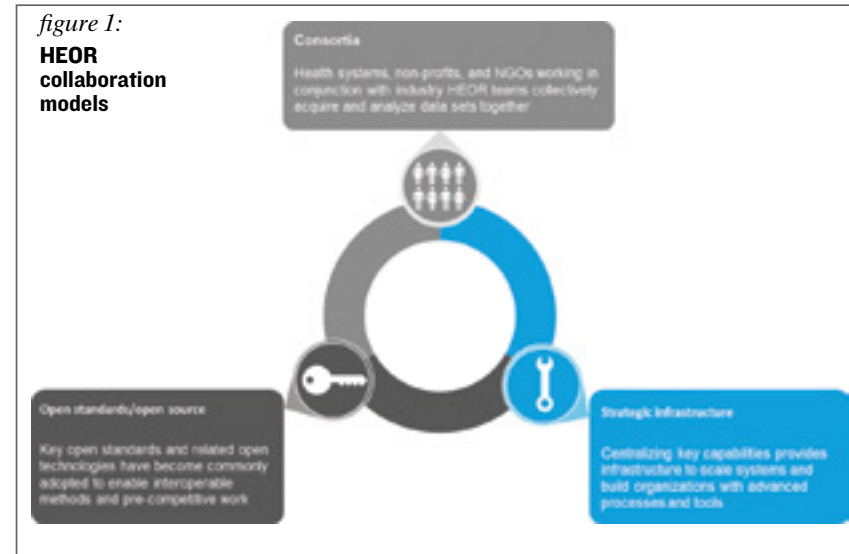
Public-private partnerships such as the European Innovative Medicines Initiative (IMI) facilitate HEOR research by forming grants to study diseases in large-scale funded projects. One major project is the EHR4CR that is studying Alzheimer's disease. The structure of the IMI funding allows multiple organizations to benefit from the same shared consortium data sets.

Via commercial research networks, health systems are working with research organizations to establish a "study framework." ConvergeHEALTH by Deloitte, for example, has brought together such health systems and research groups as Intermountain Healthcare, Regenstrief Institute and Moffitt Cancer Center's M2Gen precision medicine program. The organizations don't have direct access to data sets but instead use a hosted platform to view summary data and explore hypotheses and feasibility within a set of cohort selection tools and prebuilt analysis models.

Researchers typically can't derive treatment insights out of EHR data without access to clinical teams at the hospital level. So the commercial research network model includes a "study" framework where HEOR groups from both the life-sciences company and the health system co-develop new analysis plans in funded collaborative workshops. This is followed by execution of tasks such as natural-language processing to extract new variables, algorithms to calculate novel outcomes of interest and reviews by physicians to explain findings within the data.

Regarding the third mode of consortia, nonprofit advocacy groups are pioneering collaborations around specific diseases. The Michael J. Fox Foundation for Parkinson's Research and The Crohn's & Colitis Foundation of America support thousands of patients gathering information about themselves to help HEOR researchers determine better approaches to their diagnosis and treatment. Each one has established a registry that collects biosamples for genetic analysis, sensor data and patient-reported data for the purpose of collaboration. Health economics and outcomes research teams are working closely with these groups such that multiple sponsors fund the central research effort.

Among these approaches, the commercial research network may emerge as the most powerful accelerator for HEOR teams. It delivers

figure 1:
HEOR collaboration models

a clear and sustainable business model for health systems that helps enable multiple stages of access to HEOR teams. And the power to engage directly with clinicians can allow researchers to swiftly shift observational research into follow-up studies. That offers a direct path in going from hypothesis generation to hypothesis confirmation.

Open standards/open source

The initial barrier in moving from isolation to collaboration is the lack of standards in how groups go about their work. The pressure for both scale and connectivity among groups has led organizations to go from internal bespoke HEOR systems to adopting open standards.

One of the first standards to become mainstream is the OMOP (Observational Medical Outcomes Project) CDM (Common Data Model), which tackles the issue of discordance among source systems. Without a CDM, an analyst working to build a statistical job against one data source must change the analysis tool significantly to adapt to each new data source. With a common data model, the analyst can use the same analysis against multiple data sets and share methods between collaborators.

Commercial research networks are building bridges among the academic health system research community using open tools and standards to scale collaboration with HEOR groups. They are simplifying the challenges of working with multiple health systems by using open standards and tools already in place. This likely presents the strongest value proposition for HEOR groups by extending the benefit of a flexible model for acquiring evidence with approaches that are compatible across multiple sponsored research projects. It also allows the sponsors to reduce vendor lock-in and instead focus on the most effective collaborations with an expanding set of options to meet specific research objectives.

Strategic infrastructure

Information technology organizations and research teams are collaborating to centralize data assets, data-management systems and computational systems in providing a higher quality of HEOR service across the organization. The increased scale of data is requiring bigger systems for storage, processing and memory. Groups are centralizing functions to control costs by using systems with lower expense per terabyte and cloud-friendly models and data lakes to house such big data as genomics and licensed data sets within integrated environments.

Strategic infrastructure goes beyond hardware investments. Central visual cohort selection tools enable hypothesis exploration within data sets prior to executing more detailed analysis. Providing fluid exploration of patient data in interactive commercial data visualization tools helps increase analyst productivity and expands the pool of users who can collaborate beyond statisticians. Some groups are now expanding beyond visual exploration into establishing workflow-driven processes and tools for conducting analyses such as epidemiological statistical queries, incidence and prevalence reports, geospatial visualizations for market analysis and patient journey models (*figure 2*).

Wrapping it up

Health economics outcomes research is transitioning to strategies that put collaboration at the center of new methodologies of building evidence. While multiple consortia models create value, the commercial research networks provide a rapid route to value. This value is extended when internal teams and collaborating groups standardize on common open platforms. While these bring information, the real work for HEOR still resides in the workflow of teams that can translate the information into meaningful evidence. Scalable infrastructure platforms are enabling new visual workflow driven tools that can dramatically increase productivity from HEOR teams. ∎

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figure 2:
Analysis tools by rank

	Sustainable commercial business model	Easy to execute follow-up prospective study	Patient Engagement-genomics/sensor enablement	Clinician and health system engagement	Standardize operations w/in org	Resolve IT scale issues	Increase HEOR analyst productivity	Total Score
Consortia								
Public-private partnership	1	2	2	3	1	1	2	12
Disease advocacy networks	2	3	3	2	1	1	2	14
Commercial research network	3	3	2	3	2	2	2	17
Open Source								
Common Data Model - OMOP	2	2	1	1	3	2	2	13
Federated query (PopMedNet)	1	2	2	2	3	2	2	13
Cohort Query (i2b2/tranSMART)	2	2	3	2	3	2	2	16
Private networks using open tools	3	3	2	2	2	2	3	18
Strategic central HEOR operations								
Advanced data governance	2	1	1	2	3	3	3	14
Hadoop/NoSQL	2	1	3	1	2	3	2	14
Expert teams	2	2	2	2	3	2	2	15
Cloud hosting	2	2	2	2	2	3	2	15
Visual analytics platforms	2	2	2	3	2	2	3	16
Workflow-driven tool approach	2	2	2	3	3	3	3	18