How different partnership models supported the response against COVID-19

07 June 2023
44 therapeutics have been approved for COVID-19; 1 in 18 treatments in clinical trials reached market

COVID-19 treatment pipeline

924 in preclinical development

738 in active clinical development
(10% repurposed)
(58 discontinued)

44 approved
(24% repurposed)
17 Approved in the U.S, U.K or E.U

7 WHO endorsed

U.S./U.K./E.U. Approved:
- Remdesivir (Full approval)
- Baricitinib (Full approval)
- Tocilizumab (EUA)
- Sarilumab (EUA)
- Anakinra (EUA)
- Dexamethasone (EUA)
- Hydrocortisone (EUA)
- CT-P59 (EUA)
- Sotrovimab (EUA)
- Evusheld (EUA)
- Paxlovid (Nirmatrelvir + Ritonavir) (EUA)
- LY-CoV1404 (EUA)
- LY-CoV555 + LY-CoV016 combination (EUA)
- Molnupiravir (EUA)
- LY-CoV555 mono-therapy (EUA)
- Ifx-1 (Vilobelimab) (EUA)
- REGEN-COV (EUA)

*Repurposed = candidate is approved for an alternate disease indication

Does not include phase IV clinical trials
WHO recommended treatments have widespread regulatory authorisations, but low coverage in Africa.

Regulatory decisions on the 7 WHO recommended COVID-19 treatments worldwide:

**WHO Recommended COVID-19 Treatments:**
- Remdesivir
- Nirmatrelvir + Ritonavir
- Molnupiravir
- Tocilizumab
- Sarilumab
- Baricitinib
- Dexamethasone

![Map showing regulatory decisions on the 7 WHO recommended COVID-19 treatments worldwide.]

- EMA – 4 candidates endorsed
- EC – 3 candidates approved
59 COVID-19 vaccines have been approved; ~1 in 5 vaccines in clinical trials reached market

**COVID-19 vaccines pipeline**

- **462** in preclinical development
- **214** in active clinical development (84 inactive, rejected or discontinued)
- **59** approved (10/59 variant updated)

*Does not include phase IV clinical trials*
All countries have approved at least one COVID-19 vaccine

Overview of vaccines approved since the beginning of the pandemic
177 collaborations have been agreed for production and commercialisation of COVID-19 treatments

COVID-19 Therapeutic Collaboration Deals

117 Finished drug product
29 API/excipient
3 Fill/finish
10 Distribution/Commercialisation
3 Unconfirmed production type

Total Collaborations

177

Collaborations include: Distribution and commercialisation partners, Voluntary Licensing Agreements, Manufacturing partners, Medicines Patent Pool sublicensees

Note: when deals become inactive often there is no public announcement, therefore the number of inactive deals may be higher.
Most of the vaccine manufacturing and supply chain announcements have involved a collaboration

An analysis of the number of collaborations confirmed for vaccine manufacturing

There have been 374 manufacturing announcements, 265 (71%) of which have involved a collaboration.

Definitions:
Adjuvant: Public announcements to produce and supply adjuvant for vaccine formulations
Distribution and Storage: Public announcements to distribute and/or store vaccines after production (separate from procurement deal)
Fill and finish: Public announcements to fill and finish vaccines into vials and syringes
Source of materials: Public announcements to supply raw materials for vaccine candidates
Tech: Public announcements to produce active vaccines or vaccine components
84 out of 93 voluntary licensing agreements are active; 41 for Paxlovid, 34 for Molnupiravir and 9 for Remdesivir

Voluntary licensing agreements for Nirmatrelvir + Ritonavir (Paxlovid), Molnupiravir, Remdesivir

93 VLAs in total – 84 Active, 9 inactive (at least)

9 Remdesivir – all Active
44 for Nirmatrelvir + Ritonavir – 41 Active
40 for Molnupiravir – 34 Active

Outside of the originator

80 out of 84 active agreements are in developing countries*

TOP 5 Licensee locations:
- India
- China
- South Korea
- Bangladesh
- Pakistan

*Developing countries as listed by the OECD
Manufacturing partnerships for therapeutics and vaccines were signed in parallel.

Treatments and vaccines production and agreements over time

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1. Gilead signs VLAs with 8 manufacturers for Remdesivir production.
2. MSD (Merck) signs VLAs with 9 manufacturers in India for Molnupiravir; Eli Lilly signs VLAs with 8 manufacturers for Baricitinib; 1 additional Remdesivir VLA signed.
3. 23 manufacturers sign up to manufacturer Molnupiravir through the MPP. 37 manufacturers sign up to manufacturer Nirmatrelvir + Ritonavir through the MPP.

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COVID-19 therapeutics supply and production followed vaccines at the end of 2021

Overview of COVID-19 vaccines and treatments production and supply

Cumulative Production and Supply

Vaccines

Production

Supply Agreements

Treatments

- **mAbs**
- **Antivirals**

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Appendix: Abbreviations and Definitions

**Abbreviations:**
- WTO: World Trade Organisation
- LDC: Least-developed countries
- MPP: Medicine Patent Pool
- VLA: Voluntary Licensing Agreement
- EUA: Emergency Use Authorisation

**Definitions:**
- Repurposed: Candidates that have been repurposed from previously approved/discontinued indications to COVID-19
- Novel: Candidates who’s first approval was for the treatment of COVID-19
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