The 2015 Avoca Report

Clinical Development Innovation

Sponsor and Provider Views on Innovation in Outsourced Clinical Development

Avoca
THE AVOCA GROUP
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Research Overview
Avoca Research Overview

Introduction

Each year, The Avoca Group surveys industry executives and managers to understand trends in clinical development, with a particular focus on outsourcing dynamics and relationships between research Sponsors and Providers.

In this year’s industry review, Avoca explored the topic of clinical development innovation. Specifically, we sought to understand how innovation is being utilized, from the perspective of both sponsor organizations as well as the service providers that support them, and the extent to which it is helping enhance R&D efficiency and effectiveness.

This report summarizes the key findings from our research.
Avoca Research Overview

Areas Explored in 2015

- **Perceptions of Innovative Companies**: What types of companies are driving innovation in clinical development?

- **Company Behavior/Strategy Related to Innovation**: Who is responsible for innovation and how is it funded? What types of innovative activities are being pursued, and are we progressing on goals?

- **Innovation and Provider Relationships**: How well are Sponsors and Providers collaborating on the use of innovative approaches? How does the nature of the relationship impact the ability to work together in this regard?

- **Future Outlook on Innovation**: Where is innovation most needed? Who is best positioned to drive such innovation, and how confident are we that efforts will yield meaningful results?
156 respondents from 85 Sponsor companies participated 83% with more than 10 years of biopharmaceutical industry experience

Company Type
- Top 20 Biopharma ($10B+ sales)
- Top 50 / Mid-sized Biopharma ($2-$9.9B sales)
- Other Mid-sized Biopharma ($500M-$1.9B sales)
- Small / Specialty Biopharma (<$500M sales)
- Medical Device company
- Other

Functional Area
- Clinical Development / Operations
- Quality Assurance / Quality Control
- Procurement / Outsourcing / Vendor Mgmt
- Medical / Scientific
- Executive Management
- Regulatory Affairs
- Other

Companies Represented
- AbbVie
- Achillion
- Actelion
- Akros
- Alcon
- Alexion
- Amgen
- AnaMar AB
- Arbor Pharmaceuticals
- Astellas
- AstraZeneca
- Bayer
- Biological E Ltd.
- Boehringer Ingelheim
- Boston Scientific
- Bristol-Myers Squibb
- Carefusion
- Cochlear
- Danone
- DSPA
- Eisai
- Eli Lilly and Company
- EMD Serono
- Emergent
- Endo
- Endocyte
- Ferrer
- FibroGen
- Futura Medical
- Gennova Biopharma
- Genzyme
- Glenmark
- Glycotope
- Grüenenthal
- HAL Allergy
- Intercept
- Italfarmaco
- Ivantis
- Jxchelsis
- KemPharm
- Lundbeck
- MacroGenics
- Medrobotics
- Menarini
- Merck
- Mitsubishi Tanabe
- NeuroHealing
- NinePoint Medical
- Novartis
- Omeros
- OncoMed
- Onconova
- OncoQR ML QG
- Operax Therapeutics
- Orion Pharma
- PF Labs
- Pfizer
- Philips Healthcare
- Pierre Fabre
- Plasma Surgical
- Purdue Pharma
- Recordati
- Regeneron
- Roche
- Genentech
- Salix
- Sandstone Diagnostics
- Sanofi
- Seattle Genetics
- Serum Institute of India
- Shire
- Sunovion
- Takeda
- Tekmira
- Tesaro
- Teva
- The Medicines Company
- UCB Biosciences
- United Therapeutics
- Valeant
- Vectura
- ViaCyte
- Wockhardt
Respondent Demographics: Provider

90 respondents from 61 Provider companies participated
91% with more than 10 years of biopharmaceutical industry experience

Companies Represented

- Advanced Clinical Affairs Group Worldwide: Emergent, PPD
- Almac Clinical Technologies: ExecuPharm, Premier Research
- Analgesic Solutions: Experis, Prescient
- Applied Immunology: FisheClinical Services, Proscan
- Aptiv Solutions: Frenova Renal Research, Quest Diagnostics
- Aqix: Genelife Clinical Research, ResearchPoint
- Armstrong Clinical: GlobalCare Clinical Trials, RH Bouchard & Associates
- BioClinica: ICON, Rho
- Biotrial: ICR, Savaan Pharma
- Cardiocore: INC Research, SOLTI
- Chiltern: inSeption Group, LLC, Syncro Clinical Research
- Clinantha Research: Intermountain Healthcare, Target Health
- Clindox Limited: inVentiv Health, Theorem Clinical Research
- Clinical Excellence Group: Life Sciences, Therapeutics, Inc.
- Clinically Connected: New England IRB, TKL Research
- Clinlogix: PAREXEL, University Medical Research
- CRF Health: PCG Clinical Services, Vantage BioTrials
- CRN: PerkinElmer, Worldwide Clinical Trials
- CROMSOURCE: PharmaLegacy Laboratories
- Datatrial: Popsi Cube

Company Type

- 65% CRO
- 9% Consulting Company
- 9% Imaging Company
- 9% Laboratory Services Provider
- 3% Other Niche Service Provider
- 3% Other

Functional Area

- 40% Clinical Development / Operations
- 12% Executive Management
- 12% Business Development
- 12% Alliance Management / Partnerships
- 5% Quality Assurance / Quality Control
- 7% Other
Respondent Demographics

**SPONSOR**
Mean %s

- Large/Mid-sized CROs: 66%
- Small/Specialty CROs: 26%
- Academic Research Organizations (AROs): 5%
- Other: 9%

**PROVIDER**
Mean %s

- Top 20 Biopharma: 34%
- Mid-sized Biopharma: 27%
- Small/Specialty Biopharma: 25%
- Medical Device companies: 5%
- Other: 5%

**Spend by Provider Type**

- N=134
- Large/Mid-sized CROs: 26%
- Small/Specialty CROs: 5%
- Academic Research Organizations (AROs): 66%
- Other: 5%

**Spend by Provider Relationship**

- N=130
- Partnership/Alliance providers: 34%
- Preferred providers: 34%
- Transactional providers: 29%
- Other: 26%

**Work by Sponsor Type**

- N=81
- Large/Mid-sized CROs: 34%
- Small/Specialty CROs: 25%
- Academic Research Organizations (AROs): 9%
- Other: 5%

**Work by Sponsor Relationship**

- N=83
- Partnership/Alliance relationships: 53%
- Preferred provider relationships: 26%
- Transactional relationships: 19%
- Other: 19%
Research Findings

Innovation in Clinical Development
How innovative are we?

Sponsors reported using innovative approaches in about one-third of their trials, and just over 40% view their organizations as above average in innovation. Providers reported slightly higher use of innovative approaches, but nearly three-quarters consider themselves to be above average in innovation.

View of Own Organization as Innovative

<table>
<thead>
<tr>
<th></th>
<th>Sponsor</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the forefront of innovation</td>
<td>14%</td>
<td>33%</td>
</tr>
<tr>
<td>Somewhat above average</td>
<td>27%</td>
<td>41%</td>
</tr>
<tr>
<td>About average</td>
<td>29%</td>
<td>17%</td>
</tr>
<tr>
<td>Somewhat below average</td>
<td>23%</td>
<td>17%</td>
</tr>
<tr>
<td>Not innovative at all</td>
<td>6%</td>
<td>7%</td>
</tr>
</tbody>
</table>

EXAMPLE: “We implemented a new approach with a medical informatics vendor to contact treating MDs in almost real-time to let them know about one of our trials for recruitment purposes. We shared how we review protocol variances quarterly across programs with leaders of other clinical operations teams, and no one else had implemented something as simple and effective to manage communication around the topic.”

- Specialty Pharma respondent

Q: To what extent do you view your organization as innovative with respect to clinical development? Q: Approximately what percentage of the trials your company conducted in 2014 included some type of innovative component in the approach to clinical development?
To what extent is clinical development innovation pursued?

 Providers perceive their companies to be more committed to pursuing innovation than Sponsors along various dimensions, and there is a clear disconnect regarding the extent to which Providers are introducing innovative approaches to Sponsors.

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>My company…</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>74%</td>
<td>…recognizes and adopts innovative approaches to clinical development that are shown to be successful</td>
<td>92%</td>
</tr>
<tr>
<td>52%</td>
<td>…is willing to try and fail in the pursuit of innovative approaches to clinical development</td>
<td>70%</td>
</tr>
<tr>
<td>41%</td>
<td>…invests an appropriate amount of money and resources into innovative approaches to clinical development</td>
<td>72%</td>
</tr>
<tr>
<td>43%</td>
<td>…has been introduced to new innovative approaches to clinical development through its relationships with CROs</td>
<td>89%</td>
</tr>
<tr>
<td></td>
<td>…has introduced new innovative approaches to clinical development to the Sponsors we support</td>
<td></td>
</tr>
</tbody>
</table>

Q: To what extent do you view your organization as innovative with respect to clinical development?

Q: Please indicate the extent to which you agree or disagree with each of the following statements:
Which companies are leading innovation in clinical development?

When asked to identify the companies that are making the greatest strides in innovation, respondents mentioned the largest biopharma and CRO companies most frequently. Sponsors and Providers were fairly consistent in their responses.

Companies Bringing Greatest Innovations to Clinical Development

Size of name represents frequency of mentions.

Top 10 Biopharma Companies Mentioned
- Novartis
- Gilead
- BMS
- GSK
- Pfizer
- Amgen
- Lilly
- JnJ
- Merck
- Roche

Top 10 Service Providers Mentioned
- Covance
- PPD
- ICON
- inVentiv
- Medidata
- PRA
- INC Research
- PAREXEL

Q: Which biopharma companies are bringing the greatest innovations to clinical development? Please list up to three.
Q: Which service providers are bringing the greatest innovations to clinical development? Please list up to three.
How are different types of organizations contributing to innovative advances?

While respondents specifically named the largest companies most frequently as contributors to innovation, when asked to evaluate the innovative abilities of various types of organizations, small/specialty companies received higher average ratings than large organizations.

### Level of Innovation by Company Type

#### Sponsor Assessment of Providers:

<table>
<thead>
<tr>
<th>Type of Provider</th>
<th>Not innovative at all</th>
<th>Somewhat below average</th>
<th>About average</th>
<th>Somewhat above average</th>
<th>At the forefront of innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large CROs</td>
<td>7%</td>
<td>12%</td>
<td>42%</td>
<td>29%</td>
<td>11%</td>
</tr>
<tr>
<td>Mid-sized CROs</td>
<td>4%</td>
<td>10%</td>
<td>39%</td>
<td>42%</td>
<td>6%</td>
</tr>
<tr>
<td>Small/Specialty CROs</td>
<td>2%</td>
<td>11%</td>
<td>23%</td>
<td>41%</td>
<td>22%</td>
</tr>
<tr>
<td>Academic Research Organizations (AROs)</td>
<td>16%</td>
<td>31%</td>
<td>25%</td>
<td>18%</td>
<td>10%</td>
</tr>
</tbody>
</table>

#### Provider Assessment of Sponsors:

<table>
<thead>
<tr>
<th>Type of Sponsor</th>
<th>Not innovative at all</th>
<th>Somewhat below average</th>
<th>About average</th>
<th>Somewhat above average</th>
<th>At the forefront of innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 20 Biopharma</td>
<td>5%</td>
<td>16%</td>
<td>36%</td>
<td>31%</td>
<td>11%</td>
</tr>
<tr>
<td>Mid-sized Biopharma</td>
<td>6%</td>
<td>41%</td>
<td>41%</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>Small / Specialty Biopharma</td>
<td>3%</td>
<td>16%</td>
<td>13%</td>
<td>44%</td>
<td>24%</td>
</tr>
<tr>
<td>Medical Device companies</td>
<td>4%</td>
<td>32%</td>
<td>26%</td>
<td>23%</td>
<td>15%</td>
</tr>
</tbody>
</table>

**Q:** Based on your experience, how innovative do you consider the following types of Clinical Service Providers to be?

**Q:** Based on your experience, how innovative do you consider the following types of Sponsors to be?
Who is responsible for innovation within Sponsor and Provider companies?

More than half of survey participants indicated that Clinical Development/Operations has responsibility for innovation within their organizations; most of the remainder reported that there is a dedicated group/function responsible for innovation at their company.

Responsibility for Clinical Development Innovation

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embedded in Clinical Dev/Ops</td>
<td>58% (N=109)</td>
</tr>
<tr>
<td>Dedicated group/function</td>
<td>21%</td>
</tr>
<tr>
<td>External providers/consultants guide innovation</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>6%</td>
</tr>
</tbody>
</table>

“Implementation of innovation is a cross-functional approach and should be led by clinical development, but must be supported by all other areas, e.g. strategic management, IT, QA, etc.”

- Mid-sized Biopharma respondent

Q: Which of the following best describes who has responsibility for innovation as it relates to clinical development within your organization?
How is innovation funded and is ROI measured?

When it comes to funding innovation, three-quarters of participating Sponsors reported that costs are embedded within study budgets, while Providers are more likely to have a centralized budget. Relatively few Sponsors indicated that they have metrics to measure innovation ROI, while nearly half of Providers reported having ROI metrics.

**Funding for Clinical Development Innovation**

- **Sponsor**
  - 78% Costs in individual study budgets
  - 19% Central/shared budget
  - 19% Other
  - N=94

- **Provider**
  - 39% Costs in individual study budgets
  - 43% Central/shared budget
  - 18% Other
  - N=56

**Measurement of ROI Associated with Innovation**

- **Sponsor**
  - 15% of respondents indicating ROI is measured
  - N=80

- **Provider**
  - 47% of respondents indicating ROI is measured
  - N=45

"We have measured data query and change rates, which affect both quality and speed, and the associated costs of cleaning data. We also have figures that show how significantly reducing on-site monitoring affects cost."

- CRO respondent

Q: Please indicate which statement best reflects how innovative clinical development approaches are typically funded at your organization. Q: Does your company currently have any metrics to measure the ROI associated with innovative approaches to clinical development?
What are the goals associated with innovation and are they being achieved?

Both Sponsors and Providers confirmed that various goals are important in their pursuit of innovative approaches to clinical development. In general, Providers view their companies as more successful in achieving these goals than Sponsors.

### Importance and Success of Goals/Benefits of Innovative Approaches

Mean ratings on scale of 1 “Not at all Important/Successful” to 5 “Extremely Important/Successful”

<table>
<thead>
<tr>
<th>Goal</th>
<th>Sponsor Importance</th>
<th>Sponsor Success</th>
<th>Provider Importance</th>
<th>Provider Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing development timelines</td>
<td>3.2</td>
<td>4.6</td>
<td>3.9</td>
<td>4.6</td>
</tr>
<tr>
<td>Reducing development costs</td>
<td>3.2</td>
<td>4.4</td>
<td>3.9</td>
<td>4.4</td>
</tr>
<tr>
<td>Improving success rates</td>
<td>3.3</td>
<td>4.4</td>
<td>3.8</td>
<td>4.6</td>
</tr>
<tr>
<td>Getting more value from clinical data collected</td>
<td>3.4</td>
<td>4.4</td>
<td>3.9</td>
<td>4.5</td>
</tr>
<tr>
<td>Enhancing focus on patients</td>
<td>3.6</td>
<td>4.1</td>
<td>3.7</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Sponsor N=104-115; Provider N=64-71

**Q:** How important are each of the following goals/benefits in driving your company to pursue innovative approaches to clinical development?  
**Q:** How successful has your company been in achieving goals or recognizing benefits in each area below due to innovative approaches to clinical development?
What are the primary barriers to innovation?

Sponsors and Providers are well aligned on what they consider to be the main barriers to innovation in clinical development, namely, risk aversion, company culture, and the potential cost of new approaches.

**Q: Thinking about the company you work for, what would you say are the primary internal barriers to innovation in clinical development?**

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>“(1) Mindset of employees and management, and (2) budgetary constraints – unless there is hard data showing cost savings or time savings.”</td>
<td>“The company as a whole has a risk averse culture. In addition to this, management is financially focused.”</td>
</tr>
<tr>
<td>“Decision makers would rather stick to conservative measures than to take the risk to spend money on new innovative approaches. Often decision making takes too long to allow selected measures to show an effect.”</td>
<td>“Internally we face the same challenges as our sponsors – we need to be able to justify the investments and show potential ROI.”</td>
</tr>
<tr>
<td>“Anything innovative (process, tool, etc.) that doesn’t have a proven track record is less likely to be implemented until there is proof of success.”</td>
<td>“Obtaining sponsor approval for the roll out of new approaches/capabilities on projects; reluctance to be the first project.”</td>
</tr>
</tbody>
</table>
Which activities can have the greatest impact and how much progress has been made in those areas?

Trial design, patient recruitment/enrollment and patient engagement represent areas where innovation can have the greatest impact, but progress is somewhat lacking according to respondents, particularly for patient recruitment and engagement.

### Top Activities Where Innovation Can Have An Impact and Where Progress Has Been Made

<table>
<thead>
<tr>
<th>Activity</th>
<th>Sponsor Impact</th>
<th>Sponsor Progress</th>
<th>Provider Impact</th>
<th>Provider Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial design</td>
<td>66%</td>
<td>39%</td>
<td>59%</td>
<td>37%</td>
</tr>
<tr>
<td>Patient recruitment and enrollment</td>
<td>43%</td>
<td>16%</td>
<td>39%</td>
<td>16%</td>
</tr>
<tr>
<td>Patient engagement and involvement</td>
<td>40%</td>
<td>22%</td>
<td>51%</td>
<td>10%</td>
</tr>
<tr>
<td>Data collection and management</td>
<td>34%</td>
<td>22%</td>
<td>38%</td>
<td>24%</td>
</tr>
<tr>
<td>Feasibility and site selection</td>
<td>30%</td>
<td>29%</td>
<td>31%</td>
<td>28%</td>
</tr>
<tr>
<td>Site monitoring</td>
<td>34%</td>
<td>27%</td>
<td>41%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Less frequently selected activities included: Site engagement and management, data analysis, overall trial management and drug supply management.

Q: For the following clinical development activities, please indicate the three in which you believe innovative approaches can have the greatest impact. Q: For which of the following clinical development activities has your company made the most progress in utilizing innovative approaches? Please select up to three.
What are some examples of innovative approaches that have been utilized?

When asked to describe the most innovative approach to clinical development that they have utilized or heard about, respondents most frequently offered examples involving risk-based monitoring, use of electronic health records, novel data collection and analysis techniques, and adaptive trial designs.

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trial Design</strong></td>
<td></td>
</tr>
<tr>
<td>“Import of a patient’s EMR into the CRF. Remote lab capture so patients do not have to go to as many clinic visits. Use of adaptive study designs.”</td>
<td>“Incorporating at-home visits for selected protocol tests and assessments.”</td>
</tr>
<tr>
<td><strong>Site Monitoring</strong></td>
<td></td>
</tr>
<tr>
<td>“Aiming to reduce the burden of 11% SDV and move towards risk based monitoring or targeted monitoring, shaped by the risk assessment of each study.”</td>
<td>“Building a central monitoring hub for a key client to drive down monitoring costs and enhance productivity and quality.”</td>
</tr>
<tr>
<td><strong>Data Collection &amp; Management</strong></td>
<td></td>
</tr>
<tr>
<td>“Electronic data capture enabling effective linking/loading of all related clinical data including SAE reporting, IxRT data, and lab data, etc.”</td>
<td>“Because sites enter most of our study data in real-time, we look at the data every day. This, coupled with real-time edit checks at time of entry, yield better quality data, and faster time to decision-making.”</td>
</tr>
<tr>
<td><strong>Feasibility &amp; Site Selection</strong></td>
<td></td>
</tr>
<tr>
<td>“Dedicated resources at the country level to do investigator landscaping and collate ‘Voice of Site/Patient.’”</td>
<td>“Using data on site performance from thousands of trials, the company has created a technology enabled service to enable sponsors to select sites for future trials based upon past performance.”</td>
</tr>
</tbody>
</table>

Q: What is the most innovative idea or approach you’ve heard about related to clinical drug development? Q: For each of the development activities you selected, please provide a specific example of the innovative approach(es) your company has utilized.
Which activities are Sponsors requesting and how are Providers performing in those areas?

While trial design and patient engagement are among the areas believed to offer the greatest potential impact, Providers are most frequently asked to use innovative approaches in site monitoring. From the Sponsor perspective, Providers are not meeting their innovation needs very well, particularly with respect to patient engagement.

<table>
<thead>
<tr>
<th>Areas</th>
<th>Sponsors</th>
<th>Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data collection and</td>
<td>37%</td>
<td>50%</td>
</tr>
<tr>
<td>Patient recruitment and</td>
<td>33%</td>
<td>52%</td>
</tr>
<tr>
<td>Site monitoring</td>
<td>28%</td>
<td>69%</td>
</tr>
<tr>
<td>Feasibility and site selection</td>
<td>28%</td>
<td>43%</td>
</tr>
<tr>
<td>Trial design</td>
<td>24%</td>
<td>41%</td>
</tr>
<tr>
<td>Site engagement and</td>
<td>22%</td>
<td>35%</td>
</tr>
<tr>
<td>Data analysis</td>
<td>22%</td>
<td>28%</td>
</tr>
<tr>
<td>Overall trial management</td>
<td>19%</td>
<td>39%</td>
</tr>
<tr>
<td>Patient engagement and</td>
<td>13%</td>
<td>41%</td>
</tr>
</tbody>
</table>

**Q: Of the following clinical development activities, in which areas are Providers meeting your needs with respect to the use of innovative approaches?**  
**Q: Of the following clinical development activities, in which areas are Sponsors requesting the use of innovative approaches?**
Who drives innovation when Sponsors and Providers collaborate?

There is a clear disconnect regarding which party primarily drives the use of innovative approaches in outsourced clinical trials, as nearly two-thirds of both Sponsors and Providers indicated that their organization is the primary driver.

Driver of Innovation

Sponsors

Providers

My Company

35

65

35

65

Q: In your opinion, for trials your company conducts involving innovative approaches and a Clinical Service Provider, which party primarily drives the innovation? Q: In your opinion, for trials your company conducts involving innovative approaches, which party primarily drives the innovation? (100 point allocation)
How does relationship type impact the use of innovative approaches?

Overall, both Sponsors and Providers indicated that deeper relationships have a more positive impact on the use of innovative approaches to clinical development than transactional relationships.

Relationship Impact on Utilization of Innovative Approaches

Mean ratings on a scale of -2 “Strong negative impact” to +2 “Strong positive impact”

<table>
<thead>
<tr>
<th>Partnership / Alliance</th>
<th>Preferred Provider</th>
<th>Transactional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Impact</td>
<td>Sponsor</td>
<td>Provider</td>
</tr>
<tr>
<td>1.09</td>
<td>0.76</td>
<td>0.42</td>
</tr>
<tr>
<td>Positive Impact</td>
<td>Preferred Provider</td>
<td></td>
</tr>
<tr>
<td>1.13</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Little to No Impact</td>
<td>Sponsor</td>
<td>Provider</td>
</tr>
<tr>
<td>Negative Impact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative Impact</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sponsor N=89-93; Provider N=56-59

Q: Based on your experience, to what extent do each of the following types of relationships between Sponsors and Clinical Service Providers impact the utilization of innovative approaches?
What are some examples of innovative relationships that have been formed?

Respondents offered a variety of examples when asked to describe innovative collaborations that they are familiar with, including novel approaches to contracting, organizational structure, partnering with ancillary providers, and others.

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>“The revised cost model that many recruitment firms have put into place, whereby sponsors pay based on actual patient recruitment success, on a per patient basis. This makes the recruitment firm take on a certain level of risk to the campaign they propose and execute. Essentially, this is a performance-based contract model that makes sure that the sponsor is not burdened with 100% of the cost of delayed or failed campaigns due to vendor performance.”</td>
<td>“[Named IRB’s] global research network. Academic Institutions that agree to become members of the network are &quot;marketed&quot; to Sponsors who submit studies to one of their central IRBs. Sponsors can then receive data pertaining to the institutions’ metrics, e.g. study start-up times, track record in achieving enrollment goals, regulatory actions, etc.”</td>
</tr>
<tr>
<td>“There is a large CRO that built a group to handle small biotechs with large trials, so the small biotech does not get lost in the competition with large pharma with many studies, and does not need or pay for the multitude of layers within the CRO structure.”</td>
<td>“One sponsor creating a large alliance included a central team, made up of sponsor and alliance partner staff, to drive continuous improvement. Each partner benefits from the improvements identified.”</td>
</tr>
<tr>
<td>“Utilization of ambulatory care services to conduct selected protocol tests and assessments at the patient’s home rather than the investigator site.”</td>
<td></td>
</tr>
</tbody>
</table>
What impact do regulators have on the use of innovative approaches?

The US FDA and EMA are perceived as having a positive impact on the use/adoption of innovative approaches, while the regulatory authorities in Japan and China are viewed as having a negative impact according to survey respondents.

Regulatory Agency Impact on the Use of Innovative Approaches

Mean ratings on a scale of -2 “Strong negative impact” to +2 “Strong positive impact”

<table>
<thead>
<tr>
<th>Regulatory Agency</th>
<th>Sponsor Rating</th>
<th>Provider Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>US FDA</td>
<td>0.41</td>
<td>0.49</td>
</tr>
<tr>
<td>EMA</td>
<td>0.44</td>
<td>0.34</td>
</tr>
<tr>
<td>Japan MHLW</td>
<td>-0.28</td>
<td>-0.16</td>
</tr>
<tr>
<td>China FDA</td>
<td>-0.50</td>
<td>-0.13</td>
</tr>
</tbody>
</table>

Q: To what extent do each of the following regulatory agencies impact the use/adopter of innovative approaches to clinical development?

“The Clinical Trial Transformation Task Force within the FDA has been a driving force in creating room within the regulatory framework for Sponsors to drive and/or adopt innovative approaches to development.”

- Large Biopharma respondent
What type of organizations are best positioned to drive adoption of innovative approaches?

Of the various types of organizations evaluated, respondents selected large and small biopharma companies and CROs most frequently as the ones best positioned to promote innovation in clinical development.

<table>
<thead>
<tr>
<th>Organization Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 20 Biopharma companies</td>
<td>47%</td>
</tr>
<tr>
<td>Mid-sized Biopharma companies</td>
<td>35%</td>
</tr>
<tr>
<td>Small/Specialty Biopharma companies</td>
<td>43%</td>
</tr>
<tr>
<td>Large CROs</td>
<td>35%</td>
</tr>
<tr>
<td>Mid-sized CROs</td>
<td>18%</td>
</tr>
<tr>
<td>Small/Specialty CROs</td>
<td>35%</td>
</tr>
<tr>
<td>Large Consulting firms</td>
<td>6%</td>
</tr>
<tr>
<td>Specialty/Niche Consulting firms</td>
<td>19%</td>
</tr>
<tr>
<td>Regulatory Authorities</td>
<td>13%</td>
</tr>
<tr>
<td>Academic Research Institutions</td>
<td>12%</td>
</tr>
<tr>
<td>Government Agencies</td>
<td>4%</td>
</tr>
<tr>
<td>Specialty Not-for-profit Organizations</td>
<td>4%</td>
</tr>
</tbody>
</table>
**Do we believe investments in innovation will pay off in the future?**

Three-quarters of survey participants agreed that organizations involved in the biopharma industry will create and adopt innovative approaches that will significantly improve the way clinical development is conducted over the next five years, although less than one-third were willing to strongly agree with this prediction.

**Clinical Development Will Improve with Innovative Approaches Over the Next 5 Years**

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=105</td>
<td>N=65</td>
</tr>
<tr>
<td>22%</td>
<td>35%</td>
</tr>
<tr>
<td>13%</td>
<td>9%</td>
</tr>
<tr>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>51%</td>
<td>44%</td>
</tr>
</tbody>
</table>

**Q:** Please rate your agreement with the following statement: I think the pharma industry can and will create and adopt innovative approaches that will significantly improve the way clinical development is conducted over the next 5 years.
Summary of Findings and Key Takeaways
Summary of Findings

• Less than half of clinical trials conducted today incorporate some type of innovative component. **Providers consider themselves to be more innovative than Sponsors, and reported greater commitment to innovation** in terms of their investment, willingness to try new approaches, and adoption of novel approaches that are shown to be successful. **There is a large disconnect related to the extent to which Providers are introducing innovative approaches to Sponsors.**

• While respondents specifically named leading biopharma companies and CROs most frequently as contributors to innovation, when asked to evaluate the innovative abilities of various types of organizations, **small/specialty companies were perceived as more innovative than large organizations.**

• When it comes to funding innovation, most Sponsors indicated that costs are embedded within study budgets, while Providers are more likely to have a centralized budget. **Relatively few Sponsors reported having metrics to measure innovation ROI, compared to nearly half of Providers.**

• Both Sponsors and Providers confirmed that various goals are important in their pursuit of innovative development approaches (e.g., reducing development timelines and costs, improving success rates, etc.), but **Providers view their companies as more successful in achieving these goals than Sponsors.**
Summary of Findings

• **Trial design, patient recruitment/enrollment and patient engagement** represent areas where innovation can have the greatest impact, but progress appears to be somewhat lacking, particularly for patient recruitment and engagement. **From the Sponsor perspective, Providers are not meeting their innovation needs very well**, particularly with respect to patient engagement.

• There is strong alignment on the main **barriers to innovation** in clinical development, namely, risk aversion, company culture, and the potential cost of new approaches.

• There is a **clear disconnect regarding which party primarily drives the use of innovative approaches in outsourced clinical trials**, as nearly two-thirds of both Sponsors and Providers indicated that their organization is the primary driver.

• Both Sponsors and Providers confirmed the notion that **deeper relationships (e.g., alliances/partnerships) have a more positive impact on the use of innovative approaches to clinical development than transactional relationships**.

• While most were not strongly committed to the idea, three-quarters of survey participants agreed that **organizations involved in the biopharma industry will create and adopt innovative approaches that will significantly improve the way clinical development is conducted over the next five years**.
Key Takeaways

- Our research indicates that there are varying levels of commitment to innovation throughout the industry. For the companies that wish to pursue innovative approaches to clinical development, Avoca recommends *conducting a strategic review of potential collaborators* (suppliers, customers, others; existing relationships and those outside of the company’s network) to determine *which organizations are a best fit in terms of innovation partners.*

- When pursuing collaborative innovation, companies must initially ensure alignment on goals, then *map specific activities to prioritized goals and determine how each party is expected to contribute.* This should clarify ownership and promote progress in the areas deemed most important. Establishing methods *to measure and systematically review actual vs. planned progress is critical,* and all parties should *commit at the onset of the initiative to making quick decisions* when needed to modify focus and efforts based on real-world results.

- *Patient recruitment/enrollment and patient engagement* represent areas where innovation is believed to offer high value but progress has been limited. Across the industry, *greater collaboration in these areas among Sponsors, CROs, sites and other stakeholder organizations is needed* given the importance of patient participation to the ongoing quest to develop new medicines.
Thank you

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