Overview Notes for Hospify on the eClinical Trial Solutions Market

Prepared by Karl Rego on 13 Sept, 2018.

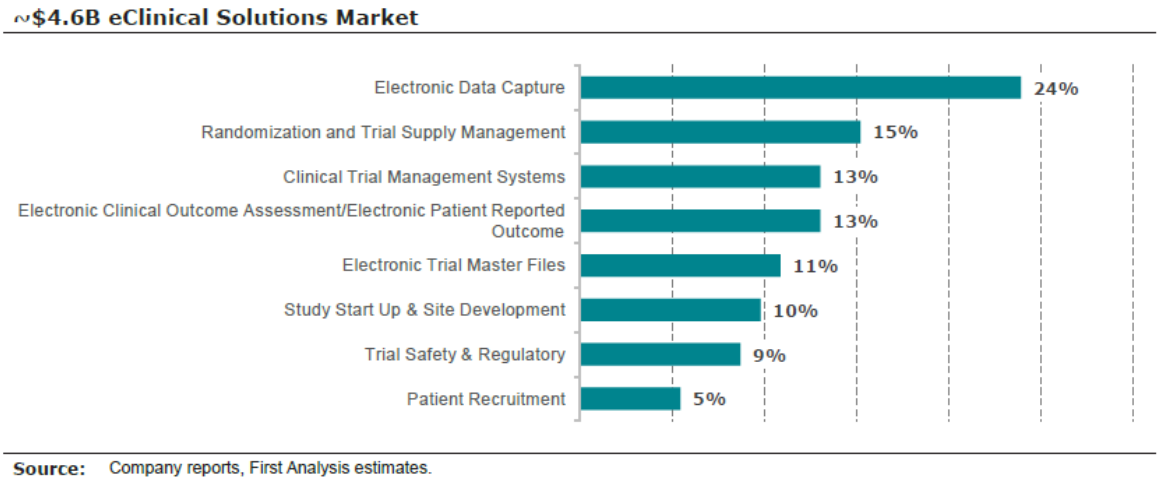
Summary table of contents:

Sections of this report highlighted in blue are especially relevant for Hospify.

I) Market Size & Growth - eClinical Solutions:

Solutions for patient tracking, drug interaction and adherence, e-Patient Diaries/reminders, and post-approval monitoring are part of a broader "eClinical Solutions" Market, valued at ~$4.6B globally, annually, and expected to grow at 12% annually for the next 5 years.

This market includes the following solutions:



Of these, the "Electronic Clinical Outcome Assessment (eCOA)/ Electronic Patient Reported Outcome (ePRO)" portion (which includes e-Patient Diaries) are most relevant for Hospify, particularly in relation to the post-approval research & monitoring stage.

* (Please note: Many of the graphics and much of the clinical trials summary text in sections I-IV of this document were excerpted from an excellent January 2018 report by First Analysis Securities Corporation, entitled: eClinical Solutions: Streamlining the introduction of new drugs and medical technology. I've also added in my own commentary throughout, plus data from a number of other sources.)

II) Market Size & Growth - eCOA:

As of 2017, the global eCOA market was valued at $635m, and is projected to grow at 15.3% CAGR, to ~ $2.16B by 2025. (Source: https://www.persistencemarketresearch.com/market-research/epro-epatient-diaries-and-ecoa-market.asp)

III) What exactly is eCOA?

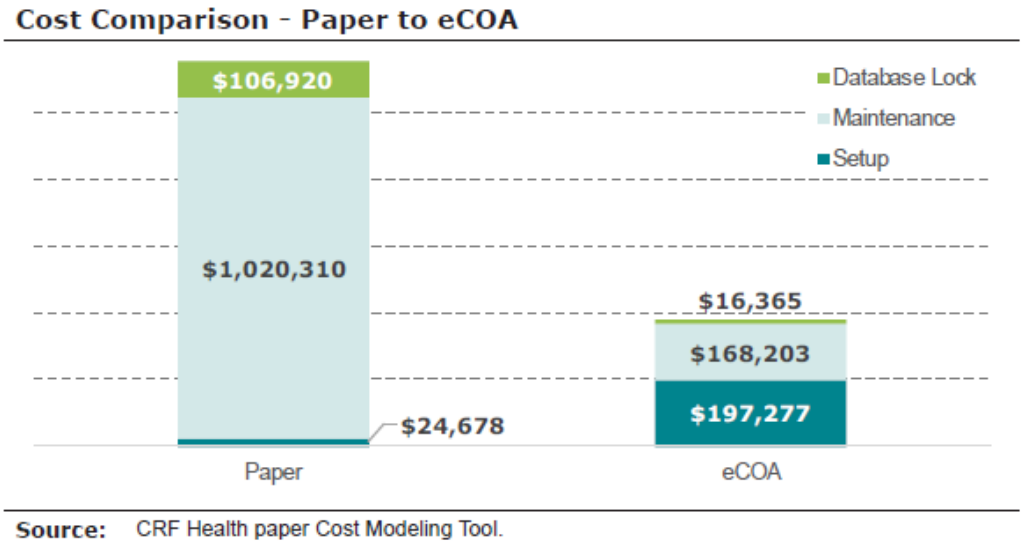
A clinical outcome assessment (COA) directly or indirectly measures how patients feel and can be used to determine whether or not a drug has been demonstrated to provide a treatment benefit. Many studies still use paper methods to collect clinical outcome data, and there are cases when it may make more sense to achieve study objectives through paper rather than electronic methods (e.g., Phase I studies with limited subjects). However, several types of clinical outcome data can be collected more efficiently, at lower cost, and more accurately with electronic approaches (e.g., diary data or daily pain scores).

eCOAs consist of a variety of electronically captured assessments, including patient-reported outcomes (PROs), clinician-reported and healthcare professional assessments (ClinROs), observer reported outcomes (ObsROs), patient performance outcomes (PerfOs), and E-Patient Diaries.

eCOA uses advanced mobile technology such as smartphones, tablets, and personal computers to allow patients, clinicians, and their caregivers to directly report outcomes. eCOA generates highly accurate data that allows for a better understanding of the patient experience in clinical trials.

ePRO is a patient reported outcome that is collected by electronic devices such as smartphones, tablets, and computers. ePRO methods are most commonly used in clinical trials, but they are also used for other medical applications in healthcare.

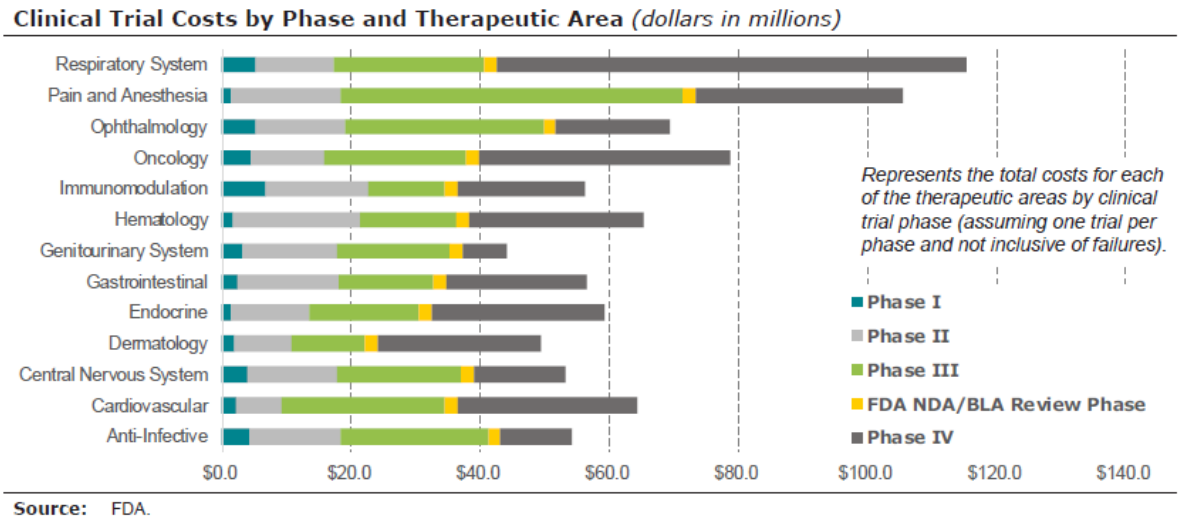
E-Patient Diaries are electronic diaries or tools that are used in clinical trials or disease treatment in order to evaluate a patient's condition or to measure treatment compliance.



Note the higher setup cost for eCOA solutions. This could be an opportunity for Hospify to offer a lighter-touch solution to capture data during post-approval monitoring.

According to EvaluatePharma, worldwide pharmaceutical R&D totaled ~$157 billion in 2016 and is expected to grow at a 2-3% annual rate through 2022. Of this amount, First Analysis estimate the clinical development spend (Phases I-IV) to be~$60 billion.

Of this $60 billion, here is the breakdown by Clinical Trial Phase for various therapeutic areas:



Note that the Phase IV data collection can be quite costly.

IV) A Quick Review of the Clinical Trials/Approval/Post-Approval Process:

Discovery and preclinical testing

Prior to testing in humans, a new drug candidate is considered to be a preclinical or discovery (rather than a developmental) project. The focus of preclinical testing is to determine whether the candidate is safe enough to use in humans and whether it exhibits sufficient pharmacological activity or response to warrant further investigation.

Human clinical testing

Phase I clinical trials are conducted in a small number of human volunteers (typically fewer than 100) to determine the safety, tolerability, and pharmacokinetics and pharmacodynamics of the drug—how the drug acts in the body and the relationship between the drug's chemical structure and its effects on patients.

Phase II clinical trials are conducted with patient volunteers to assess the efficacy and dosage response of the drug candidate. Phase II trials typically enroll 100-500 patients and identify common, short-term drug treatment side effects. Drug candidates that are shown to be both safe and efficacious in Phase I and II clinical testing move forward and are next tested in larger randomized, controlled trials.

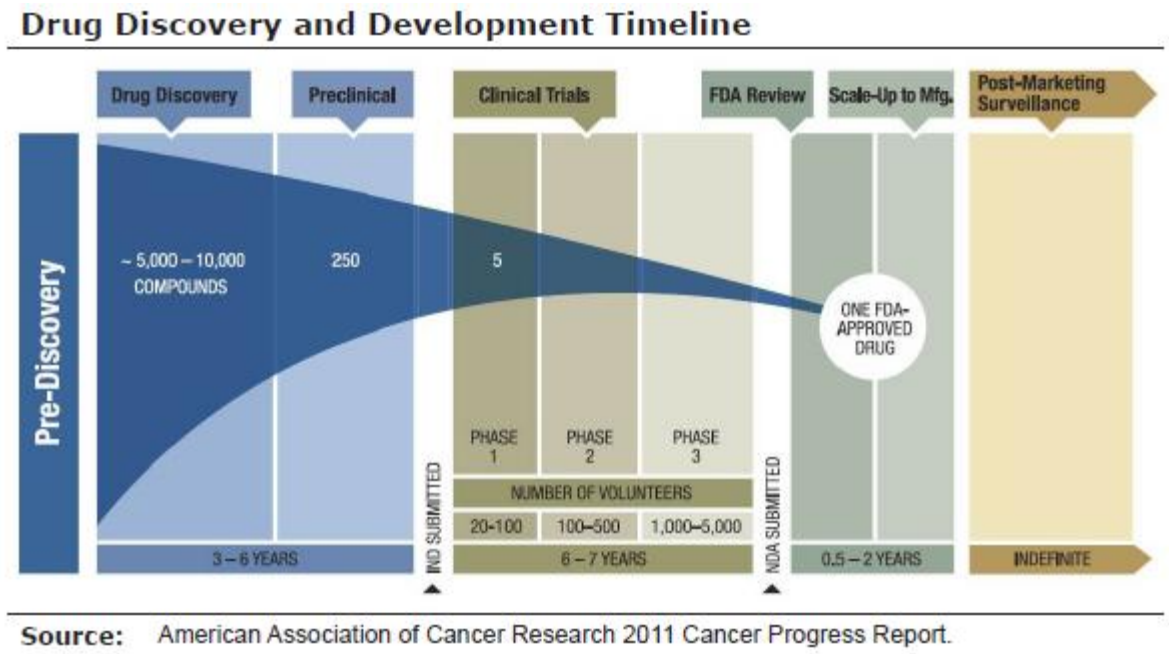
Phase III clinical trials enroll 1,000-5,000 patients (or more) across numerous clinical trial sites. From enrollment to completion, Phase III trials may take years to complete. Regulatory authorities in the U.S. and internationally typically require positive data from two Phase III trials to support and justify a submission for market approval.

Regulatory review and approval. If the trials prove successful, the data collected from both the preclinical studies and clinical trials are submitted to the FDA for review in the form of a new drug application (NDA) or biologic license application (BLA). If the candidate is ultimately approved, the sponsor may market it for the approved indication(s).

Post-approval research and monitoring

Research does not end when the discovery and development phases are over and the product is on the market. Sponsors conduct extensive post-approval research to monitor safety and long-term side effects on patients using the drug. The FDA requires that sponsors monitor a drug for as long as it stays on the market and submit periodic reports on safety issues. Sponsors must report any adverse events that patients or healthcare providers report from use of the medicine.

Phase IV clinical trials are often conducted to test the long-term safety and efficacy of approved drugs and may be required by the FDA as a condition of approval. Additionally, sponsors may conduct post-approval studies to assess the benefits of a medicine for different populations or in other disease areas. In some cases, they may also develop improved delivery methods or dosage forms. Phase IV trials improve researchers' and clinicians' understanding of a drug's potential uses and its full benefits for health and quality of life. This phase of continued research can help identify whether a drug has a greater impact on an outcome when it is used earlier in a disease, in combination with other drugs, for other disease indications, or with specific biomarkers.



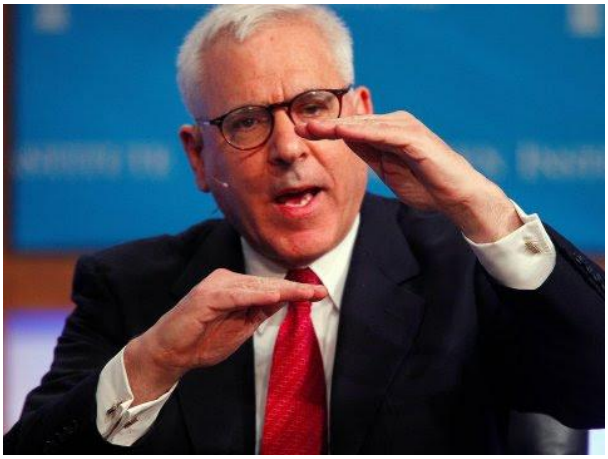
V) Recent M&A Activity: eClinical / R&D

This is a hot area, attracting a lot of investment from industry players (CRO's) as well as from private equity/financial acquirers. It is now in a state of consolidation, with a number of acquisitive players. As evidence of the M&A activity in this space (eClinical / R&D overall), see the article below on CRO's (Contract Research Organisations, who use many eClinical and eCOA solutions), along with my quick notes below on the eCOA market in particular. In my time in the eCOA space, we partnered with the leading CRO's and I know a number of the industry and PE players mentioned below.

http://uk.businessinsider.com/mergers-and-acquisitions-in-the-contract-research-organization-2017-7?r=US&IR=T

Wall Street is making huge bets on healthcare companies you've never heard of

- Lydia Ramsey
- Jul. 21, 2017, 12:07 AM



Carlyle Group cofounder and managing director David Rubenstein.REUTERS/Fred Prouser

- **Wall Street is interested in the companies that help drugmakers research and develop drugs.**
- **These companies, called contract research organizations, are becoming increasingly important for the pharmaceutical industry as companies look to save money on R&D.**

Wall Street has been piling in to an area in healthcare you've most likely never heard of.

Contract research organizations, or CROs, work with drugmakers to take on some of the science that companies have to carry out to get drugs approved.

That means things like discovering potential drug targets and running clinical trials on behalf of pharmaceutical companies.

For example, say you need to run a clinical trial for a drug you're working on but don't want to invest in hiring all the folks to run the clinical trial. You could work with a CRO, which can set that up for

you and recruit patients for a certain price. As drug companies continue to look for ways to trim research-and-development costs, these companies have become more popular.

That activity has made a lot of room for mergers and acquisitions, even at a time when drugmakers themselves are in a bit of a dealmaking lull. According to Bloomberg, M&A spending in the CRO industry was $24 billion in 2016. This year, the spending on deals has totaled $13 billion.

Many of these CROs are getting picked up by private equity, signaling that investors expect the companies to grow over the next decade. Pamplona Capital Management, Carlyle Group, and GTCR have all struck big deals in the space recently.

Stocks of the companies that are public are up by more than 25% over the past year, signaling public-market investors are betting on the companies too, potentially in anticipation of activity to come.

"We are at the beginning of this process," KPMG principal Paul Saias told Bloomberg.

Almost every major CRO has been involved with an acquisition, starting back in 2015.

- Pamplona Capital Management acquired **Parexel International** in a $5 billion deal to take the CRO private in June.
- In June, **Albany Molecular Research Inc.** was acquired and taken private by Carlyle Group and GTCR for $922 million.
- **Chiltern** picked up the Japanese CRO Integrated Development Associates in May.
- In May, two of the largest CROs — **Inc Research Holdings** and **InVentiv Health** — merged in a $4.6 billion deal.
- In 2016, **Charles River Laboratories** went on an acquisition spree, snapping up other CROs.
- In 2016, **Quintiles Transnational** merged with IMS Health in an $8.75 billion deal. The combined company provides clinical research and health-information technologies, which goes beyond what's traditionally considered a CRO.
- Back in 2015, LabCorp acquired **Covance** in a $6.2 billion deal.

Only two of the top 10 CROs appear to not be part of the dealmaking frenzy. One is Pharmaceutical Product Development, which is majority owned by Carlyle Group, which was also behind taking Albany Molecular private. The other is Icon, which might be more open to deals now, according to Jefferies analyst David Windley.

VI) Recent M&A Activity: eCOA

The eCOA portion of the market has been following a similar pattern, with consolidation accelerating over the past few years. It is a competitive market and industry players are acquiring others to broaden their portfolio of solutions, etc. and the players themselves are being bought and sold by leading PE firms. For example, leading eCOA provider CRF Health (then owned by PE firm Vitruvian) acquired Entera Health in 2016/2017, a global leader in digital health solutions. The announcement read:

> CRF Health, the leading global provider of eCOA solutions for the life sciences industry, has acquired Entra Health, a global leader in mobile health IT, cloud-based remote monitoring, health data exchange and analytics solutions. The acquisition expands CRF Health's offerings into the expanding market of wireless medical and wellness devices, bringing a new level of connectivity to its eCOA technologies and establishing a complete network of solutions to collect, manage and analyze biometric and clinical trial data. The combination solidifies CRF Health as the most established provider of market-leading eCOA solutions and medical devices for remote patient monitoring, telemedicine and wireless health, backed by unrivalled expertise and regulatory know-how.
>
> Entera Health's solution delivers remote monitoring of clinical trial and non-trial patient populations across a multitude of therapeutic areas as well as post-surgical, preventative and chronic care.

Interestingly, in parallel, Genstar Capital bought CRF's competitor Bracket, and then Bracket bought mProve, and CLINapps. Then, just this month, CRF merged with Bracket (for an undisclosed amount):

> https://www.prweb.com/releases/crf_health_and_bracket_announce_merger_closing/prweb15735945.htm
>
> CRF Bracket was formed by the acquisition of CRF Health from Vitruvian Partners by Genstar Capital (read press release), and by Genstar Capital's acquisition of Bracket in March 2017.

This is just one of a number of serial acquisition stories in this space. There have been a number of new entrants as well.