

Overview of Indian pharmaceutical companies preparedness and response to COVID-19 Vaccine demand

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Abstract –This article is part of a series of articles written on the Ph. D research topic named: **problems and prospects of export oriented Pharmaceutical companies in Maharashtra.**

Here, we examine the demand of vaccine due to covid 19 crises, the challenges that emerged due to it, and the pharmaceutical industry response in the short term.

There are currently two locally-made vaccines for the coronavirus: Covishield and Covaxin. At the same time, the government of India's target is to vaccinate adult population of India.

In this research paper, we will analyze the total demand of vaccine in Indian market as well as we will analyze how much demand can be fulfilled by Indian pharmaceutical companies.

Keywords – Covid 19, Indian pharmaceutical companies, Vaccination in India, vaccine demand and supply in India

I. INTRODUCTION

The pharmaceutical sector of India supplies over 50% of global demand for number of vaccines, 40% of United States generic demand and almost 25% of all medicine demand in the UK. Globally, India ranks third in terms of pharmaceutical production by volume. [1]6

More than 1 billion of the population of India is adult. [2] we can expect it to be the minimum current demand for vaccines in Indian Market.

When the COVID-19 pandemic arrived, the world expected India to supply the bulk of the vaccines to poorer countries considering its image as 'the pharmacy of the world'. [5] Indian pharmaceutical industry also appeared to accept this challenge quite willingly.

India has 21 Licensed human vaccine manufacturing facilities. [6] out of which currently 7 companies are in the process of developing covid vaccine. [7]. Currently 5 Vaccines are approved for Use in India out of which two vaccines are made by Indian pharmaceutical companies. [8]

OBJECTIVES:

The objective of this research paper is to:

1. Understand demand of covid 19 vaccine in India,
2. Understand current demand supply structure for covid 19 vaccination in India
3. analyze Indian pharmaceutical industry response to covid vaccination demand.

RESEARCH METHODOLOGY:

This research paper is based on secondary data. Online sources such as government web portals and press releases by pharmaceutical companies were analyzed for data collection. Offline sources such as newspaper and research articles were also used in this research.

LIMITATIONS:

The article is written within a very short span of covid 19 crises hence the data may be changing continuously and the findings may vary after a long span of time.

Pharmaceutical companies have to follow a very complex procedure to get approvals for any kind of drugs or vaccines hence we cannot predict with current clinical trials data that companies involved in vaccine research are certainly going to launch in expected timeline.

ABOUT VACCINATION CAMPAIGN OF INDIA:

India adopted the vaccination strategy in phases. The first phase of mass inoculation programme in India was launched on 16 January, covering almost 30 million healthcare as well as front line workers

On March 1, 2021, India initiated the second phase, with the aim to cover people above 45 years of age with comorbidities and the cohort and entire population above 60 years. This initiative was expanded on the first of April to cover everyone above 45 years of age, bringing the total to

over three hundred million people. Still this number accounted for only 22% of the Indian population. [9]

The Press Information Bureau (PIB) made it public on 19 April 2021 that the government is going to focus on the scale and speeding in the third phase. [10]

POPULATION IN DIFFERENT AGE GROUPS AND THEIR PROPORTIONS TO TOTAL POPULATION

Table: population in different age groups and their proportions to total population [11]

OVERVIEW OF DEMAND AND SUPPLY GAP:

group	Population	Percentage
0 - 4	110,447,164	10.7
5 - 9	128,316,790	12.5
10 - 14	124,846,858	12.1
15- 19	100,215,890	9.7
20 - 24	89,764,132	8.7
25 - 44	284,008,819	27.6
45 - 64	139,166,661	13.5
65 - 79	41,066,824	4.0
80+	8,038,718	0.8
Age not stated	2,738,472	0.3

Demand in a glimpse:

A total 17,01,76,603 (More than 17 crores) doses of the Covid vaccine had been administered till May 10. [11] It is less than 3.8 percent of the entire country, according to Our World in Data.[12]

Hence we can assume a whopping demand needs to be met by currently 5 pharmaceutical companies, out of which only 2 companies are from India.

Indian companies' preparedness to meet demand:

A total of 7 Indian companies are working to develop vaccines.

1) Bharat Biotech, 2) Serum Institute, 3) Zydus Cedilla, 4) Panacea Biotec, 5) Indian Immunological, 6) Mynvax and 7) Biological E out of which 1) Bharat Biotech already developed Covaxin whereas 2) Serum Institute started manufacturing Covishield which is Developed by Oxford University and AstraZeneca.

Sr. No.	Companies working on Covid development	Companies developed the Covid vaccine	Companies manufacturing
1	Bharat Biotech	Bharat Biotech	Bharat Biotech (Covaxin)
2	Serum Institute	X	Serum Institute (Covishield)
3	Zydus Cadila	X	X
4	Panacea Biotec	X	X
5	Indian Immunologicals	X	X
6	Mynvax	X	X
7	Biological	X	X

References: [7], [13], [14]

COVID-19 Accelerated Vaccine Development

Vaccine development generally involves years of research. Earlier, this process involved a series of steps but considering the emergency, the scientists and regulators worked together to accelerate the whole process without compromising any protocols.

	PRE-CLINICAL DEVELOPMENT	CLINICAL TRIALS	LOGISTICS	REGULATORY APPROVAL
TYPICAL PROCESS	1-2 years Laboratory Research and Animal studies	4-6 years Sequential human clinical trials in 3 Phases	2-4 years Infrastructure, manufacturing and distribution channels set-up after Phase 3 trials or after Regulatory Approval	1 year After completion and analysis of data from all phases of Clinical Trials
ACCELERATED PROCESS	6 months Fast-tracked research and use of existing vaccine platforms	1 year Human Clinical Trials in 3 Phases – conducted in parallel with continuous analysis	1 year Infrastructure and Manufacturing set-up even before Approval to enable faster distribution	1 year Analysis of data and procedure of approval in parallel with the Clinical Trials

Reference: [15]

Sr. No.	Companies working on Covid vaccine development	PRECLINICAL PHASE 1 clinical trials	PHASE 1 clinical trials	Phase 2 clinical trials	PHASE 3 clinical trials	PHASE 4 clinical trials	Phase 5 clinical trials	Reference with date
1	Bharat Biotech	Completed	Completed	Completed	Completed	X	X	05 Apr 2021, [18]
2	Serum Institute	Completed	Completed	Completed	Completed	X	X	27 Apr 2021, [17]
3	Zydus Cadila	Completed	Completed	Completed	X	X	X	19 Apr 2021, [16]
4	Panacea Biotec	NA	NA	NA	NA	NA	NA	05 July 2021, [19]
5	Indian Immunologicals	X	X	X	X	X	X	May 29, 2021, [20]
6	Mynvax	X	X	X	X	X	X	November 18, 2020, [21]
7	Biological E.	Completed	Completed	X	X	X	X	26 Apr 2021 [22]

References: [16],[17],[18],[19],[20],[21],

Note: Panacea Biotec is preparing to manufacture vaccine developed by Russian based company

By understanding the above table we can simply get a clue that a big level of efforts are being made by Indian pharmaceutical companies to meet demand for vaccines generated due to Covid 19 crises. At the same time we can also see that Indian pharmaceutical industry needs more advancements considering the size of its production and importance in the global market.

CONCLUSION:

At the beginning of Covid 19 pandemic, the world expected India to supply the bulk of the vaccines to poorer countries considering its image as 'the pharmacy of the world'. Indian pharmaceutical industry also appeared to accept this challenge quite willingly.

By understanding the clinical trial phases, we can simply get a clue that a big level of efforts are being made by Indian pharmaceutical companies to meet demand for vaccines

generated due to Covid 19 crises. At the same time we can also see that Indian pharmaceutical industry needs more advancements considering the size of its production and importance in the global market.

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