**CONTRACT RESEARCH ORGANISATION**

P Arun Tej*, S Revathi  
Research Graduate, Bachelor of Pharmacy, Clinical Research, Clinosol, Visakhapatnam, India.  
*Corresponding author’s E-mail: aruntej313@gmail.com

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**ABSTRACT**

Contract Research Organizations (CROs) had faced two critical challenges: low-profit margin and limited marketing. Nowadays, the CRO industry is trying to compete with the developing organizations of the pharmaceutical and biotechnology value chain. The Regulatory aspects, detailing of sponsors responsibility in GCP guidelines, Departments in Contract Research Organization. Market Scenario, Marketing Objectives, Marketing Size, and Growth of the CRO in health sectors, Clinical Trials, and growth through intertwined industries are studied.  

**Keywords:** Clinical Trial, Sponsor, Integrity, Audit, Pharmacovigilance, Pharmacokinetics, Reporting.

**INTRODUCTION**

1. **Definition**  
CRO (Contract Research Organization), also called the Clinical Research Organization is a working organization providing support to pharmaceutical companies and biotechnology organizations as an outsourced research service in the pharmaceutical industries. It helps in speeding the development of key Drug compounds, as well as expert clinical-stage trial services, to accelerate drug development.  

2. **Regulatory aspects** (Boards)  
**Drugs Controller and General of India (DCGI)**  
It is the department of standard control organization in central drugs of the Government of India. It includes ensuring the quality of drugs and cosmetics being sold in the country and for its further approval of new drugs and clinical trial regulations.  

**Central Drugs and Standard Control Organization (CDSCO)**  
The Director-General of Health and family welfare, the Ministry of Health services and the National Regulatory Authority (NRA) of India. According to the Drugs and Cosmetics Act of 1940 & 1945, it has given the responsibility to the state and central bodies in regulating the drugs and other cosmetics.

It makes sure of the safety and quality of various manufactured medicinal products throughout the country and their further distribution.  

**Indian Council of Medical Research (ICMR)**  
It is the main body which is responsible for formulations, coordination, and the promotions being carried out in the biomedical research.  

It receives funds from the Ministry Of Family Welfare and the Health Department, Government of India.  

2.1 Sponsor’s responsibilities and their further details in good clinical practice guidelines;  
A sponsor can transfer any limited or all the sponsor’s trial-related duties and their functions to a CRO, but the final responsibility in maintaining the quality and the integrity of trial data always lies within the sponsor, thereafter it should implement the quality control and assurance.

2.2 Functions required in conductance of clinical research in a contract research organization are:  
1. **Medical Function:** People who are working in this area are to be medically qualified so that they help in designing of a clinical study which helps in developing clinical trial and its protocols, they also provide the medical-related input in the study. It includes designations such as the clinical research physician, medical monitor, and a medical advisor, etc.
2. Regulatory submission team: This department gives the guidance in the submission of various documentations and further obtaining the approval from the regulatory authorities like in the DCGI. The regulatory affairs person who is experienced is very much important.

3. Clinical Operations: This team is the largest clinical research organization. They consist of clinical research associates, clinical trial assistants, project managers, etc. This team takes responsibility in the selection of the clinical trial sites, the conductance of monitoring in sites, assisting in the study closeouts, therefore it helps in the overall study management.

4. Data Management: The data management team helps in the designing of various tools and their databases. This is an important team in the contract research organization. It helps in ensuring the data collected from clinical trials whether it is clean and ready for the analysis. In achieving they use sophisticated software like the SAS, Oracle Clinical.

5. Biostatistics: The Biostatistics team helps in analyzing the study data as per the protocol given and to figure out whether the study has a positive or negative yield in the final results. It helps in generating the statistical tables and graphs with its interpretations which are then later on passed to the medical writers for reporting.

6. Medical Writing: Medical writer helps in writing study results in such a way so that they can be understood by the general public. They help in the writing of the study reports, protocols, and writing promotional material.

7. Quality Assurance: This department helps in conducting an audit to ensure whether all the guidelines, regulations, and standard operating procedures were being followed. This department is prior responsible for maintaining the overall quality of the organization.

8. IT Team: IT support staff is a part of CRO. They take responsibility for IT related needs like in purchasing and maintaining desktops, telephones, laptops, servers, and software.

9. Admin and Finance: They take care of all the administration and other finance-related works.

10. Human Resources: The majority of CRO’s comprises a dedicated human resources team. They are the utmost staff responsible for the hiring of the new staff and in developing various measures to retain the talent pool within the organization.

11. Training and Development: It is a dedicated department in the majority of CROs. This department or a team that focuses on the professional development of their employees and it further conducts routine training to make sure that the staff advances with various skills up to date with recent advances.

3. Market size

These Industries offer safe options in investing as the industries are largely recession-proof and they further show upscale in growth. India has occupied a very small share in the clinical trials when it is compared to the global market, it comprises about 5% global clinical trials as of 2012.

Top multinational various pharmaceutical companies are been expanding in-to Indian business, with their collaboration in Indian Drug Companies. Such an increase in outsourcing from various western countries has led global pharma companies and other Indian entrepreneurs to set up the Contract Research Organizations (CROs) in India.

To bring this into the realization and to meet its market demand, while it simultaneously aiding in improvising the market position, well-coordinated efforts of the government, industry, and other working professionals are to be needed in terms of regulatory affairs, audits, transparency in the work affairs, improvising confidence of the patient, and pharmacovigilance.

3.1 Market Scenario

A contract research organization(CRO) provides support to the biotechnology, pharmaceutical and various medicinal manufacturing industries for specific service on a contract basis, these include research and the drug development

CRO always provides management services in clinical marketing.

The CRO staff includes the Master’s Degrees in Biotechnology, junior Clinical Research Assistants acting as monitors those who held Undergraduate, Ayurvedic Medicine, and dentistry. Other CRO staff roles included Operations and project Managers with overall responsibilities of the trials; Business Managers who have interacted with the Sponsors in trying to secure the new projects, Protocol Writers those who worked along with Sponsors research designs and planning studies. The Quality Assurers those who checked all the various datasets before handing them over to the sponsors, the Statisticians who have made the relevant quantitative analyses, and the CEOs who have acted as the intellectual and various public relations superiors of the companies. The more senior positions that include the people with Medical Degrees holding (MBBS and MD), Masters in Pharmacology and Pharmacy, and PhDs in Pharmacology.

3.2 CRO Marketing Objectives

1. To provide insight into the factors affecting market development and Growth

2. Analysing the market based on its supply chain analysis, price analysis, and porters five force analysis.

3. Detail analysis of the market structures along with a study of the next 6 years in the CROO market.
4. Country-level analysis of segments by therapeutic applications and by the end-users.¹

3.3 Marketing Size in India ³

Contract Research Organization India Market 2019

Demands with Size, Share Analysis and Industry Revenue up to 2023

CLINICAL TRIALS 22.4%
PRODUCT DEVELOPMENT 12.5%
PROCESS DEVELOPMENT 25.0%
POST MARKETING SURVEILLANCE 18.3%
QUALITY MONITORING 13.0%³

Status of multinationals and CRO’S in India ⁴

In India, 25 contract research Organisations (CROs) and almost all the pharmaceutical multinational companies (like Eli Lilly, Pfizer, GlaxoSmithKline, Roche, and Sanofi-Aventis have already started the Phase-I and II trials in India).

For the last 3 years. Many independent CROs (Mumbai-based Metropolis Health Services,) have conducted the clinical trials in various therapeutic segments (like allergic disorders, anti-inflammatory cardiovascular, oncology, and central nervous system) and they also offered a spectrum of development in clinical services.

According to the detailed report by Market Research Future, the market of India CRO has been assessed to reach a significant market value of USD 986.9 Million, growing with a 12% CAGR, during the forecast period study of 2017 to 2023.⁴

Top 10 (CRO) Contract Research Organisation 2019

1. PPD
2. MEDPACE
3. CLINIC
4. PRA HEALTH SCIENCES
5. KCR
6. ICON
7. IQVIA
8. PSI
9. PAREXEL
10. COVANCE

4. Growth ⁵

The CROs conducted comparisons of generics and biosimilars. Three CROs were originally Indian organizations that had been merged with the international partners, and the rest of them were international CROs with their offices in India.⁷

Asia contributes about 60% of the world population that has started it’s venturing in the clinical research following globalization of clinical trials. Present, the growth of the clinical research market in Asia is to be expected to mount faster than that of the United States and Europe. It’s been estimated that about 30% of the global contract research market is supporting the clinical research activities, including the research and development of pharma industries that will be outsourced as developing countries by 2008. The immediate attention toward the Asian countries has been attributed to the global pharmaceutical company’s quest, thereby exploring newer avenues to expand their business enterprises which have been further influenced by it’s spread of clinical research organizations throughout the Asian countries to cope up with the market expansion. The major reason for conducting the clinical trials in Asia is attributed to it’s increased prevalence of various Western diseases like hypertension, diabetes mellitus, dyslipidemia, with the change in the dietary pattern and lifestyle.

Asian countries like Hong Kong, Japan, and Singapore are most experienced and they already have essential and established infrastructure for the clinical research. In contrast, countries like China, India, and Korea are actively involved in global clinical trials only in the last few years. Despite their delayed entry, China and India are expected to have their tremendous growth and potential in clinical research due to their high disease prevalence and treatment. India is having added benefits of diverse populations, well-equipped hospitals, and laboratories, and also has highly qualified investigators, which make it one of the preferred destinations for the conductance of global clinical trials. The manufacturing services and contract research in India were expected to rise from $3.8 billion in 2010 to $7.6 billion in 2012.⁵

India emerges as the favorite clinical trial hub in global pharmaceutical companies. It becomes mandatory in exploring the authentic status of clinical trials throughout India. Hence the study was designed to evaluate the trends of clinical trials carried out in India over the last 4 years.⁶

4.1 Clinical trials and development of pharmaceutical companies as intertwined industries.⁶

Clinical Trials:

The aim of phase I in clinical trials is to establish the safety and pharmacology of the drug.

Phase I is conducted within 20 to 80 volunteers who are healthy and are closely monitored. This trial period of this clinical trial may take up to 2 years.

In phase II of the clinical trials, The research focuses on bioavailability, pharmacokinetics, drug disease, and drug-drug interactions. Their intent is in testing the effectiveness of drugs in specific populations and in for specific diseases.

This phase may be between 100-500 subjects with longer treatment intervals.
The main aim behind phase III of clinical trials is in confirming the safety and efficacy of the drug under this study.

The experimental drug is given to large groups of volunteers (between 1,000-5,000 participants) in various countries.

FDA requires at least two adequate and well-controlled studies for approval.

Number of Clinical Trials by Country (2011)

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Clinical Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>56,981</td>
</tr>
<tr>
<td>Canada</td>
<td>8,745</td>
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<tr>
<td>Germany</td>
<td>8,002</td>
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<tr>
<td>France</td>
<td>6,820</td>
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<tr>
<td>United Kingdom</td>
<td>5,867</td>
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<tr>
<td>Italy</td>
<td>4,461</td>
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<tr>
<td>Spain</td>
<td>3,920</td>
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<tr>
<td>Netherlands</td>
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<tr>
<td>Belgium</td>
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<tr>
<td>Israel</td>
<td>3,190</td>
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<tr>
<td>India</td>
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<tr>
<td>Australia</td>
<td>3,049</td>
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<tr>
<td>South Korea</td>
<td>2,800</td>
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<tr>
<td>Denmark</td>
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<tr>
<td>China</td>
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<tr>
<td>Brazil</td>
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<td>Poland</td>
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<tr>
<td>Switzerland</td>
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<tr>
<td>Taiwan</td>
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<tr>
<td>Sweden</td>
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<tr>
<td>Austria</td>
<td>2,125</td>
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<tr>
<td>Japan</td>
<td>2,014</td>
</tr>
</tbody>
</table>

Source: US National Institute Of Health, ClinicalTrials.gov registry 2011, only countries conducting 2000 or more clinical trials were included in the table.

Development of pharmaceutical companies as intertwining industries.

1. Outsourcing: Larger biotechnology and pharmaceutical companies, sometimes universities, join up with CRO. The former who generally develops the experiment could be a regional or national player. Some companies have their clinical operations, but most of them are lean, they just handle parts of the process, such as Regulatory, Reporting or Data Management, the rest of the operations. For example, Merck and GSK use this model.

2. Small tie-ups: Entire product development to CRO’S has been outsourced by smaller biotech companies medium/bigger size (more than twelve people) development can be handled by the company itself. They may outsource the parts of the process to various bodies.

3. Preferred partnerships: International pharmaceutical companies such as MSD and Pfizer have preferred larger international CRO partners such as Quintiles and ICON. Their preferred partner could have offered them a full service or else they might outsource the only part of its service. For example, Merck always gives their lab work to Coax.

4. Backward integration: A CRO invests in small pharmaceutical or biotechnology companies so that in future they are contracted in running the clinical trial phases. Small budgets are marked by CROs for this kind of investment in small companies.

5. Sub-contracting model: Development is outsourced partially or completely by the companies as a particular lab test. This might be a one-off relationship or involve irregular contact only, without any of the formal relationships.

6. Alliances and loose arrangements: Across the regions, companies purchase the smaller ones through various mergers and acquisitions, and then harmonize their Standard Operating Procedures.

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