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Regione Lombardia
CENTRE FOR MACH MultidisciplinAry ResearCh in Health Science
UNIVERSITA DEGLI STUDI DI MILANO
DIPARTIMENTO DI FISIOPATOLOGIA MEDICO-CHIRURGICA E DEI TRAPIANTI
SIFC
SOCIETÀ ITALIANA PER LO STUDIO DELLA FIBROSI CISTICA

Quale insegnamento dai trial clinici e possibilità di un vaccino

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Disclosures

- AG received speaker's honoraria and fees for attending advisory boards from ViiV Healthcare, Gilead, Janssen-Cilag, Merck Sharp & Dohme, Bristol-Myers Squibb, Pfizer and Novartis and received research grants from ViiV, Bristol-Myers Squibb, and Gilead.

COVID-19….

NEW THERAPEUTIC PERSPECTIVES

Covid-2019: Treatment

Vaccine: **not available**

Active drugs: **no effective treatment**

Covid-2019: Treatment

Vaccine: **not available**

Active drugs: **no effective treatment**

Support therapy in severe forms: **marked improvement**

The Economist May 9th 202

How covid-19 is changing science

Reaping from the whirlwind

MAJOR ARTICLE

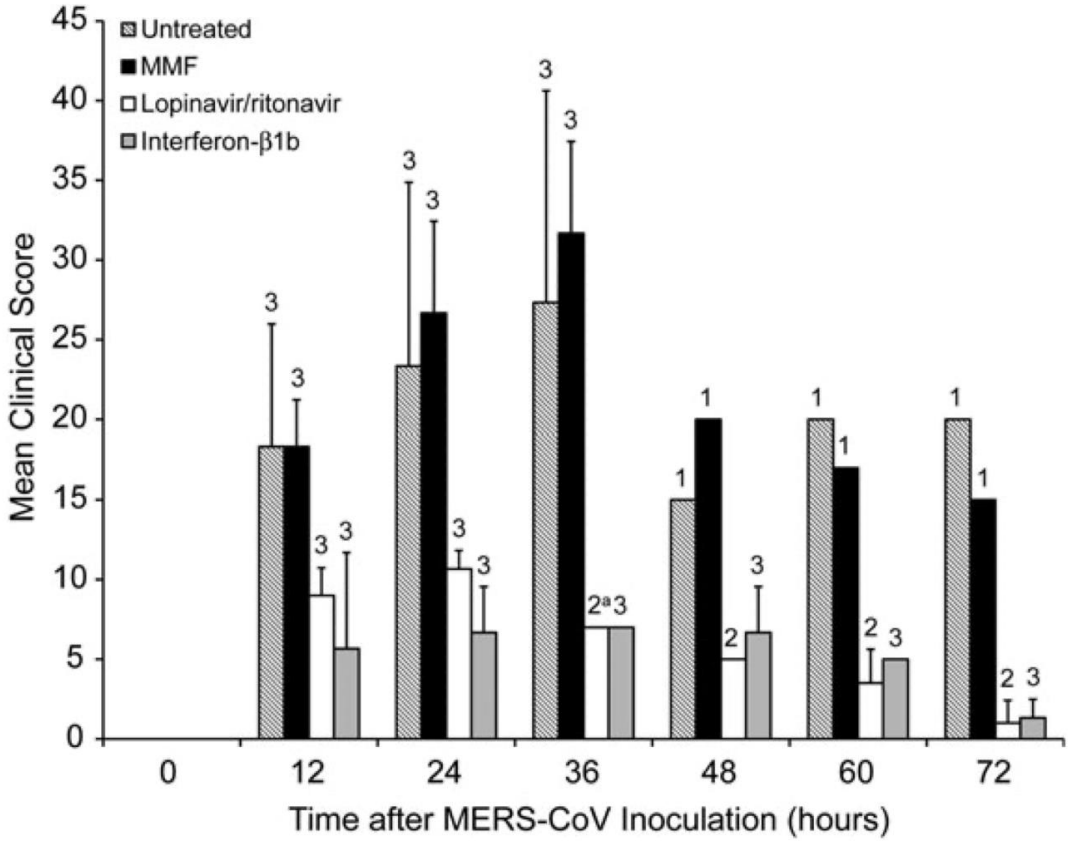
Treatment With Lopinavir/Ritonavir or Interferon-β1b Improves Outcome of MERS-CoV Infection in a Nonhuman Primate Model of Common Marmoset

Jasper Fuk-Woo Chan,[1,2,3,4,a] Yanfeng Yao,[5,a] Man-Lung Yeung,[2] Wei Deng,[5] Linlin Bao,[5] Lilong Jia,[2] Fengdi Li,[5] Chong Xiao,[5] Hong Gao,[5] Pin Yu,[5] Jian-Piao Cai,[2] Hin Chu,[2] Jie Zhou,[2] Honglin Chen,[1,2,3,4] Chuan Qin,[5,b] and Kwok-Yung Yuen[1,2,3,4,b]

[1]State Key Laboratory of Emerging Infectious Diseases, [2]Department of Microbiology, [3]Research Centre of Infection and Immunology, [4]Carol Yu Centre for Infection, The University of Hong Kong, Hong Kong Special Administrative Region, and [5]Institute of Laboratory Animal Sciences, Chinese Academy of Medical Sciences, Beijing, China

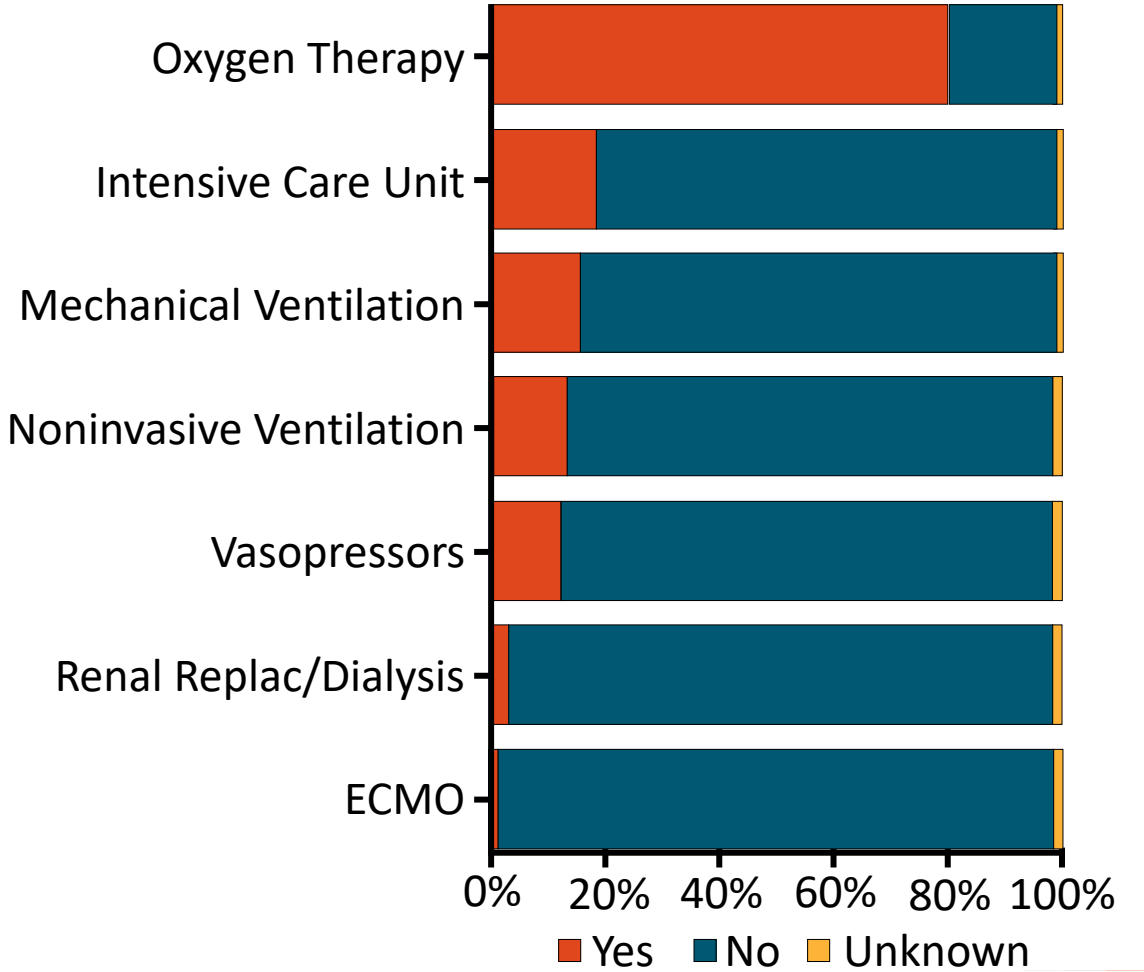
• **JID 2015:212 (15 December)** • Chan et al

Mean clinical scores of MERS-CoV-infected common marmosets at different time points after virus inoculation



Medications and Supportive Therapy Among COVID-19–Positive Hospitalized Patients in Spain

Medication	Number/ With Data	%
Viral targeted		
Lopinavir/ritonavir	2820/4005	70.4
Hydroxychloroquine	2618/3995	65.5
Azithromycin	1499/3928	38.2
Interferon-beta	1153/3950	29.2
Remdesivir	48/3957	1.2
Ribavirin	1/3956	0.03
Host targeted		
Corticosteroids	1109/3965	28.0
Tocilizumab	373/3951	9.4



Berenguer. IAS COVID-19. Abstr 11569.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

ESTABLISHED IN 1812 MAY 7, 2020 VOL. 382 NO. 19

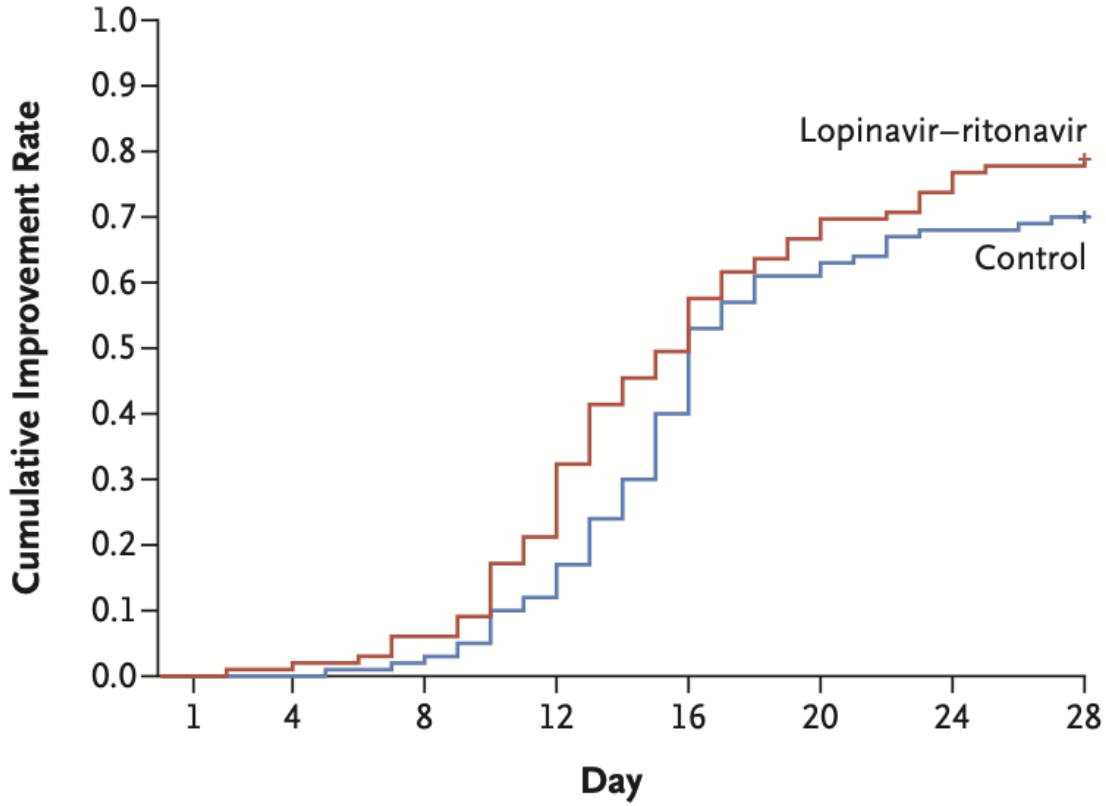
A Trial of Lopinavir–Ritonavir in Adults Hospitalized with Severe Covid-19

B. Cao, Y. Wang, D. Wen, W. Liu, Jingli Wang, G. Fan, L. Ruan, B. Song, Y. Cai, M. Wei, X. Li, J. Xia, N. Chen, J. Xiang, T. Yu, T. Bai, X. Xie, L. Zhang, C. Li, Y. Yuan, H. Chen, Huadong Li, H. Huang, S. Tu, F. Gong, Y. Liu, Y. Wei, C. Dong, F. Zhou, X. Gu, J. Xu, Z. Liu, Y. Zhang, Hui Li, L. Shang, K. Wang, K. Li, X. Zhou, X. Dong, Z. Qu, S. Lu, X. Hu, S. Ruan, S. Luo, J. Wu, L. Peng, F. Cheng, L. Pan, J. Zou, C. Jia, Juan Wang, X. Liu, S. Wang, X. Wu, Q. Ge, J. He, H. Zhan, F. Qiu, L. Guo, C. Huang, T. Jaki, F.G. Hayden, P.W. Horby, D. Zhang, and C. Wang

CONCLUSIONS

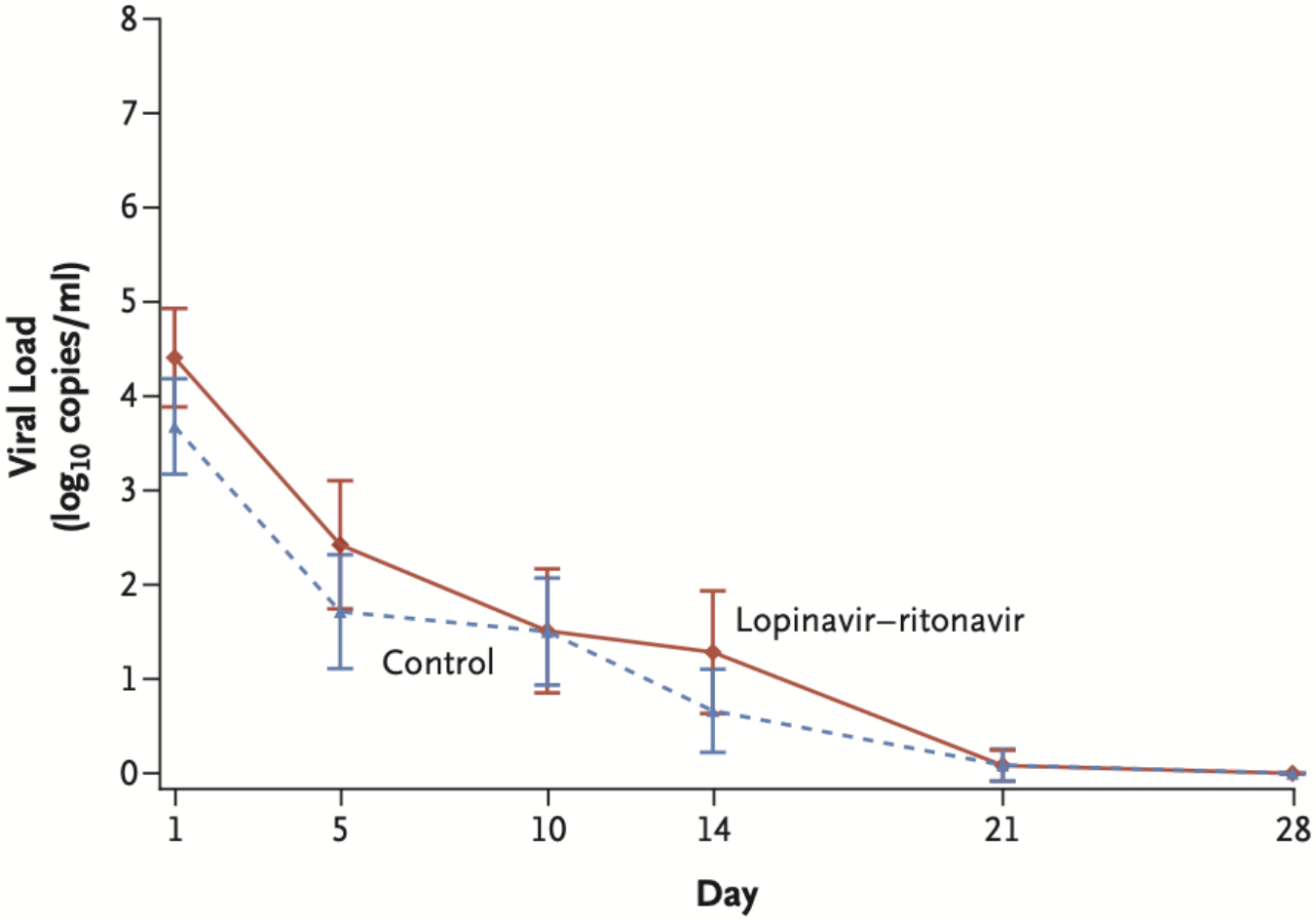
In hospitalized adult patients with severe Covid-19, no benefit was observed with lopinavir–ritonavir treatment beyond standard care. Future trials in patients with severe illness may help to confirm or exclude the possibility of a treatment benefit. (Funded by Major Projects of National Science and Technology on New Drug Creation and Development and others; Chinese Clinical Trial Register number, ChiCTR2000029308.)

Time to Clinical Improvement in the Intention-to-Treat Population



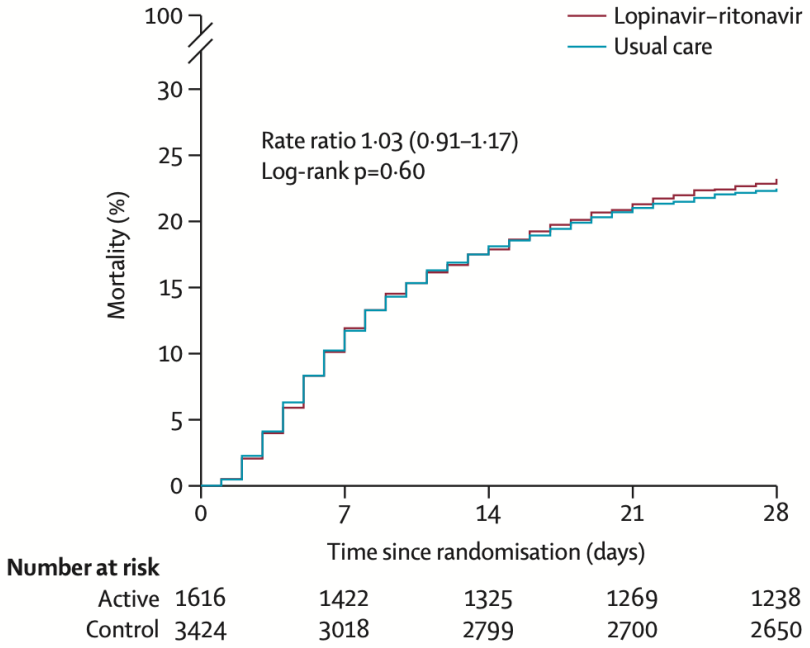
No. at Risk								
Lopinavir–ritonavir	99	98	93	78	50	33	26	22
Control	100	100	98	88	60	39	32	30

Mean Change from Baseline in SARS-CoV-2 Viral RNA Load by qPCR on Throat Swabs



Lopinavir–ritonavir in patients admitted to hospital with COVID-19 (RECOVERY): a randomised, controlled, open-label, platform trial

*RECOVERY Collaborative Group**



Interpretation In patients admitted to hospital with COVID-19, lopinavir–ritonavir was not associated with reductions in 28-day mortality, duration of hospital stay, or risk of progressing to invasive mechanical ventilation or death. These findings do not support the use of lopinavir–ritonavir for treatment of patients admitted to hospital with COVID-19.

Clinical Trials Update

FREE

May 26, 2020

More

No Benefit for Lopinavir–Ritonavir in Severe COVID-19

Anita Slomski

JAMA. 2020;323(20):1999. doi:10.1001/jama.2020.6793

Treatment with the HIV combination drug lopinavir-ritonavir did not accelerate recovery or improve mortality rates among hospitalized patients with severe coronavirus disease 2019 (COVID-19), a trial in the *New England Journal of Medicine* reported.

Medications and Supportive Therapy Among COVID-19–Positive Hospitalized Patients in Spain

Medication	Number/ With Data	%
Viral targeted		
Lopinavir/ritonavir	2820/4005	70.4
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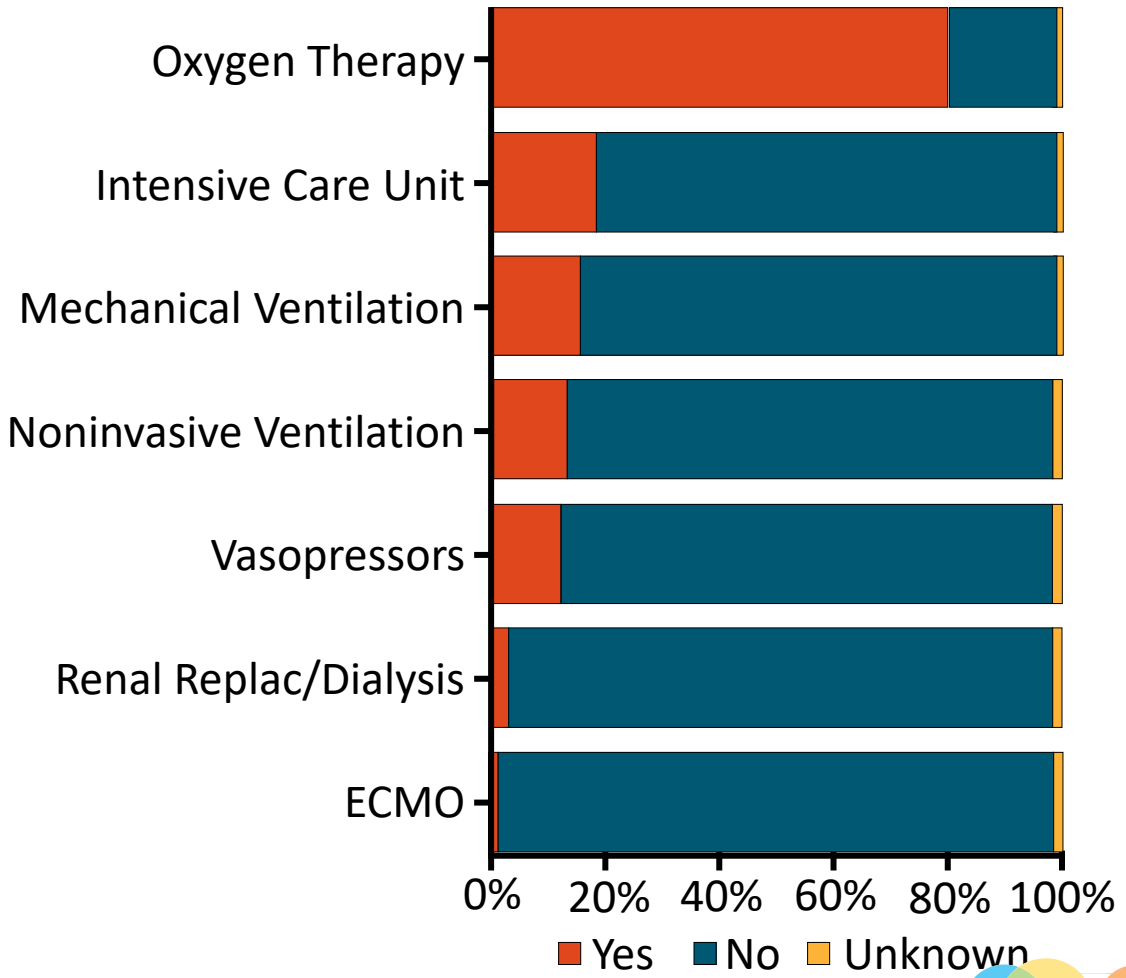
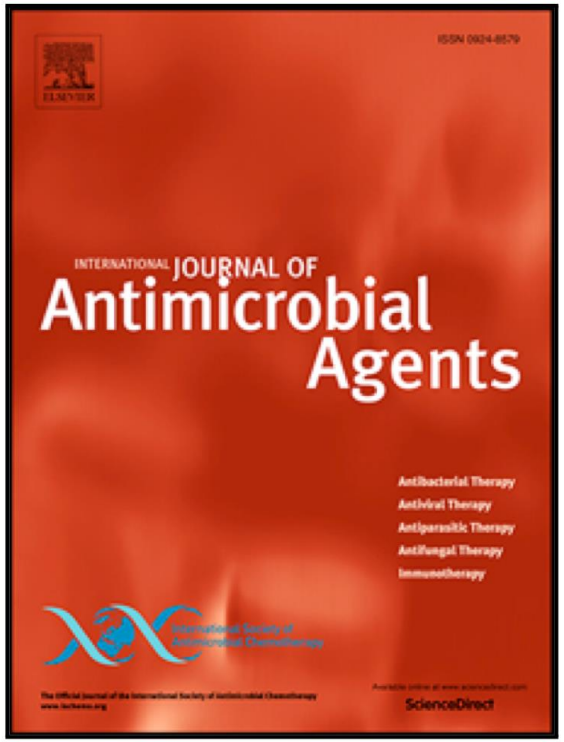


Berenguer. IAS COVID-19. Abstr 11569.

Journal Pre-proof

Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial

Philippe Gautret , Jean-Christophe Lagier , Philippe Parola , Van Thuan Hoang , Line Meddeb , Morgane Mailhe , Barbara Doudier , Johan Courjon , Valérie Giordanengo , Vera Esteves Vieira , Hervé Tissot Dupont , Stéphane Honoré , Philippe Colson , Eric Chabrière , Bernard La Scola , Jean-Marc Rolain , Philippe Brouqui , Didier Raoult



Background

Chloroquine and hydroxychloroquine have been found to be efficient on SARS-CoV-2, and reported to be efficient in Chinese COV-19 patients. We evaluate the role of hydroxychloroquine on respiratory viral loads.

Conclusion

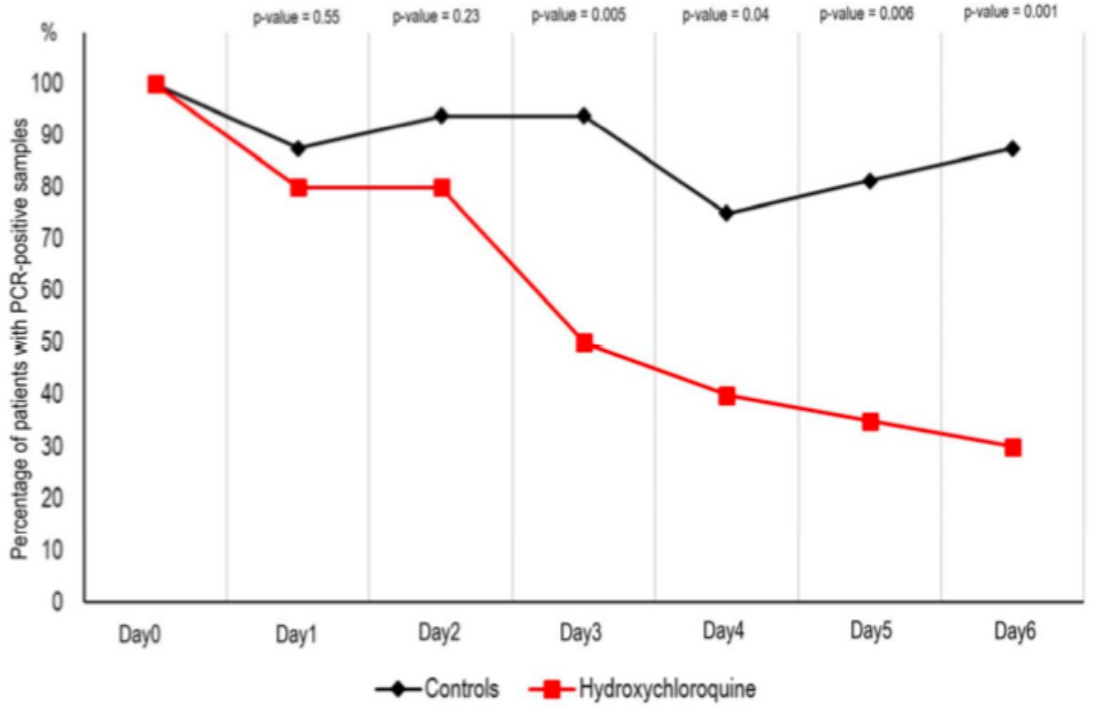
Despite its small sample size our survey shows that hydroxychloroquine treatment is significantly associated with viral load reduction/disappearance in COVID-19 patients and its effect is reinforced by azithromycin.

Clorochina – evidenze cliniche

- Al giorno 6 post-inclusione il 70% dei pazienti trattati risultava virologicamente guarito (RT-PCR per SARS-CoV-2 negativa su tampone nasale) contro il 12.5% del gruppo controllo

- Differenza nella riduzione della carica già presente al giorno 3 post-trattamento

Figure 1. Percentage of patients with PCR-positive nasopharyngeal samples from inclusion to day6 post-inclusion in COVID-19 patients treated with hydroxychloroquine and in COVID-19 control patients.



P. Gautret et al., Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial. IJAA 2020

Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis

Mandeep R Mehra, Sapan S Desai, Frank Ruschitzka, Amit N Patel

Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis

Mandeep R Mehra, Sapan S Desai, Frank Ruschitzka, Amit N Patel

Summary

Background Hydroxychloroquine or chloroquine, often in combination with a second-generation m[illegible]ide, are b[illegible] widely used for treatment of COVID-19, despite no conclusive evidence of their benefit. Althoug[illegible]nerally s[illegible]e whe[illegible] used for approved indications such as autoimmune disease or malaria, the safety and bene[illegible]f th[illegible]treatment regimens are poorly evaluated in COVID-19.

Methods We did a multinational registry analysis of the use of hydroxychloroquine [illegible]oquine wit[illegible]thout a macrolide for treatment of COVID-19. The registry comprised data from 671 hosp[illegible]s in s[illegible]ntinents. We included patients hospitalised between Dec 20, 2019, and April 14, 2020, with a positive laboratory [illegible]g for SARS-CoV-2. Patients who received one of the treatments of interest within 48 h of diagn[illegible]e included in [illegible]f four treatment groups (chloroquine alone, chloroquine with a macrolide, hydroxychlor[illegible]ine alone, or hydroxychloroquine with a macrolide), and patients who received none of these treatments formed [illegible] control gr[illegible]. Patients for whom one of the treatments of interest was initiated more than 48 h after diagnosis or [illegible]ile they we[illegible]on mechanical ventilation, as well as patients who received remdesivir, were excluded. The main outc[illegible]of int[illegible]st were in-hospital mortality and the occurrence of de-novo ventricular arrhythmias ([illegible]tained or[illegible]ed ventricular tachycardia or ventricular fibrillation).

Findings 96 032 patients (mean age 53·8 years, 46·3% women) [illegible]OVID-19 were hospitalised during the study period and met the inclusion criteria. Of the[illegible] patie[illegible]were in the treatment groups (1868 received chloroquine, 3783 received chloroquine with [illegible]macro[illegible]e, 3016 [illegible]eived hydroxychloroquine, and 6221 received hydroxychloroquine with a macrolide) and [illegible] pati[illegible]in the control group. 10 698 (11·1%) patients died in hospital. After controlling for multiple c[illegible]fou[illegible]ctors ([illegible] sex, race or ethnicity, body-mass index, underlying cardiovascular disease and its risk fac[illegible] diabetes, [illegible]derlying lung disease, smoking, immunosuppressed condition, and baseline disease severity), wh[illegible]mpared wi[illegible]ortality in the control group (9·3%), hydroxychloroquine (18·0%; hazard ratio 1·335, 95% [illegible]·22[illegible]457), hydro[illegible]ychloroquine with a macrolide (23·8%; 1·447, 1·368–1·531), chloroquine (16·4%; 1·365, [illegible]318–1·531), [illegible]chloroquine with a macrolide (22·2%; 1·368, 1·273–1·469) were each independently associated [illegible]n an increased r[illegible]f in-hospital mortality. Compared with the control group (0·3%), hydroxychloroquine (6[illegible]; 2·36[illegible]·935–2·900), hydroxychloroquine with a macrolide (8·1%; 5·106, 4·106–5·983), chloroquine (4·3%; [illegible]1, 2[illegible]0–4·596), and chloroquine with a macrolide (6·5%; 4·011, 3·344–4·812) were independently associate[illegible]an incr[illegible]ed risk of de-novo ventricular arrhythmia during hospitalisation.

Interpretati[illegible] We w[illegible]e unabl[illegible]nfirm a benefit of hydroxychloroquine or chloroquine, when used alone or with a macro[illegible]on in[illegible]spital outcomes for COVID-19. Each of these drug regimens was associated with decreased in-hospita[illegible]vi[illegible]reased frequency of ventricular arrhythmias when used for treatment of COVID-19.

Funding William[illegible]vey Distinguished Chair in Advanced Cardiovascular Medicine at Brigham and Women's Hospital.

P[illegible]ed Online
[illegible] 22, 2020
https://doi.org/10.1016/S0140-6736(20)31180-6

This online publication has been corrected. The corrected version first appeared at thelancet.com on May 29, 2020

See Online/Comment
https://doi.org/10.1016/S0140-6736(20)31174-0

Brigham and Women's Hospital Heart and Vascular Center and Harvard Medical School, Boston, MA, USA (Prof M R Mehra MD); **Surgisphere Corporation, Chicago, IL, USA** (S S Desai MD); **University Heart Center, University Hospital Zurich, Zurich, Switzerland** (Prof F Ruschitzka MD); **Department of Biomedical Engineering, University of Utah, Salt Lake City, UT, USA** (A N Patel MD); **and HCA Research Institute, Nashville, TN, USA** (A N Patel)

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Expression of concern: Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis

Published Online
June 2, 2020
https://doi.org/10.1016/
S0140-6736(20)31290-3

Important scientific questions have been raised about data reported in the paper by Mandeep Mehra et al—Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis[1]—published in *The Lancet* on May 22, 2020. Although an independent audit of the provenance and validity of the data has been commissioned by the authors not affiliated with Surgisphere and is ongoing, with results expected very shortly, we are issuing an Expression of Concern to alert readers to the fact that serious scientific questions have been brought to our attention. We will update this notice as soon as we have further information.

The Lancet Editors

The Lancet, London EC2Y 5AS, UK

1 Mehra MR, Desai SS, Ruschitzka F, Patel AN. Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis. *Lancet* 2020; published online May 22. https://doi.org/10.1016/S0140-6736(20)31180-6.

Chloroquine or hydroxychloroquine for COVID-19: why might they be hazardous?

The findings from Mehra and colleagues' study add to preliminary reports suggesting that regimens of chloroquine or hydroxychloroquine, alone or with azithromycin, are not useful and could be harmful in hospitalised patients with COVID-19.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

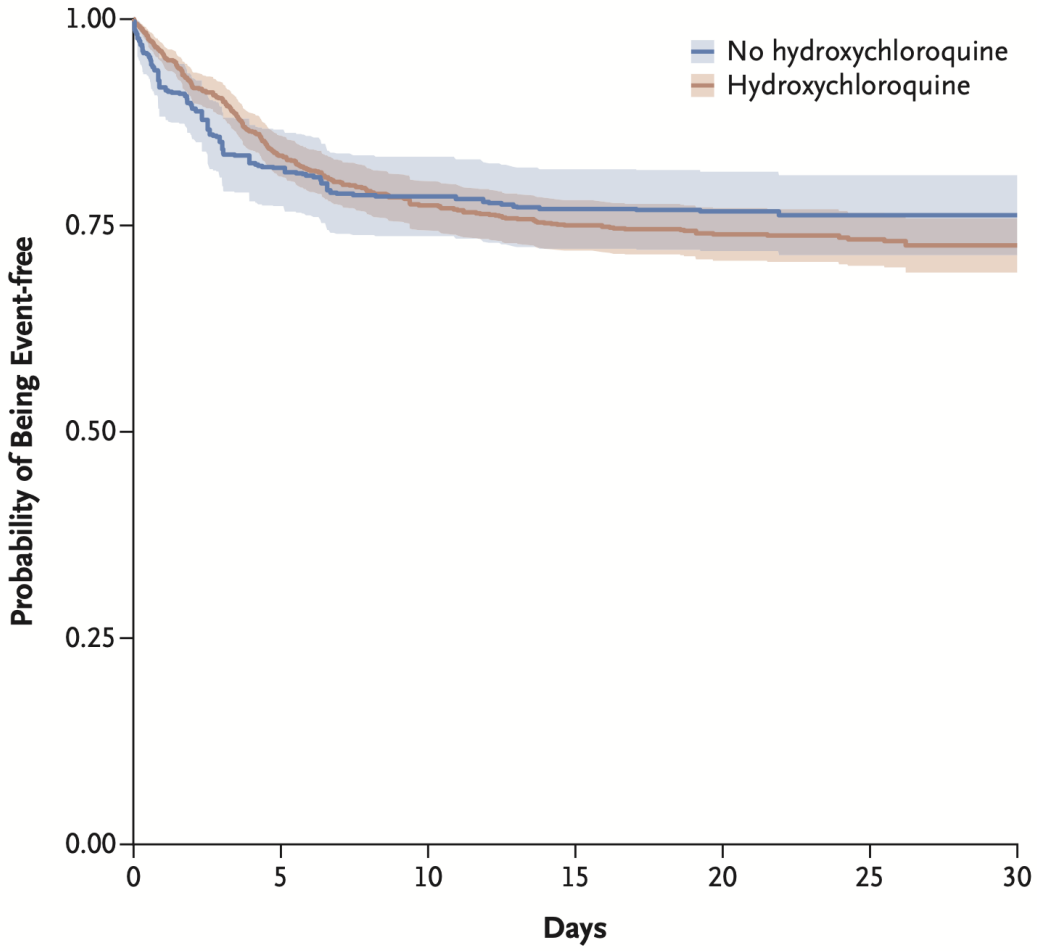
Observational Study of Hydroxychloroquine in Hospitalized Patients with Covid-19

Joshua Geleris, M.D., Yifei Sun, Ph.D., Jonathan Platt, Ph.D., Jason Zucker, M.D., Matthew Baldwin, M.D., George Hripcsak, M.D., Angelena Labella, M.D., Daniel K. Manson, M.D., Christine Kubin, Pharm.D., R. Graham Barr, M.D., Dr.P.H., Magdalena E. Sobieszczyk, M.D., M.P.H., and Neil W. Schluger, M.D.

CONCLUSIONS

In this observational study involving patients with Covid-19 who had been admitted to the hospital, hydroxychloroquine administration was not associated with either a greatly lowered or an increased risk of the composite end point of intubation or death. Randomized, controlled trials of hydroxychloroquine in patients with Covid-19 are needed. (Funded by the National Institutes of Health.)

Freedom from Composite End Point of Intubation or Death

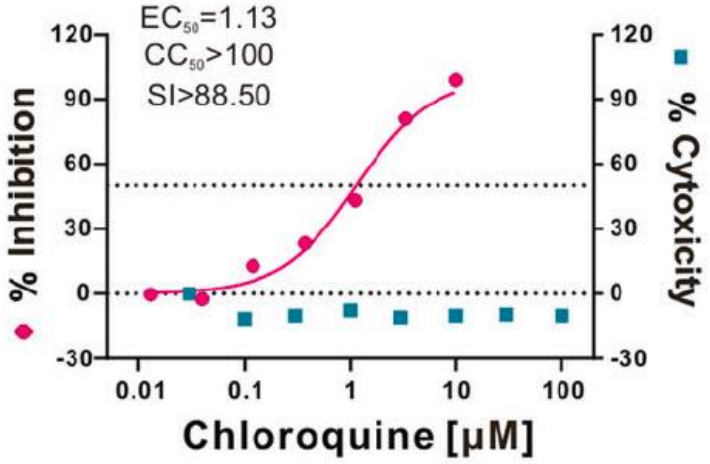


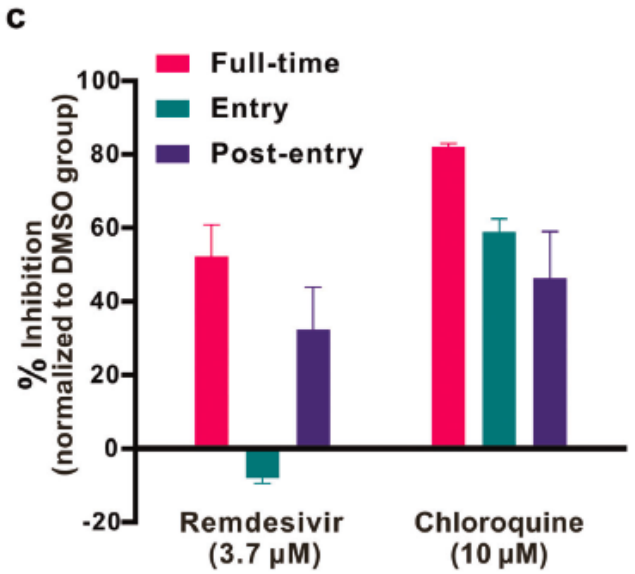
Remdesivir – evidenze precliniche

- Evidenza in vitro di efficacia di inibizione della replicazione virale di SARS-CoV-2 a concentrazioni terapeutiche raggiungibili in vivo

- Attività antivirale in vitro nei confronti dei coronavirus umani endemici OC43 ed 229E

- Efficacia pre clinica in modelli murini nel ridurre la carica virale, nel migliorare la funzionalità polmonare e nel prevenire la patologia polmonare da MERS-CoV e SARS-CoV





1. M. Wang et al., Remdesivir and chloroquine effectively inhibit the recently emerged novel coronavirus in vitro. Nature 2020
2. Brown et al., remdesivir inhibits human endemic and zoonotic deltacoronaviruses with highly divergent RNA dependent RNA polymerases. Antiviral research 2019
3. P. Timothy et al., Comparative therapeutic efficacy of remdesivir and LPV/r and IFN beta against MERS-CoV. Nature communications 2020

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Compassionate Use of Remdesivir for Patients with Severe Covid-19

J. Grein, N. Ohmagari, D. Shin, G. Diaz, E. Asperges, A. Castagna, T. Feldt, G. Green, M.L. Green, F.-X. Lescure, E. Nicastri, R. Oda, K. Yo, E. Quiros-Roldan, A. Studemeister, J. Redinski, S. Ahmed, J. Bernett, D. Chelliah, D. Chen, S. Chihara, S.H. Cohen, J. Cunningham, A. D'Arminio Monforte, S. Ismail, H. Kato, G. Lapadula, E. L'Her, T. Maeno, S. Majumder, M. Massari, M. Mora-Rillo, Y. Mutoh, D. Nguyen, E. Verweij, A. Zoufaly, A.O. Osinusi, A. DeZure, Y. Zhao, L. Zhong, A. Chokkalingam, E. Elboudwarej, L. Telep, L. Timbs, I. Henne, S. Sellers, H. Cao, S.K. Tan, L. Winterbourne, P. Desai, R. Mera, A. Gaggar, R.P. Myers, D.M. Brainard, R. Childs, and T. Flanigan

CONCLUSIONS

In this cohort of patients hospitalized for severe Covid-19 who were treated with compassionate-use remdesivir, clinical improvement was observed in 36 of 53 patients (68%). Measurement of efficacy will require ongoing randomized, placebo-controlled trials of remdesivir therapy. (Funded by Gilead Sciences.)

Oxygen-Support Status at Baseline and after Treatmen

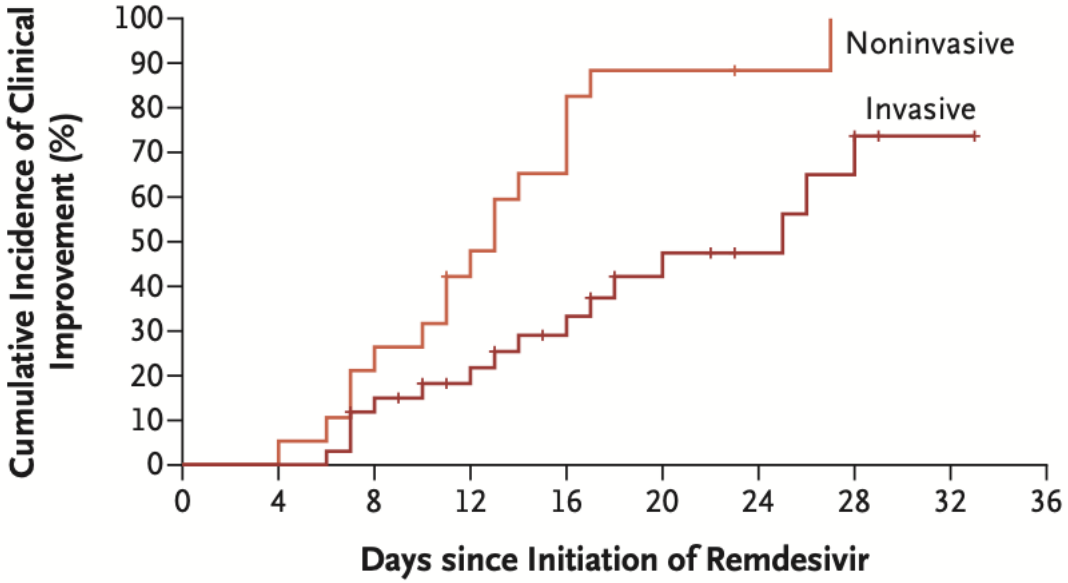
Improvement (blue cells), no change (beige) and worsening (gray) in oxygen-support status are shown

No. of Patients in Oxygen-Support Group after Treatment (%)		No. of Patients in Oxygen-Support Group at Baseline (%)			
		Invasive (N=34)	Noninvasive (N=7)	Low-flow oxygen (N=10)	Ambient air (N=2)
Category on ordinal scale →		5	4	3	2
Death	6	6 (18)	1 (14)	0	0
Invasive	5	9 (26)	1 (14)	0	0
Noninvasive	4	3 (9)	0	0	0
Low-flow oxygen	3	0	0	0	0
Ambient air	2	8 (24)	0	0	0
Discharged	1	8 (24)	5 (71)	10 (100)	2 (100)
Improvement		**19 (56)**	**5 (71)**	**10 (100)**	**2 (100)**
		↑ Category on ordinal scale			

Cumulative Incidence of Clinical Improvement from Baseline to Day 36

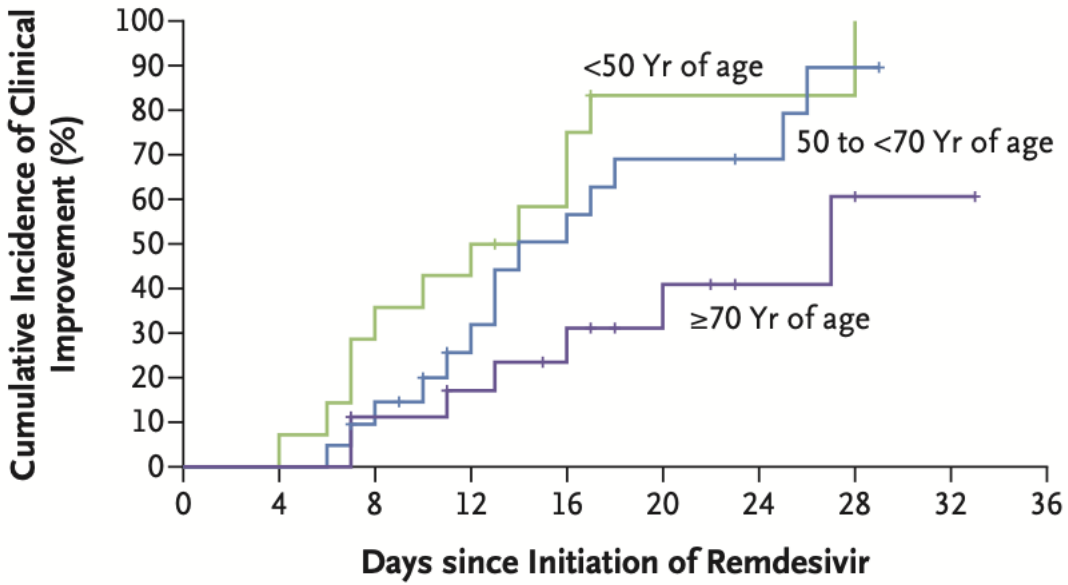
Clinical improvement is shown in the full cohort, in the cohort stratified according to ventilation status at baseline, and in the cohort stratified by age

B **Baseline Oxygen Support**



No. at Risk										
Noninvasive	19	19	15	10	6	2	1	0		
Invasive	34	34	28	23	17	11	6	4	1	0

C **Age**



No. at Risk										
<50 Yr of age	14	14	10	8	5	1	1	1		
50 to <70 Yr of age	21	21	18	12	8	5	3	1	0	
≥70 Yr of age	18	18	15	13	10	7	3	2	1	0

Summary of Adverse Events

Event	Invasive Ventilation (N=34)	Noninvasive Oxygen Support (N=19)	Total (N=53)
		number of patients (percent)	
Any adverse event	22 (65)	10 (53)	32 (60)
Adverse events occurring in 2 or more patients			
Hepatic enzyme increased*	8 (24)	4 (21)	12 (23)
Diarrhea	1 (3)	4 (21)	5 (9)
Rash	3 (9)	1 (5)	4 (8)
Renal impairment	4 (12)	0	4 (8)
Hypotension	3 (9)	1 (5)	4 (8)
Acute kidney injury	2 (6)	1 (5)	3 (6)
Atrial fibrillation	2 (6)	1 (5)	3 (6)
Multiple-organ-dysfunction syndrome	3 (9)	0	3 (6)
Hypernatremia	3 (9)	0	3 (6)
Deep-vein thrombosis	3 (9)	0	3 (6)
Acute respiratory distress syndrome	1 (3)	1 (5)	2 (4)
Pneumothorax	2 (6)	0	2 (4)
Hematuria	2 (6)	0	2 (4)
Delirium	1 (3)	1 (5)	2 (4)
Septic shock	2 (6)	0	2 (4)
Pyrexia	1 (3)	1 (5)	2 (4)
Any serious adverse event	9 (26)	3 (16)	12 (23)
Serious events occurring in 2 or more patients			
Multiple-organ-dysfunction syndrome	2 (6)	0	2 (4)
Septic shock	2 (6)	0	2 (4)
Acute kidney injury	2 (6)	0	2 (4)
Hypotension	2 (6)	0	2 (4)

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

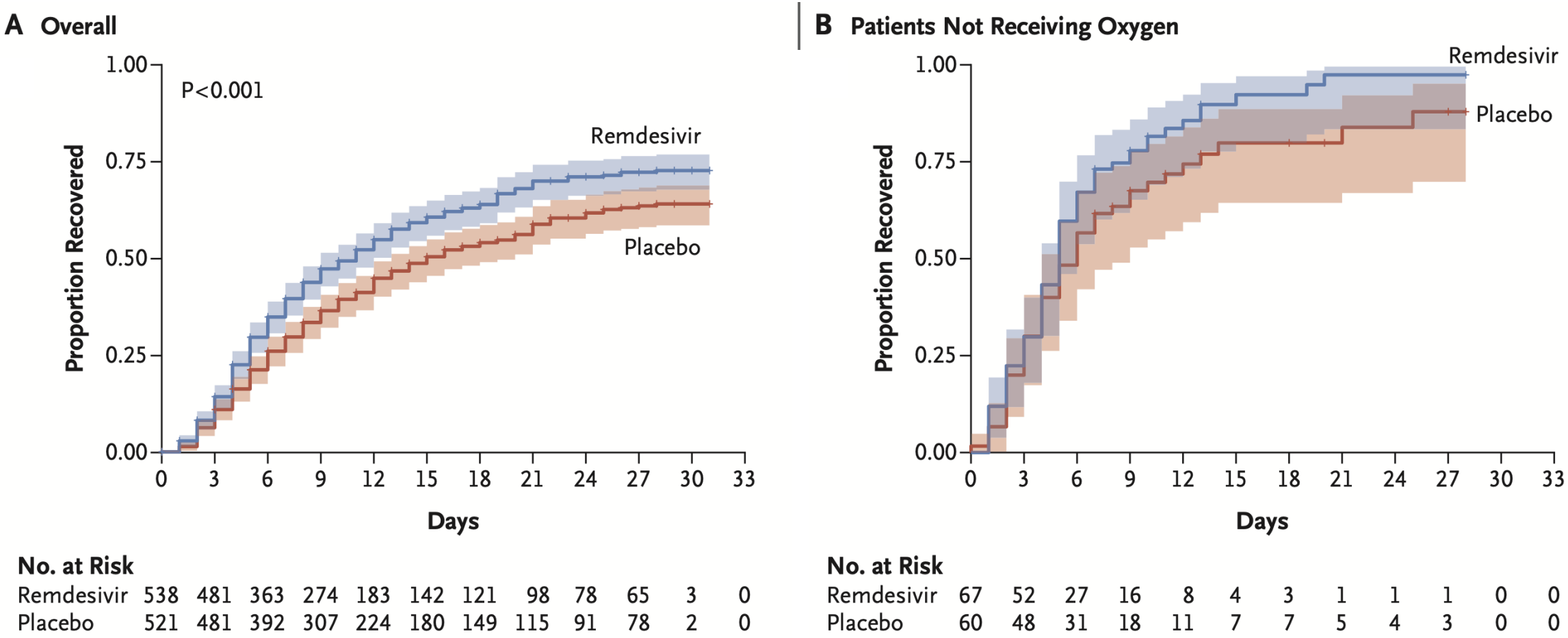
Remdesivir for the Treatment of Covid-19 — Preliminary Report

J.H. Beigel, K.M. Tomashek, L.E. Dodd, A.K. Mehta, B.S. Zingman, A.C. Kalil, E. Hohmann, H.Y. Chu, A. Luetkemeyer, S. Kline, D. Lopez de Castilla, R.W. Finberg, K. Dierberg, V. Tapson, L. Hsieh, T.F. Patterson, R. Paredes, D.A. Sweeney, W.R. Short, G. Touloumi, D.C. Lye, N. Ohmagari, M. Oh, G.M. Ruiz-Palacios, T. Benfield, G. Fätkenheuer, M.G. Kortepeter, R.L. Atmar, C.B. Creech, J. Lundgren, A.G. Babiker, S. Pett, J.D. Neaton, T.H. Burgess, T. Bonnett, M. Green, M. Makowski, A. Osinusi, S. Nayak, and H.C. Lane, for the ACTT-1 Study Group Members*

CONCLUSIONS

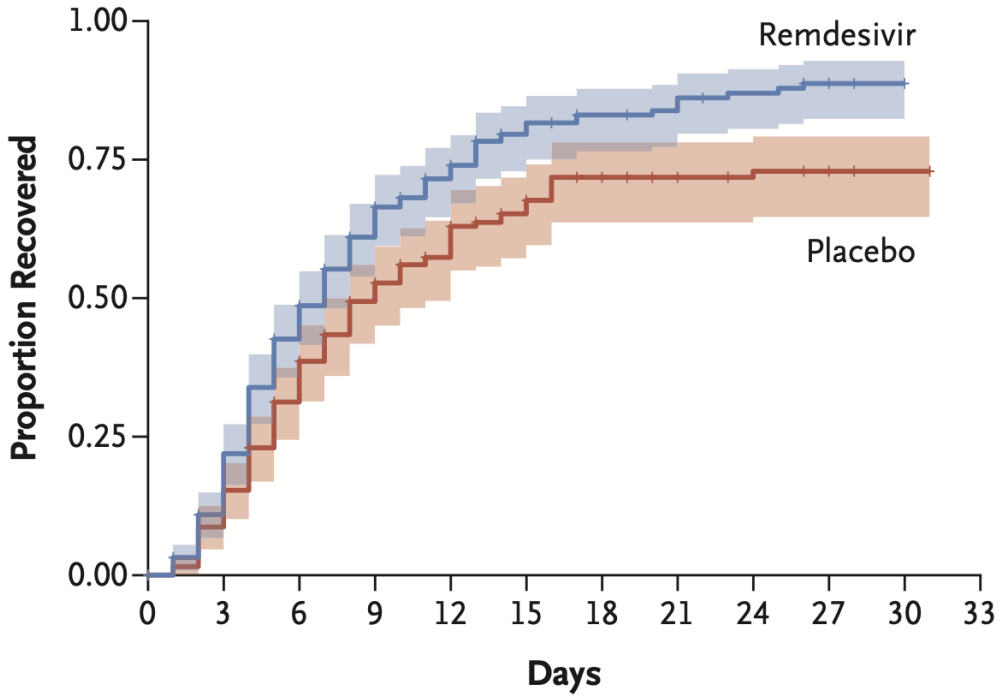
Remdesivir was superior to placebo in shortening the time to recovery in adults hospitalized with Covid-19 and evidence of lower respiratory tract infection. (Funded by the National Institute of Allergy and Infectious Diseases and others; ACTT-1 ClinicalTrials.gov number, NCT04280705.)

Kaplan–Meier Estimates of Cumulative Recoveries



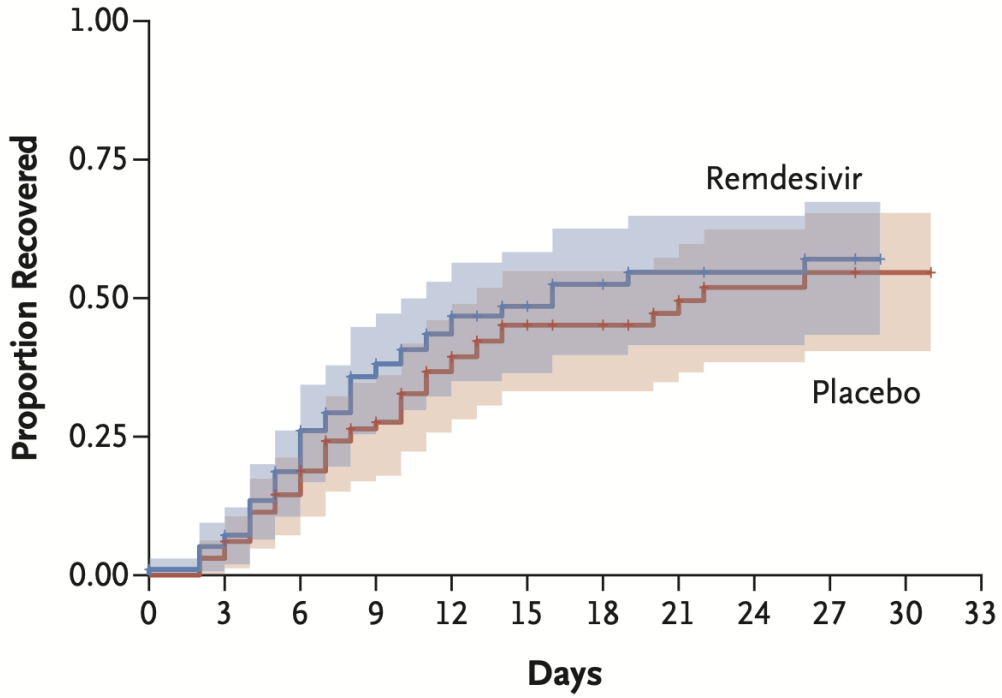
Kaplan–Meier Estimates of Cumulative Recoveries

C Patients Receiving Oxygen



No. at Risk												
Remdesivir	222	194	124	79	47	30	23	21	15	12	2	0
Placebo	199	179	131	91	61	43	33	29	26	23	1	0

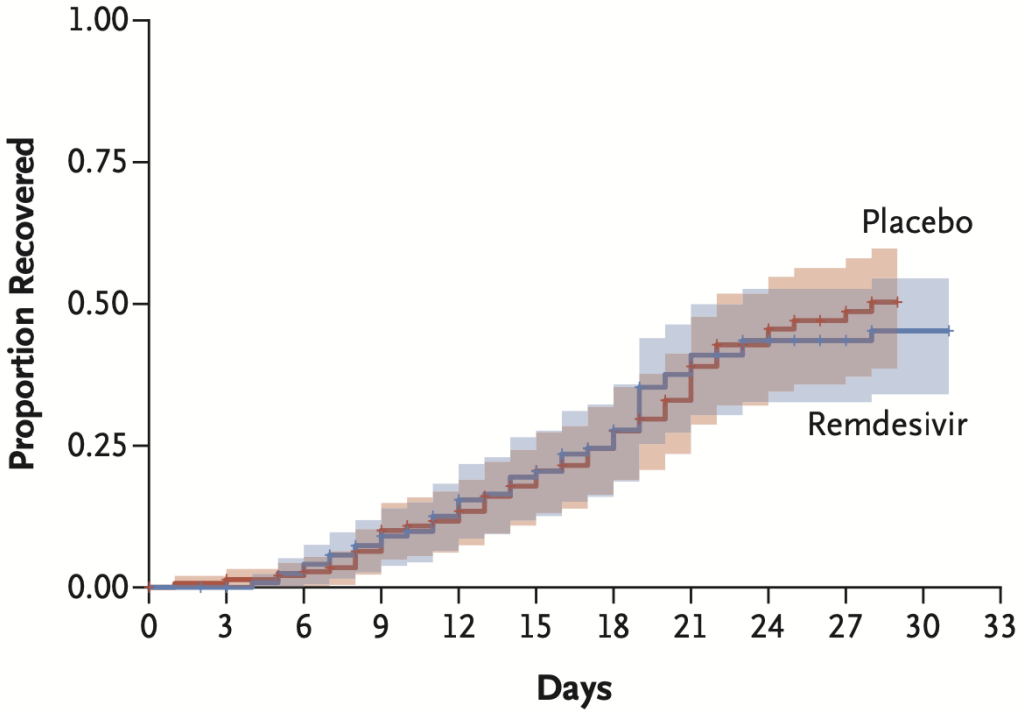
D Patients Receiving High-Flow Oxygen or Noninvasive Mechanical Ventilation



No. at Risk												
Remdesivir	98	92	77	56	35	27	23	20	19	17	0	0
Placebo	99	96	80	62	47	37	34	23	18	17	1	0

Kaplan–Meier Estimates of Cumulative Recoveries

E **Patients Receiving Mechanical Ventilation or ECMO**



No. at Risk

Remdesivir	125	124	120	111	91	80	71	55	42	34	1	0
Placebo	147	145	141	127	102	91	73	56	41	33	0	0

World Health Organization

medRxiv THE PREPRINT SERVER FOR HEALTH SCIENCES

CSH Cold Spring Harbor Laboratory BMJ Yale

MedRxiv (October 15) version

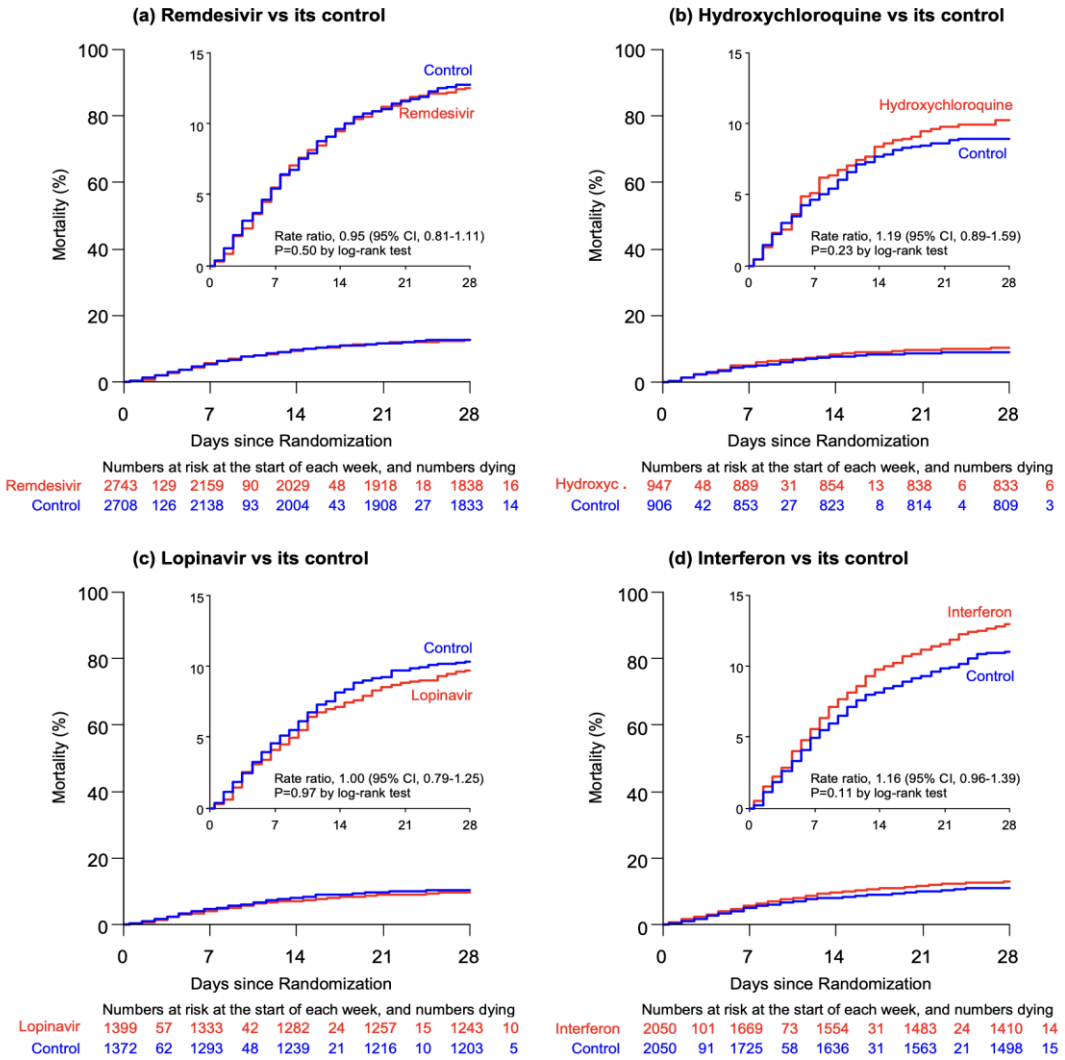
Repurposed antiviral drugs for COVID-19 –interim WHO SOLIDARITY trial results

WHO Solidarity trial consortium*

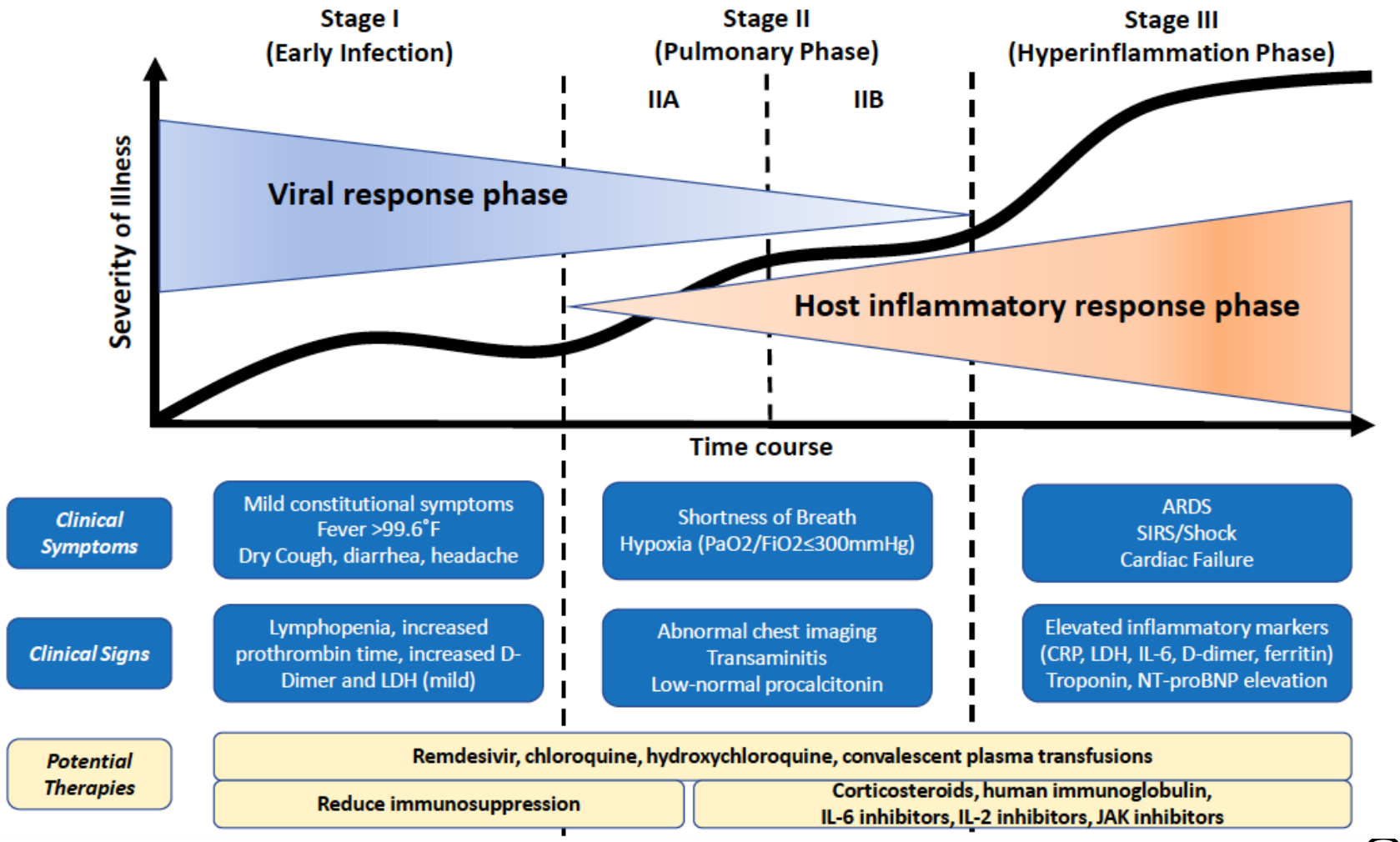
CONCLUSIONS

These Remdesivir, Hydroxychloroquine, Lopinavir and Interferon regimens appeared to have little or no effect on hospitalized COVID-19, as indicated by overall mortality, initiation of ventilation and duration of hospital stay. The mortality findings contain most of the randomized evidence on Remdesivir and Interferon, and are consistent with meta-analyses of mortality in all major trials. (Funding: WHO. Registration: ISRCTN83971151, NCT04315948)

Effects of (a) Remdesivir, (b) Hydroxychloroquine, (c) Lopinavir, and (d) Interferon on 28-day mortality

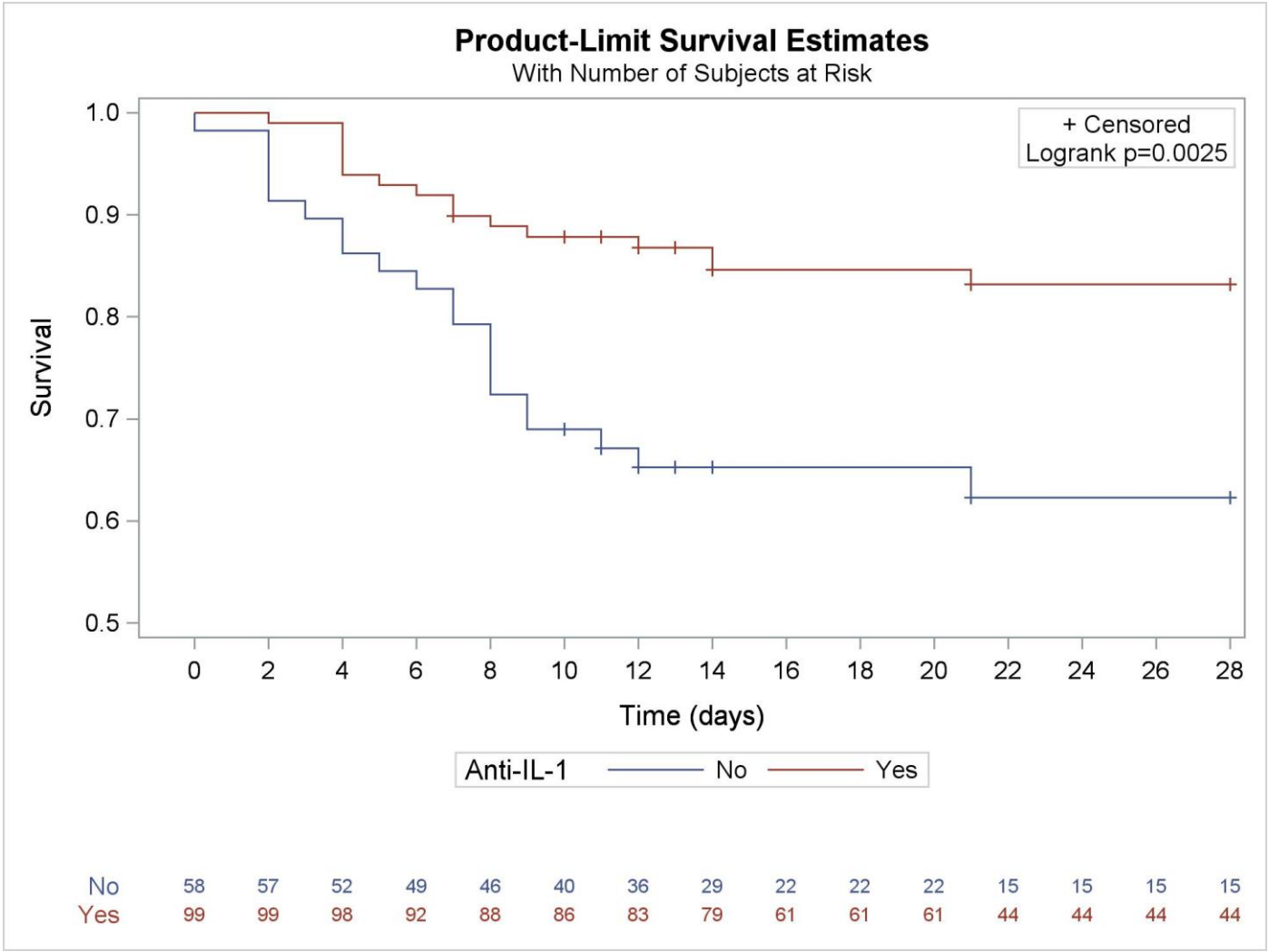


COVID-19: Le fasi di malattia

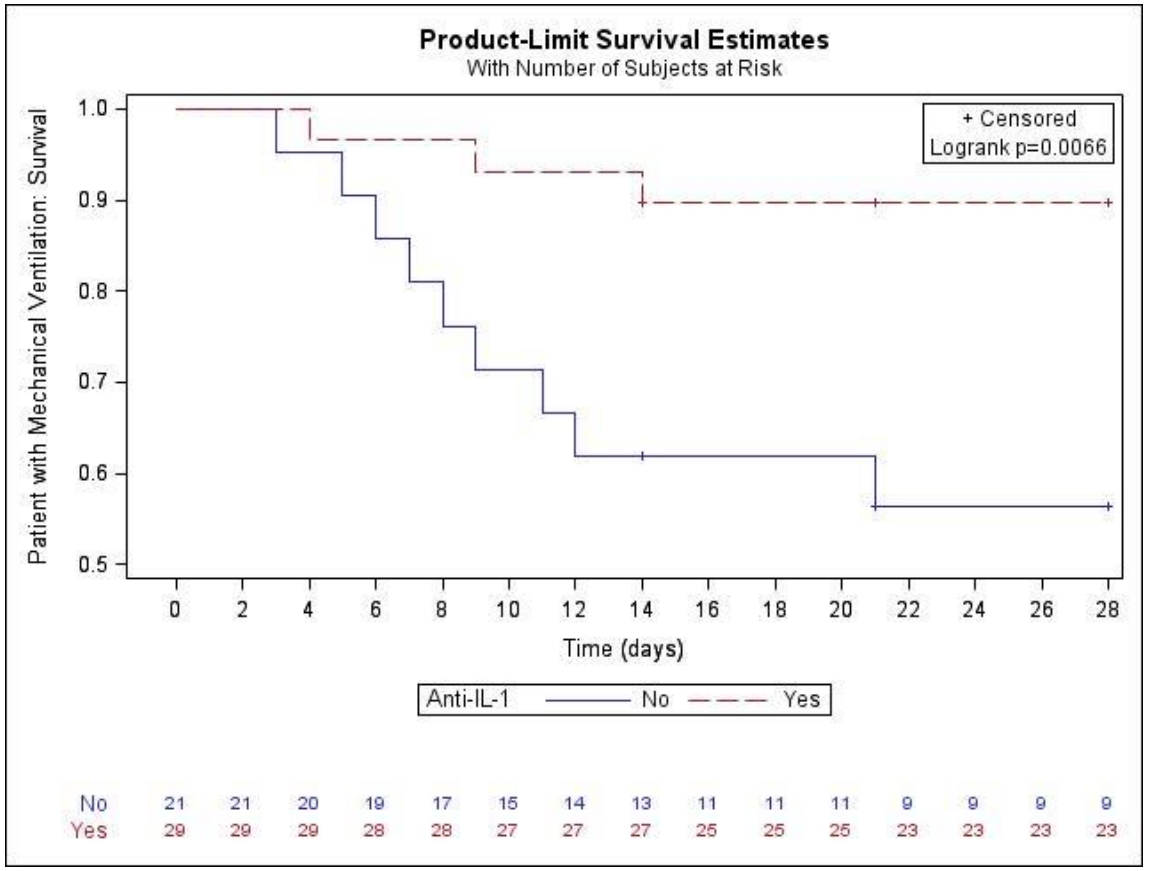


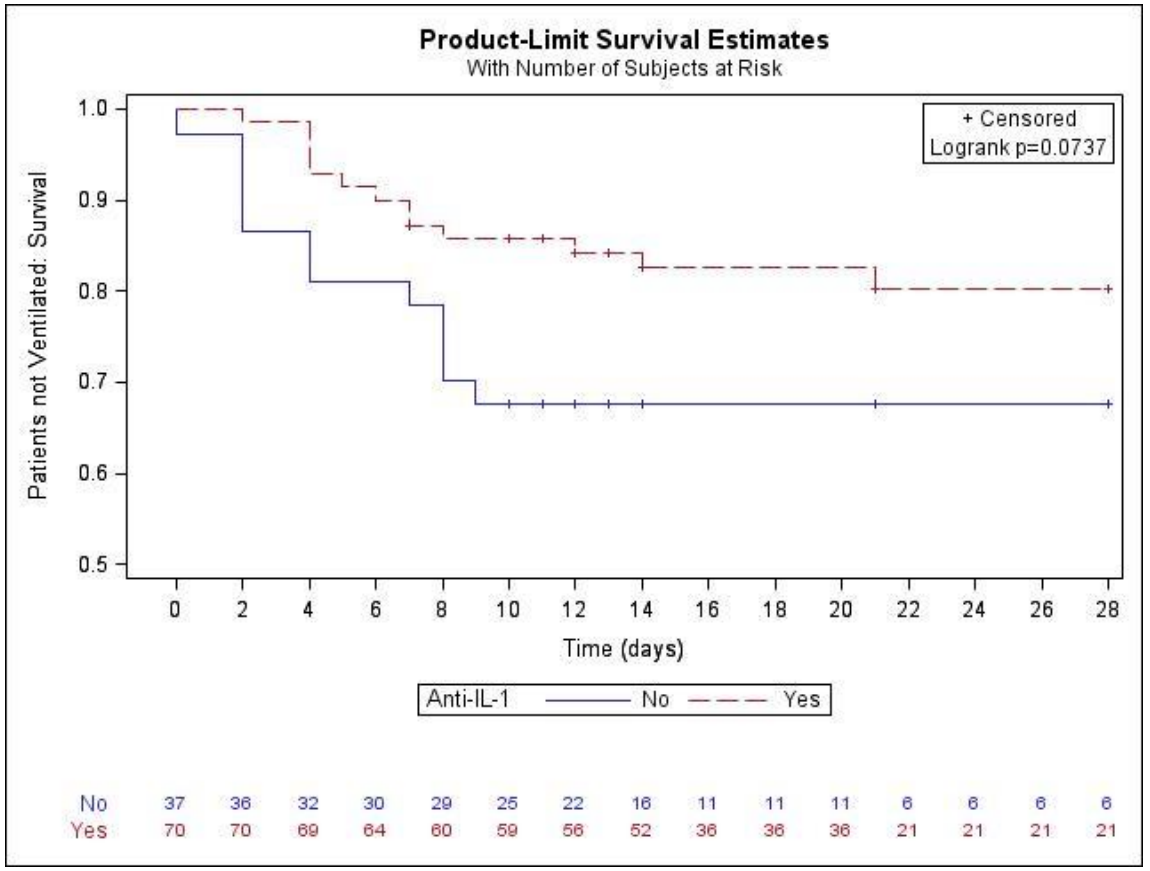
H.K. Siddiqi et. Al, COVID-19 illness in native and immunosuppressed states: a clinical-therapeutic staging proposal. J of heart and lung transp

Survival according to treatment with Anti-IL-1



Survival according to treatment with Anti-IL-1, in patients with MV and without MV at inclusion





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JEM Journal of Experimental Medicine

VIEWPOINT

Vaccines: An achievement of civilization, a human right, our health insurance for the future

Rino Rappuoli[1,2], Angela Santoni[3], and Alberto Mantovani[4,5,6]

Vaccines have made a key, cost-effective contribution to the prolongation of life expectancy and quality. Here we summarize challenges facing vaccinology and immunology at the level of society, scientific innovation, and technology in a global health perspective. We argue that vaccines represent a safety belt and life insurance for humankind.

The New York Times

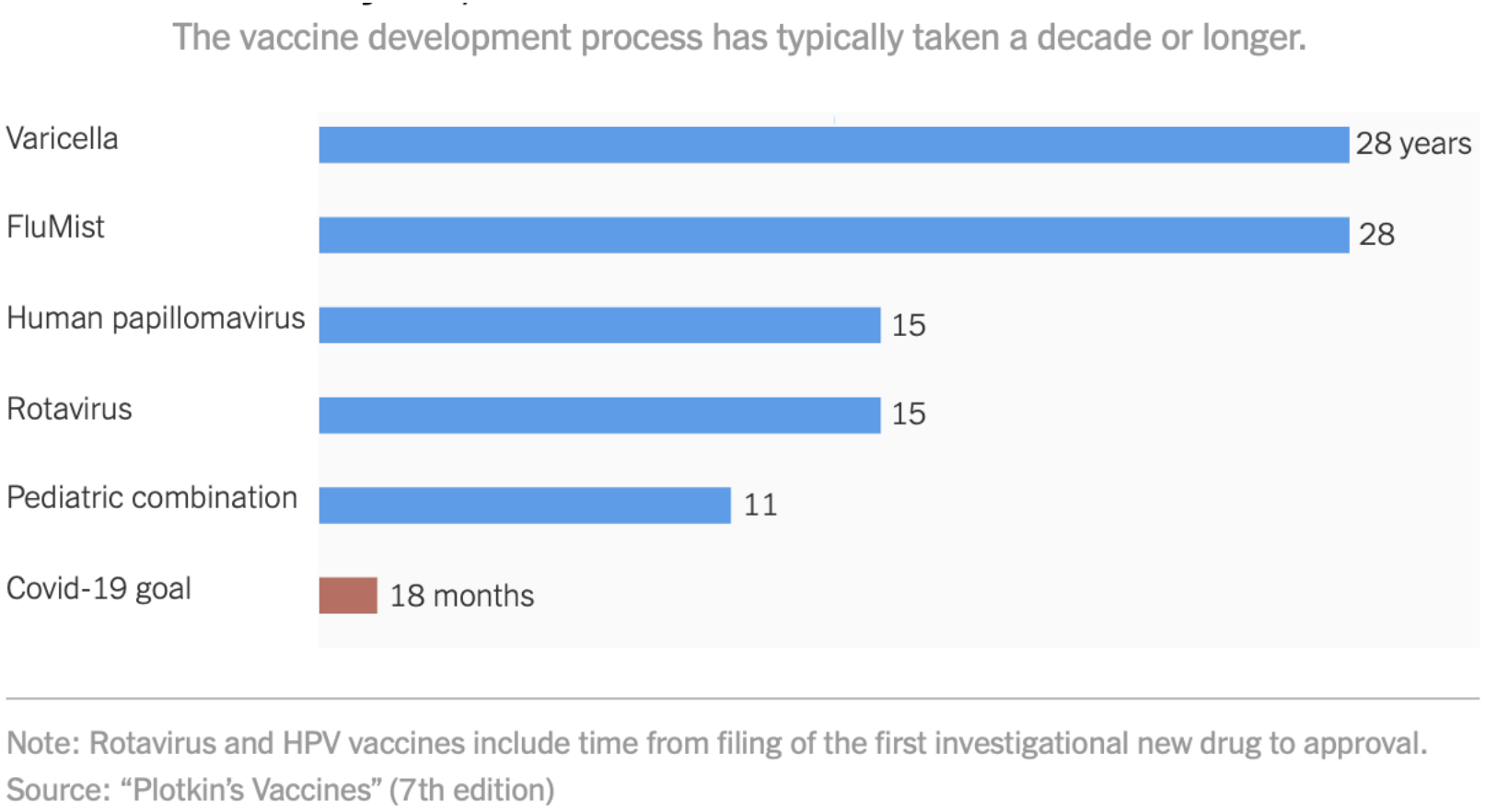
Opinion

How Long Will a Vaccine Really Take?

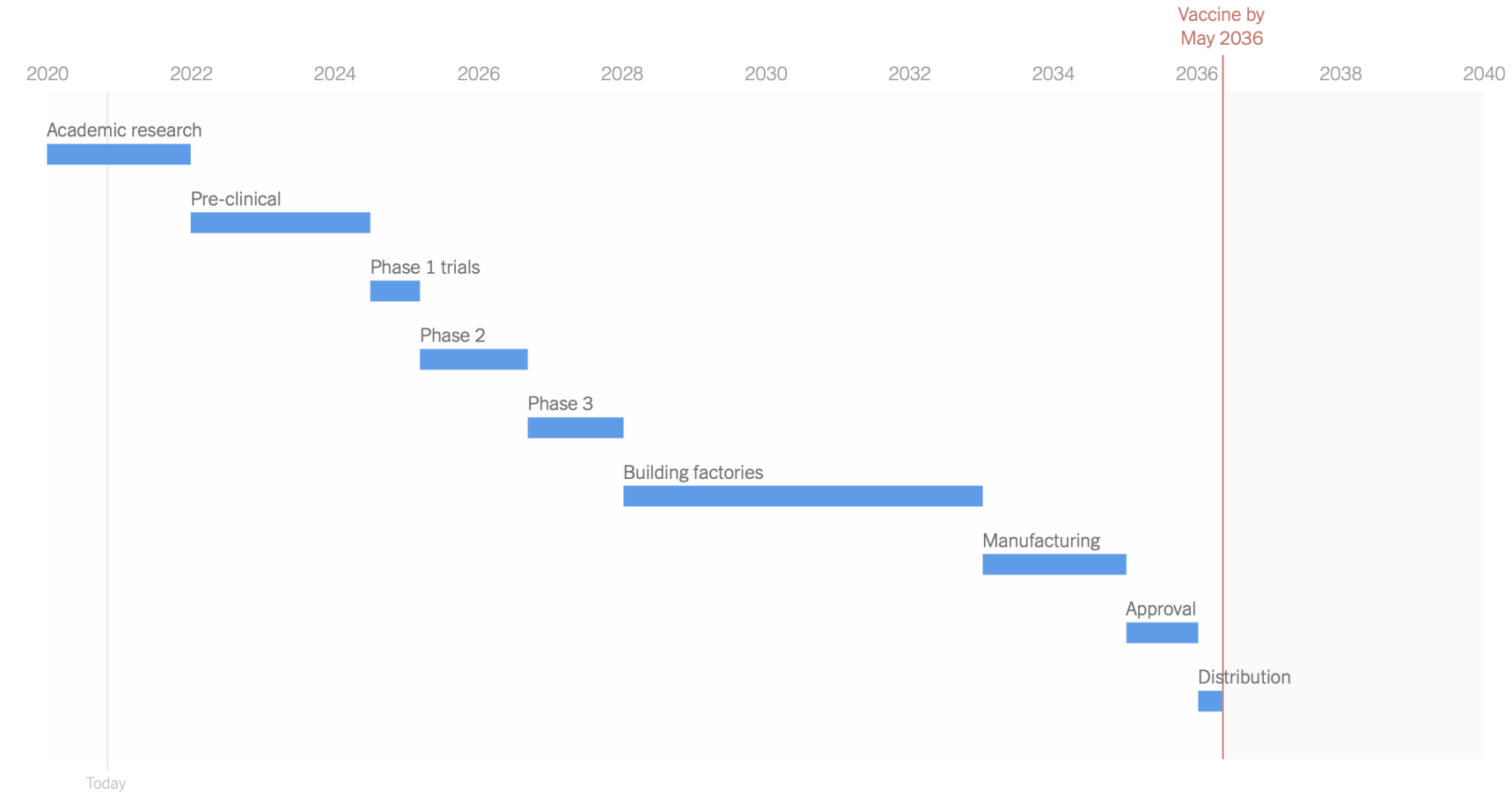
By Stuart A. Thompson

APRIL 30, 2020

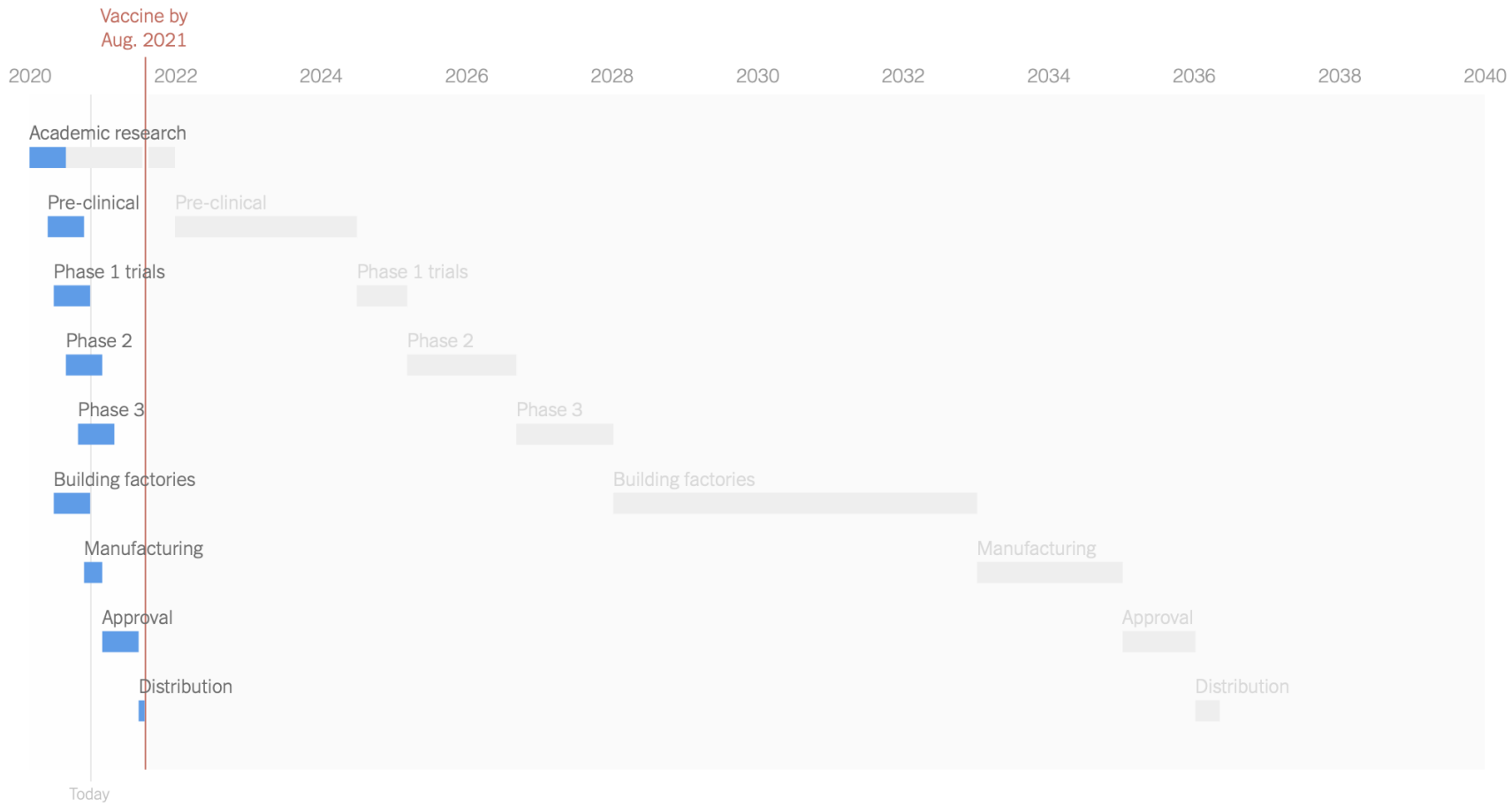
Years and years, at minimum



A vaccine would be the ultimate weapon against the coronavirus and the best route back to normal life



Officials like Dr. Anthony S. Fauci, the top infectious disease expert on the Trump administration's coronavirus task force, estimate a vaccine could arrive in at least 12 to 18 months

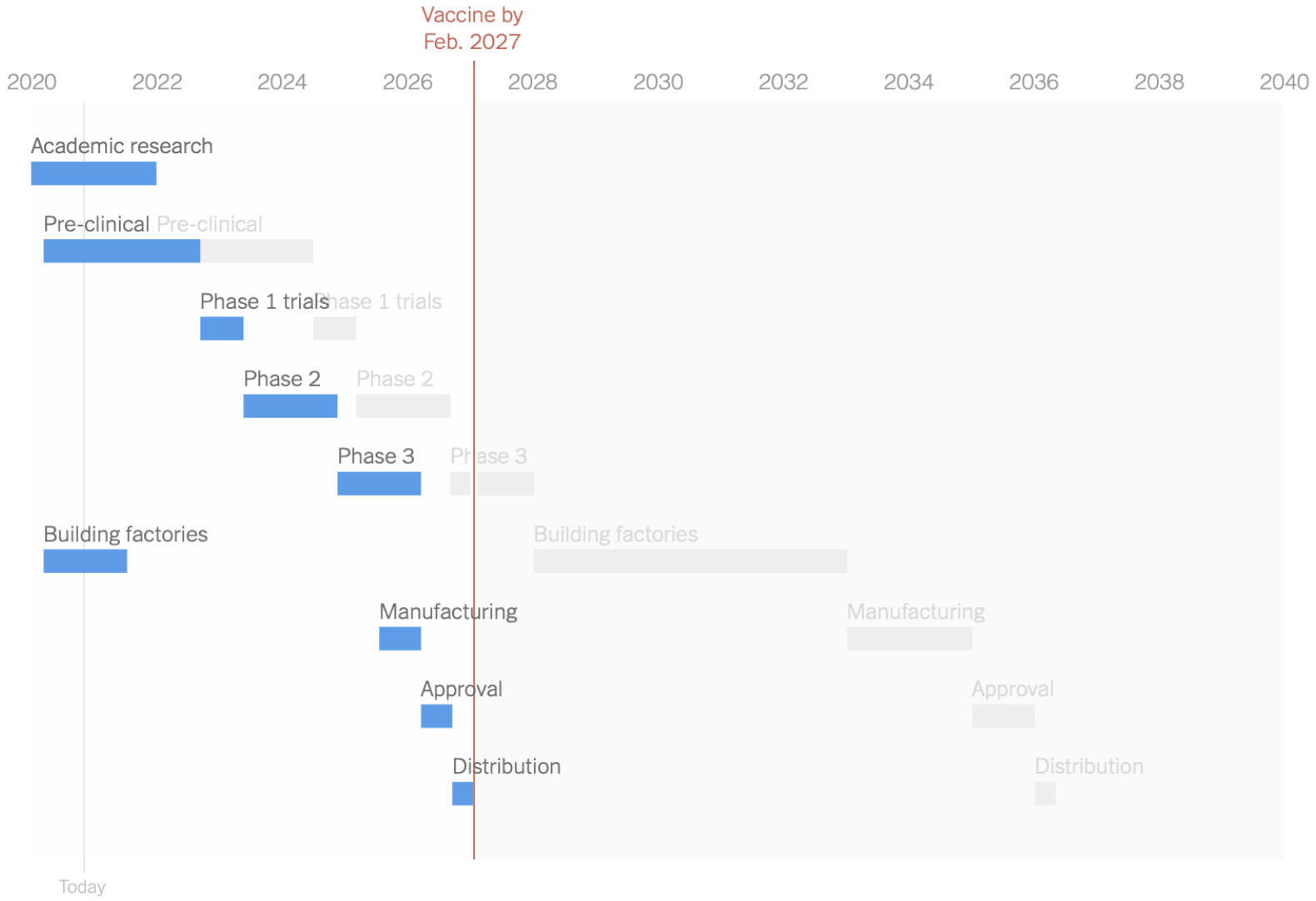


Don’t wait for academic research

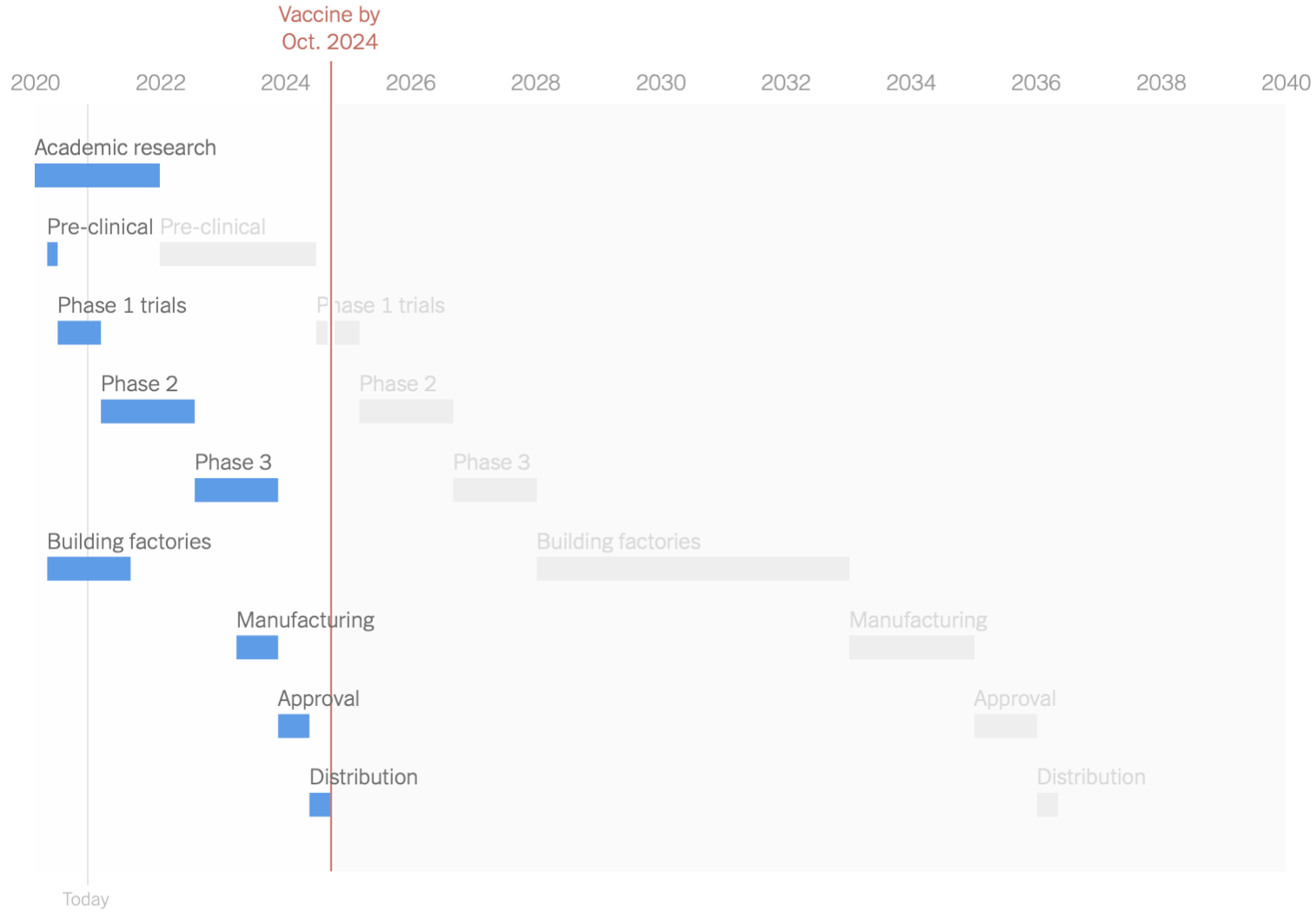
- Skip to clinical phases using what we know about the coronavirus so far

Start trials early

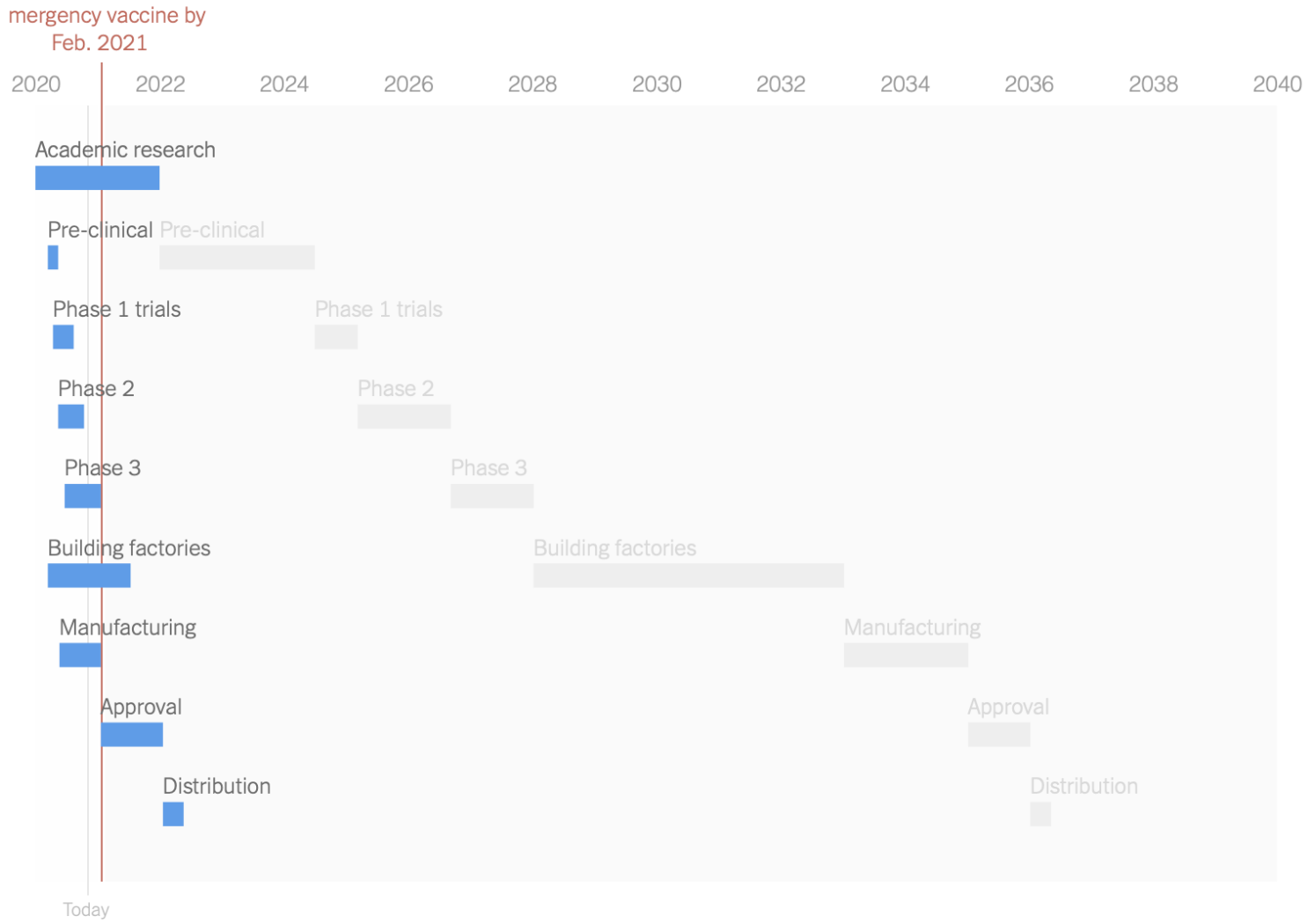
- Rely on work from studying SARS and MERS to shorten preparations before clinical trials



Move at 'Pandemic Speed' Through Trials



Start Preparing Factories Now



The Bill and Melinda Gates Foundation says it will build factories for seven different vaccines

“Even though we’ll end up picking at most two of them, we’re going to fund factories for all seven, just so that we don’t waste time”

nature

A personal take on science and society

World view

Don’t rush to deploy COVID-19 vaccines and drugs

By Shibo Jiang

Safety testing must be paramount in measures to tackle the new coronavirus.

“It is important not to cut corners.”

VIEWPOINT

Finding Effective Treatments for COVID-19
Scientific Integrity and Public Confidence in a Time of Crisis

Jesse L. Goodman, MD, MPH
Georgetown University, Washington, DC.

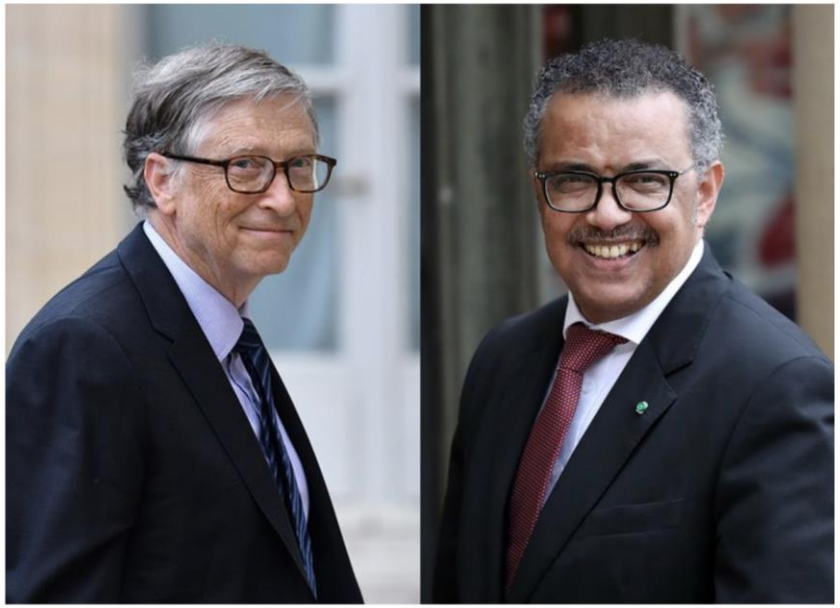
Luciana Borio, MD
In-Q-Tel, Arlington County, Virginia.

As learned from the Ebola outbreak, mortality can be reduced through identifying best practices.

nature

EDITORIAL · 11 FEBRUARY 2020

As coronavirus spreads, the time to think about the next epidemic is now



Philanthropist Bill Gates (left) has pledged $100 million for coronavirus-response efforts. Tedros Adhanom Ghebreyesus (right), director-general of the World Health Organization, is calling for urgent support to bolster weak health systems. Credit: Mustafa Yalcin/Anadolu Agency/Getty

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