

# COVID-19: come si cura oggi a casa?

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# Disclosures (past 5 years)

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- Advisor/consultant/speaker bureau
  - Angelini, Gilead, Menarini, MSD, Pfizer, Shionogi



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# FIRST MESSAGE

**NOT with  
ANTIBIOTICS**



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# Who should be treated at home?

Stage	Characteristics
Asymptomatic infection	Positive virologic test for SARS-CoV-2 (ie, NAAT or antigen test) but no symptoms consistent with COVID-19
Mild illness	Varied symptoms (eg, fever, cough, sore throat, malaise, headache, muscle pain, nausea, vomiting, diarrhea, loss of taste or smell) but no shortness of breath, dyspnea, or abnormal chest imaging
Moderate illness	SpO <sub>2</sub> ≥ 94% and lower respiratory disease evidenced by clinical assessment or imaging
Severe illness	SpO <sub>2</sub> < 94%, PaO <sub>2</sub> /FiO <sub>2</sub> < 300 mm Hg, respiratory rate > 30 breaths/min, or lung infiltrates > 50%
Critical illness	Respiratory failure, septic shock, and/or multiorgan dysfunction



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NIH COVID-19 Treatment Guidelines Last Updated March 24, 2022



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# The Pillars of COVID-19 Treatment

- Supportive care (antipyretics, analgesics, or antitussives)
- Oxygen, Non-invasive Support, Mechanical Ventilation.
- Antiviral Agents
- Monoclonal Antibodies
- Anticoagulants
- Immunomodulators



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# Supportive Care

ALL  
Patients

- Fever
- Headache
- Myalgias
- Cough





# Antiviral agents and Monoclonal Antibodies

**At high risk patients**

- Chronic renal failure
- Severe pulmonary disease
- Oncological/oncohematological pathology in the active phase
- Primary or acquired immunodeficiency
- Obesity [(Body Mass Index, BMI)  $\geq 30$ ]
- Severe cardiovascular disease (heart failure, cardiomyopathy)
- Uncompensated diabetes mellitus



# The landscape is changing

In Italy > **90%** of the population is vaccinated



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# Who Remains At Risk Of Severe Disease After Vaccination?

## Medical Conditions Associated With Higher Risk for Severe COVID-19

Tier	Risk Group
1	<ul style="list-style-type: none"> <li>Immunocompromised individuals not expected to mount an adequate immune response to COVID-19 vaccination or SARS-CoV-2 infection due to their underlying conditions, regardless of vaccine status (see Immunocompromising Conditions below); <i>or</i></li> <li>Unvaccinated individuals at the highest risk of severe disease (anyone aged <math>\geq 75</math> years or anyone aged <math>\geq 65</math> years with additional risk factors).</li> </ul>
2	<ul style="list-style-type: none"> <li>Unvaccinated individuals not included in Tier 1 who are at risk of severe disease (anyone aged <math>\geq 65</math> years or anyone aged <math>&lt; 65</math> years with clinical risk factors)</li> </ul>
3	<ul style="list-style-type: none"> <li>Vaccinated individuals at high risk of severe disease (anyone aged <math>\geq 75</math> years or anyone aged <math>\geq 65</math> years with clinical risk factors)</li> </ul> <p><b>Note:</b> Vaccinated individuals who have not received a COVID-19 vaccine booster dose are likely at higher risk for severe disease; patients within this tier in this situation should be prioritized for treatment.</p>
4	<ul style="list-style-type: none"> <li>Vaccinated individuals at risk of severe disease (anyone aged <math>\geq 65</math> years or anyone aged <math>&lt; 65</math> years with clinical risk factors)</li> </ul> <p><b>Note:</b> Vaccinated individuals who have not received a COVID-19 vaccine booster dose are likely at higher risk for severe disease; patients within this tier in this situation should be prioritized for treatment.</p>

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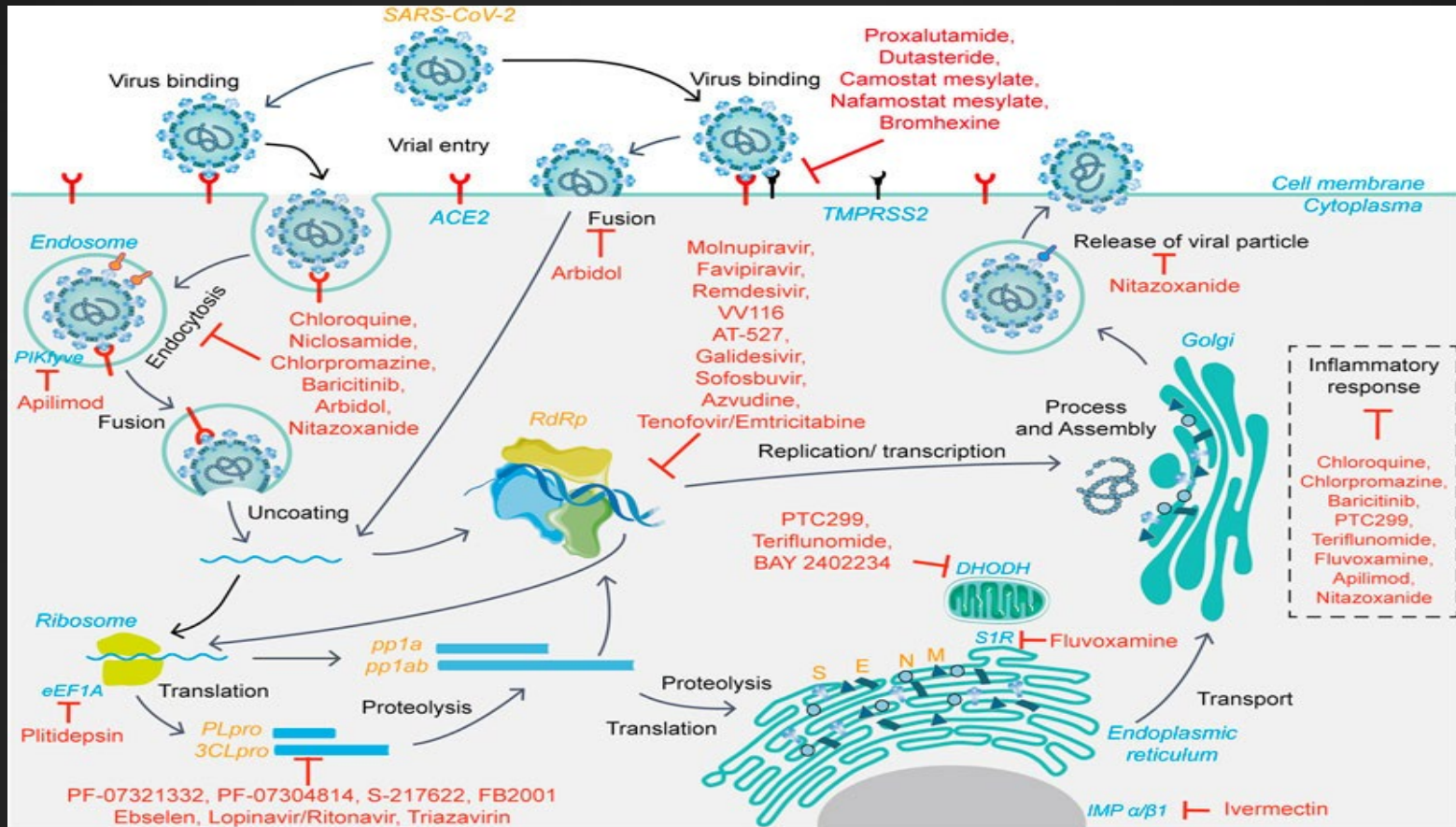


# Outpatient treatment for COVID-19

	Remdesivir	Sotrovimab	Nirmatrelvir/ ritonavir	Molnupiravir
Age	≥12 yo	≥12 yo	≥ 12	≥ 18yo
Days from symptoms onset	≤5 days	≤10 days	≤5 days	≤5 days
Route of administration/ Duration	IV/5 days	IV/ Single infusion	PO/5 days	PO/5 days
PROS	Good experience; High efficacy	Single infusion	Oral; High efficacy against all VOCs	Oral; No drug-drug interactions
CONS	Need for hospital admission	IV administration; Concerns against BA.2 variant	Drug-drug interactions	Lower efficacy in pivotal trial.



# Potential Mechanisms Of Action Of Anti-SARS-COV-2 Antiviral Drugs



Zhao L, Front Pharmacol 2022;13:840639

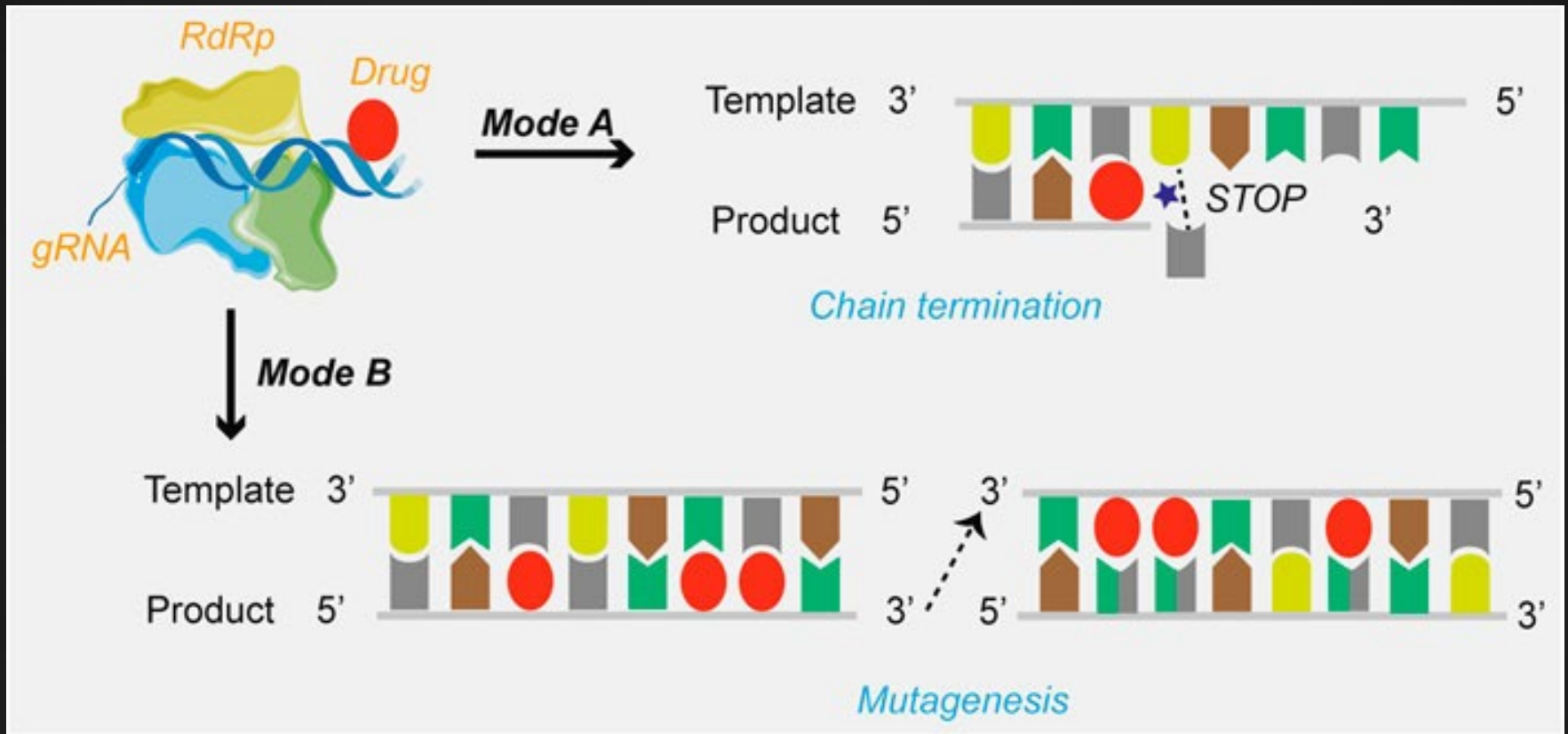


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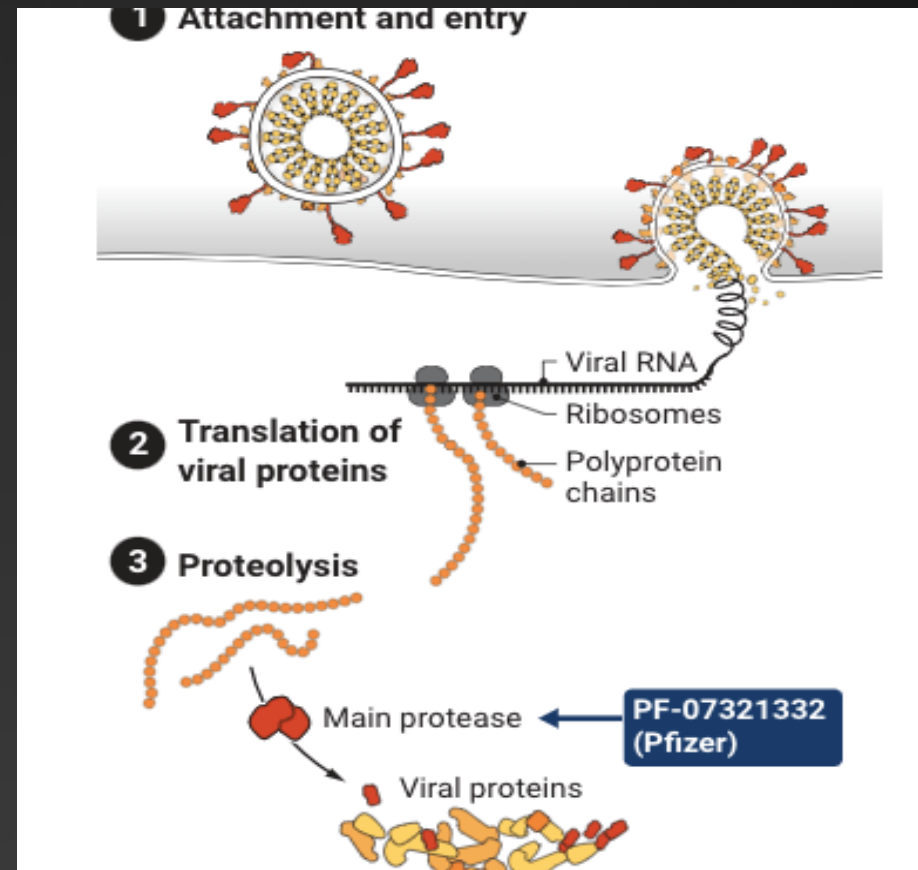


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# Potential Mechanisms Of Action Of Anti-SARS-COV-2 Antiviral Drugs



# ANTIVIRAL AGENTS

## SUMMARY

	<b>NIRMATRELVIR/r (Paxlovid)</b>	<b>MOLNUPIRAVIR (Lagevrio)</b>	<b>REMDESIVIR X 3 (Veklury)</b>
Dosing	300-100 mg BID GFR ≥ 60 150-100 mg BID GFR ≥ 30- <60	800 mg BID	200 mg as a single dose on day 1, followed by 100 mg once daily on days 2 and 3
Route	Oral	Oral	IV
Trial	EPIC-HR	MOVE-OUT	PINE-TREE
N	2246	1433	563
Vaccinated	NOT INCLUDED	NOT INCLUDED	NOT INCLUDED
Symptoms (days)	< 5	< 5	< 7
Condition High Risk	≥ 1	≥ 1	≥ 1
Age (median)	46	43	50
Efficacy	89%	31%	87%
NNT	16	34.5	22
Deaths (Drug/Placebo)	0/13	1/9	0/0
Activity VOC	Yes	Yes	Yes
GFR	≥ 30	No adjustment	≥ 30
Pregnancy	No experience. Discuss	Contraindicated	Discuss



# Key issues

## Age of the patient

- 12 yo > Age < 18 yo
- Age < 65 yo
- Age > 65 yo

## Underlying conditions

- Renal impairment
- Liver impairment
- Pregnancy
- Other comorbidities

## Time from symptoms onset

## Modality of infusion

## Other concomitant medications



# Clinical case



COVID-19 Drug Interactions



About

Interaction Checkers

Prescribing Resources

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Interactions with selected WHO Essential Medicines and Paxlovid (nirmatrelvir/ritonavir) now available in the Prescribing Resources section - [click here for the PDF.](#)

If a drug is not listed below it cannot automatically be assumed it is safe to coadminister.

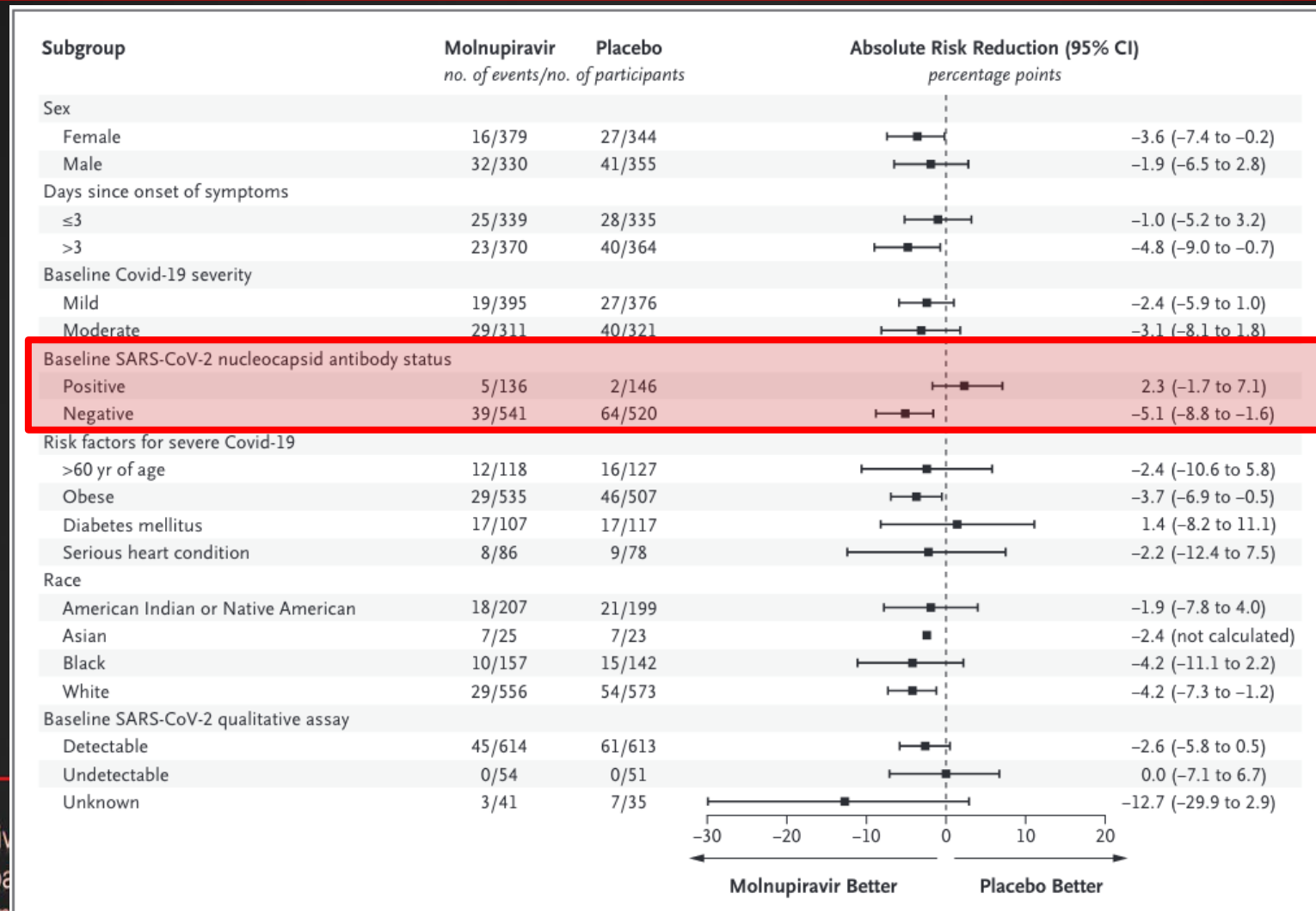
COVID Drugs	Co-medications	Drug Interactions
<input type="text" value="Search drugs..."/>	<input type="text" value="amlod"/>	<input checked="" type="checkbox"/> Check COVID/COVID drug interactions
<input type="radio"/> A-Z <input type="radio"/> Class <input type="radio"/> Trade	<input type="radio"/> A-Z <input type="radio"/> Class	<input type="button" value="Reset Checker"/>
<input type="checkbox"/> Molnupiravir	<input checked="" type="checkbox"/> Pantoprazole	<input type="button" value="Switch to table view"/> <input type="button" value="Results Key"/>
<input type="checkbox"/> Niclosamide	<input checked="" type="checkbox"/> Hydrochlorothiazide	<div style="background-color: #f4a460; padding: 5px; text-align: center;"> <b>Potential Interaction</b> </div> <p>Nirmatrelvir/ritonavir (Please read the interaction details as management of these interactions may be complex.)</p>
<input checked="" type="checkbox"/> Nirmatrelvir/ritonavir (Please read the interaction details as management of these interactions may be complex.)	<input checked="" type="checkbox"/> Captopril	
<input type="checkbox"/> Nitazoxanide		

Co-medication	Interaction
Nirmatrelvir/ritonavir (Please read the interaction details as management of these interactions may be complex.)	
Amlodipine	■
Atorvastatin	■
Captopril	◆
Carvedilol <a href="https://www.covid19-drugin">https://www.covid19-drugin</a>	◆
Furosemide	◆
Hydrochlorothiazide	◆
Pantoprazole	◆



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# Molnupiravir for Oral Treatment of Covid-19 in Nonhospitalized Patients



# Our clinical experience

- Observational retrospective cohort study (January 2022 and February 2021)
- **Aim:** to describe our clinical experience with molnupiravir to treat patients with mild or moderate SARS-Cov-2 infections since its recent approval in Italy.

Bassetti M; Vena A; personal data



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# Our clinical experience

## Inclusion criteria

- Non-hospitalized adult (aged  $\geq 18$  years) patients
- Confirmed COVID-19 by polymerase chain reaction or by antigenic test;
- Had initial onset of signs/symptoms attributable to COVID-19 for  $\leq 5$  days prior to start molnupiravir;
- Mild or moderate illness at the time of the initial administration
- Had at least **one characteristic or underlying medical condition** associated with an **increased risk of severe illness** from COVID-19.



# Our clinical experience

**Primary endpoint:** composite of requirement of hospital admission and/ or need for supplemental oxygen during the 30-day follow-up period.

**Secondary endpoints:** included 30-day overall mortality and adverse events.

CHARACTERISTICS	Molnupiravir N= 169
Age, years	68.6 ± 17.6
Sex, male	97 (57.4)
Charlson comorbidity index	1.68±1.39
<b>Previous anti-SARS-Cov-2 vaccination</b>	<b>146 (86.4)</b>
<b>McCabe Scale</b>	
<b>Ultimately fatal</b>	72 (42.6)
<b>Non-fatal</b>	54 (32.0)
<b>Rapidly fatal</b>	43 (25.4)

Bassetti M; Vena A; personal data



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Bassetti et al. Personal data.

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# Our clinical experience

Median time to study drug initiation from symptoms onset  
**2.3 days**



CHARACTERISTICS	Molnupiravir N = 169
<b>Risk factor for disease progression</b>	
Cardiovascular disease	68 (40.2)
Onco-hematological disease	33 (19.5)
Primary or secondary immunodepression	36 (21.3)
Chronic obstructive pulmonary disease	27 (16.0)
Obesity (BMI≥30)	25 (14.8)
Diabetes mellitus	16 (9.5)
Chronic kidney failure	5 (3.0)

**36 patients had more than 1 risk factor for disease progression**



# Our clinical experience

Only 1 unvaccinated patient was admitted because of COVID-19

No patients died for Covid-19

Adverse events: rash with only one patient requiring treatment withdrawal

CHARACTERISTICS	Molnupiravir N= 169
Requirement for hospital admission or need for supplemental oxygen	7 (4.1)
Adverse events	2 (1.0)
30-day overall mortality	7 (4.1)

Our results suggest that molnupiravir is a well tolerated and effective drug for the treatment of mild moderate COVID-19

Bassetti M; Vena A; personal data

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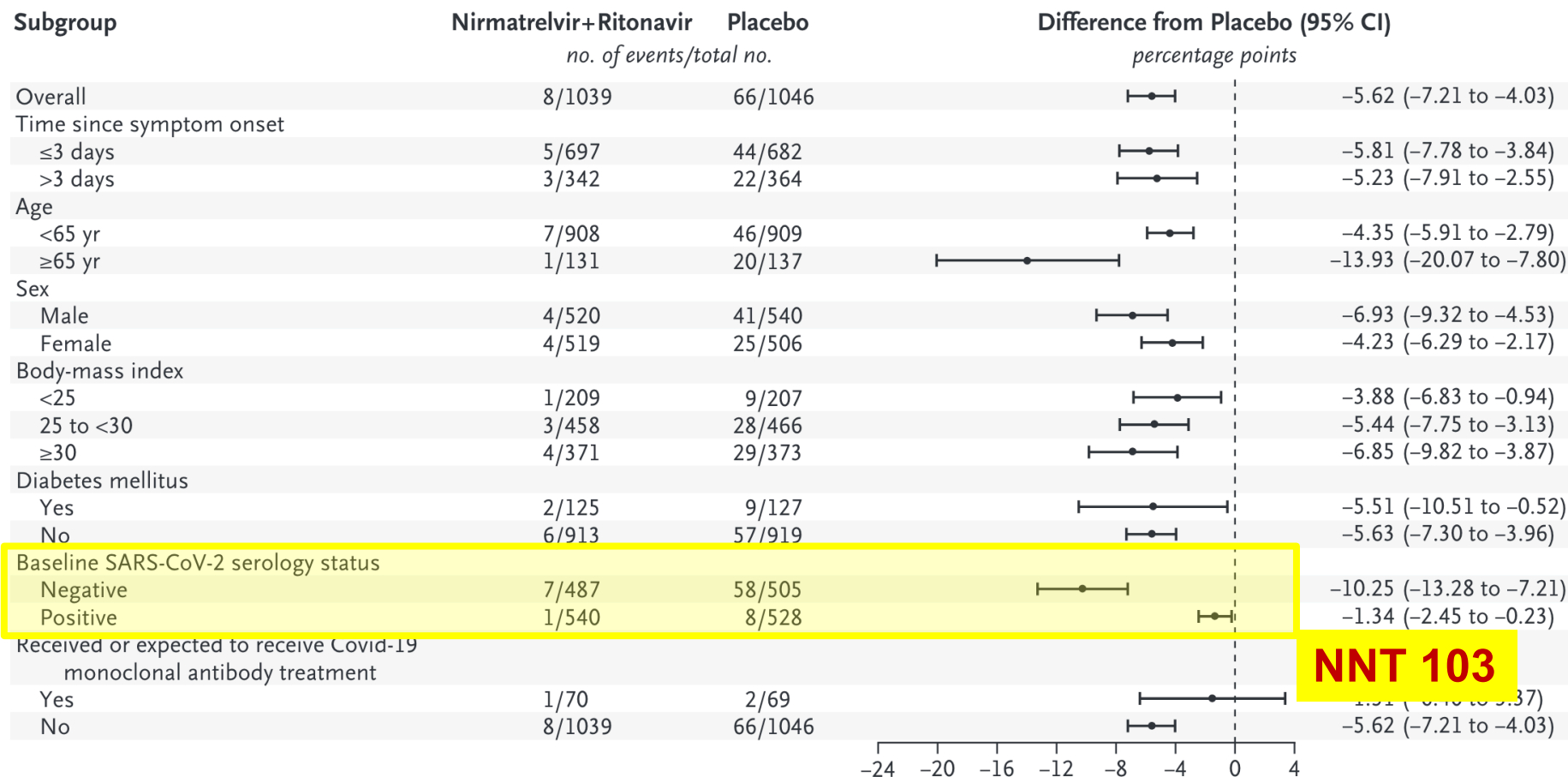
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# Oral Nirmatrelvir for High-Risk, Nonhospitalized Adults with Covid-19

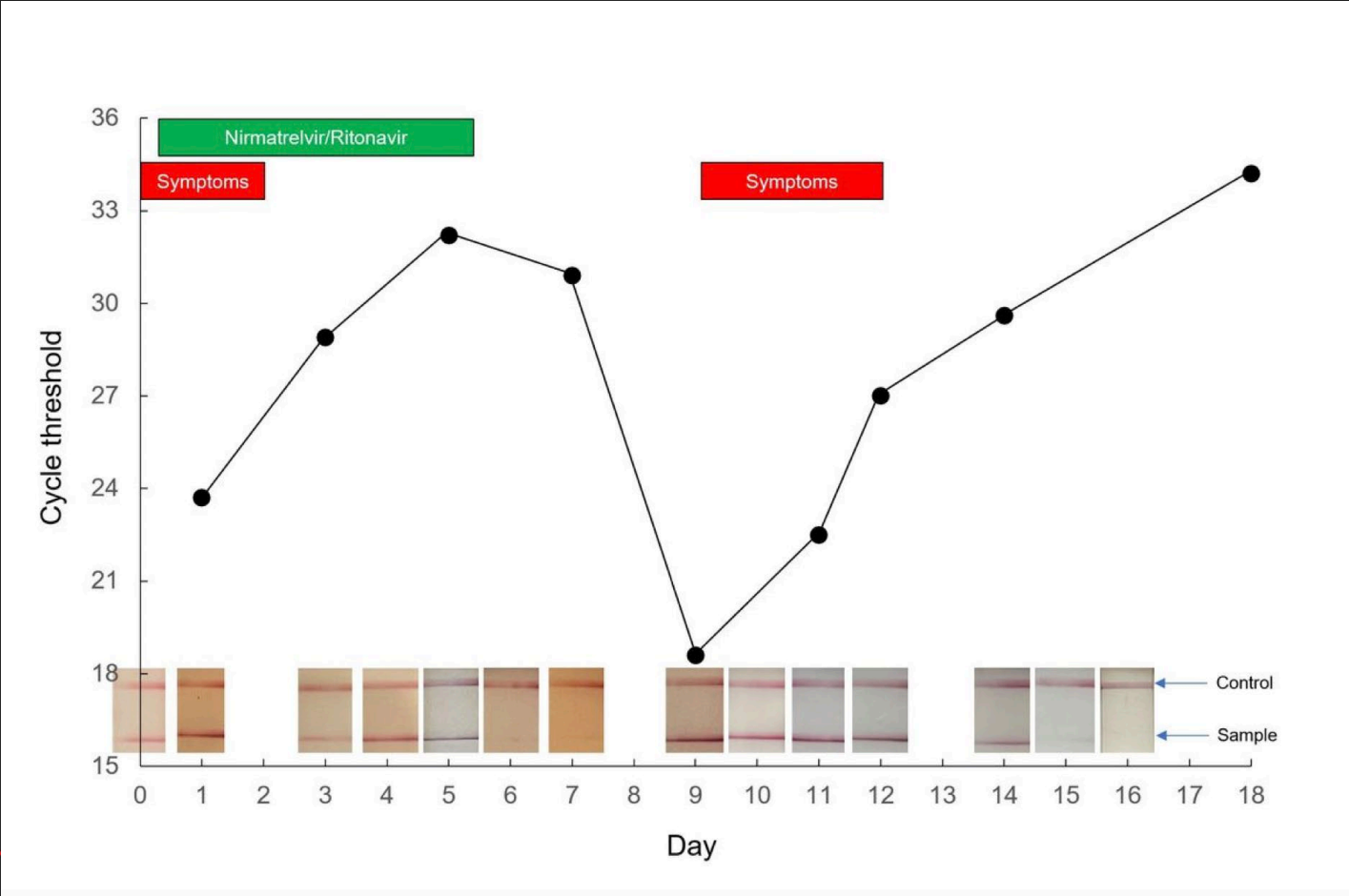
## C Subgroup Analysis



**NNT 103**



# Covid-19 Relapses after nirmatrelvir



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# What about monoclonal antibodies?



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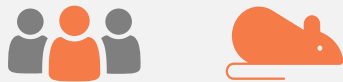


# nAb-cocktail derived from a large pool of candidates

REGENERON

## Antibodies collected

- **Convalescent plasma** from previously infected patients
- **Humanised mice** challenged with SARS-CoV-2 spike protein



## Antibodies screened

- **Binding affinity**
- **Neutralisation potency**
- **3D structure**
- **Non-overlapping epitopes**



## nAbs selected



*Bind to distinct regions of the spike protein*

Hansen. Science 2020  
Baum. Science 2020

<https://www.regeneron.com/covid19> (Accessed Sep 2020)



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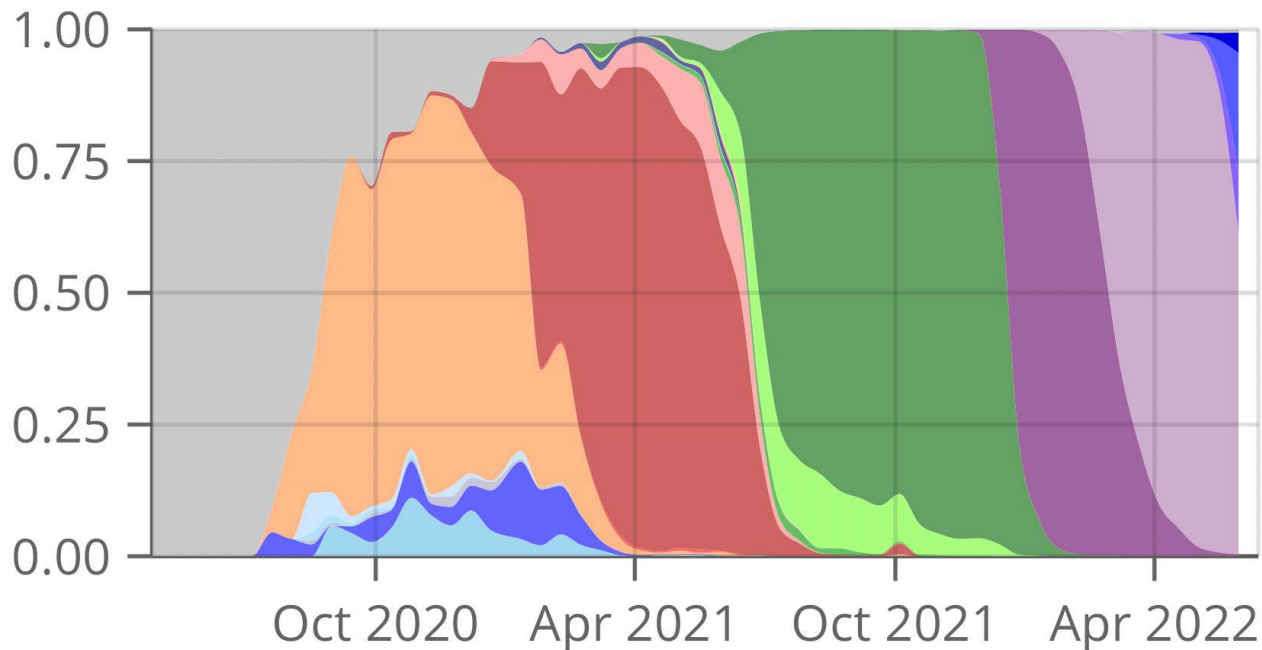


# MONOCLONAL ANTIBODIES

- **BAM**lanivimab
- **ETE**sevimab
- **CAS**irivimab
- **IMD**evimab
- **SOT**rovimab
- **CIL**gavimab
- **TIX**agevimab
- **REG**danvimab
- **BEB**telovimab



# Variant of Concern Italy



30 May 2022 - 13 Jun 2022

Variant	Num seq	Freq
21L (Omicron)	515	0.61
22B (Omicron)	192	0.23
22A (Omicron)	97	0.11
22C (Omicron)	33	0.04
others	5	0.01



# Monoclonal Antibodies Activity Against VOC

↕	BAM ↕	ETE ↕	BAM/ETE ↕	CAS ↕	IMD ↕	CAS/IMD ↕	CIL ↕	TIX ↕	CIL/TIX ↕	SOT ↕	REG ↕	BEB ↕	ADI ↕
Alpha	1 <sub>21</sub>	13 <sub>18</sub>	1.3 <sub>9</sub>	1 <sub>27</sub>	0.6 <sub>28</sub>	1 <sub>13</sub>	0.6 <sub>12</sub>	1.5 <sub>11</sub>	0.8 <sub>11</sub>	2* <sub>21</sub>	2.6 <sub>2</sub>	0.6 <sub>4</sub>	1.2 <sub>4</sub>
Beta	>1000 <sub>24</sub>	516 <sub>21</sub>	897 <sub>10</sub>	117 <sub>32</sub>	0.6 <sub>32</sub>	1.6 <sub>16</sub>	1.1 <sub>11</sub>	6.3 <sub>12</sub>	1.4 <sub>11</sub>	1 <sub>21</sub>	33 <sub>3</sub>	0.6 <sub>4</sub>	2.5 <sub>4</sub>
Gamma	>1000 <sub>15</sub>	313 <sub>15</sub>	404 <sub>4</sub>	154 <sub>21</sub>	0.4 <sub>21</sub>	1 <sub>8</sub>	0.5 <sub>11</sub>	5.9 <sub>10</sub>	0.9 <sub>8</sub>	1.2 <sub>16</sub>	61 <sub>3</sub>	0.7 <sub>3</sub>	1.8 <sub>4</sub>
Delta	>1000 <sub>20</sub>	0.5 <sub>20</sub>	1 <sub>8</sub>	0.8 <sub>22</sub>	1.5 <sub>23</sub>	1 <sub>9</sub>	2.5 <sub>8</sub>	0.9 <sub>8</sub>	1 <sub>9</sub>	1.6 <sub>15</sub>	9.8 <sub>3</sub>	0.7 <sub>4</sub>	1.5 <sub>4</sub>
Omicron/BA.1	>1000 <sub>23</sub>	340 <sub>22</sub>	794 <sub>9</sub>	>1000 <sub>26</sub>	>1000 <sub>27</sub>	>1000 <sub>12</sub>	305 <sub>24</sub>	306 <sub>25</sub>	75 <sub>15</sub>	4.5 <sub>29</sub>	>1000 <sub>7</sub>	0.7 <sub>7</sub>	108 <sub>10</sub>
Omicron/BA.2	>1000 <sub>3</sub>	444 <sub>3</sub>	897 <sub>2</sub>	>1000 <sub>4</sub>	161 <sub>4</sub>	344 <sub>3</sub>	1.8 <sub>6</sub>	674 <sub>5</sub>	5.4 <sub>6</sub>	32 <sub>7</sub>	-	0.8 <sub>2</sub>	638 <sub>2</sub>

**BAM**lanivimab, **ETE**sevimab, **CAS**irivimab, **IMD**evimab, **SOT**rovimab, **CIL**gavimab, **TIX**agevimab, **REG**danvimab, **BEB**telovimab

<https://covdb.stanford.edu/page/susceptibility-data/>



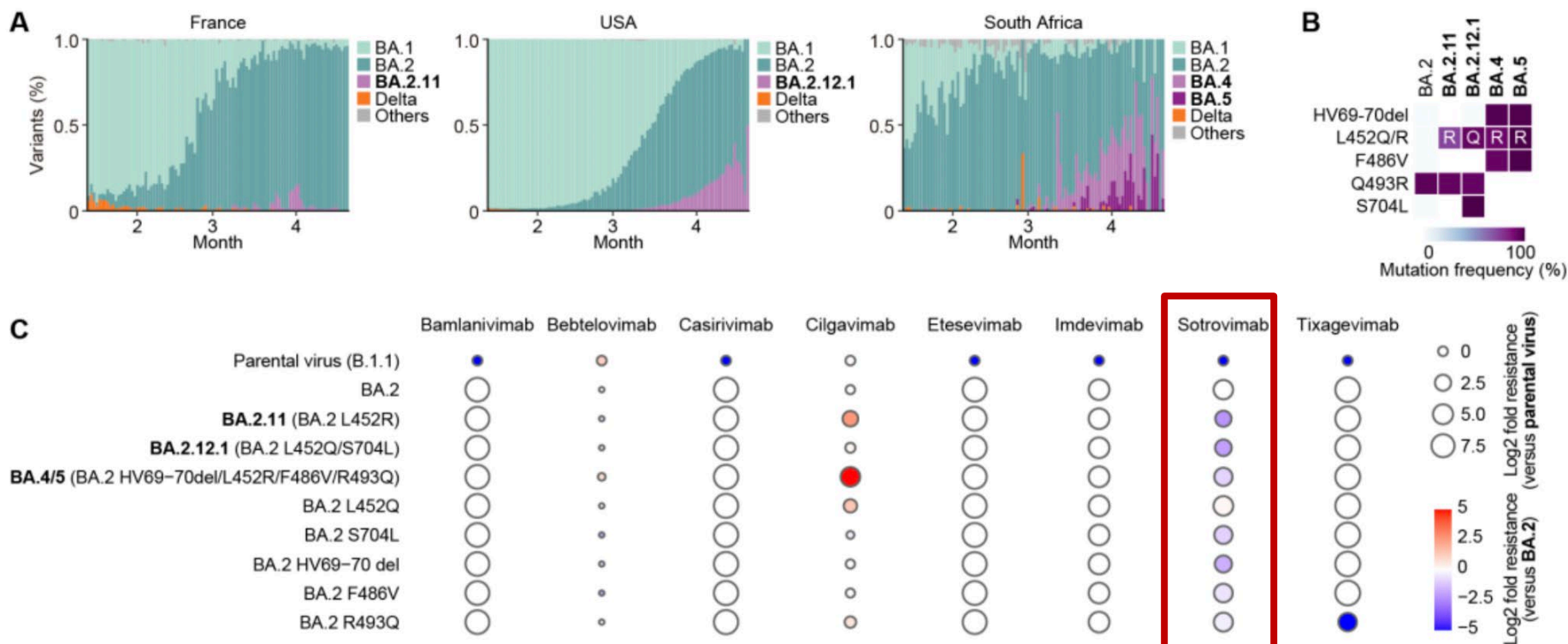
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# Sensitivity of novel SARS-CoV-2 Omicron subvariants, BA.2.11, BA.2.12.1, BA.4 and BA.5 to therapeutic monoclonal antibodies

Daichi Yamasoba, Ph.D.<sup>1,2#</sup>, Yusuke Kosugi, M.S.<sup>1#</sup>, Izumi Kimura, Ph.D.<sup>1#</sup>, Shigeru Fujita, D.V.M.<sup>1</sup>, Keiya Uriu, M.S.<sup>1</sup>, Jumpei Ito, D.V.M., Ph.D.<sup>1</sup>, Kei Sato, Ph.D.<sup>1\*</sup>, The



Yamasoba, Under Review bioRxiv.gov



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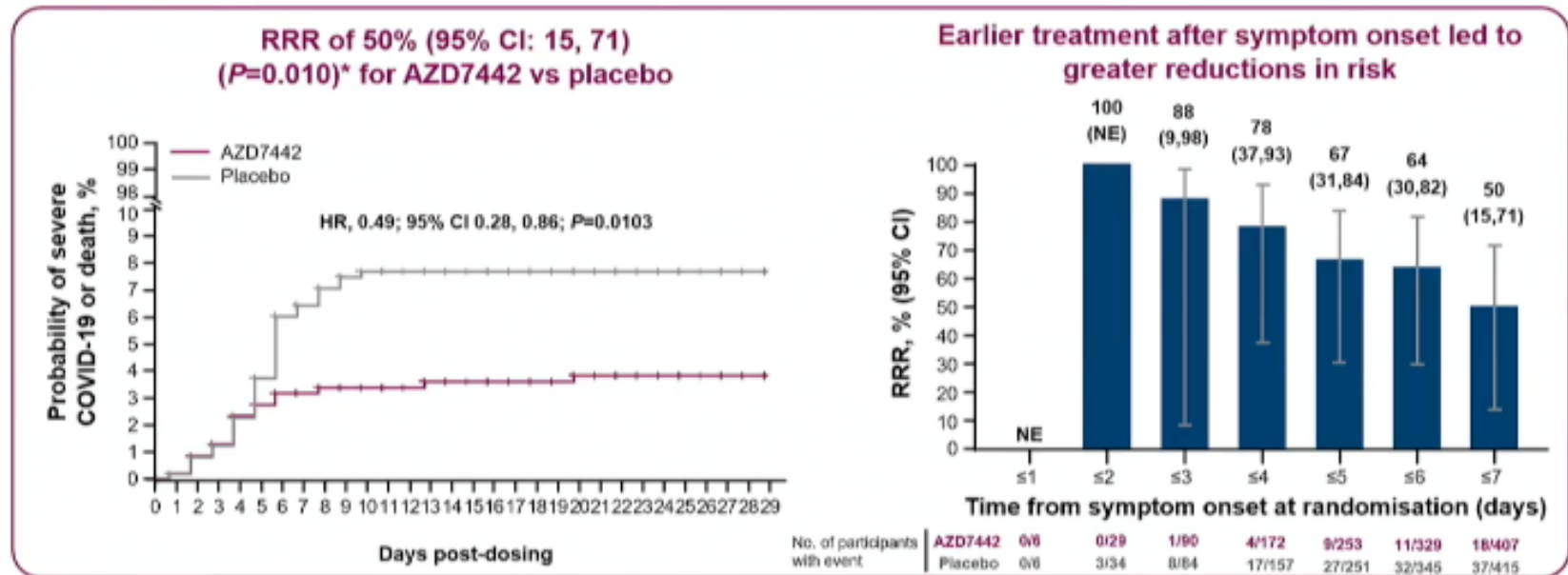




# TIXAGEVIMAB/CILGAVIMAB

## Primary endpoint met

(Reduction in severe COVID-19 or death when AZD7442 administered  $\leq 7$  days after symptom onset)



### Conclusions

A single 600 mg dose of intramuscular AZD7442 provided statistically and clinically significant protection against development of severe COVID-19 or death 28 days post-dose, with earlier treatment leading to more favourable outcomes

Montgomery; Lancet 2022



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**ANYTHING ELSE?**



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# FLUVAXIMINE

Table 1. Fluvoxamine COVID-19 Trial Details

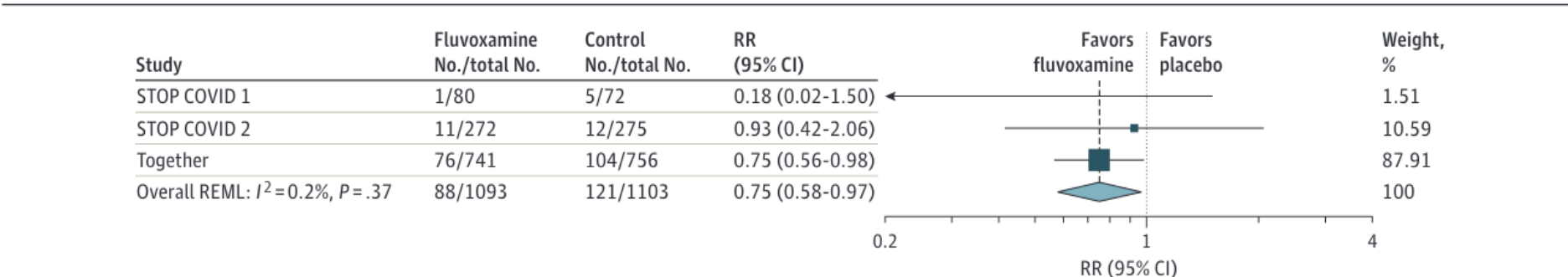
Source	Dates	Original outcome	Inclusion criteria	Demographics	Fluvoxamine target dose <sup>a</sup>	Duration, d
Stop COVID 1 <sup>6</sup> United States	April 10, 2020- August 5, 2020	Clinical deterioration: Hospitalization or new hypoxemia within 15 d	Age ≥18 unvaccinated positive test with: ≤7 d symptoms	Median age 46; 72% female; 70% White individuals; 56% BMI ≥ 30; 20% hypertension; 11% diabetes  Median 4 d of symptoms	100 mg	15
Stop COVID 2 <sup>9</sup> United States and Canada	December 22, 2020-May 21, 2020	Clinical deterioration: Hospitalization or new hypoxemia within 15 d	Age ≥30 unvaccinated positive test with: ≤6 d symptoms  Criterion for high risk	Median age 47; 62% female; 73% White individuals; 44% BMI ≥ 30; 21% hypertension; 9% diabetes  Median 5 d of symptoms	100 mg	15
TOGETHER <sup>10</sup> Brazil	January 20, 2021-August 5, 2021	ED visit ≥6 h or hospitalization within 28 d	Age ≥18 unvaccinated positive test with: ≤7 d symptoms  Criterion for high risk	Median age 50; 55% female; 96% mixed race; 51% BMI ≥ 30; 13% hypertension; 16% diabetes  Mean 3.8 d of symptoms <sup>b</sup>	100 mg	10

Abbreviations: BMI, body mass index; ED, emergency department.

<sup>b</sup> Median not provided; missing data on approximately 23% of participants.

<sup>a</sup> Target dose was to be taken orally twice a day.

Figure 2. Frequentist Random Effects Meta-analysis



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# DISCUSSION



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