



Department of  
**International  
Development**

# **Public Funding, Patents, and Technology Transfer: Learning from the Contrasting Oxford and Texas Models of COVID-19 Vaccine Production and Distribution**

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**Article Contents**

JOURNAL ARTICLE

## Contrasting academic approaches to COVID-19 vaccine production and distribution: What can the Oxford and Texas experiences teach us about pandemic response?

Jorge L Contreras, Kenneth C Shadlen  [Author Notes](#)

*Health Affairs Scholar*, Volume 2, Issue 2, February 2024, qxae012, <https://doi.org/10.1093/haschl/qxae012>

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# Contrasting academic approaches to COVID-19 vaccine production and distribution: What can the Oxford and Texas experiences teach us about pandemic response?

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1. Motivations: contrasting approaches, contrasting experiences, *and contrasting reactions*
2. Core of article: focus away from IP and licensing per se and toward technology transfer
3. Assessment of how the “COVID-19 Innovation System” (Sampat and Shadlen 2021) functioned
4. Informing “post-COVID” debates on pandemic preparedness

**Table 1.** Comparison of COVID-19 vaccine developer strategies and outcomes.

	Academic		Industry	
	Oxford	Texas	Moderna	BioNTech
Technology	Viral vector	Protein	mRNA	mRNA
Patented	Yes	No	Yes	Yes
Global development and commercialization partner	AstraZeneca	None	None	Pfizer
Technology transfer	AstraZeneca to manufacturing partners	Direct to manufacturing partners	Direct to manufacturing partners	Direct to manufacturing partners
Manufacturing <sup>a</sup>	Global manufacturing network (12 countries)	Licensed Manufacturing partners (2 countries)	In-house + manufacturing partners (3 countries)	In-house + Pfizer (2 countries)
Doses manufactured <sup>b</sup>	3096 million	100 million	1163 million	3687 million
Adult authorizations and approvals <sup>c</sup>	168 offices plus WHO EUL/PQ	4 offices <sup>d</sup>	95 offices plus WHO EUL/PQ	131 offices plus WHO EUL/PQ
Date of first authorization <sup>c</sup>	December 30, 2020	December 28, 2021	December 17, 2020	December 2, 2020
Pricing/distribution constraints	Commitment to distribute at cost in poor countries	None disclosed	None disclosed	None disclosed

Abbreviations: EUL/PQ, Emergency Use Listing/Prequalification; WHO, World Health Organization.

<sup>a</sup>Drug substance only (ie, excluding fill-finish production). Source: Airfinity.

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## Patents

- Tex: no patents = no litigation fears
- But Oxf/AZ not patented in many of the partner countries either
- Both cases: licensing over other forms of IP (e.g. data, know-how)
- Not “independent” production

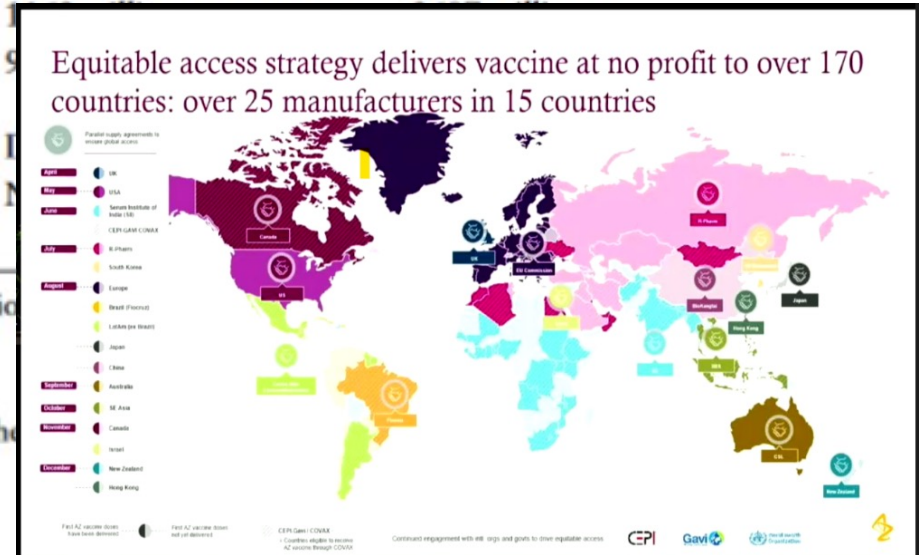
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Manufacturing <sup>a</sup>	Global manufacturing network (12 countries)	Licensed Manufacturing partners (2 countries)	Moderna	BioNTech
Doses manufactured <sup>b</sup>	3096 million	100 million	1.2 billion	1.3 billion
Adult authorizations and approvals <sup>c</sup>	168 offices plus WHO EUL/PQ	4 offices <sup>d</sup>	100	100
Date of first authorization <sup>c</sup>	December 30, 2020	December 28, 2021	December 21, 2020	December 21, 2020
Pricing/distribution constraints	Commitment to distribute at cost in poor countries	None disclosed	None disclosed	None disclosed

**Global Production Networks**

- AZ enabled simultaneous, global TT
- Relationships, capabilities, experience
- From scepticism to enthusiasm – with AZ on board “things “really took off..”

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# Comparative Lessons: Looking inwards and looking outwards

## Oxford

### Technology Transfer Experience

- Industrial-scale technology transfer
- But not entirely successful: 60% output from one partner (SII)
- Difficult during pandemic, even with AZ experience
- Lessons from LA cases

## Texas

### Technology Transfer Experience

- Artisan-scale technology transfer
- Directly to partners (starter kit, 24/7 availability)
- Figuring out how to produce at scale (for trials and then admin) all done by the partners
- Tex couldn't transfer to mult producers simultaneously (nor could Oxf)
  - Not criticizing for “only” producing 100m doses

# Comparative Lessons: Looking inwards and looking outwards

## Oxford

### Technology Transfer Experience

- Industrial-scale technology transfer
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- Difficult during pandemic, even with AZ experience
- Lessons from LA cases

### COVID Innovation System

- Reliance on SII: foreseeable design flaw with major consequences
- Resources for downstream production a hallmark, but not on global scale
- Missed opportunities:
  - OWS, CEPI
  - National govs in partner countries

## Texas

### Technology Transfer Experience

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### COVID Innovation System

- Tex vaccine neglected by funders (and FDA)
- By “big pharma” too -- Tex actively courted
- Missed opportunities:
  - Conditional funding (e.g. UK/Oxford)
  - Funding-enabled partnership (pilot prod) and accelerated development
- Would insistence on “non-exclusivity” matter?

# Informing Global Debates

## Debating the WHO “Pandemic Treaty”

- Agreement: need more technology transfer and more distributed global production
- Disagreement: how to achieve, e.g. “encourage” vs. “require”

What we propose depends on what we “learned” from COVID experience, which had a lot of contingency

- Key “what ifs” –
  - Oxford/AZ tech transfer experience more successful + Support for Texas scale-up → more resilient global vaccination campaign, less vulnerable to India export ban
  - Would we regard the global response as having been so poor and demanding fundamental change?
- (Other “what if” – vaccine development success)

➔ Concrete and modest – not entirely transformative – steps that could have been taken that could have greatly improved the response

- We may want transformative steps too, but would need to justify them on other grounds