

Results from ACTIV-6: A Decentralized, Double-Blind, Randomized, Placebo- Controlled Platform Trial of Repurposed Drugs for the Treatment of Mild-to- Moderate COVID-19

**Matthew McCarthy, MD
on Behalf of the ACTIV-6 Study team**

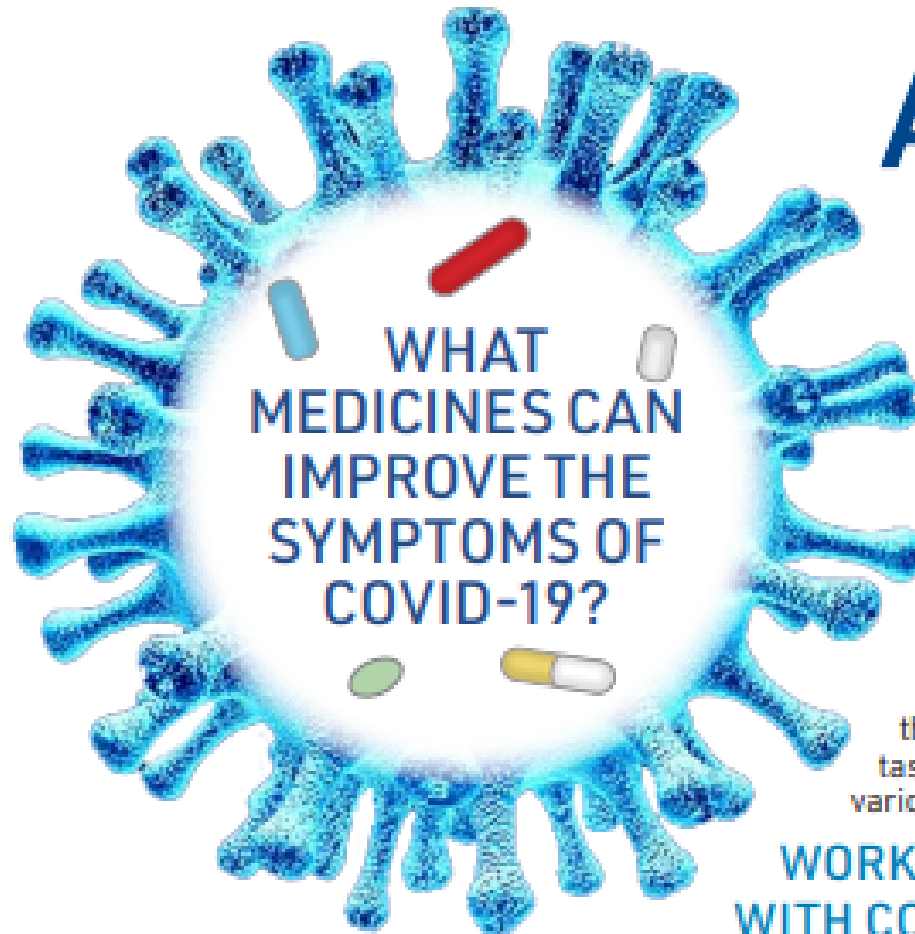


Primary Objectives

How to help someone *feel better faster* with newly diagnosed mild-moderate COVID-19?

How to *prevent hospitalizations or death* in someone with newly diagnosed mild-moderate COVID-19?

Study Population



ACTIV-6

ACTIV-6 is a nationwide study to test medicines that are already approved for other diseases to see if they can help people with mild to moderate COVID-19 feel better faster and stay out of the hospital. ACTIV-6 is part of the Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV) program.

WHO CAN PARTICIPATE? Adults age 30 or older with COVID-19 symptoms, a positive test within the last 10 days, and at least two symptoms of the illness for seven days or less. Symptoms include fatigue, difficulty breathing, fever, cough, nausea, vomiting, diarrhea, body aches, chills, headache, sore throat, nasal symptoms, and/or new loss of sense of taste or smell. You may be excluded from the study for various reasons.

**WORKING TOGETHER TO HELP PEOPLE
WITH COVID-19 FEEL BETTER FASTER.**

Study Design

- Direct-to-participant
- All participants assigned to a site
- Symptom reporting daily
- COVID-19 outcome reporting
- Remote visits
- Continuous safety assessments
- 5 active arms to date

WHAT ARE THE STEPS IN THIS STUDY?

1

SIGN UP ONLINE

People can participate from anywhere in the US. After signing up online, by web or phone, you will get an email or text message within a day with a link. That link will take you to the registration survey.



2

ABOUT THE MEDICINES

This study is testing several different medicines. You will be selected by chance to get either a medicine you are eligible for or a placebo. [Learn about the medicines here.](#)

CLINICAL STUDIES AND PLACEBOS

Participants in this study take either a study medicine or a placebo. A placebo is a medication that has no active ingredients and will have no effect on you. When some people take medicines and others take placebos, that lets researchers figure out if a medicine is useful or not.

3

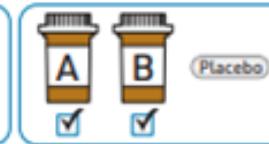
CHOOSE THE MEDICINES YOU WOULD WANT TO TRY

Participating in this study involves: 1) choosing which medicines you'd be willing to take, 2) taking the medication assigned to you, and 3) keeping track of your symptoms by using online surveys. No one, including you, will know if you're taking a medicine or a placebo.

Your chance of taking a medicine instead of a placebo depends on how many medicines you are willing to try and are eligible for:



Choose 1, your chance is 50% (1 out of 2)



Choose 2, your chance is 67% (2 out of 3)



Choose 3, your chance is 75% (3 out of 4)

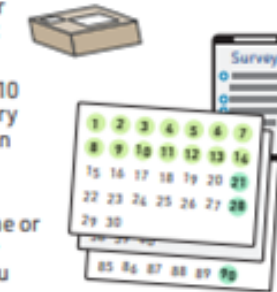
4

RECEIVE AND TAKE YOUR MEDICATION, COMPLETE DAILY SURVEYS

Your medication will be mailed to your home at no cost, and then you will start taking it according to its instructions.

You will be asked to answer a short (5 to 10 minutes) survey on a secure website every day for 14 days, and follow-up surveys on days 21, 28 and 90.

If you still have symptoms after 14 days, you'll take a daily survey until they're gone or you reach day 28. If you feel worse at any time, you should seek medical care as you normally would and notify the study team during the next survey.



There are no in-person visits involved with this study. You can stop participating in the study at any time.

5

GET YOUR REWARD

You will receive gift cards on the 28th and 90th day that total \$100.

\$100

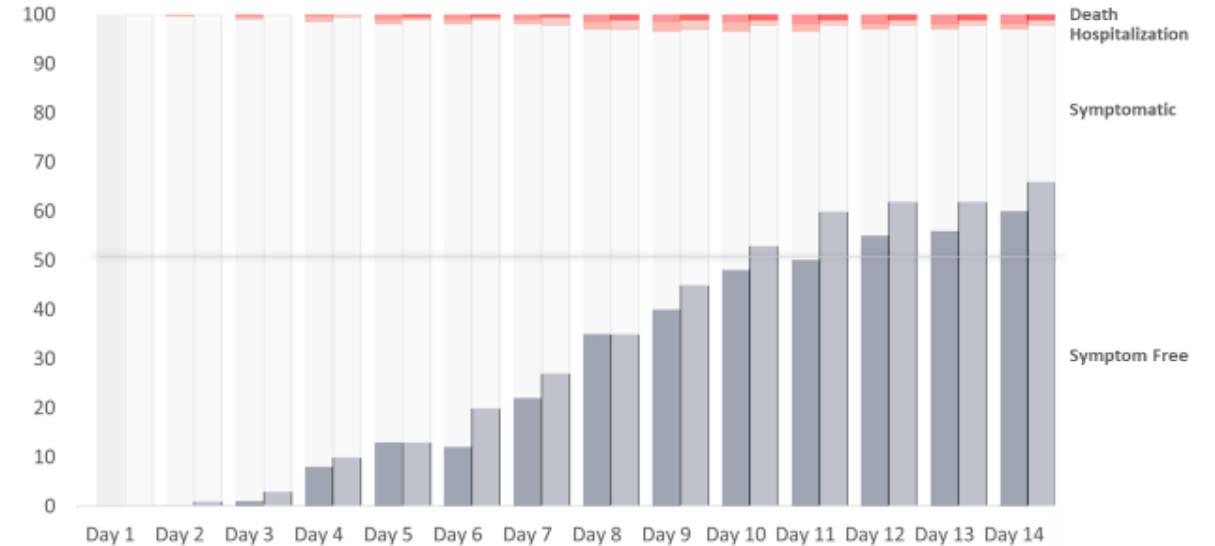
Active Interventions

- Repurposed drugs chosen by independent committee based on existing evidence including human studies
- Ivermectin dosed to achieve $\sim 400 \mu\text{g/kg}$ (7 mg tablets) daily for 3 days
 - Opened June 23, 2021, Closed February 4, 2022
- Fluticasone furoate $200 \mu\text{g/day}$ inhaled daily for 14 days
 - Opened August 10, 2021, Closed February 12, 2022
- Fluvoxamine maleate 50 mg tablet twice daily for 10 days
 - Opened August 6, 2021, Closed May 27, 2022

Measurements

No symptoms
Mild symptoms
Moderate symptoms
Severe symptoms
Hospitalization
Death

Primary Outcomes



Time to recovery, clinical events
Days of benefit (Day 28)

Participant Characteristics

	Ivermectin 400 µg/kg		Fluticasone		Fluvoxamine 50 mg	
	Active (n=817)	Placebo (n=774)	Active (n=656)	Placebo (n=621)	Active (n=674)	Placebo (n=614)
Age, median (IQR), y	47 (39-56)	48 (39-56)	45 (37-55)	46 (38-56)	47 (37-57)	48 (39-58)
Age <50, no. (%)	476 (58.3)	435 (56.2)	405 (61.7)	370 (59.6)	395 (58.6)	350 (57.0)
Female, no. (%)	508 (62.2)	424 (54.8)	431 (65.7)	376 (60.5)	387 (57.4)	347 (56.5)
Race, not mutually exclusive, no. (%):						
Black or African American	57 (7.0)	56 (7.2)	47 (7.2)	44 (7.1)	47 (7.0)	49 (8.0)
White	659 (80.7)	627 (81.0)	523 (79.7)	500 (80.5)	542 (80.4)	496 (80.8)
Ethnicity: Latino	93 (11.4)	70 (9.0)	78 (11.9)	83 (13.4)	119 (17.7)	102 (16.6)

Participant Characteristics

	Ivermectin 400 µg/kg		Fluticasone		Fluvoxamine 50 mg	
	Active (n=817)	Placebo (n=774)	Active (n=656)	Placebo (n=621)	Active (n=674)	Placebo (n=614)
BMI, median (IQR), kg/m ²	28.3 (24.9-33.2)	28.3 (24.9-33.3)	28.1 (24.4-33.6)	28.1 (24.6-32.9)	27.8 (24.5-32.1)	28.1 (24.4-32.4)
BMI >30 kg/m ² , no./No. (%)	334/816 (40.9)	314 (40.6)	260 (39.6)	239/620 (38.5)	246 (36.5)	223/613 (36.4)
Heart disease, no./No. (%)	34/804 (4.2)	36/756 (4.8)	25/640 (3.9)	33/606 (5.4)	23/658 (3.5)	30/587 (5.1)
Diabetes, no./No. (%)	96/804 (11.9)	88/756 (11.6)	56/640 (8.8)	65/606 (10.7)	59/658 (9.0)	56/588 (9.5)
High blood pressure, no./No. (%)	212/804 (26.4)	203/756 (26.9)	156/640 (24.4)	169/606 (27.9)	153/658 (23.3)	151/588 (25.7)
Asthma, no./No. (%)	121/804 (15.05)	120/756 (15.9)	76/640 (11.9)	86/606 (14.2)	89/658 (13.5)	75/587 (12.8)
Smoker (past year), no./No. (%)	134/804 (16.27)	103/756 (13.6)	83/640 (13.0)	72/606 (11.9)	88/658 (13.4)	76/588 (12.9)

Participant Characteristics

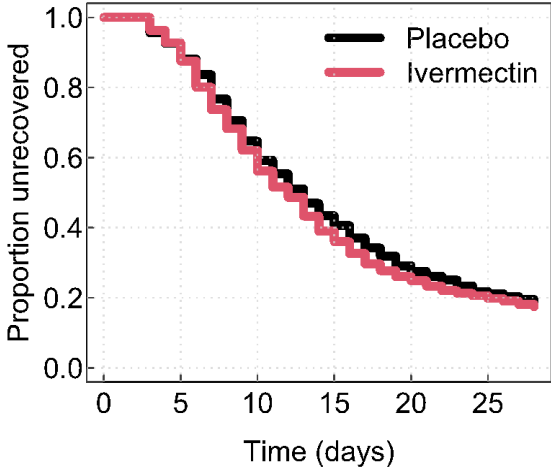
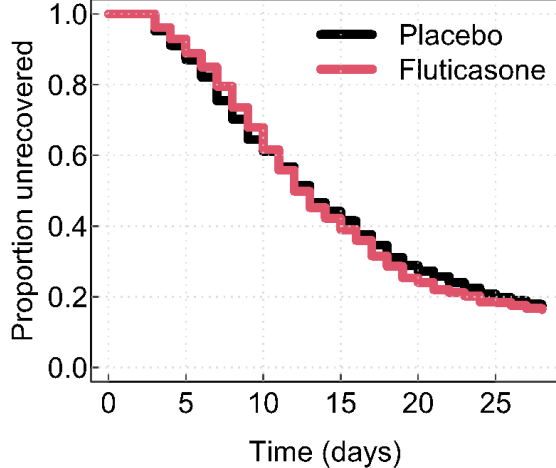
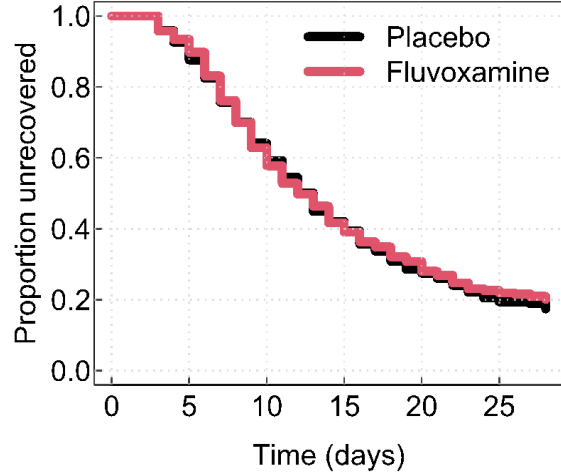
	Ivermectin 400 µg/kg		Fluticasone		Fluvoxamine 50 mg	
	Active (n=817)	Placebo (n=774)	Active (n=656)	Placebo (n=621)	Active (n=674)	Placebo (n=614)
Vaccine status, no. (%)						
Not vaccinated	420 (51.4)	394 (50.9)	220 (33.5)	211 (34.0)	210 (31.3)	195 (32.1)
Vaccinated (1 dose)	12 (1.5)	12 (1.6)	8 (1.2)	11 (1.8)	8 (1.2)	7 (1.2)
Vaccinated (2+ doses)	385 (47.1)	368 (47.6)	428 (65.2)	399 (64.3)	452 (67.5)	405 (66.7)
Days between symptom onset and receipt of study drug, median (IQR)	6 (5-8)	6 (4-7)	6 (4-7)	5 (4-7)	5 (4-7)	5 (4-7)
Symptom burden on study day 1, no. (%)						
None	55 (6.73)	54 (6.98)	35 (5.3)	39 (6.3)	36 (5.8)	37 (6.5)
Mild	490 (60.0)	434 (56.1)	402 (61.3)	371 (59.7)	396 (63.7)	353 (62.0)
Moderate	221 (27.1)	247 (31.9)	186 (28.4)	174 (28.0)	176 (28.3)	166 (29.2)
Severe	51 (6.2)	39 (5.0)	11 (1.7)	25 (4.0)	14 (2.3)	13 (2.3)

Safety Events

	Ivermectin 400 µg/kg		Fluticasone		Fluvoxamine 50 mg	
	Active (n=817)	Placebo (n=774)	Active (n=656)	Placebo (n=621)	Active (n=674)	Placebo (n=614)
Experienced an adverse events, No. (%)	25 (3.1)	27 (3.7)	13 (1.98)	16 (2.58)	29 (4.30)	31 (5.05)
Experienced a serious adverse events, No. (%)	10 (1.2)	9 (1.2)	3 (0.46)	6 (0.97)	3 (0.48)	4 (0.65)
Serious adverse events, No. (not mutually exclusive)						
COVID-19 pneumonia or NOS	5	7	3	1	0	1
Venous thromboembolism (including PE)	1	5	0	0	0	0
Bacteremia	0	1	0	0	0	0
Diplopia	0	1	0	1	0	0
Pneumonia due to bacteria	2	0	0	0	0	0
Acute kidney injury	1	0	0	0	0	0
Hospitalization (shortness of breath)	1	0	0	0	0	0
Viral bronchopneumonia	1	0	0	0	0	0
COPD exacerbation	0	0	0	0	2	0
Coronary vasospasm	0	0	0	1	0	1
Nausea and vomiting	0	0	0	1	0	0
Other Infection (UTI, finger)	0	0	0	1	1	0
Adverse drug reaction	0	0	0	1	0	0

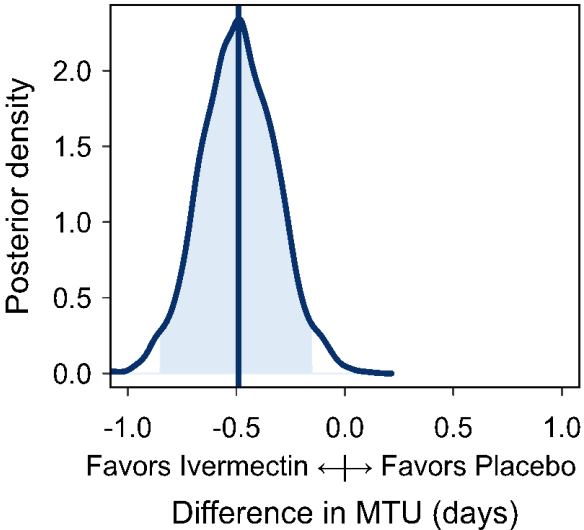
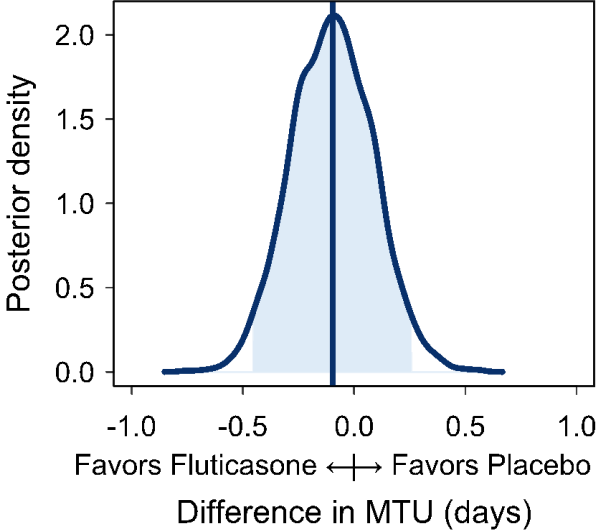
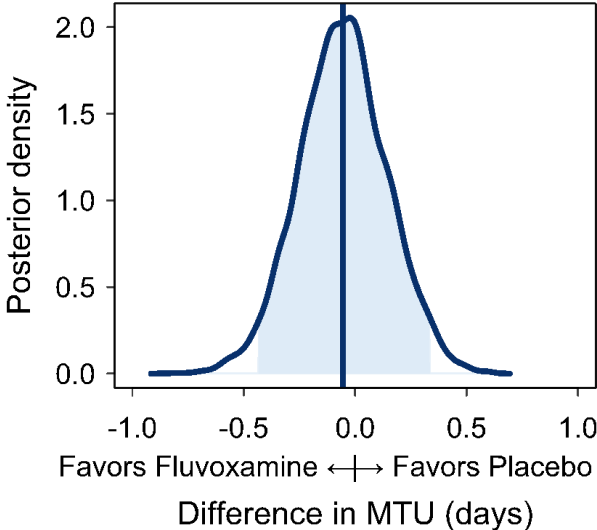
Primary Endpoint: Time to Sustained Recovery

Among participants that did not die during follow-up, recovery was defined as **three consecutive days without COVID-19 symptoms**, as affirmatively reported by the study participant. Time to recovery was administratively censored at 28 days.

	IVERMECTIN 400 µg/kg	FLUTICASONE	FLUVOXAMINE 50 mg
Kaplan-Meier			
HR (95% CrI) P(HR>1)	1.07 (0.96, 1.17) 0.91	1.01 (0.91, 1.12) 0.56	0.96 (0.87, 1.07) 0.22
Median time (IQR), active vs placebo	12 (11-13) vs 13 (12-14)	11 (10.9-11.2) vs 11.5 (11.3-11.6)	12 (11-14) vs 13 (12-13)

Secondary Endpoint: Time Spent Unwell

The difference in the mean time spent unwell reflects the **difference in symptomatic days** during the first 14 days of follow-up when taking active drug compared with placebo. A negative number favors active drug.

	IVERMECTIN 400 µg/kg	FLUTICASONE	FLUVOXAMINE 50 mg
Δ: Difference in time unwell			
Δ (95% CrI) P(Δ<0)	-0.49 (-0.82, -0.15) 0.99	-0.10 (-0.45, 0.26) 0.70	-0.06 (-0.43, 0.33) 0.61

Secondary Outcomes – 28 Day Events

	Ivermectin 400 µg/kg				Fluticasone				Fluvoxamine 50 mg			
	Active (n=817)	Placebo (n=774)	HR (CrI)	P*	Active (n=817)	Placebo (n=774)	HR (CrI)	P*	Active (n=674)	Placebo (n=614)	HR (CrI)	P*
Mortality	1 (0.1)	0 (0.0)	-	-	0 (0.0)	0 (0.0)	-	-	0 (0.0)	0 (0.0)	-	-
Death or hospitalization	10 (1.2)	9 (1.16)	1.1 (0.4-2.6)	-	3 (0.5)	3 (0.5)	0.94 (0.2-4.7)	-	1 (0.2)	2 (0.2)	0.45 (0.04-4.99)	-
Hospitalization, urgent or emergency care visit, or death	32 (3.9)	28 (3.6)	1.2 (0.6-1.8)	0.32	24 (3.7)	13 (2.1)	1.9 (0.8-3.5)	0.035	26 (3.9)	23 (3.8)	1.1 (0.6, 1.8)	0.34
WHO Clinical Progression Scale	OR (CrI)			P*	OR (CrI)			P*	OR (CrI)			P*
Day 7	0.81 (0.50-1.13)			0.88	1.10 (0.62-1.63)			0.41	1.32 (0.72-1.98)			0.15
Day 14	0.76 (0.39-1.13)			0.89	0.91 (0.42-1.50)			0.67	1.17 (0.49-2.01)			0.39
Day 28	1.11 (0.52-1.91)			0.45	2.74 (0.50-5.94)			0.07	1.46 (0.79-2.28)			0.10

Conclusion

- ACTIV-6 is a large, randomized trial platform designed to evaluate multiple repurposed medications for benefits of symptomatic improvement or prevention of major clinical events in non-hospitalized adults with mild-to-moderate COVID-19 illness.
- We observed no significant differences in relief of mild-to-moderate symptoms between participants taking ivermectin 400 µg/kg, fluticasone, or fluvoxamine 50 mg twice daily and participants taking placebo.
- There was no difference observed in the number of hospitalizations or deaths between participants taking ivermectin 400 µg/kg, fluticasone, or fluvoxamine and participants taking placebo.
- There were no safety concerns identified in any active arm.

Effect of Ivermectin vs Placebo on Time to Sustained Recovery in Outpatients With Mild to Moderate COVID-19 A Randomized Clinical Trial

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IMPORTANCE The effectiveness of ivermectin to shorten symptom duration or prevent hospitalization among outpatients in the US with mild to moderate symptomatic COVID-19 is unknown.

OBJECTIVE To evaluate the efficacy of ivermectin, 400 µg/kg, daily for 3 days compared with placebo for the treatment of early mild to moderate COVID-19.

DESIGN, SETTING, AND PARTICIPANTS ACTIV-6, an ongoing, decentralized, double-blind, randomized, placebo-controlled platform trial, was designed to evaluate repurposed therapies in outpatients with mild to moderate COVID-19. A total of 1591 participants aged 30 years and older with confirmed COVID-19, experiencing 2 or more symptoms of acute infection for 7 days or less, were enrolled from June 23, 2021, through February 4, 2022, with follow-up data through May 31, 2022, at 93 sites in the US.

INTERVENTIONS Participants were randomized to receive ivermectin, 400 µg/kg (n = 817), daily for 3 days or placebo (n = 774).

MAIN OUTCOMES AND MEASURES Time to sustained recovery, defined as at least 3 consecutive days without symptoms. There were 7 secondary outcomes, including a composite of hospitalization or death by day 28.

RESULTS Among 1800 participants who were randomized (mean [SD] age, 48 [12] years; 932 women [58.6%]; 753 [47.3%] reported receiving at least 2 doses of a SARS-CoV-2 vaccine), 1591 completed the trial. The hazard ratio (HR) for improvement in time to recovery was 1.07 (95% credible interval [CrI], 0.96-1.17; posterior P value [HR > 1] = .91). The median time to recovery was 12 days (IQR, 11-13) in the ivermectin group and 13 days (IQR, 12-14) in the placebo group. There were 10 hospitalizations or deaths in the ivermectin group and 9 in the placebo group (1.2% vs 1.2%; HR, 1.1 [95% CrI, 0.4-2.6]). The most common serious adverse events were COVID-19 pneumonia (ivermectin [n = 5]; placebo [n = 7]) and venous thromboembolism (ivermectin [n = 1]; placebo [n = 5]).

CONCLUSIONS AND RELEVANCE Among outpatients with mild to moderate COVID-19, treatment with ivermectin, compared with placebo, did not significantly improve time to recovery. These findings do not support the use of ivermectin in patients with mild to moderate COVID-19.

TRIAL REGISTRATION ClinicalTrials.gov Identifier: NCT04885530

 Visual Abstract

 Supplemental content

Author Affiliations: Author affiliations are listed at the end of this article.

Group Information: The Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV-6) Study Group and Investigators appear in Supplement 4.

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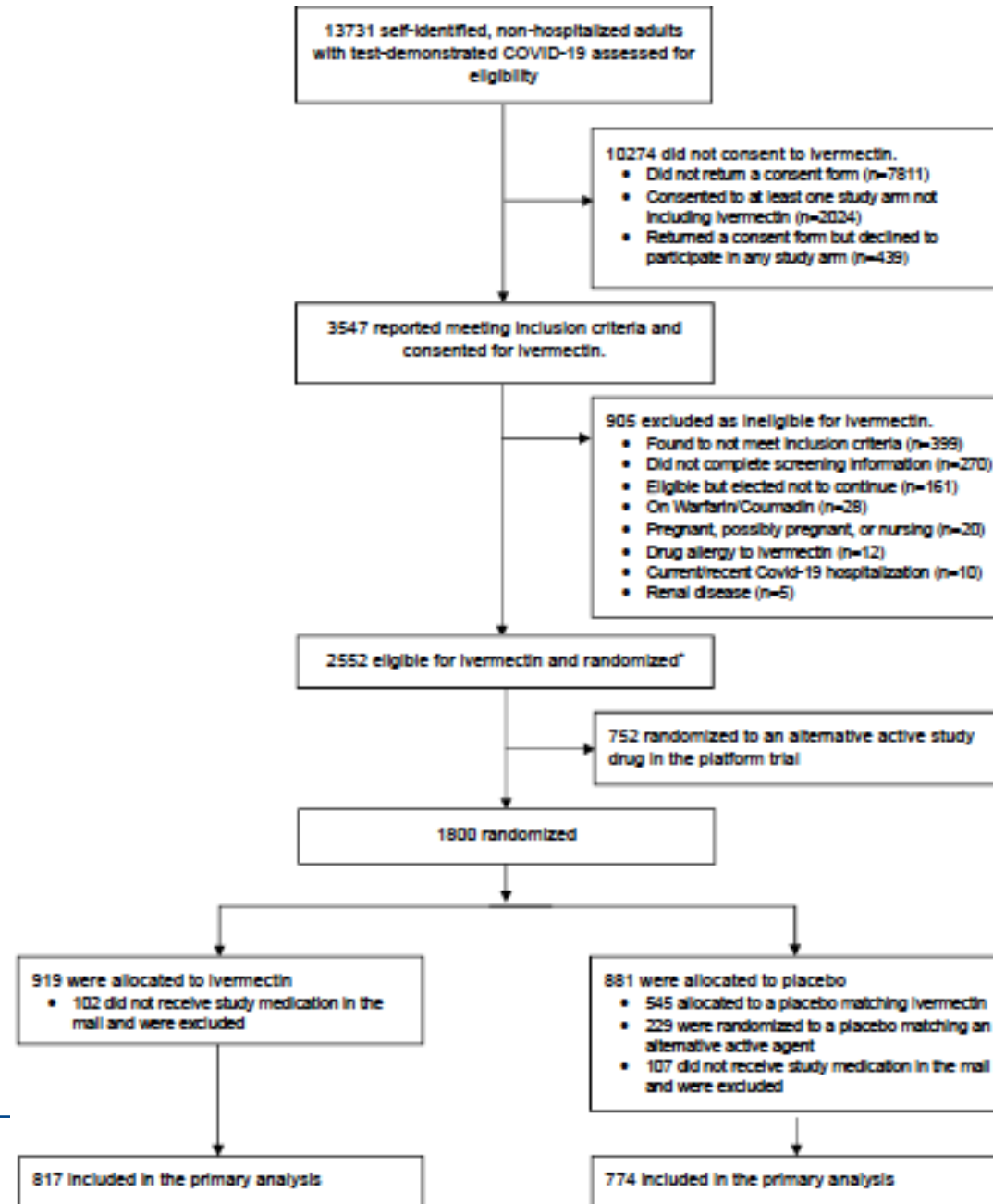
Available at [jama.com](https://www.jama.com)



Questions

Additional questions can be sent to the ACTIV-6
inbox: DCRI-ACTIV6@dm.duke.edu

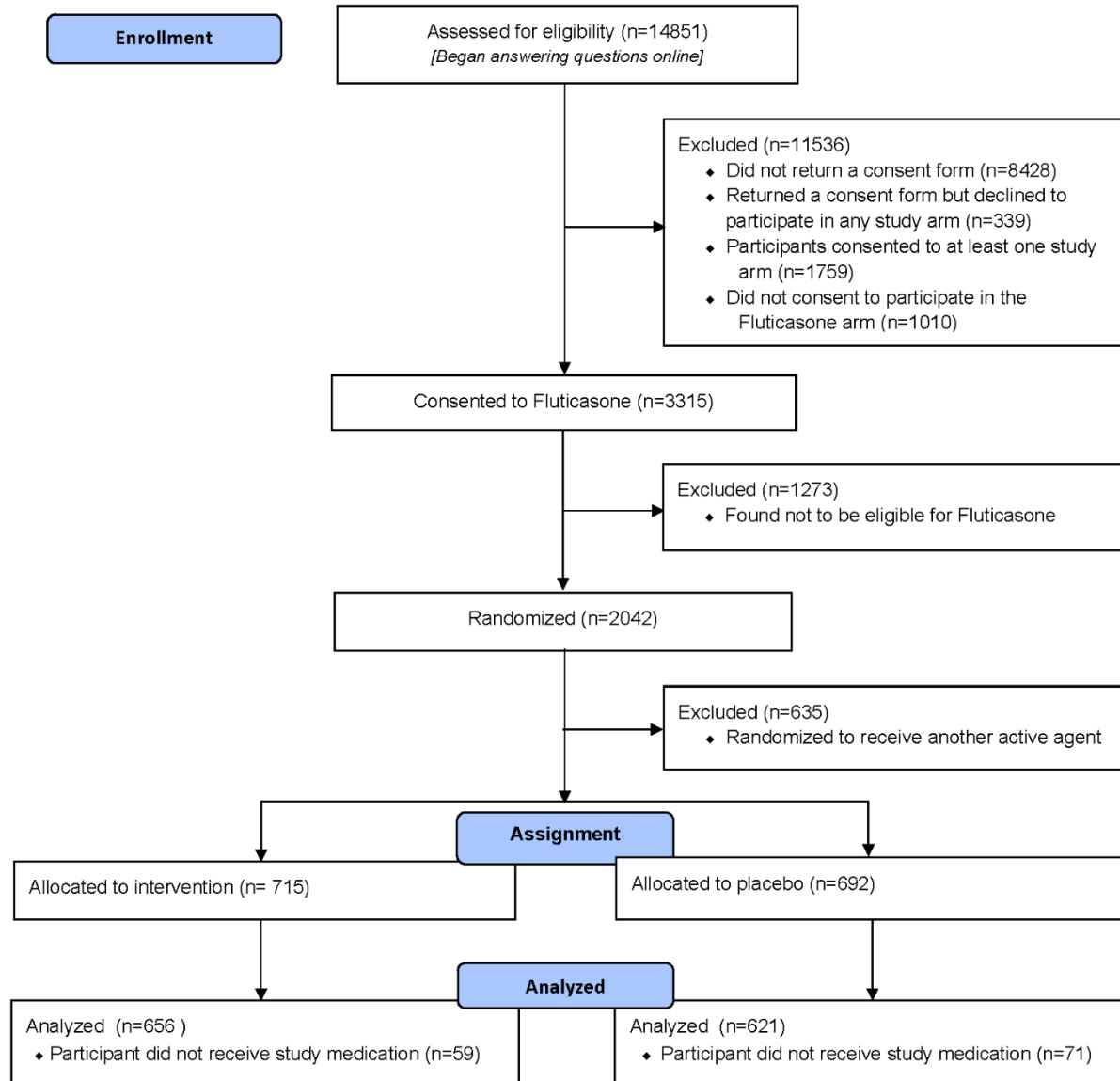
Enrollment



Ivermectin 400
n=(817)

Placebo
n=(774)

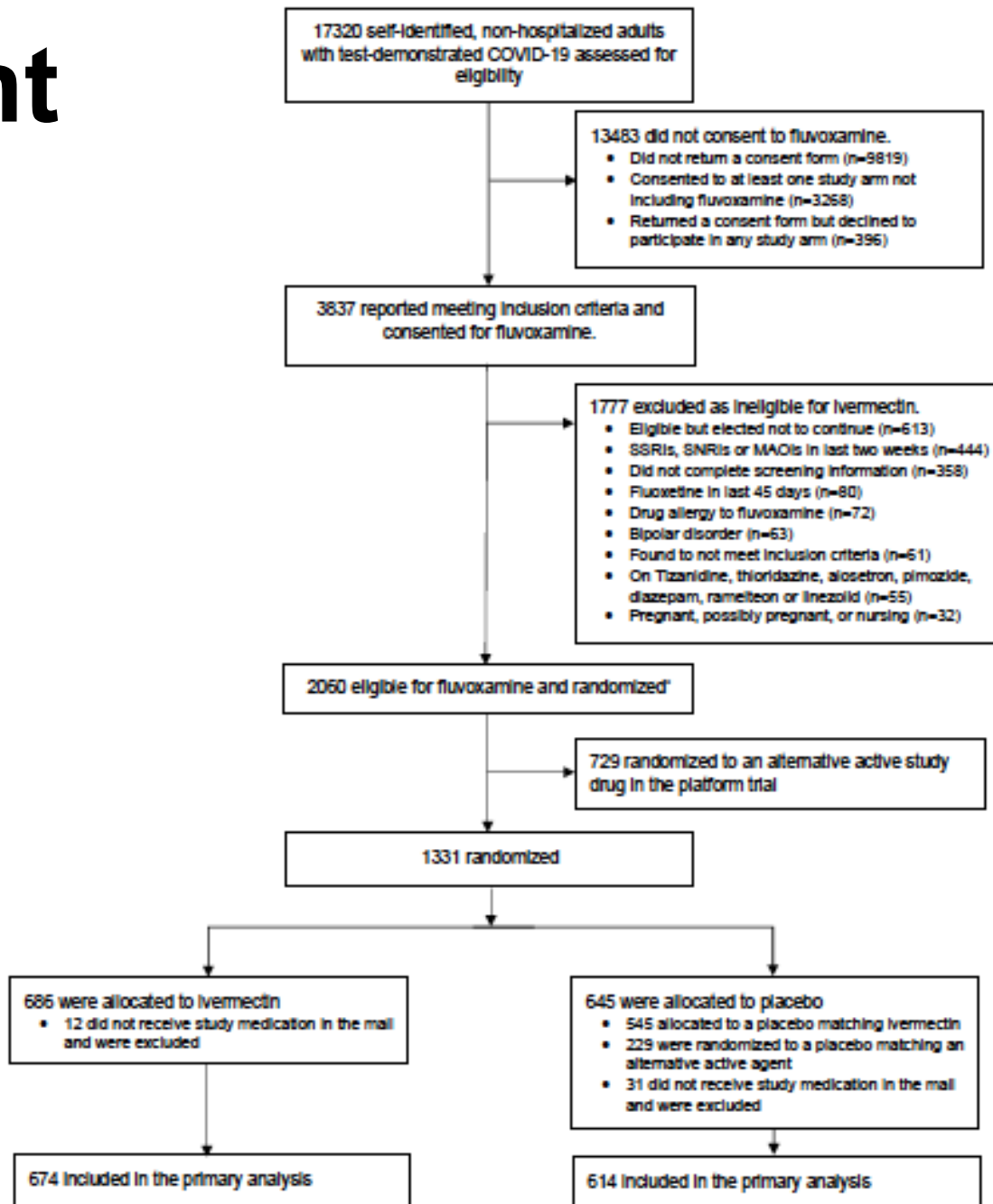
Enrollment



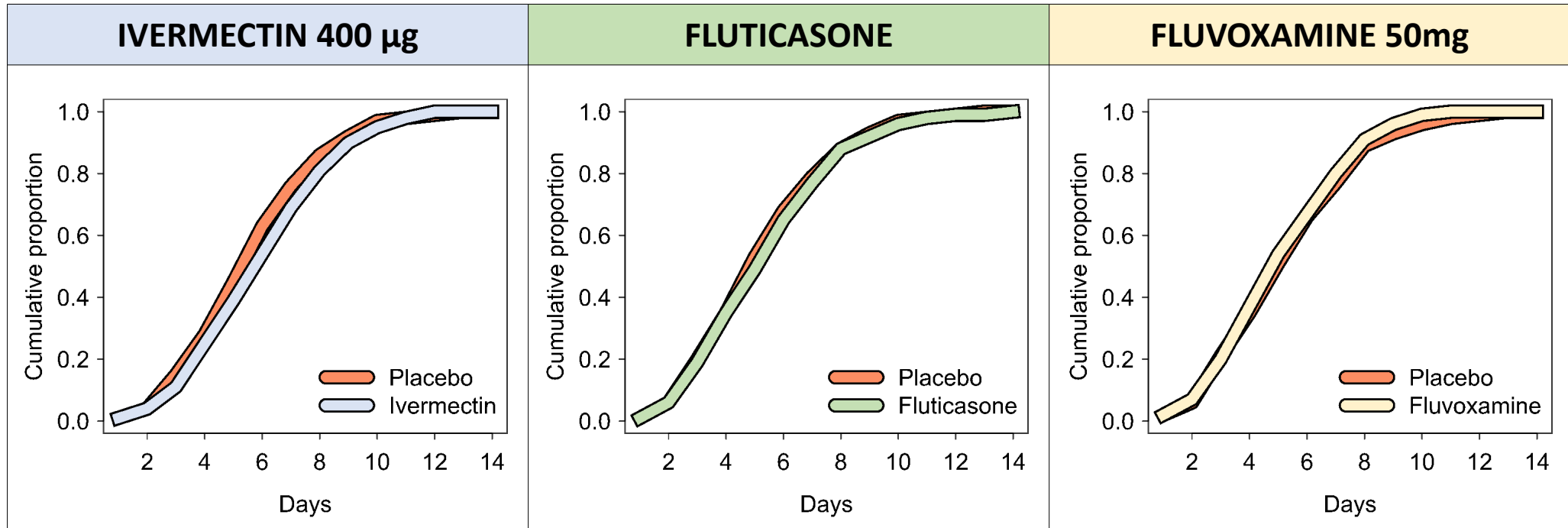
Fluticasone Furoate
n=(656)

Placebo n=(621)

Enrollment



Days between onset of symptoms and drug delivery

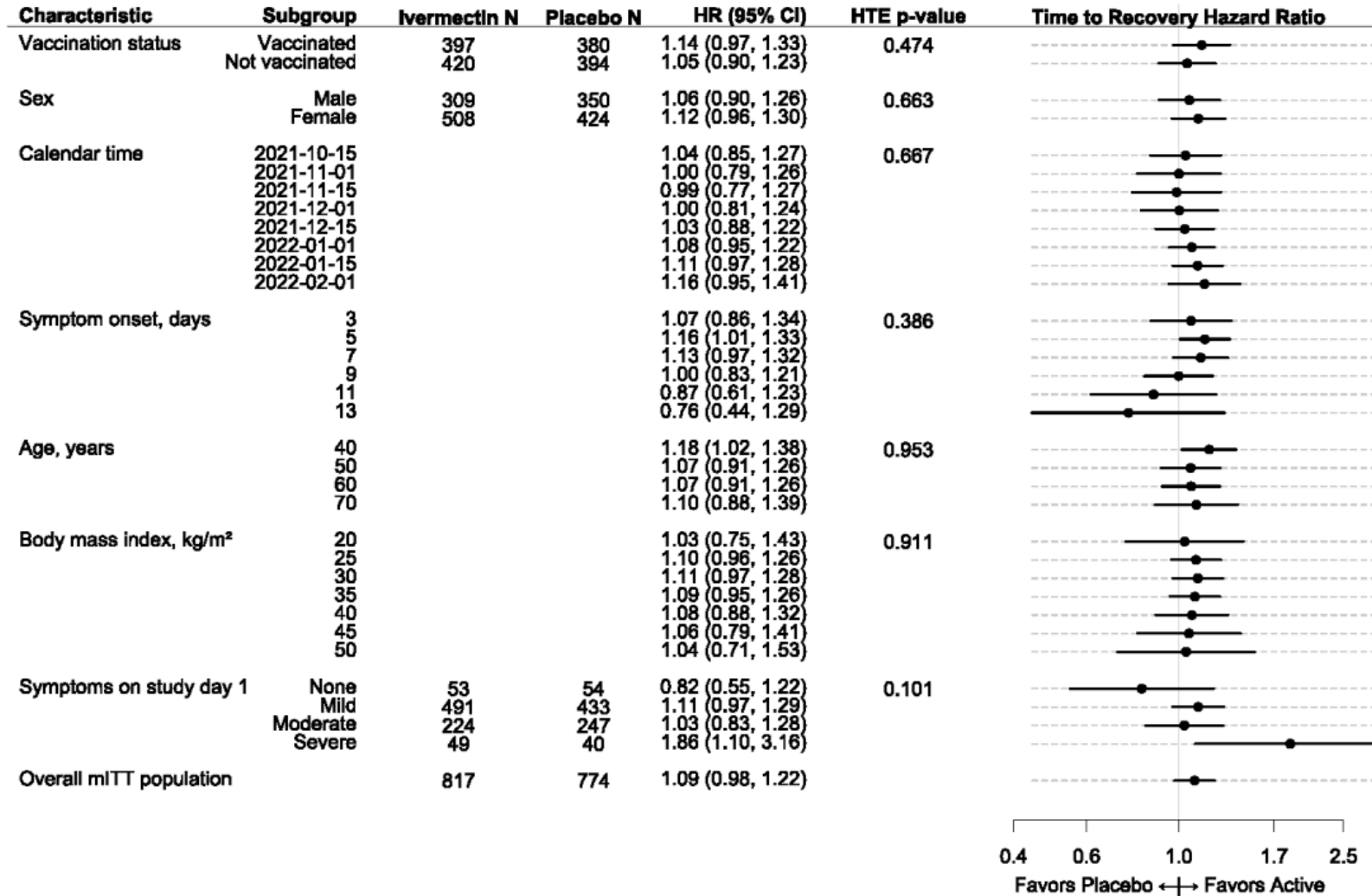


Appendix	Arm	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ivermectin 400	Placebo	0.01	0.04	0.15	0.28	0.45	0.63	0.76	0.86	0.92	0.97	0.98	0.99	1.00	1
	Active	0.01	0.04	0.11	0.25	0.39	0.54	0.69	0.81	0.90	0.95	0.98	1.00	1.00	1
Fluticasone	Placebo	0.01	0.06	0.20	0.35	0.53	0.68	0.79	0.88	0.93	0.97	0.98	0.99	1.00	1
	Active	0.01	0.06	0.19	0.35	0.49	0.65	0.77	0.88	0.92	0.96	0.98	0.99	0.99	1
Fluvoxamine 50	Placebo	0.02	0.06	0.21	0.35	0.51	0.66	0.77	0.89	0.93	0.96	0.98	0.99	1.00	1
	Active	0.02	0.07	0.20	0.37	0.54	0.67	0.80	0.91	0.96	0.99	1.00	1.00	1.00	1

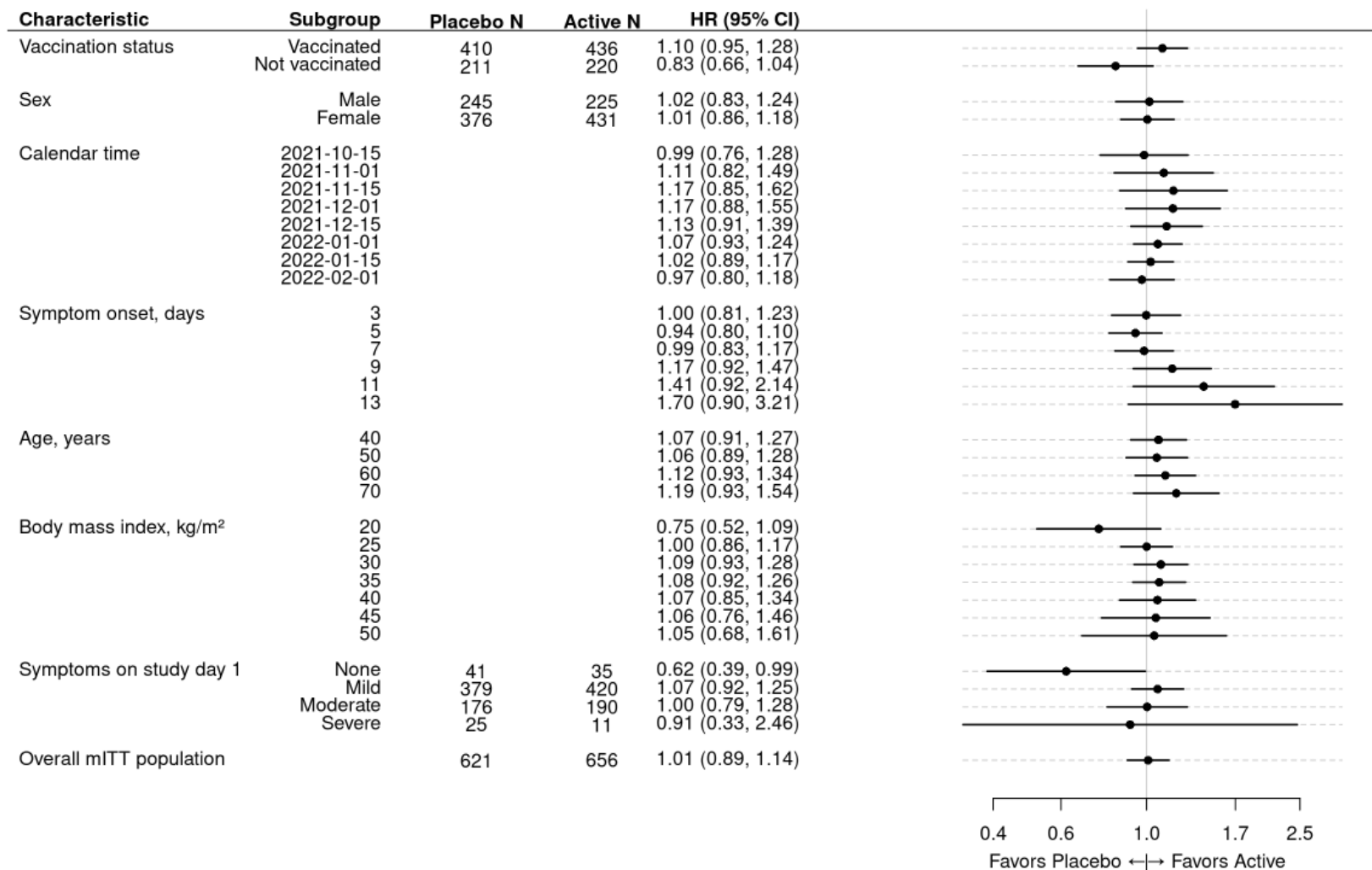
Concomitant Treatments for COVID-19

	Ivermectin 400 µg/kg		Fluticasone		Fluvoxamine 50 mg	
	Active (n=817)	Placebo (n=774)	Active (n=656)	Placebo (n=621)	Active (n=674)	Placebo (n=614)
Remdesivir (%)	2 (0.2)	2 (0.3)	1 (0.2)	0 (0.0)	0 (0.0)	1 (0.16)
Monoclonal antibodies (%)	22 (2.7)	25 (3.2)	17 (2.6)	13 (2.1)	11 (1.6)	10 (1.6)
Paxlovid (%)	1 (0.1)	1 (0.1)	0 (0.0)	1 (0.2)	8 (1.2)	5 (0.81)
Molnupiravir (%)	0	0	0	0	1 (0.15)	1 (0.16)

Heterogeneity of Treatment Effect: Ivermectin 400 µg/d



Heterogeneity of Treatment Effect: Inhaled Fluticasone



Heterogeneity of Treatment Effect: Fluvoxamine 50 mg

