

# Emerging Role of Pharmacists in Treatment and Vaccination for COVID-19



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## Background

Following the initial outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003, extensive research centered around the molecular mechanisms, pathophysiology, and treatment for the coronavirus family. Here, we describe the pathophysiology of SARS-CoV2, detection tools including RT-PCR and rapid antigen testing, treatments, and vaccines approved for Coronavirus infectious disease 2019 (Covid-19).

SARS	Infection	Physiology
SARS 2003	Binding to ACE-2 receptors	Effects on ACE-2
MERS 2012	Virus-laden respiratory droplets leads to infection	Inflammatory mediators
SARS-COV-2	Virus-laden respiratory droplets leads to infection Via binding to ACE-2 receptors Virus exits the cells via lysosome	Inflammatory mediators

## Purpose

Our presentation highlights the role of pharmacists in the COVID-19 pandemic in terms of drug treatment, consultation, and vaccination.

## Method

Covid-19 related keyword search and review of primary and tertiary literatures available in medRxiv and PubMed. The search focused on COVID-19 pathophysiology, clinical data, detection, treatments, and available vaccines under emergency use authorization (EUA).



# COVID-19 RESPONSE

## Results

### A. Detection:

Testing	Utilization
RNA detection via Real-Time (RT)-PCR	<ul style="list-style-type: none"> <li>Conventional method used to detect Covid-19</li> <li>Early disease diagnosis and contact tracing.<sup>2,3</sup></li> </ul>
ELISA	Antibody detection-7 days after exposure
Rapid Antigen Testing	Convenient, fast result
CRISPR-Cas 9	Fast and accurate testing method

### B. Treatment:

Covid-19 Treatment Options	Role of Pharmacists
<p><b>Monoclonal Antibody: Tocilizumab</b></p> <p>Tocilizumab blocks the IL-6 receptor to reduce the inflammatory response.</p> <p>Block the spike protein of coronaviruses from entering ACE receptor on host cells.<sup>6,7,8</sup></p>	<p>Tocilizumab can be used to treat the severe COVID-19 - cytokine release which leads to inflammatory responses on the lungs.<sup>11</sup></p> <p>Increase oxygen saturation.</p> <p>Our review highlights this drug because of its well-tolerated properties, and less side effects compared to other monoclonal antibody drugs like Gimsilumab.</p>
<p><b>Retroviral Therapy: Remdesivir</b></p> <p>Reduction in SARS-CoV replication</p>	<p>Remdesivir has been shown to reduce both hospital stays, and mortality rates associated with Covid-19.</p>

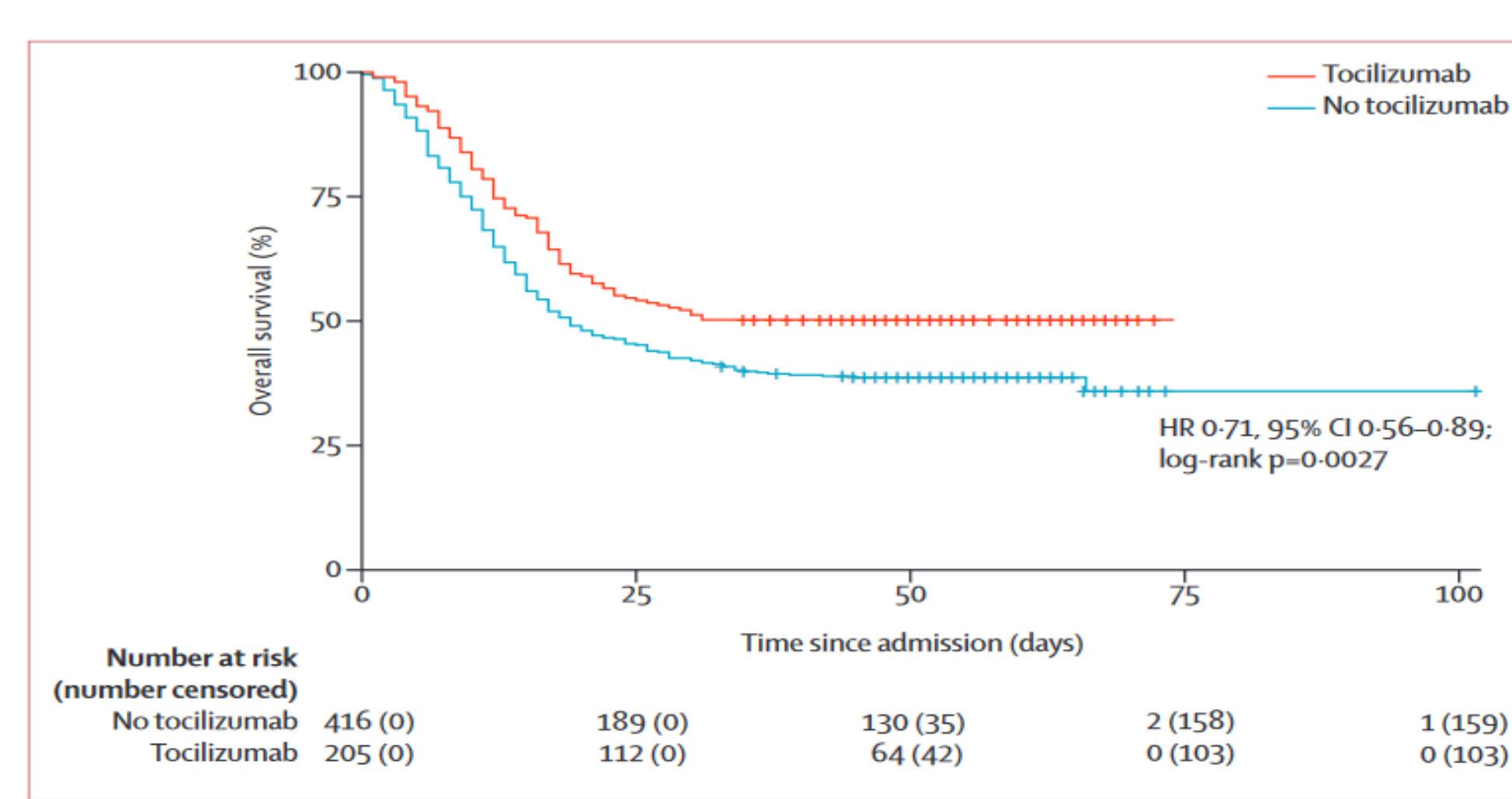
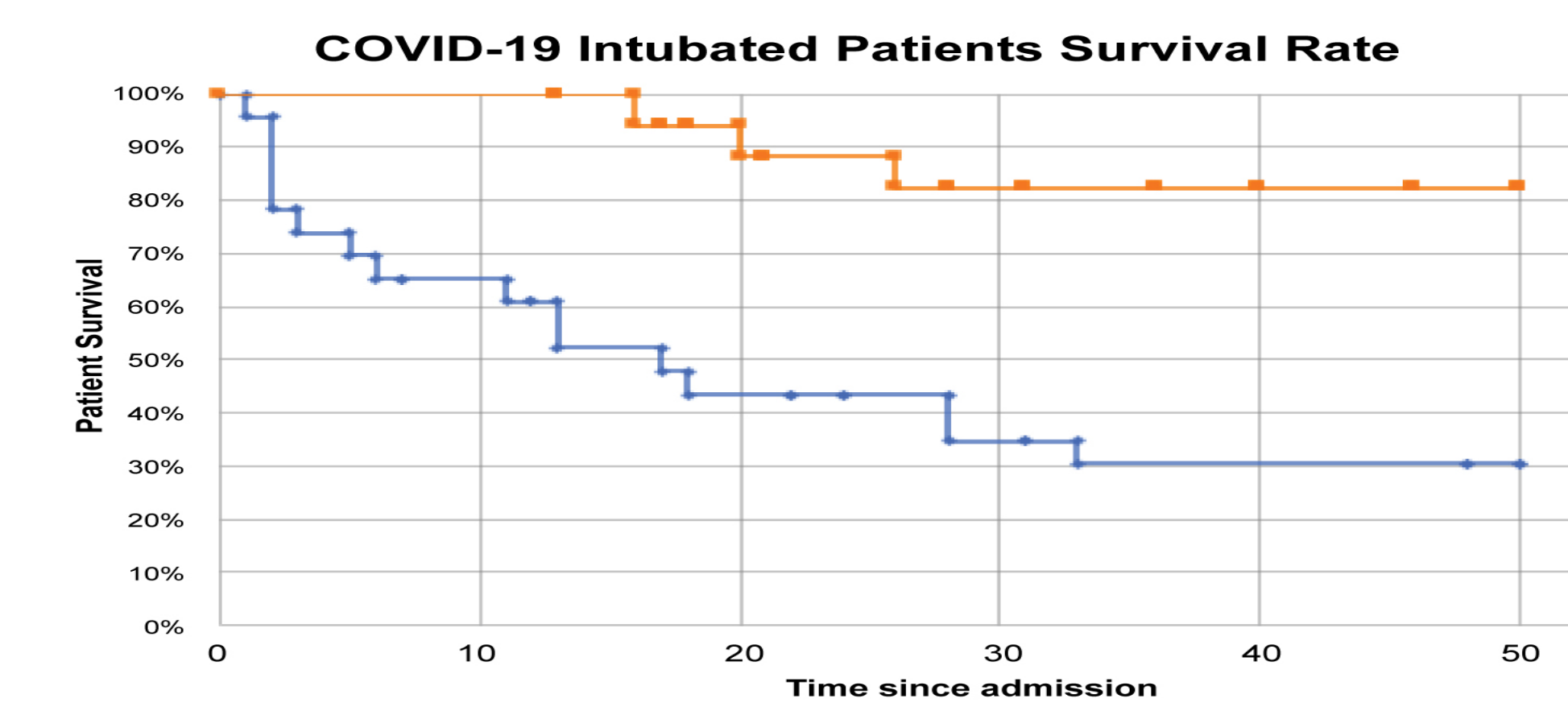
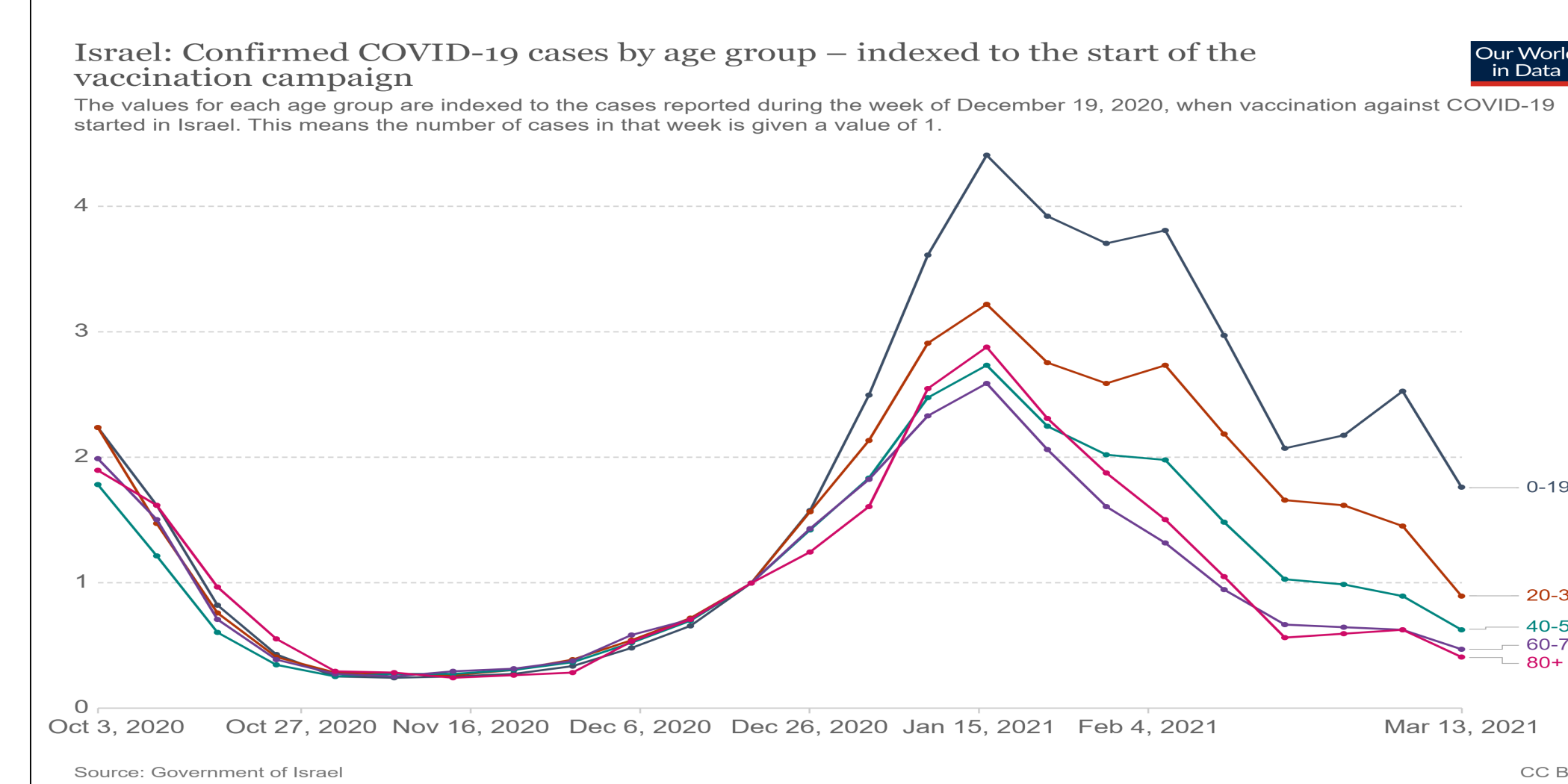


Figure 2: Overall survival among propensity score-matched patients

### C. EUA Vaccine:

- Israel has become a successful country in terms of Covid-19 prophylaxis by providing vaccines to 95% of the population. An abundance of front-line healthcare workers emerged to administer millions of vaccine to patients, minimizing the mortality rate of COVID-19 significantly according. Still, there are upcoming vaccines with different types of technologies as displayed on the table below.



Vaccine	Technology	Number of doses
Pfizer/BioNTech	mRNA	2
Moderna	mRNA	2
Johnson & Johnson	Viral Vector	1
Oxford/AstraZeneca	Viral Vector	1
Novavax	Protein Subunit	Work in Progress
Sanofi Pasteur/G SK	Protein Subunit	Work in Progress
Medicago/G SK	VLP+ adjuvant	Work in Progress

## Summary

- RT-PCR, LAMP-PCR, and ELISA are all available for COVID-19 detection and offer precision and accuracy. Antigen testing is done using CRISPR-cas9 technology that employs gene editing processes. However, the process requires high technical training along with laboratory equipped with a sophisticated setup.
- From the pharmacist's perspective, Tocilizumab and Remdesivir stand out as emergency treatments for hospital-admitted patients to reduce the mortality rate, and duration of the hospital stays in ICU set-up in severe COVID-19 cases.
- COVID-19 vaccines have been developed for prophylaxis against infection by targeting the S-protein. With the Emergency Use Authorization and release of Covid-19 vaccines, pharmacists will continue to provide the immunizations, monitor the side effects, engage in patient education and counseling to improve immunization rates, and ultimately help reduce the rates of infection in communities.

## Discussion

- Deaths due to COVID-19, as well as the number of new positive cases increased almost daily earlier in 2020. This led to a burden on worldwide healthcare institutions, leaving many hospitals without available patient beds.
- Community pharmacist's role in COVID-19 test and vaccine administration is crucial. In addition, community pharmacists could engage in counseling patients via telehealth regarding treatment options, quarantining, COVID-19 test results, or vaccination.
- Hospital pharmacists on the other hand would handle the temporary protocols for the antiviral or monoclonal antibody treatments for severe COVID-19 hospitalized cases.
- Counseling points and treatment evaluation from pharmacists would be critical in terms of administering COVID-19 vaccines and medications. It is expected that Pharmacist's expertise along with other frontline healthcare workers would be in high demanded during the pandemic in order to control infection rates, reduce the mortality rate, and bring back normalcy to our society.

## Citation:

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