

Efficacy of Approved And Unapproved Vaccines for SARS-CoV-2 in Randomised, Blinded Clinical Trials

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Background

- Several million people have died from COVID-19 in low or middle-income countries without access to effective vaccines.
- There are 5 SARS-CoV-2 vaccines approved in US and/or Europe: Pfizer/BioNTech, Moderna, Oxford/AstraZeneca, Janssen and Novavax, with cumulative sales above \$100 billion worldwide, since launch.
- Roll-out of these 5 vaccines by low-and-middle-income countries has been slow due to high prices, legal issues and logistical barriers to vaccine procurement and delivery.
- Several other SARS-CoV-2 vaccines have been evaluated in clinical trials but not yet approved.
- This situation could persist for many years unless lower-cost alternatives to the current 5 COVID-19 vaccines are found.

Objectives

- To compare the efficacy of US or European approved versus unapproved vaccines for endpoints of symptomatic or severe infection
- To compare the differences in elicited immune response between approved and unapproved vaccines

Methodology

SYSTEMATIC REVIEW

Screening of clinical trial registers, MEDLINE & EMBASE
Inclusion of: **Phase III RCTs** of COVID-19 vaccines in **healthy non-pregnant adults** prospectively evaluating risks of **symptomatic and/or severe COVID-19** with clearly defined endpoints OR immunogenicity trials

RISK OF BIAS ASSESSMENT

Cochrane RoB 2.0 tool (high risk studies excluded). Certainty of evidence assessed using GRADE

META-ANALYSIS

Use of Cochrane-Mantel-Haenszel Tests (random effects method) comparing relative risks of symptomatic & severe disease for each vaccine versus placebo

Results

- The search identified 19 publications of 22 randomised clinical trials.
- Risk of bias assessment showed 2 publications with a low risk of bias and 17 with some concerns.

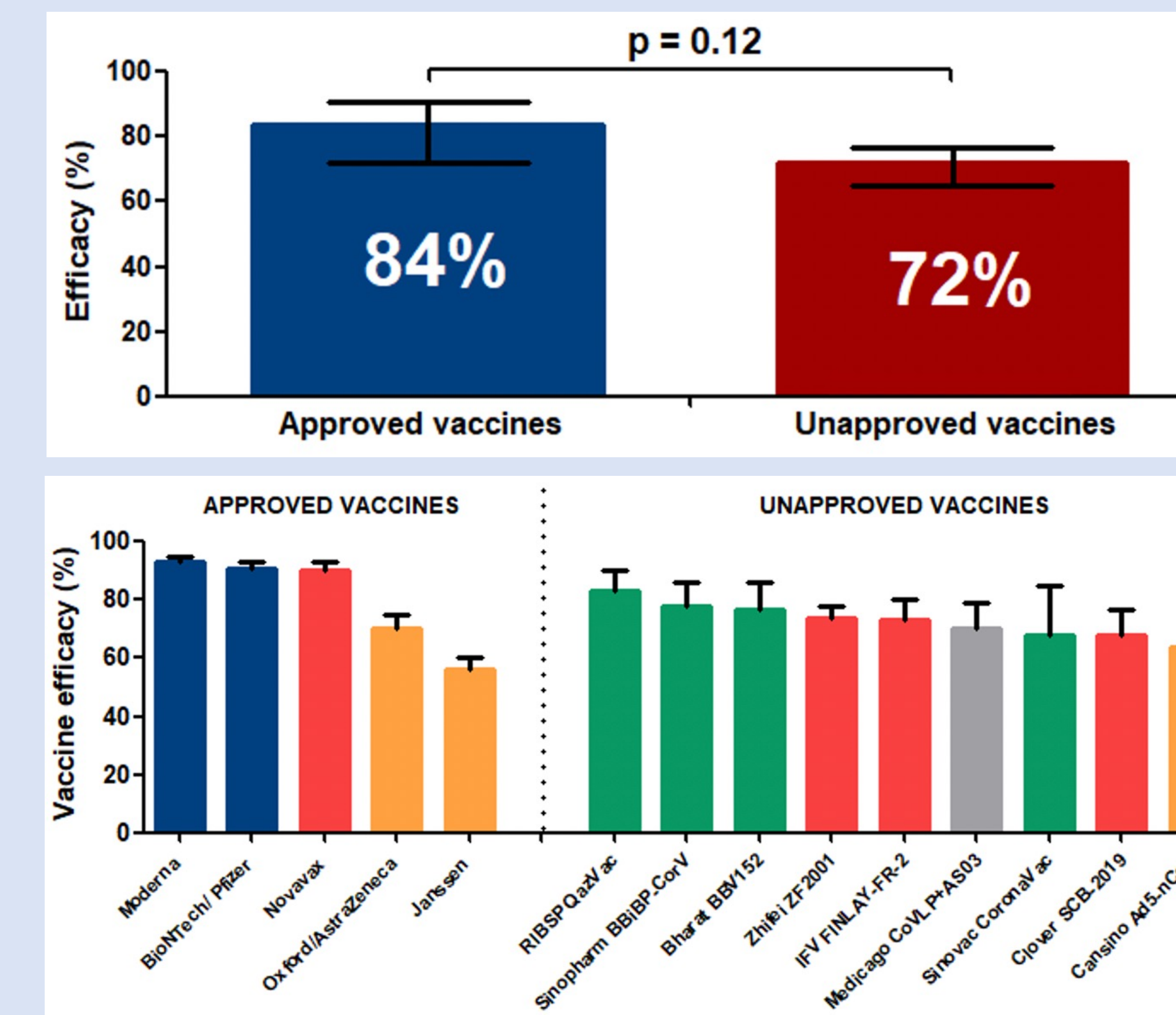
5 APPROVED VACCINES

Developer	Vaccine name	Country
Pfizer/BioNTech	Comirnaty (BNT162b2)	US, Germany
Moderna	Spikevax (mRNA-1273)	US
Oxford/AZ	Vaxzevria (ChAdOx1-S)	UK
Janssen	Jcovden (Ad26.COVS.2.S)	US
Novavax	Nuvaxovid (NVX-CoV2373)	US

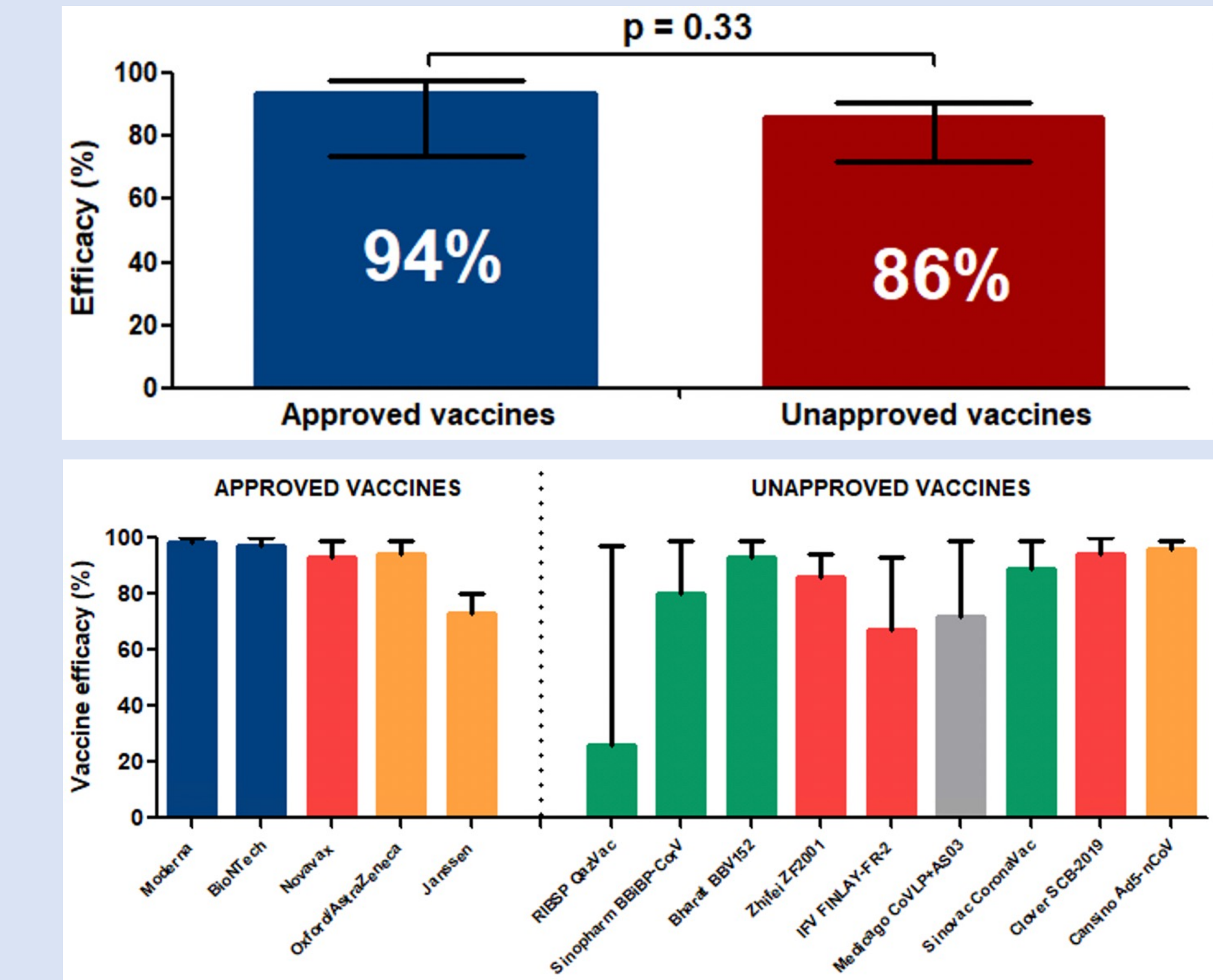
9 UNAPPROVED VACCINES

Developer	Vaccine name	Country
Bharat Biotech	Covaxin (BBV152)	India
CanSino Biologics	Covidencia (Ad5-nCoV)	China
Clover Biopharma	SCB-2019 (-)	China
Medicago	Covifenz (CoVLP+AS03)	Canada
Instituto Finlay	SOBERANA 02 (FINLAY-FR-2)	Cuba
RIBSP	QazCovid-in® (QazVac)	Kazakhstan
Sinovac	CoronaVac (-)	China
Sinopharm	Covilo (BIBP-CorV)	China
Anhui Zhifei Longcom	Zifivax (ZF2001)	China

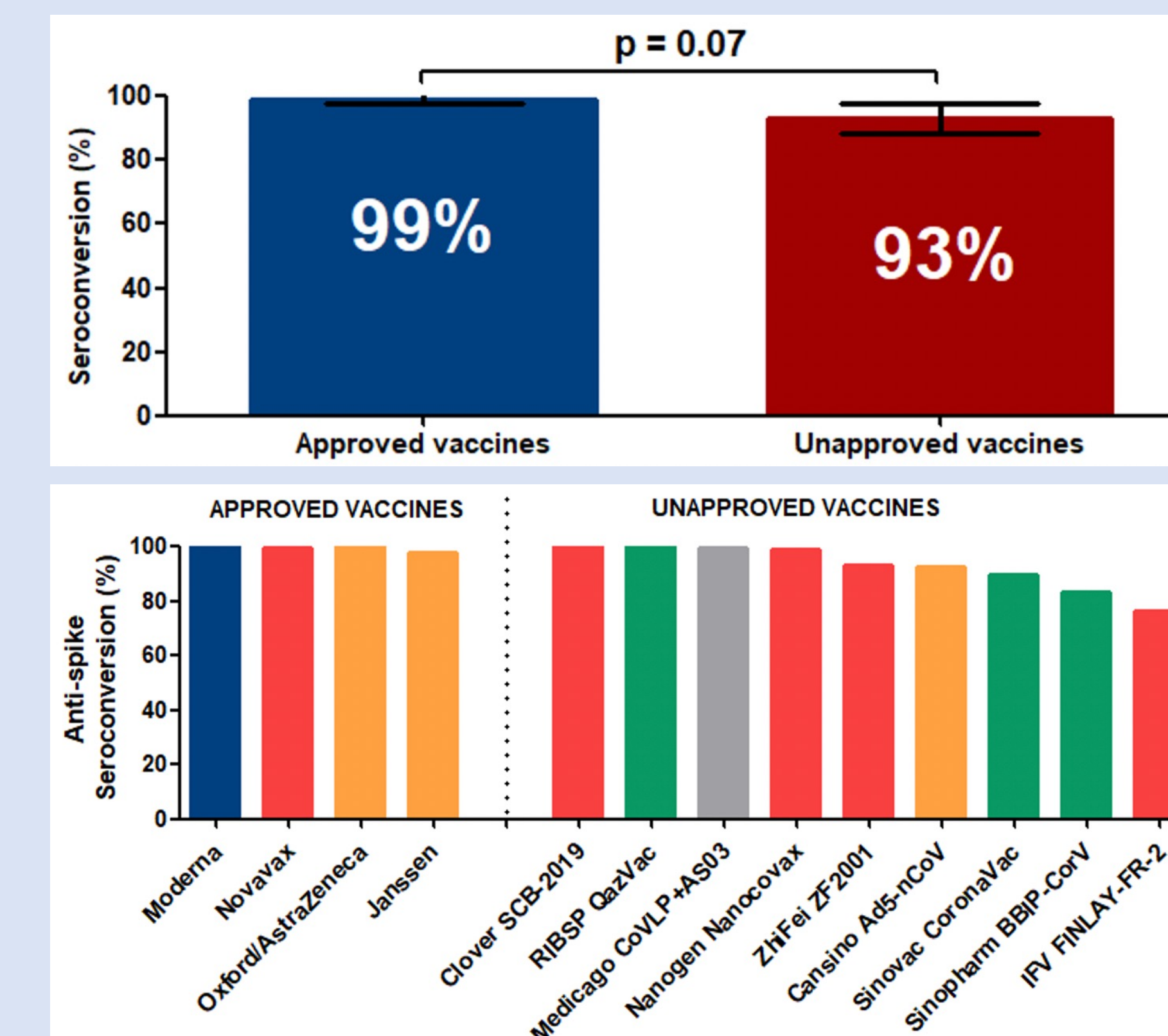
SYMPTOMATIC INFECTION



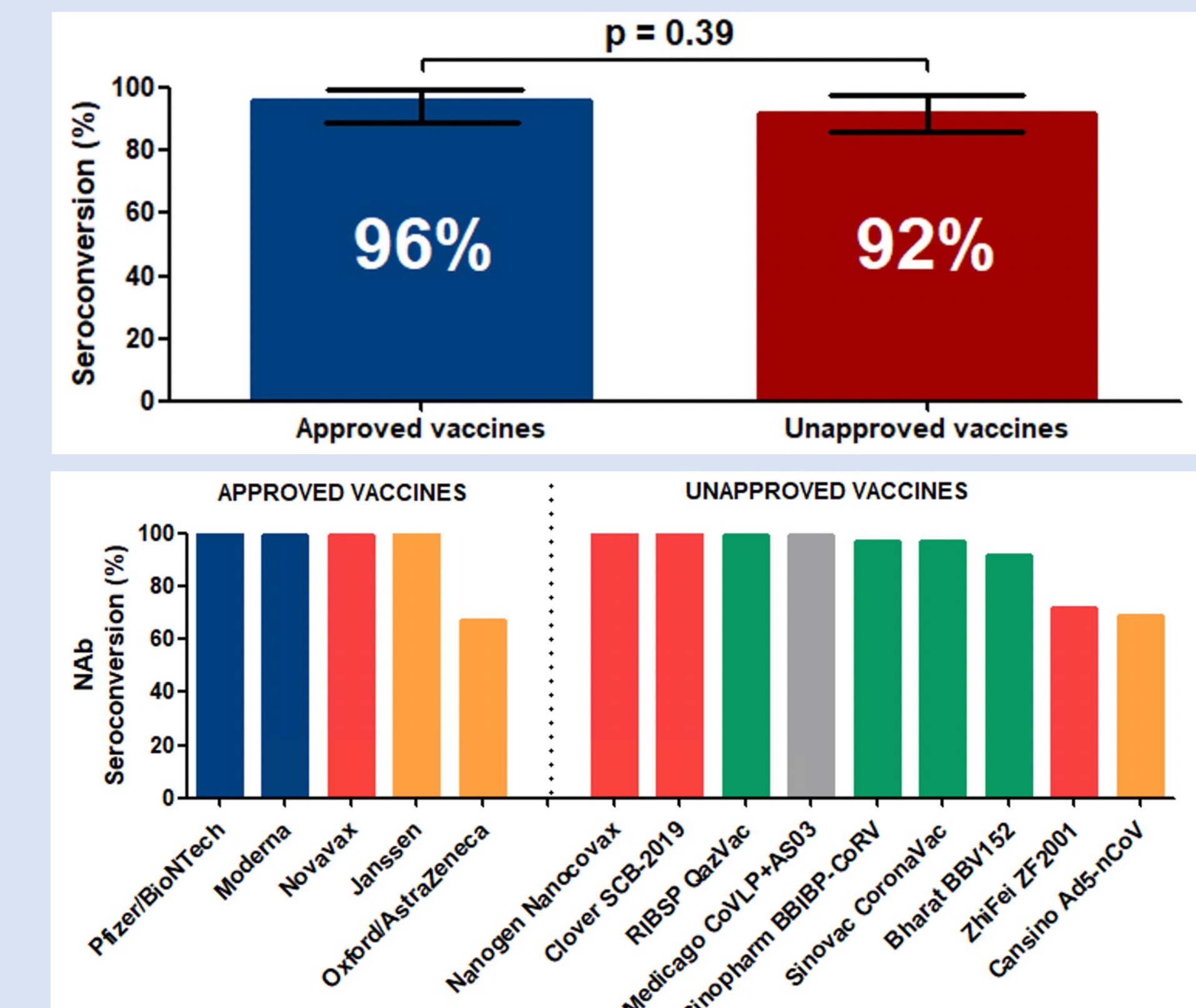
SEVERE DISEASE



ANTI-SPIKE ANTIBODIES



NAb ANTIBODIES



Discussion & Conclusions

- **Approved and unapproved COVID-19 vaccines show comparable protection against both severe and symptomatic infection**
- **Both NAb and anti-spike seroconversion responses are not significantly different between approved and unapproved vaccines**
- **There were consistent results in sensitivity analyses. The clinical trials were of a high quality in risk of bias assessments.**
- **Differences in location and timing of trials, and differences in methodology may have influenced the conclusions drawn.**
- **Future head-to-head studies are recommended, comparing approved and unapproved vaccines.**
- **The approval of low-cost, patent-free vaccines could increase access worldwide & lessen the risk of emergence of new variants.**

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