



SARS CoV2 / COVID-19

Situación actual, Aspectos clínicos y Avances en Vacunas Ministerio de Salud y Protección Social

Jose Alejandro Mojica

Infectólogo Pediatra

Enero 2021



Contenido

1. Epidemiología SARS CoV 2 / COVID-19 Colombia
2. Aspectos clínicos
3. Vacunas en desarrollo
4. Equidad- Oportunidad- Calidad
5. Resumen

Pandemia SARS Cov2 /COVID-19

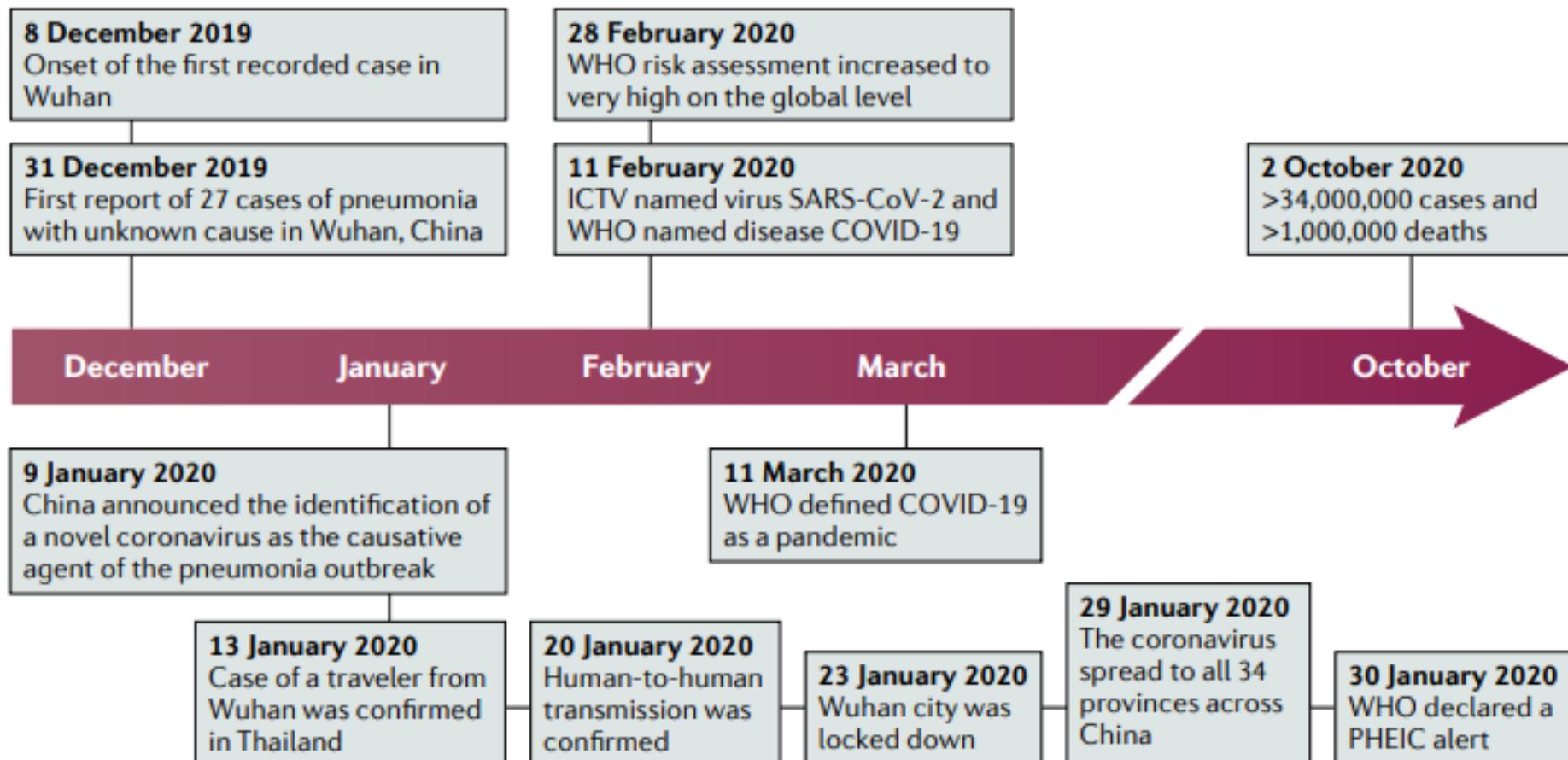


Fig. 1 | Timeline of the key events of the COVID-19 outbreak. The first recorded cases were reported in December 2019 in Wuhan, China. Over the course of the following 10 months, more than 30 million cases have been confirmed worldwide. COVID-19, coronavirus disease 2019; ICTV, International Committee on Taxonomy of Viruses; PHEIC, public health emergency of international concern; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; WHO, World Health Organization.



Global Cases

88.952.431Cases by
Country/Region/Sovereignty

21.870.427	US
10.431.639	India
8.013.708	Brazil
3.344.175	Russia
2.966.244	United Kingdom
2.804.743	France
2.307.581	Turkey
2.237.890	Italy
2.050.360	Spain
1.904.208	Germany
1.755.568	Colombia
1.703.352	Argentina

Admin0

Last Updated at (M/D/YYYY)

1/9/2021 4:22 a. m.

191
countries/regions

Cumulative Cases

Active Cases

Incidence Rate

Case-Fatality Ratio

Testing Rate

Lancet Inf Dis Article: [Here](#). Mobile Version: [Here](#). Data sources: [Full list](#). Downloadable database: [GitHub](#), [Feature Layer](#).

Lead by JHU CSSE. Technical Support: Esri Living Atlas team and JHU APL. Financial Support: JHU, NSF, Bloomberg Philanthropies and Stavros Niarchos Foundation. Resource support: Slack, Github

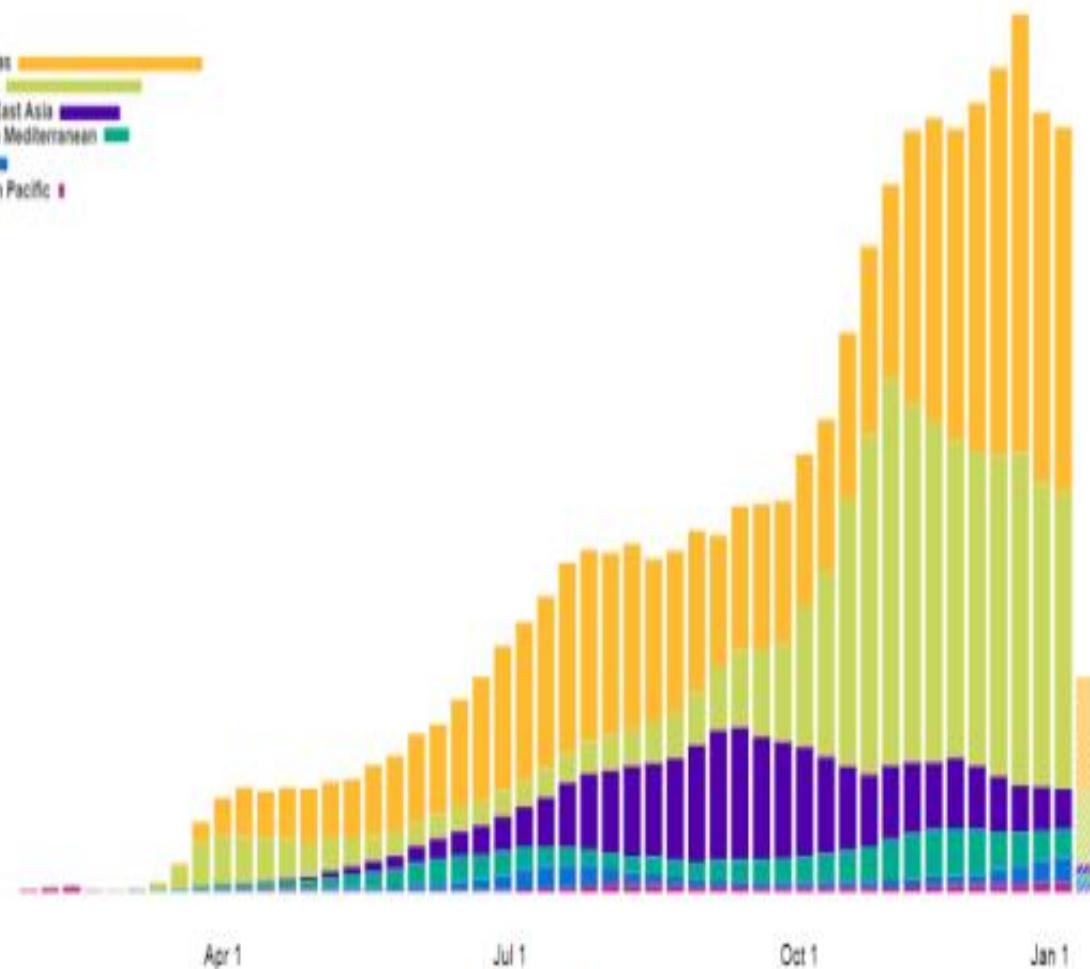


Global Deaths

1.915.006368.908 deaths
US201.460 deaths
Brazil150.798 deaths
India132.069 deaths
Mexico79.965 deaths
United Kingdom77.911 deaths
Italy22.666 deaths, recovered
Florida US19.756 deaths, 58.799
recovered
New Jersey US29.241 deaths, recovered
California US29.645 deaths, 1.536.690
recovered
Texas US39.282 deaths, 108.144
recovered
New York USUS State Level
Deaths, Recovered39.282 deaths, 108.144
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recovered
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recovered
New York US

Daily Cases

Americas
 Europe
 South-East Asia
 Eastern Mediterranean
 Africa
 Western Pacific



Variaciones % en los países con mayor número de casos y muertes en los últimos 7 días

Países	Casos anteriores 7 días	Casos últimos 7 días	Variación %	Países	Muertes anteriores 7 días	Muertes últimos 7 días	Variación %M
Global	3.898.552	4.260.608	9,3	Global	71.301	76.426	7,2
Estados Unidos	1.252.518	1.497.356	19,5	Estados Unidos	15.391	18.318	19
Reino Unido	272.551	383.833	40,8	Brasil	4.279	4.879	14
Brasil	241.214	249.461	3,4	México	4.257	4.787	12
Federación Rusa	197.797	179.347	-9,3	Alemania	4.139	4.540	10
India	145.786	132.541	-9,09	Reino Unido	3.260	4.322	33
Alemania	132.265	122.684	-7,2	Federación Rusa	3.965	3.679	-7
Italia	90.117	109.967	22,0	Italia	3.187	3.310	4
Suráfrica	81.239	101.478	24,9	Suráfrica	2.322	2.940	27
Francia	81.857	96.080	17,4	Francia	2.375	2.303	-3
Turquía	115.620	92.832	-19,7	Polonia	1.764	2.048	16

Fuente: OMS-COVID-19 Dashboard, Situación por país, territorio y área, 4 de enero



Global Cases

1.755.568Cases by
Country/Region/Sovereignty

21.870.427 US

10.431.639 India

8.013.708 Brazil

3.344.175 Russia

2.966.244 United Kingdom

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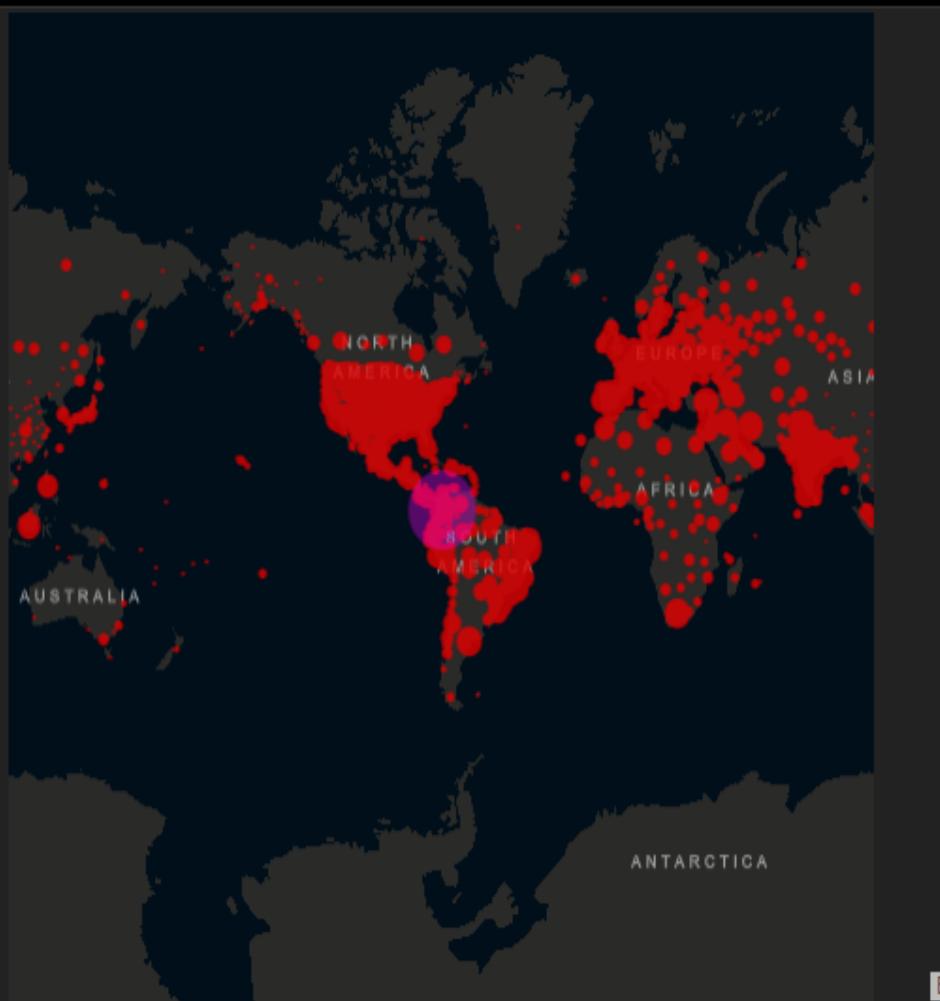
1.755.568 Colombia

1.703.352 Argentina

Admin0

Last Updated at (M/D/YYYY)

1/9/2021 4:22 a. m.

191
countries/regionsLancet Inf Dis Article: [Here](#). Mobile Version: [Here](#). Data sources: [Full list](#). Downloadable database: [GitHub](#), [Feature Layer](#).Lead by JHU CSSE. Technical Support: Esri Living Atlas team and JHU APL. Financial Support: JHU, NSF, Bloomberg Philanthropies and Stavros Niarchos Foundation. Resource support: Slack, [Github](#)

Cumulative Cases Active Cases Incidence Rate Case-Fatality Ratio Testing Rate

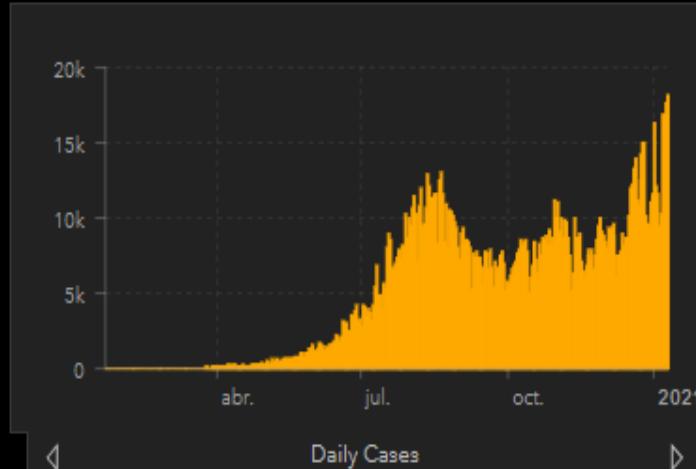
Global Deaths

45.43145.431 deaths
Colombia

Global Deaths

US State Level
Deaths, Recovered39.282 deaths, 108.144
recovered
New York US29.645 deaths, 1.536.690
recovered
Texas US29.241 deaths, recovered
California US22.666 deaths, recovered
Florida US19.756 deaths, 58.799
recovered
New Jersey US

US Deaths, Reco...



**CONFIRMADOS
EN COLOMBIA: 1.737.347***
CASOS ACTIVOS: 107.361

► MUERTES: 45.067
► RECUPERADOS: 1.580.285



Colombia Enero 2021

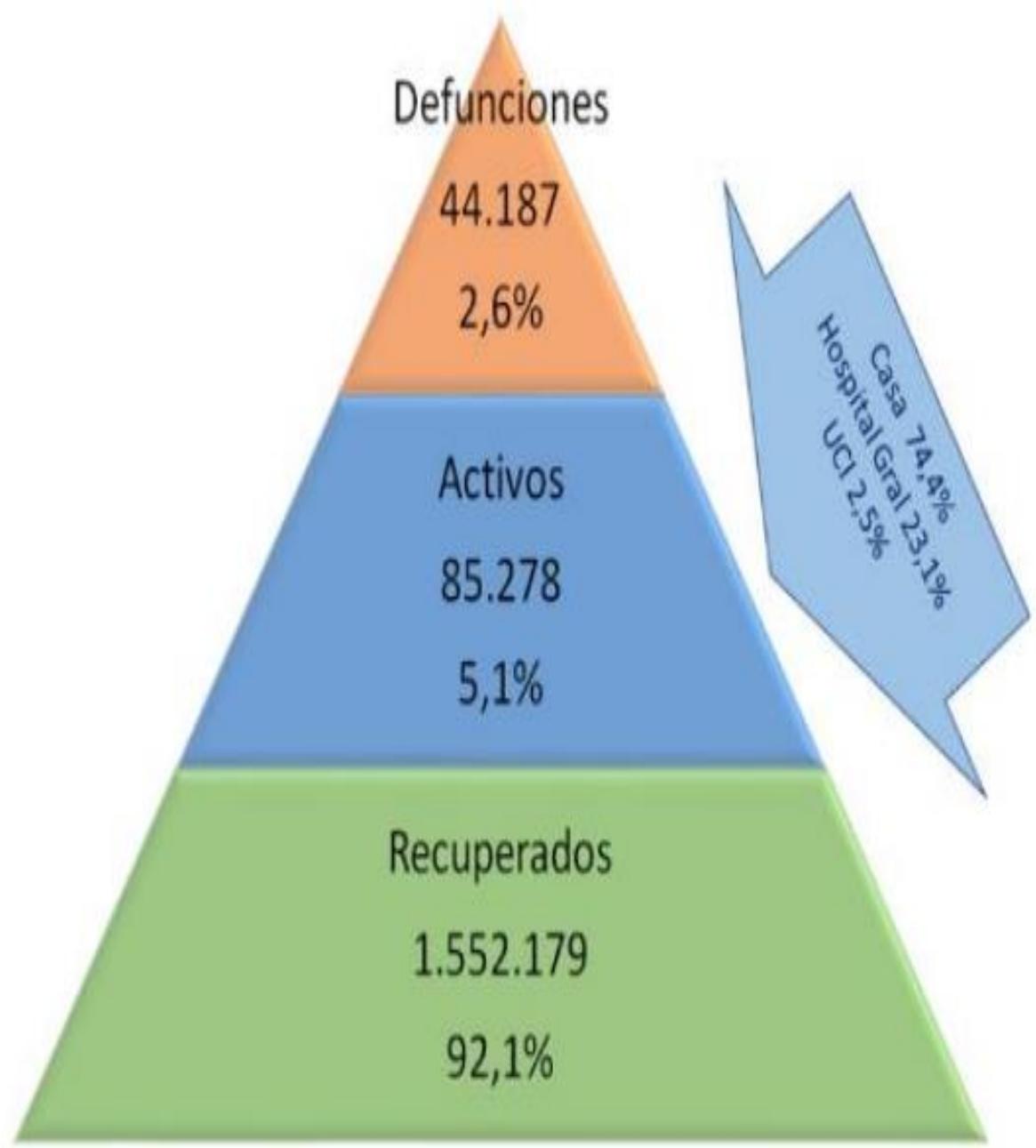
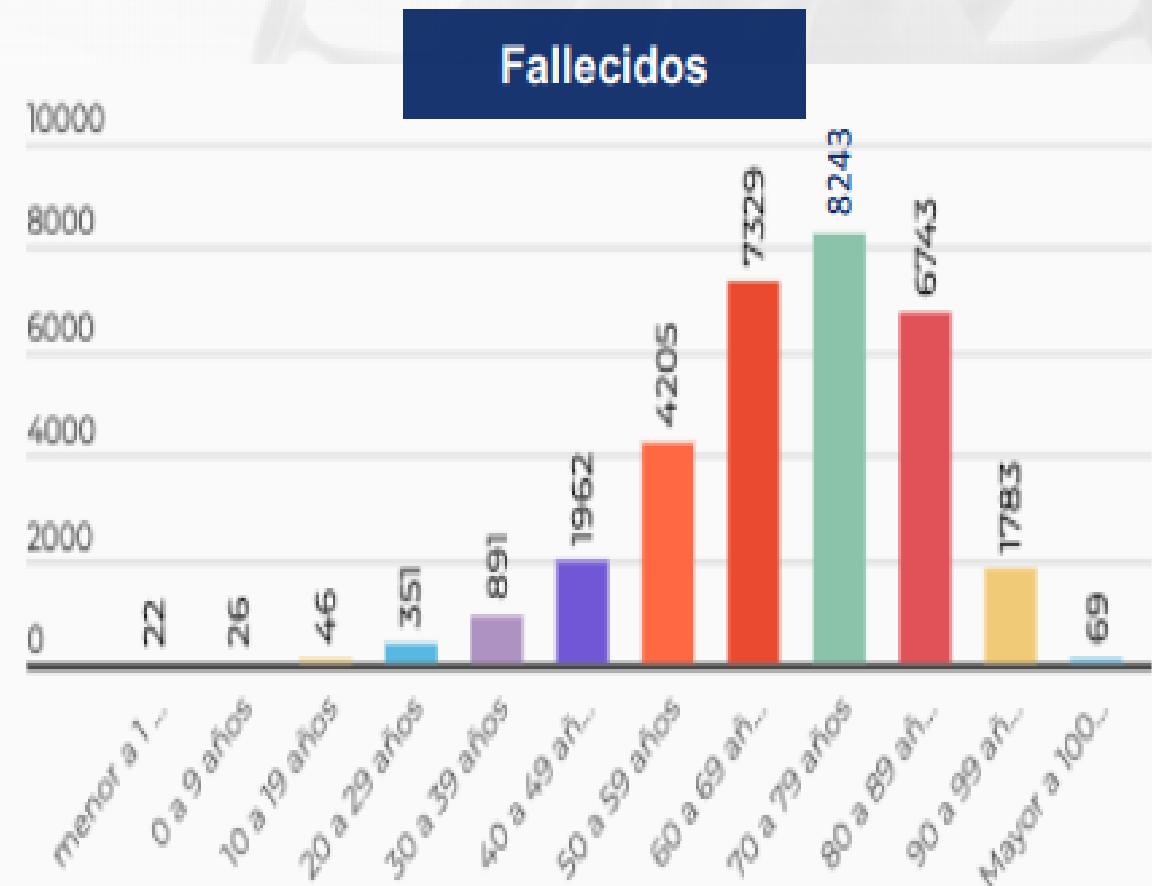
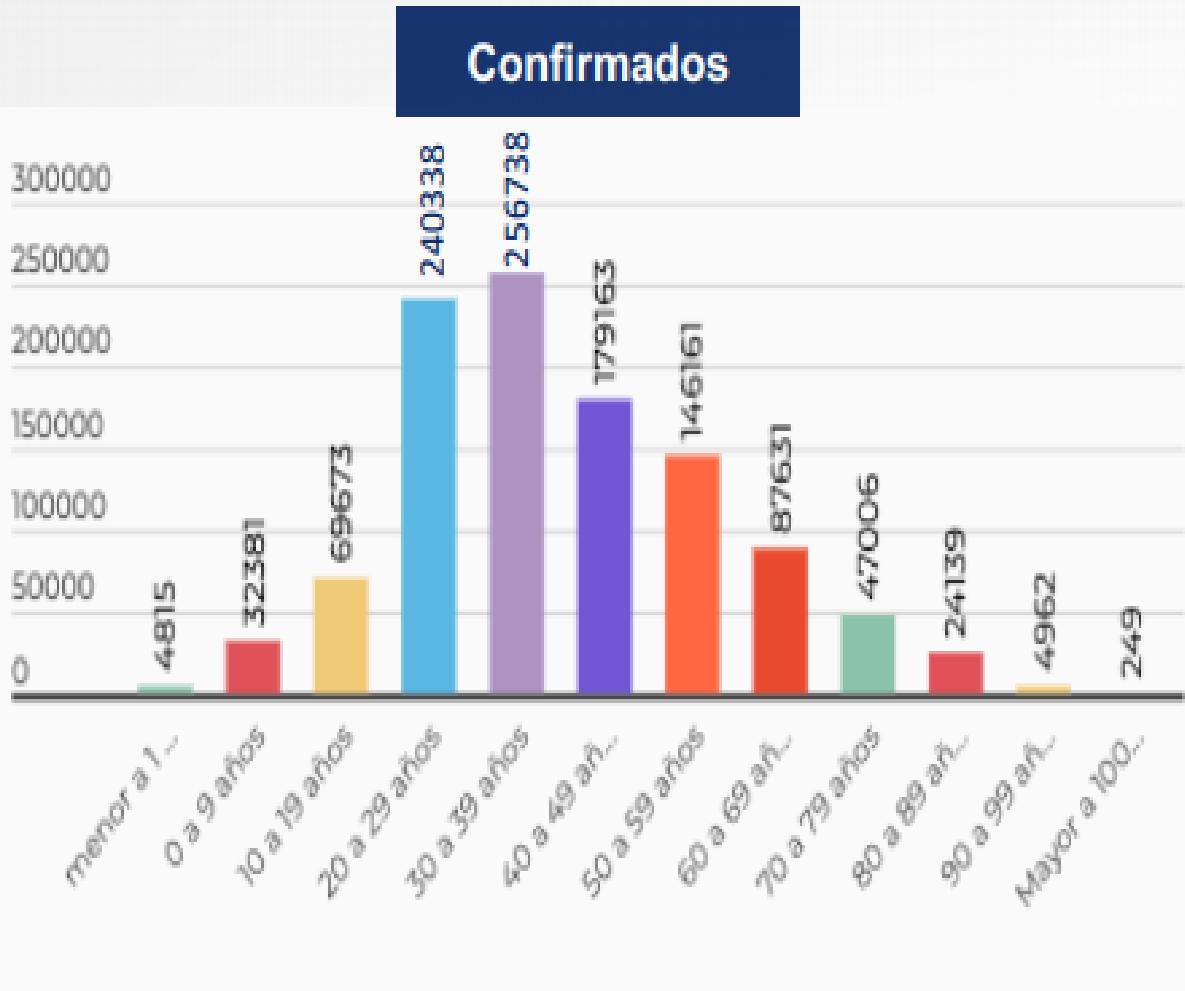


Tabla. Número de casos y defunciones por COVID-19, incrementos en la última semana con mayor carga al 5 de enero de 2021

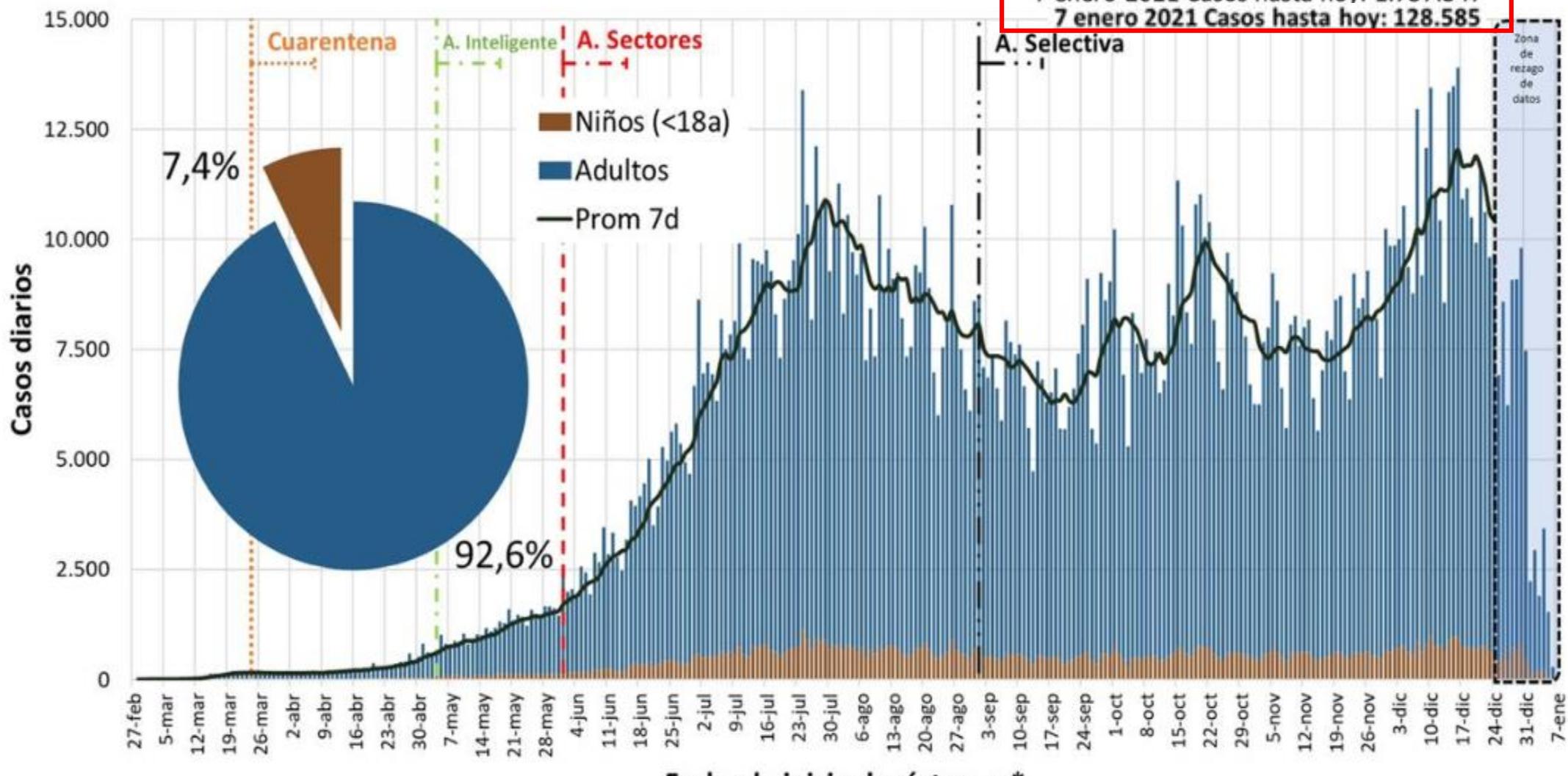
Incremento de casos en los últimas 7 días, municipios de mayor carga					Incremento de muertes en los últimas 7 días, municipios de mayor carga				
Municipio	Semana anterior	Actuales	Absoluto	Relativo	Municipio	Semana Anterior	Actuales	Absoluto	Relativo
BOGOTA	459.953	490.315	30.362	6,6	BOGOTA	9.631	10.131	500	5,2
MEDELLIN	144.946	153.356	8.410	5,8	CALI	2.689	2.797	108	4,0
CALI	96.442	100.265	3.823	4,0	MEDELLIN	2.597	2.706	109	4,2
BARRANQUILLA	55.241	58.279	3.038	5,5	BARRANQUILLA	1.872	1.918	46	2,5
CARTAGENA	42.975	45.282	2.307	5,4	CUCUTA	1.357	1.443	86	6,3
IBAGUE	32.776	34.926	2.150	6,6	BUCARAMANGA	986	1.028	42	4,3
BUCARAMANGA	28.307	29.741	1.434	5,1	MONTERIA	845	848	3	0,4
CUCUTA	27.259	28.607	1.348	4,9	CARTAGENA	765	824	59	7,7
VILLAVICENCIO	25.022	26.118	1.096	4,4	SOLEDAD	812	823	11	1,4
PEREIRA	22.241	23.994	1.753	7,9	IBAGUE	771	817	46	6,0
NACIONAL	1.614.822	1.702.966	88.144	5,5	NACIONAL	42.620	44.428	1.808	4,24

Fuente: con base en los datos publicados en: <https://www.ins.gov.co/Noticias/Paginas/Coronavirus.aspx>

Distribución por edad COVID-19 Colombia



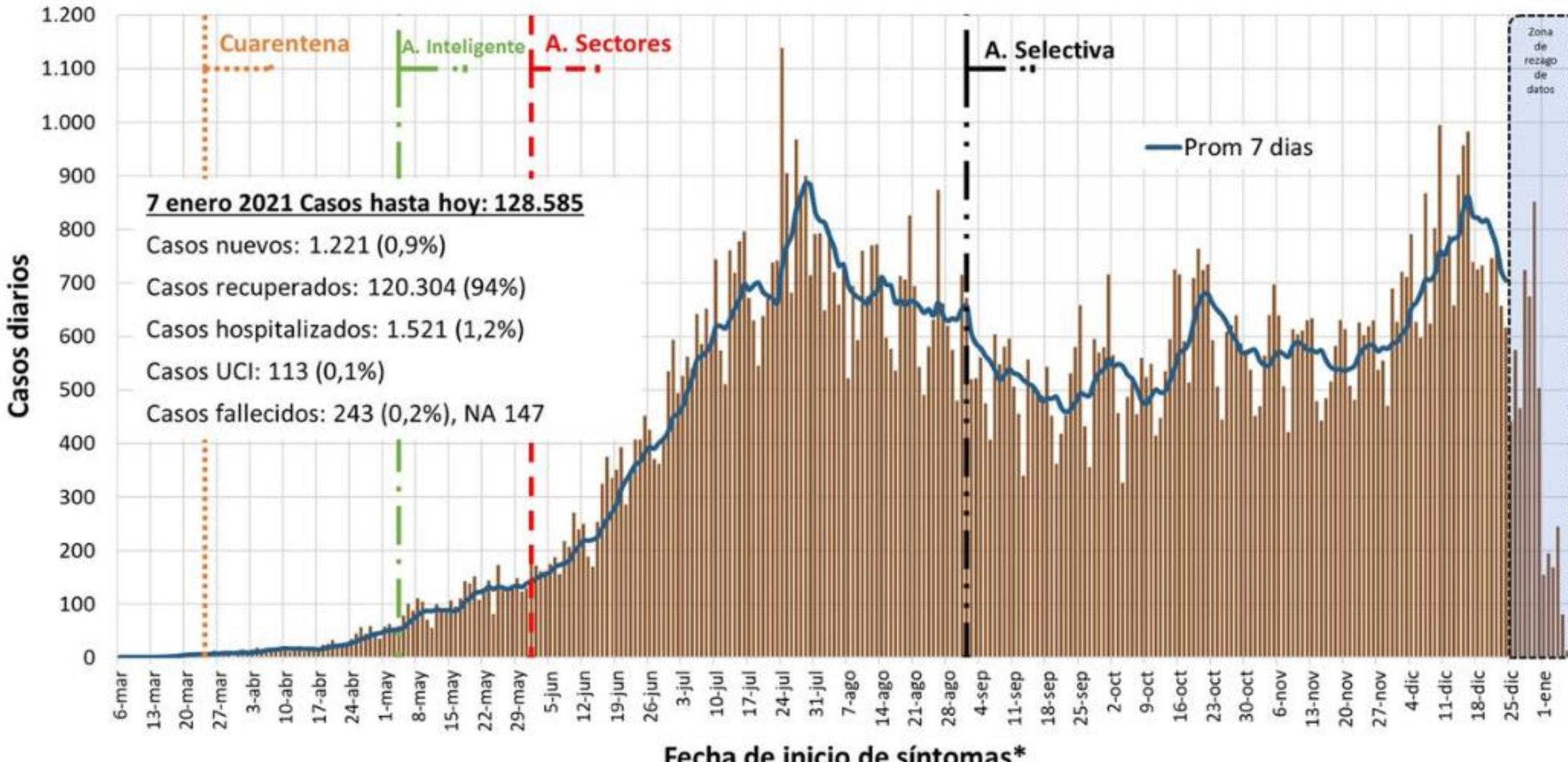
COVID19: Colombia, pediatría (<18a): CASOS TOTALES DIARIOS



*Se utiliza la fecha de notificación para los casos asintomáticos o sin dato.

@pvasquezcolpicu

COVID19: Colombia, pediatría (<18a): CASOS TOTALES PEDIATRICOS DIARIOS

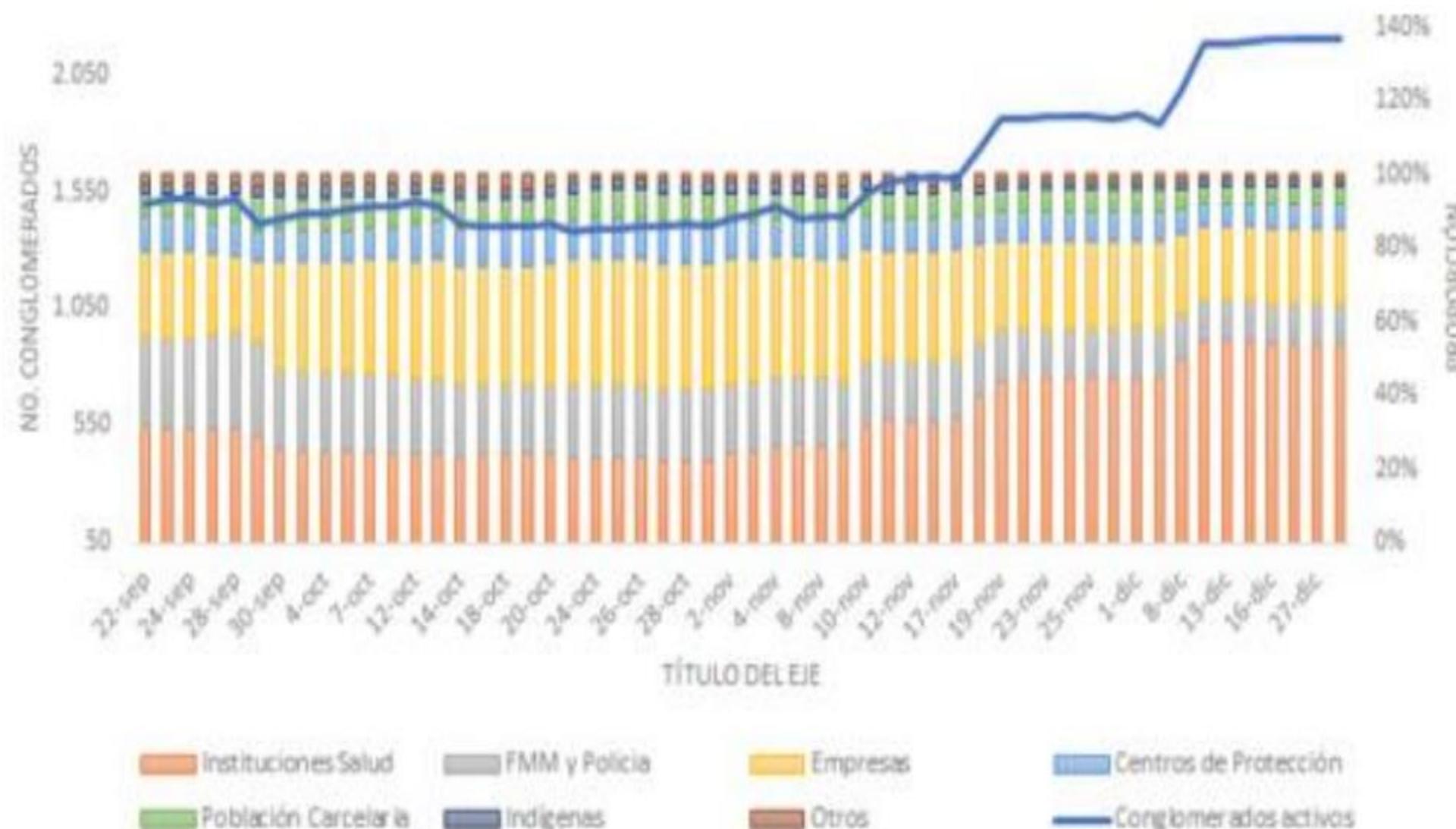


*Se utiliza la fecha de notificación para los casos asintomáticos o sin dato.

@pvasquezcolpicu

<http://www.ins.gov.co/Noticias/Paginas/Coronavirus.aspx>

Tendencia y distribución de conglomerados y casos activos para COVID-19, Colombia entre el 22 de setiembre y el 5 de enero de 2021



COVID-19 en personal de salud en Colombia | Boletín No. 60 | 31-12-2020

- Este boletín se actualiza con periodicidad diferente a la diaria del reporte nacional -

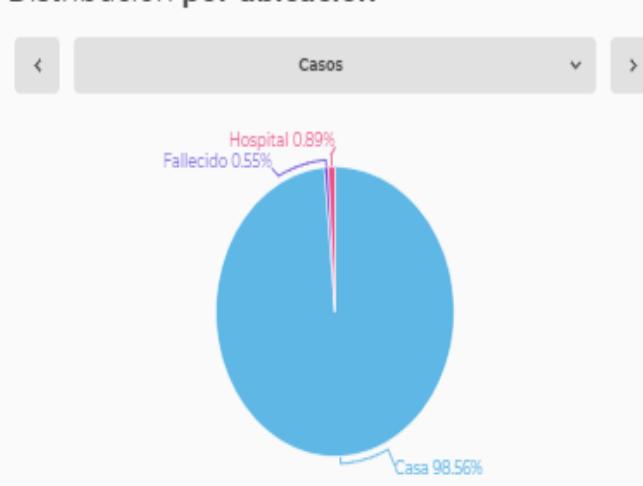
[Reportes anteriores en personal en salud](#)



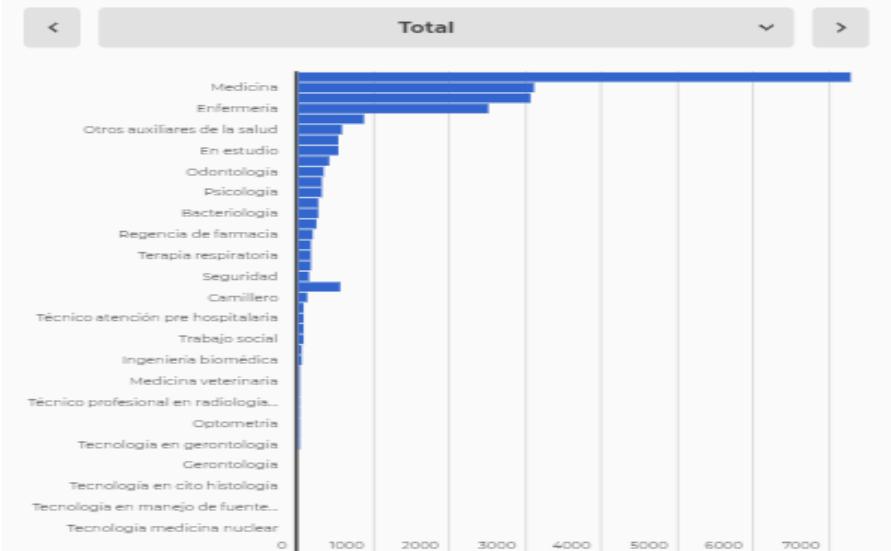
Distribución por fase de contagio



Distribución por ubicación



Distribución por profesión

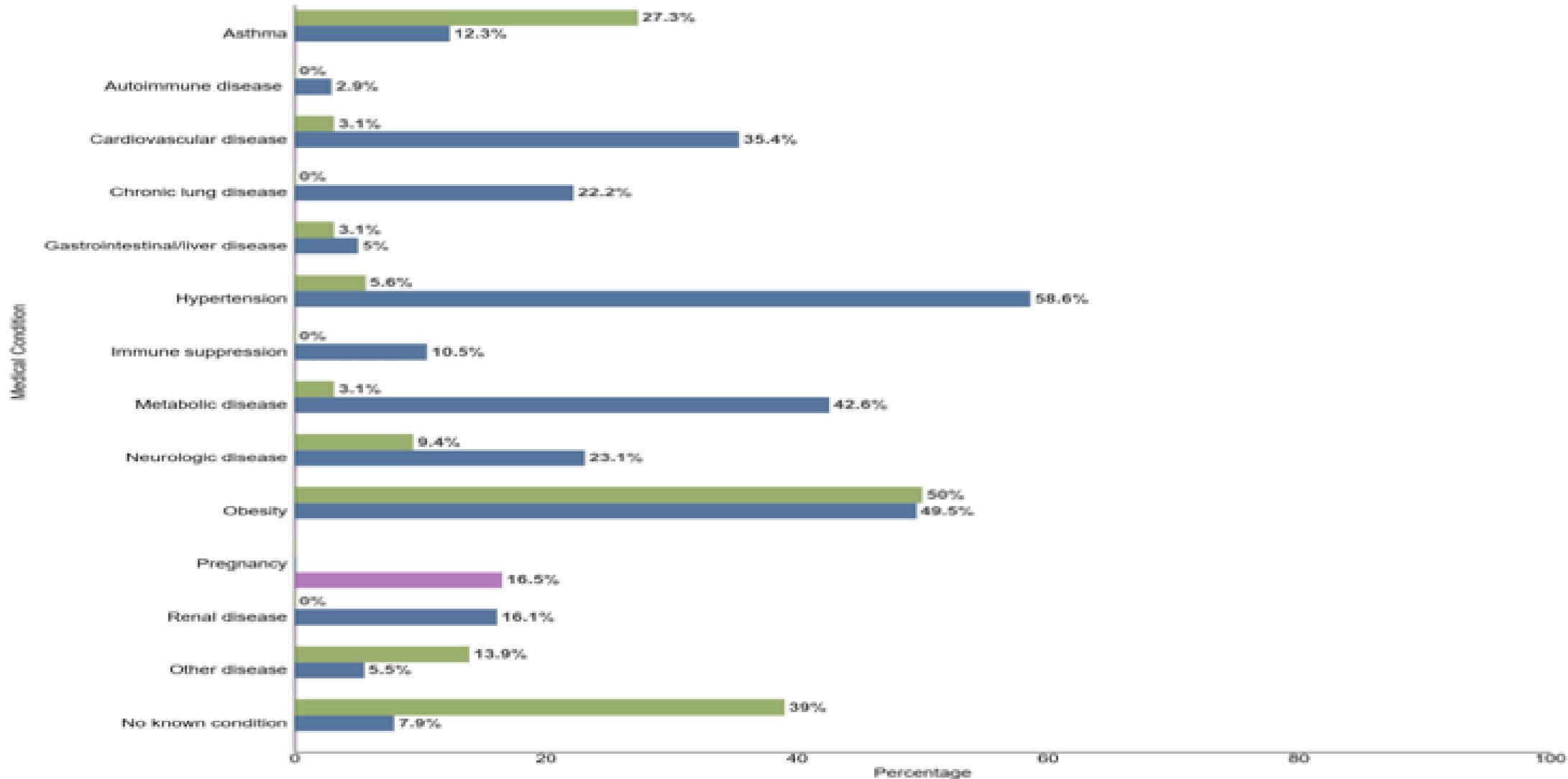


COVID-19 Laboratory-Confirmed Hospitalizations
Preliminary data as of May 16, 2020



Selected Underlying Medical Conditions

Pediatric Adult Pregnant



COVID-19 HOSPITALIZATION AND DEATH BY AGE

FACTORS THAT INCREASE COMMUNITY SPREAD AND INDIVIDUAL RISK



CROWDED SITUATIONS



CLOSE / PHYSICAL CONTACT



ENCLOSED SPACE



DURATION OF EXPOSURE

Rate ratios compared to 18-29 year olds

0-4 years

5-17 years

18-29 years

30-39 years

40-49 years

50-64 years

65-74 years

75-84 years

85+ years

HOSPITALIZATION¹

4x lower

9x lower

Comparison Group

2x higher

3x higher

4x higher

5x higher

8x higher

13x higher

DEATH²

9x lower

16x lower

Comparison Group

4x higher

10x higher

30x higher

90x higher

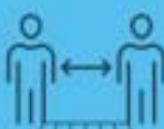
220x higher

630x higher

ACTIONS TO REDUCE RISK OF COVID-19



WEARING A MASK



SOCIAL DISTANCING (6 FT GOAL)



HAND HYGIENE

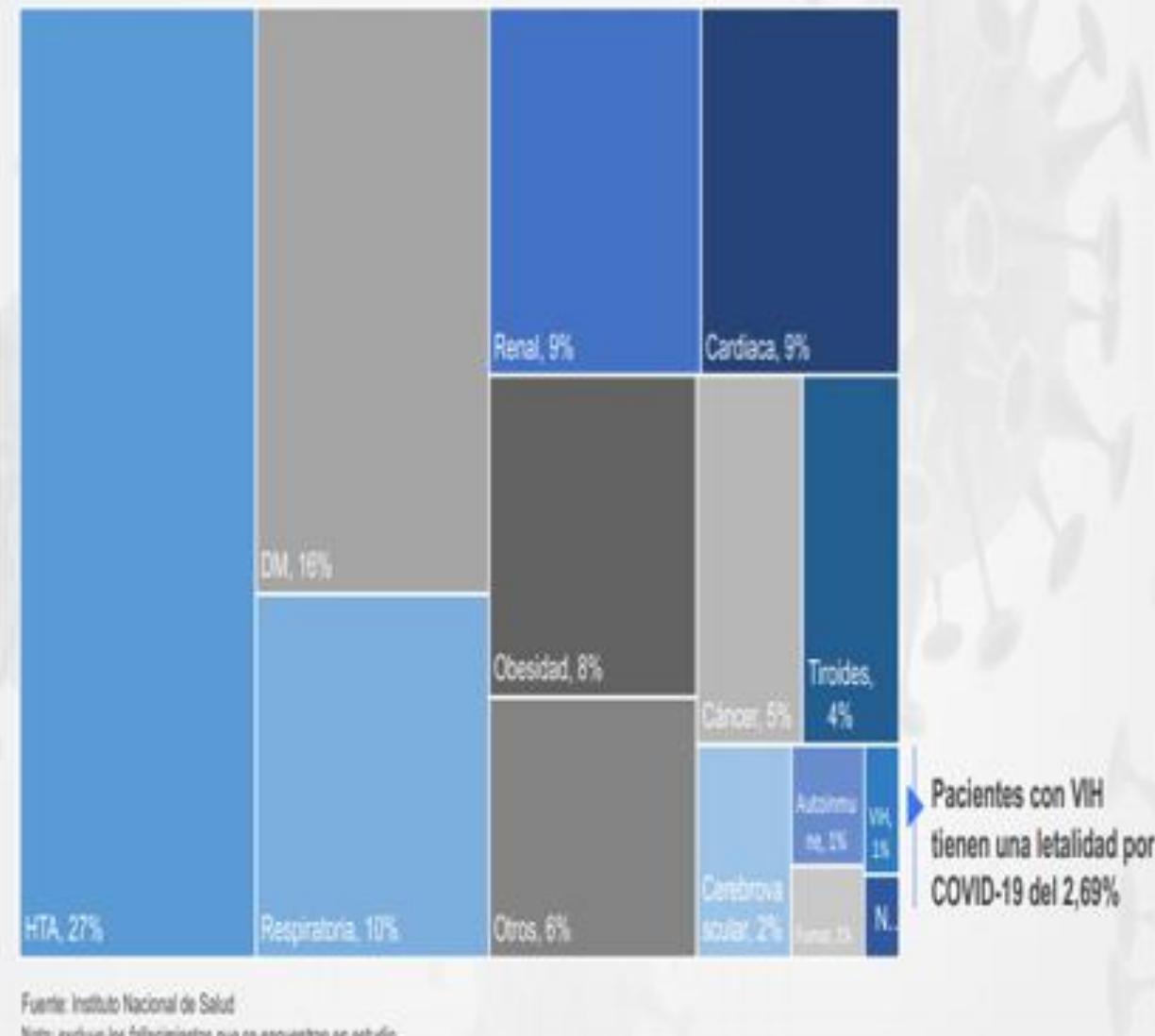


CLEANING AND DISINFECTION

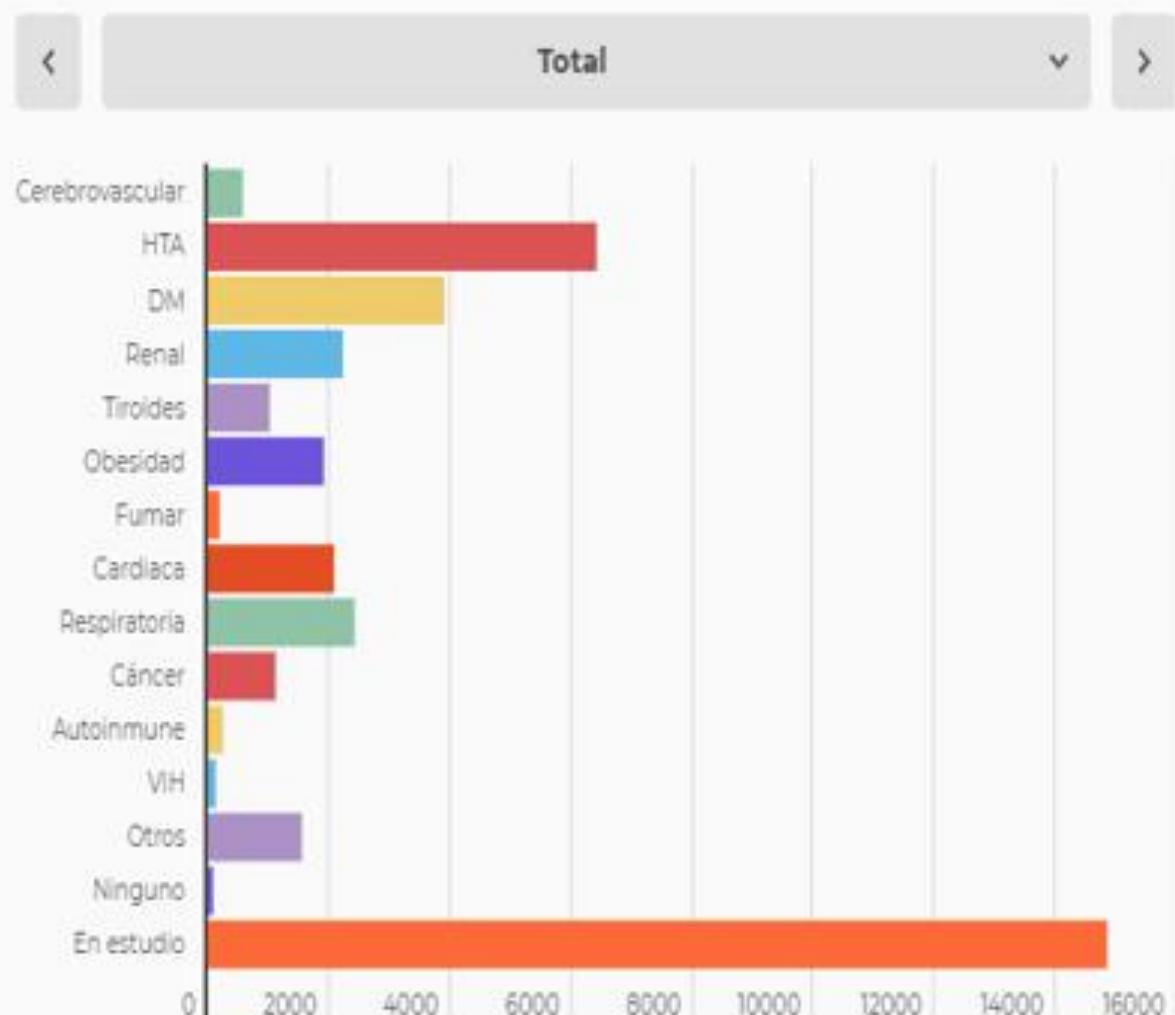
¹ Data source: COVID-NET (<https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/index.html>, accessed 08/06/20). Numbers are unadjusted rate ratios.

² Data source: NCHS Provisional Death Counts (<https://www.cdc.gov/nchs/nvss/vsrr/COVID19/index.htm>, accessed 08/06/20). Numbers are unadjusted rate ratios.

Fallecidos según comorbilidades



Comorbilidades de los fallecidos



Indicadores estratégicos de seguimiento COVID-19



1

Morbilidad x cada 100 mil habitantes

31 marzo	30 abr	31 jul	5 ene
1,8	12,92	567,8	3.380,8



2

Mortalidad General x millón habitantes

31 marzo	30 abr	31 jul	5 ene
0,3	5,5	194,7	882



3

Letalidad

31 marzo	30 abr	31 jul	5 ene
1,8	4,5	3,4	2,6



4

% Hospitalización General / total casos

31 marzo	30 abr	31 jul	5 ene
8,9	5,5	4,7	1,4



5

% Hospitalización UCI / total casos

31 marzo	30 abr	31 jul	5 ene
3,8	1,8	0,6	0,2



6

Proporción de positividad

31 marzo	30 abr	31 jul	5 ene
6	7,4	18,6	31,3



7

Número Reproductivo Rt

12 marzo	16 abr	31 jul	17 dic
3,26	1,16	1,0	1,03



Contenido

1. Epidemiología SARS CoV 2 / COVID-19 Colombia
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Extrapulmonary manifestations of COVID-19

Aakriti Gupta 1,2,3,20, Mahesh V. Madhavan 1,2,20, Kartik Sehgal 4,5,6,20, Nandini Nair⁷,

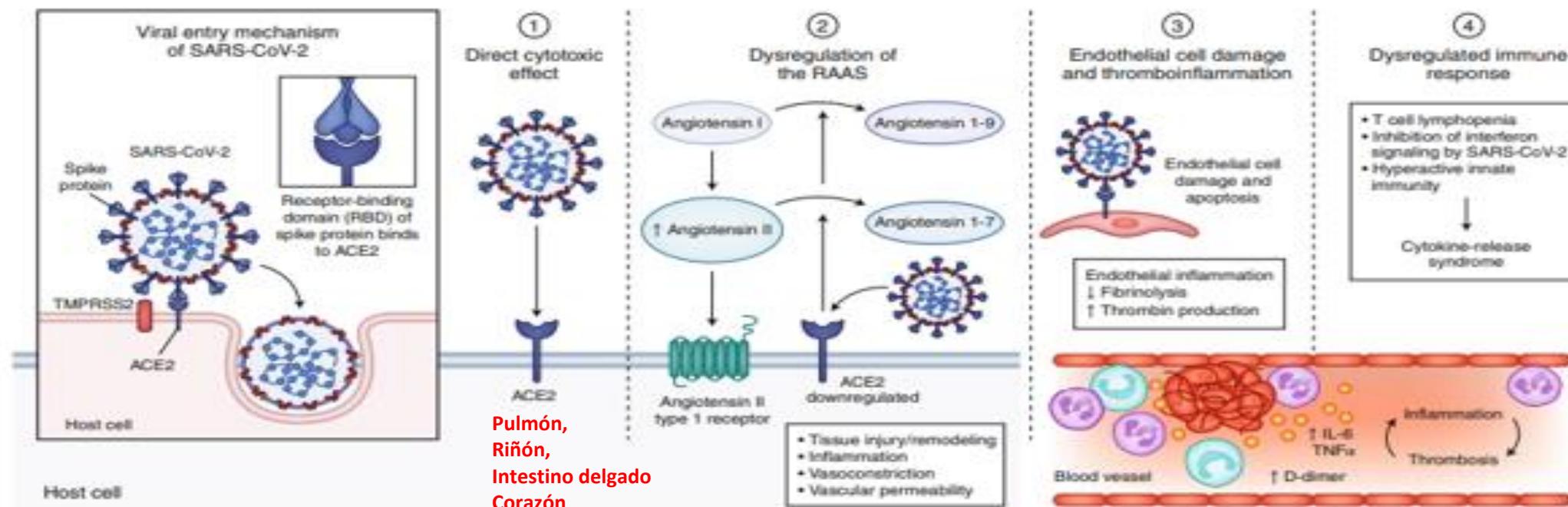
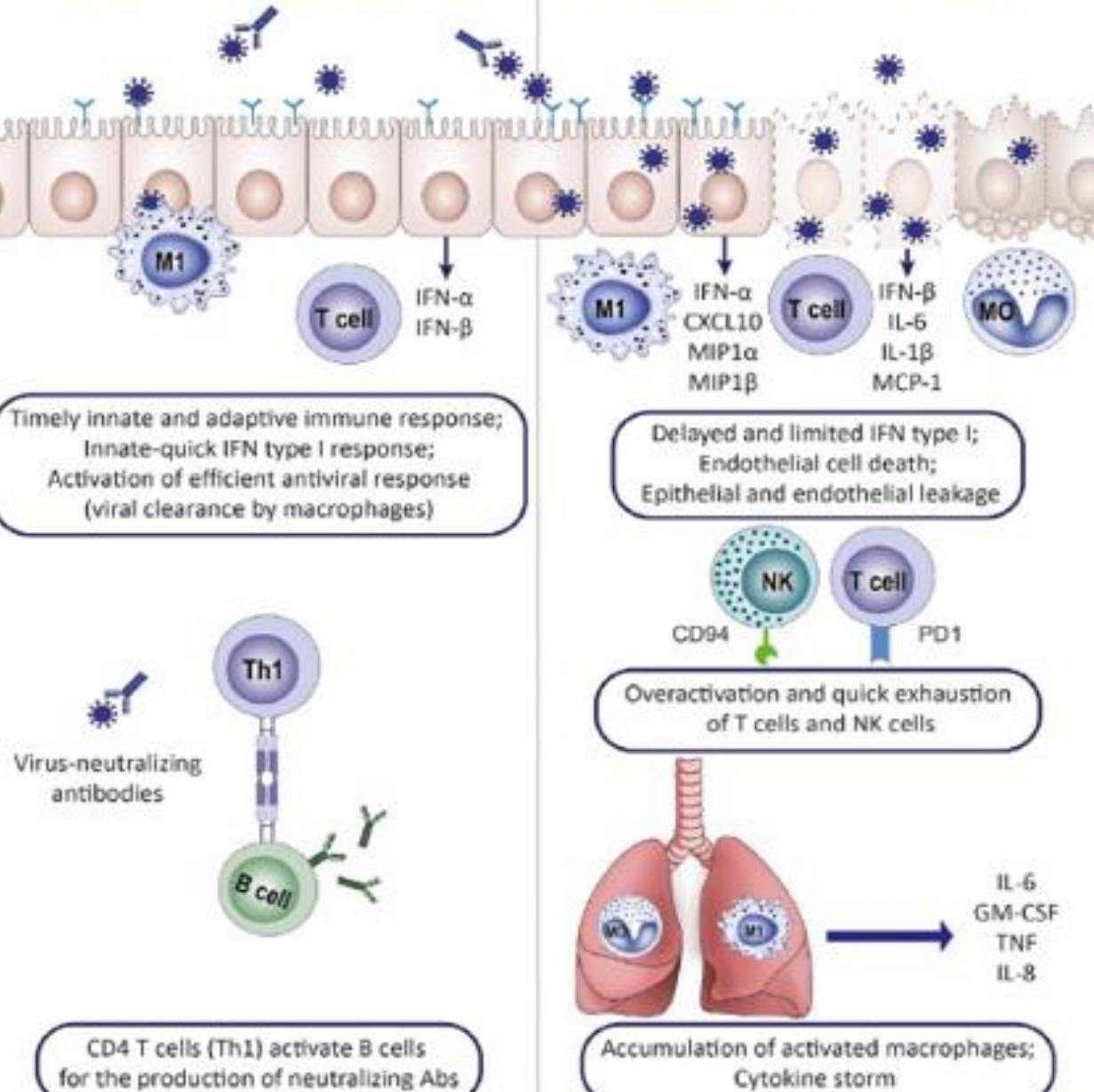


Fig. 1 | Pathophysiology of COVID-19. SARS-CoV-2 enters host cells through interaction of its spike protein with the entry receptor ACE2 in the presence of TMPRSS2 (far left). Proposed mechanisms for COVID-19 caused by infection with SARS-CoV-2 include (1) direct virus-mediated cell damage; (2) dysregulation of the RAAS as a consequence of downregulation of ACE2 related to viral entry, which leads to decreased cleavage of angiotensin I and angiotensin II; (3) endothelial cell damage and thromboinflammation; and (4) dysregulation of the immune response and hyperinflammation caused by inhibition of interferon signaling by the virus, T cell lymphodepletion, and the production of proinflammatory cytokines, particularly IL-6 and TNF α .

ADEQUATE IMMUNE RESPONSE

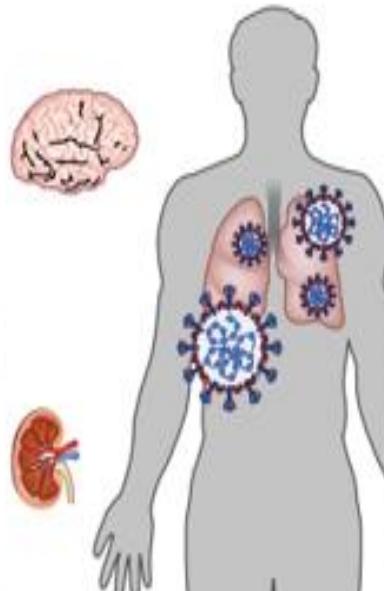
NON-ADEQUATE IMMUNE RESPONSE



Manifestaciones Extrapulmonares COVID-19

Neurologic

Headaches
Dizziness
Encephalopathy
Guillain-Barré
Ageusia
Myalgia
Anosmia
Stroke



Thromboembolism

Deep vein thrombosis
Pulmonary embolism
Catheter-related thrombosis



Cardiac

Takotsubo cardiomyopathy
Myocardial injury/myocarditis
Cardiac arrhythmias
Cardiogenic shock
Myocardial ischemia
Acute cor pulmonale



Renal

Acute kidney injury
Proteinuria
Hematuria



Endocrine

Hyperglycemia
Diabetic ketoacidosis



Hepatic

Elevated aminotransferases
Elevated bilirubin



Gastrointestinal

Diarrhea
Nausea/vomiting
Abdominal pain
Anorexia



Dermatological

Petechiae
Livedo reticularis
Erythematous rash
Urticaria
Vesicles
Pernio-like lesions



Característica Clinica SARS CoV2 / COVID -19

Age as major risk factor

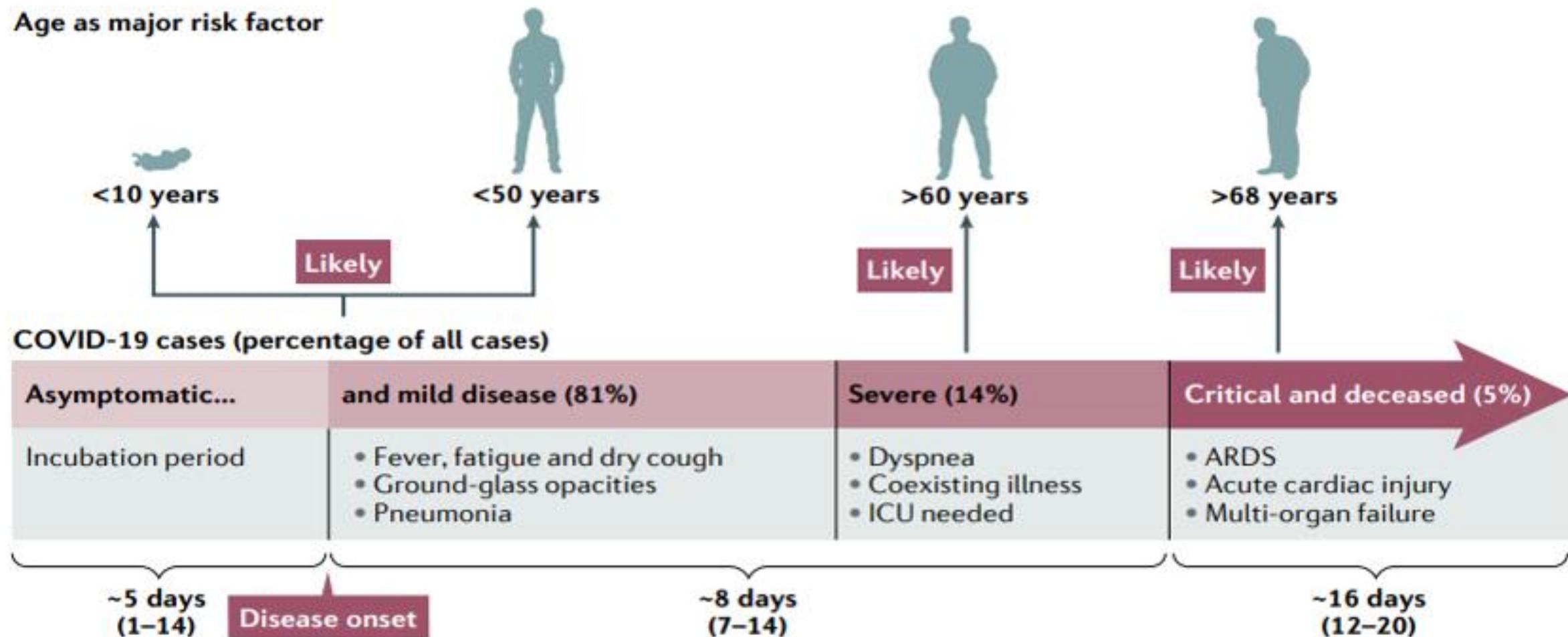


Fig. 4 | Clinical features of COVID-19. Typical symptoms of coronavirus disease 2019 (COVID-19) are fever, dry cough and fatigue and in severer cases dyspnea. Many infections, in particular in children and young adults, are asymptomatic, whereas older people and/or people with co-morbidities are at higher risk of severe disease, respiratory failure and death. The incubation period is ~5 days, severe disease usually develops ~8 days after symptom onset and critical disease and death occur at ~16 days. ARDS, acute respiratory distress syndrome; ICU, intensive care unit.

La salud
es de todos

Minsalud

PROCESO	GESTIÓN DE PRESTACIÓN DE SERVICIOS EN SALUD	Código	PSSS03
DOCUMENTO SOPORTE	Lineamientos para el manejo clínico de pacientes con infección por nuevo coronavirus COVID-19	Versión	02

LINEAMIENTOS PARA EL MANEJO CLÍNICO DE PACIENTES CON INFECCIÓN POR NUEVO CORONAVIRUS COVID-19

Ministerio de Salud y Protección Social
Bogotá, julio de 2020

infectio

REVISTA DE LA ASOCIACIÓN COLOMBIANA DE INFECTOLOGÍA

Volumen 24 Número 3 (S2). Mayo de 2020

EPP para actividades y procedimientos CON generación de aerosoles.

*Protección ocular: careta o monogafas.
Estas imágenes pertenecen al CONSENSO COLOMBIANO DE ATENCIÓN, DIAGNÓSTICO Y MANEJO DE LA INFECCIÓN POR SARS-CoV2/COVID-19 EN ESTABLECIMIENTOS DE ATENCIÓN DE LA SALUD 02/06/2020.
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En caso que sea utilizado con fines comerciales solicitar autorización.

Equipo de protección personal (EPP) para trabajadores de salud que se ocupan de la atención de pacientes con infección por SARS-CoV2-2 (COVID-19). Anexo 1 de la Sección VIII. Prevención y control de la infección por SARS-CoV2/COVID-19. Página 70.

Instituto de Evaluación
Tecnológica en Salud®

**CONSENSO COLOMBIANO DE
ATENCIÓN, DIAGNÓSTICO Y
MANEJO DE LA INFECCIÓN
POR SARS-CoV2/COVID-19
EN ESTABLECIMIENTOS
DE ATENCIÓN DE LA SALUD**

SEGUNDA EDICIÓN

**RECOMENDACIONES
BASADAS EN CONSENSO
DE EXPERTOS E INFORMADAS
EN LA EVIDENCIA**



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Inmunidad contra Coronavirus y SARS CoV2

Commonly circulating coronaviruses

HCoVs-229E, HKU1, NL63, OC43

Severe acute respiratory syndrome

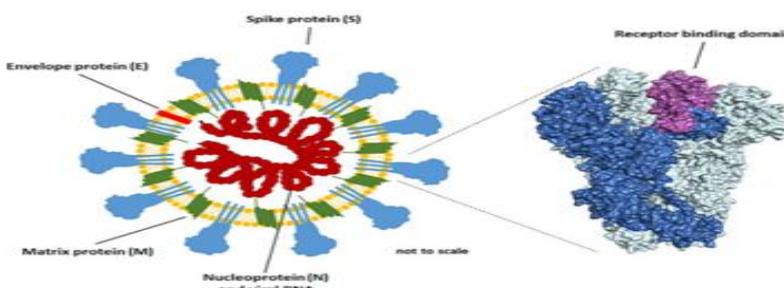
SARS-CoV

Middle East respiratory syndrome

MERS-CoV

COVID-19

SARS-CoV-2



Acs permanecen unos meses – Re- infección

Acs Neutralizantes: 4-5 meses 2-3 años declinan

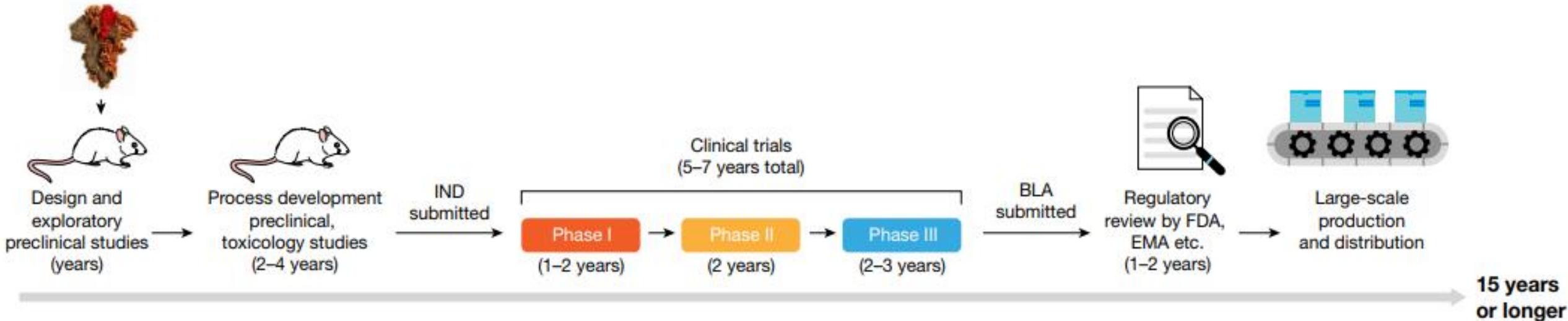
Acs Neutralizantes 2-3 meses : 3 años declinan

-Macacos Rhesus adecuados Anticuerpos
y No re- infección a nueva exposición

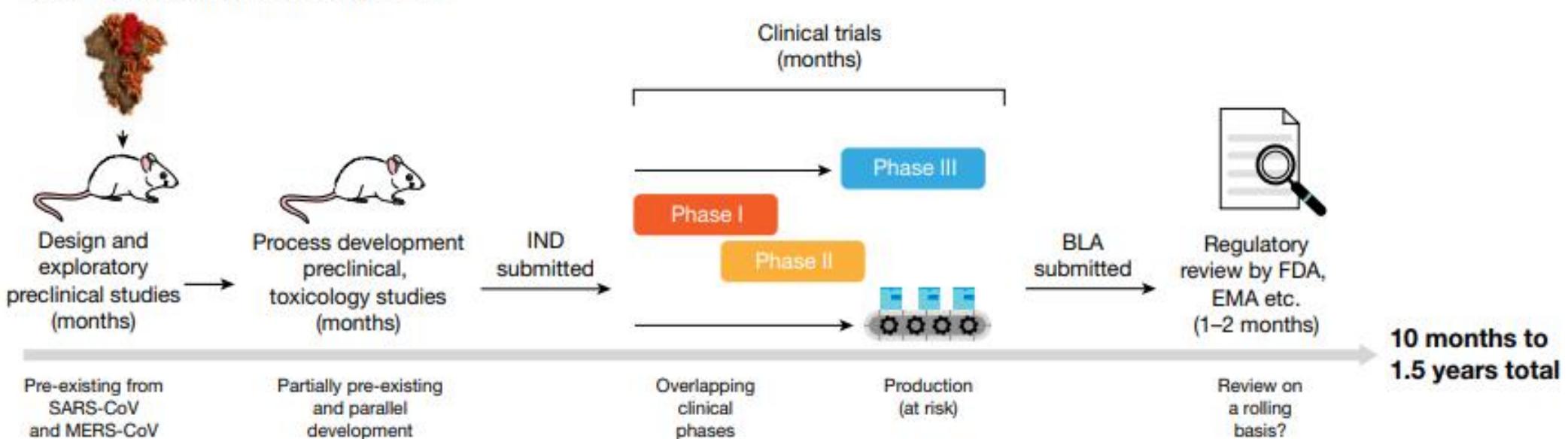
- Inmunidad Humoral – Celular
- Modelos Animales
- Humanos: Acs Plasma,
- Acs –Monoclonales

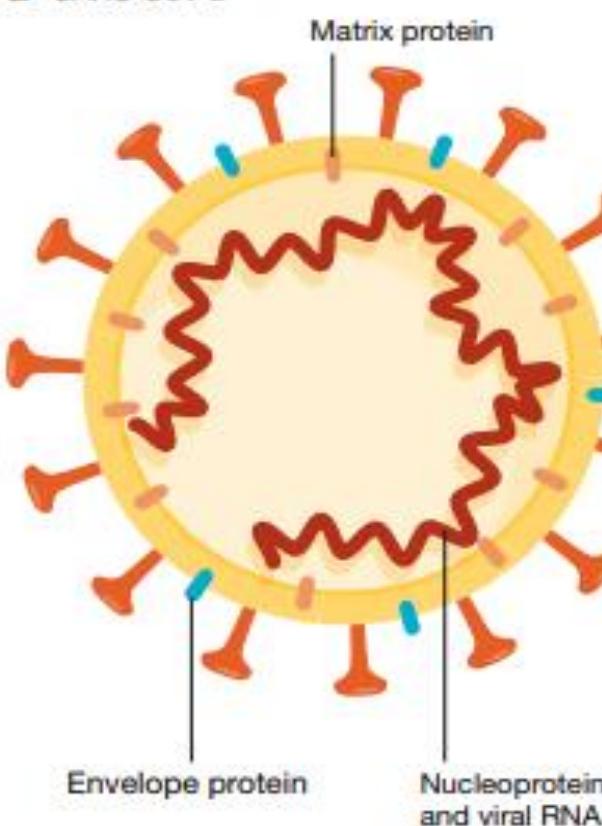
Vacunas Fases

Traditional development

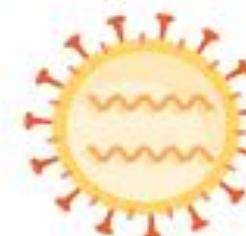


SARS-CoV-2 vaccine development

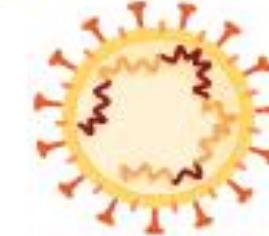
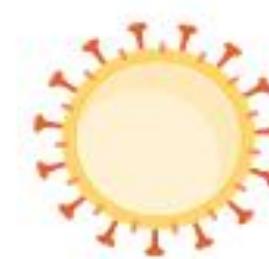


a SARS-CoV-2**b RBD of the spike protein**

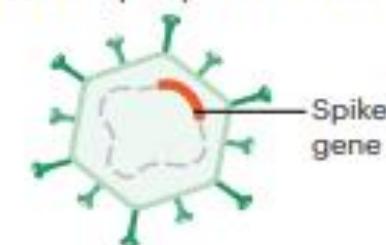
c Inactivated vaccines contain SARS-CoV-2 that is grown in cell culture and then chemically inactivated



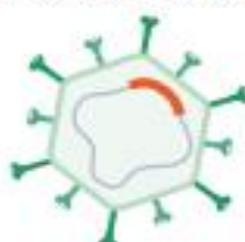
d Live attenuated vaccines are made of genetically weakened versions of SARS-CoV-2 that is grown in cell culture

**e Recombinant spike-protein-based vaccines****f Recombinant RBD-based vaccines****g VLPs carry no genome but display the spike protein on their surface**

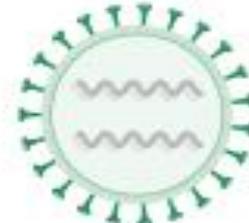
h Replication-incompetent vector vaccines cannot propagate in the cells of the vaccinated individual but express the spike protein within them



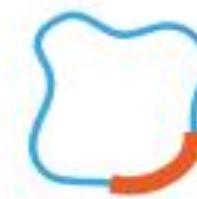
i Replication-competent vector vaccines can propagate to some extent in the cells of the vaccinated individual and express the spike protein within them



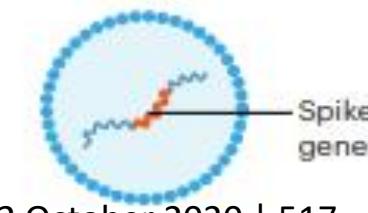
j Inactivated virus vector vaccines carry copies of the spike protein on their surface but have been chemically inactivated



k DNA vaccines consist of plasmid DNA encoding the spike gene under a mammalian promoter

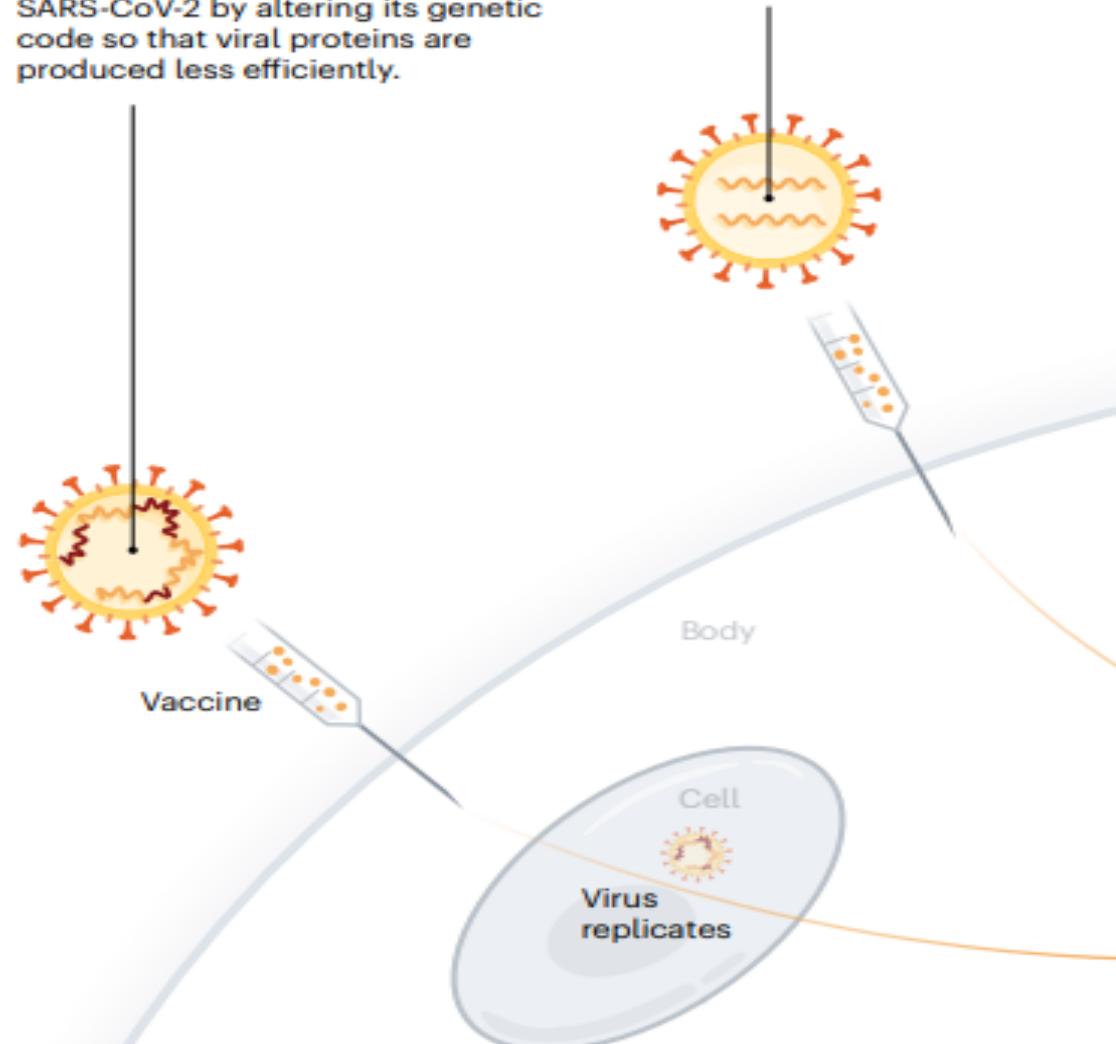


l RNA vaccines consist of RNA encoding the spike protein and are typically packaged in LNPs



Weakened virus

A virus is conventionally weakened for a vaccine by being passed through animal or human cells until it picks up mutations that make it less able to cause disease. Codagenix in Farmingdale, New York, is working with the Serum Institute of India, a vaccine manufacturer in Pune, to weaken SARS-CoV-2 by altering its genetic code so that viral proteins are produced less efficiently.



Inactivated virus

In these vaccines, the virus is rendered uninfected using chemicals, such as formaldehyde, or heat. Making them, however, requires starting with large quantities of infectious virus.

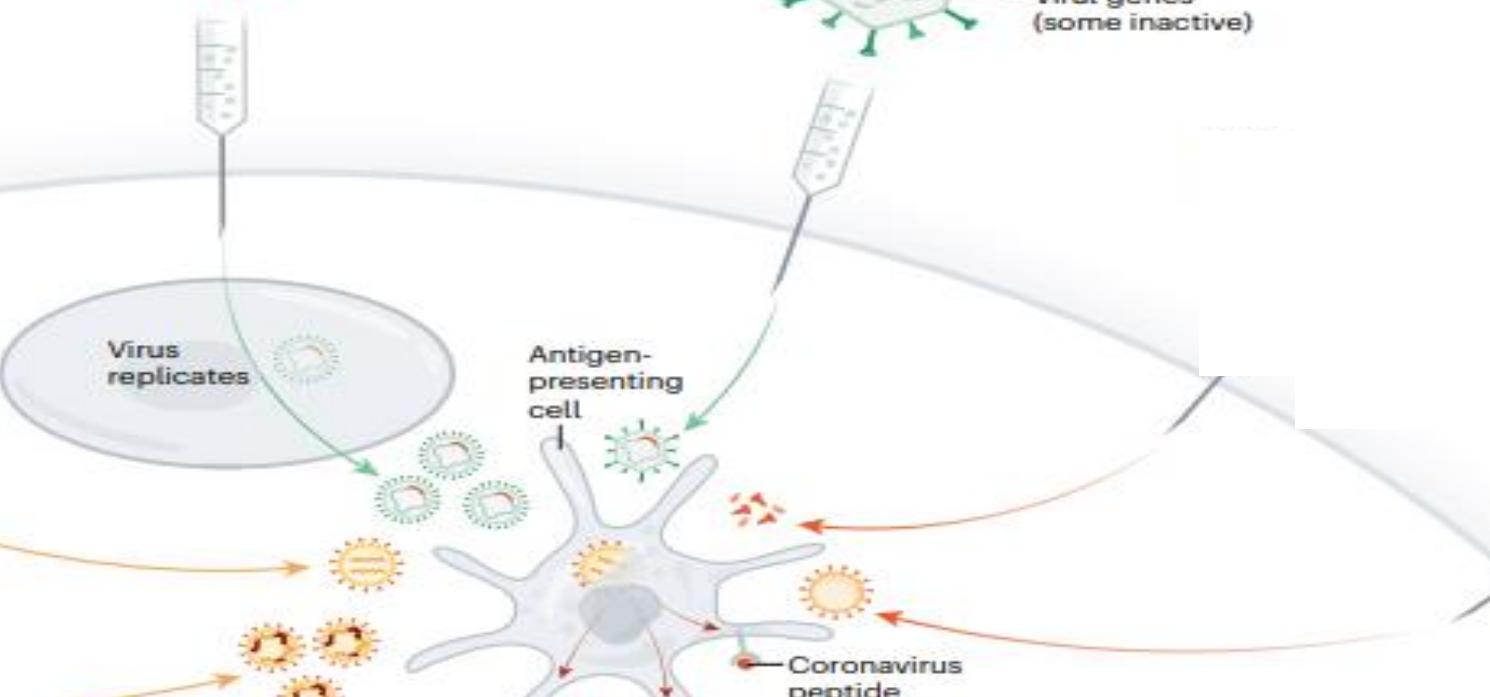
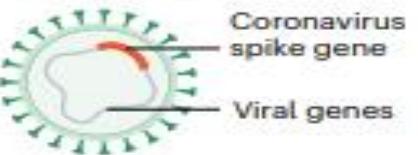
S. no.	Vaccine Platform	Advantages	Limitations
1	Live Attenuated Vaccine (LAV) /the whole virus	<ul style="list-style-type: none">It has the intrinsic ability to stimulate the immune system by inducing the toll-like receptors (TLRs) namely: TLR 3, TLR 7/8, and TLR 9 of the innate immune system that involves B cells, CD4 and CD8 T cells.It can be derived from 'cold adapted' virus strains, reassortants, and reverse genetics.	<ul style="list-style-type: none">LAV requires an extensive accessory testing to establish safety and efficacy.There is a probability of nucleotide substitution during viral replication, resulting in the creation of recombinants post-vaccination.
2	Inactivated Virus Vaccine	<ul style="list-style-type: none">Stable and safer as compared to the LAVs.It has the pre-existing technology and infrastructure required for its development.Has already been tested for SARS-CoV and various other diseases.It can be used along with adjuvants to increase their immunogenicity.	<ul style="list-style-type: none">Require the booster shots to maintain the immunity.Furthermore, large amounts of viruses need to be handled and the integrity of the immunogenic particles must be maintained.
3	Sub-unit Vaccine	<ul style="list-style-type: none">Do not have any live component of the viral particle.Thus, it is safe with fewer side-effects.	<ul style="list-style-type: none">Induce an immune response.Memory for future responses is doubtful.

VIRAL-VECTOR VACCINES

Around 25 groups say they are working on viral-vector vaccines. A virus such as measles or adenovirus is genetically engineered so that it can produce coronavirus proteins in the body. These viruses are weakened so they cannot cause disease. There are two types: those that can still replicate within cells and those that cannot because key genes have been disabled.

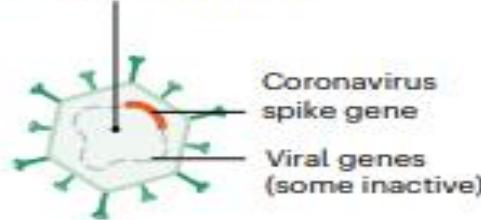
Replicating viral vector (such as weakened measles)

The newly approved Ebola vaccine is an example of a viral-vector vaccine that replicates within cells. Such vaccines tend to be safe and provoke a strong immune response. Existing immunity to the vector could blunt the vaccine's effectiveness, however.



Non-replicating viral vector (such as adenovirus)

No licensed vaccines use this method, but they have a long history in gene therapy. Booster shots can be needed to induce long-lasting immunity. US-based drug giant Johnson & Johnson is working on this approach.



Advantages

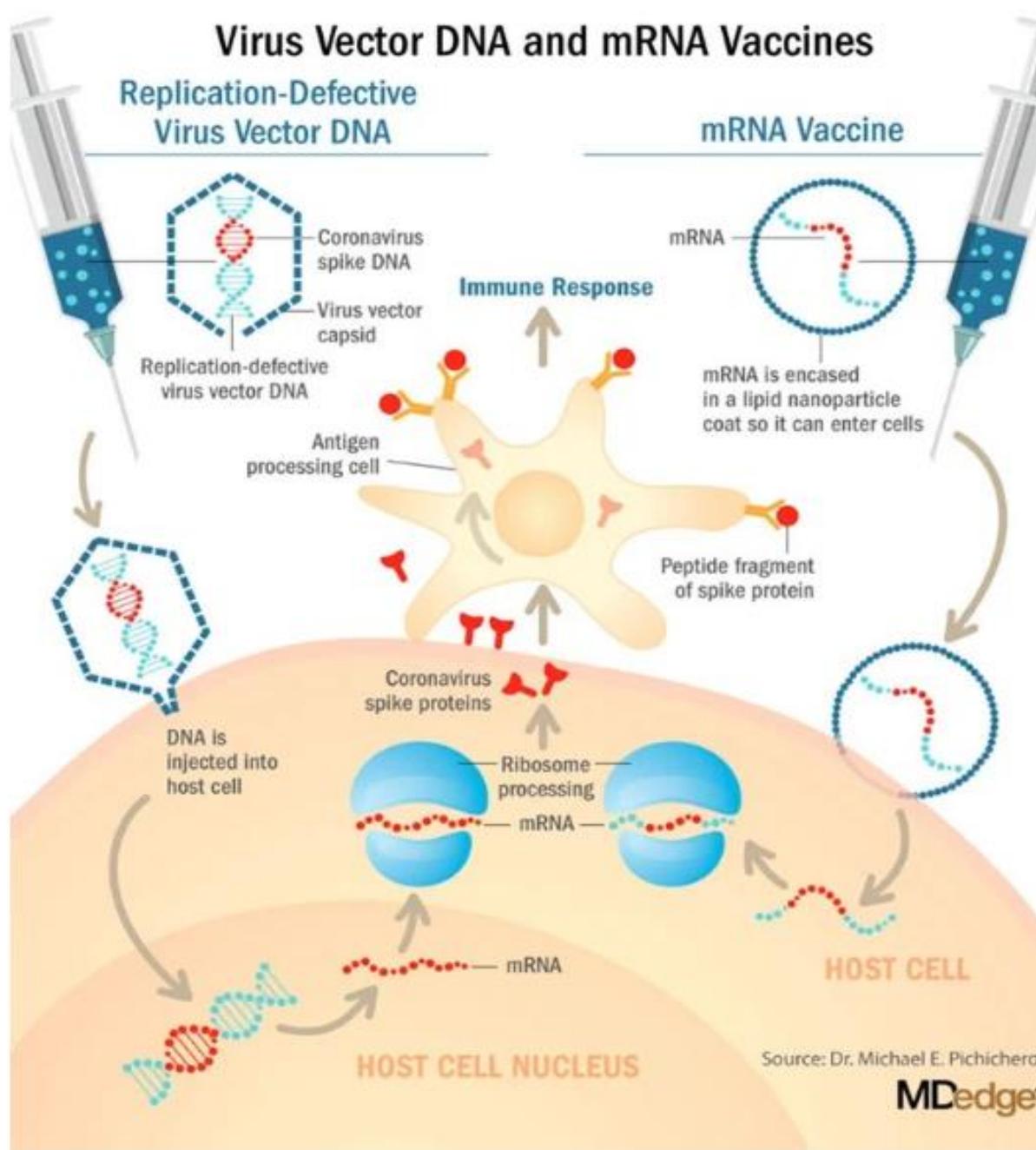
Viral vector-based vaccine

- Show a highly specific gene delivery into the host cell with a vigorous immune response.
- Avoids handling of any infectious particle and it has been used widely for MERS-CoV with positive

Limitations

- The host may possess immunity against the vector due to prior exposure, reducing the efficacy.
- May lead to cancer due to the integration of the viral genome into the

Virus Vector DNA and mRNA Vaccines



DNA Vaccines

Advantages

- The synthetic DNA is temperature stable and cold-chain free.
- It can be developed at an accelerated pace.
- It does not require the handling of the infectious viral particle.

RNA Vaccines

- The translation of mRNA occurs in the cytosol of the host cell averting the risk of any sort of integration into the host genome.

Limitations

- Though it elicits both Cytotoxic and humoral immunity, the titers remain low.
- Insertion of foreign DNA into the host genome may cause abnormalities in the cell.
- May induce the antibody production against itself.
- Safety issues with reactogenicity have been reported for various RNA based vaccines.
- It also shows instability.

DESARROLLO DE VACUNAS PARA COVID-19

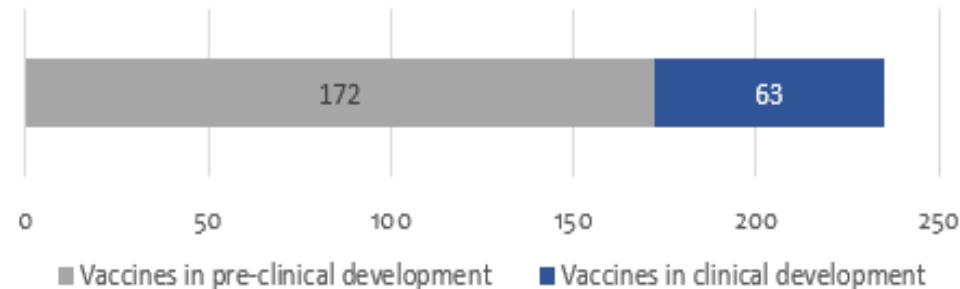
Alrededor del mundo se vienen desarrollando vacunas basado en métodos que han demostrado funcionar en el pasado con otras enfermedades, pero también en formas novedosas.

Cerca de 180 vacunas se están desarrollando en el mundo para combatir la enfermedad por SARS-CoV-2, algunas se han basado en fórmulas tradicionales que han sido efectivas en otros agentes patógenos como es el caso de virus inactivados, vacunas de proteínas y vacunas vectorizadas, otras en cambio son novedosas como es el caso de las vacunas de ARN y ADN (1,2).

Tabla 1. Principales ventajas y desventajas de las vacunas en curso

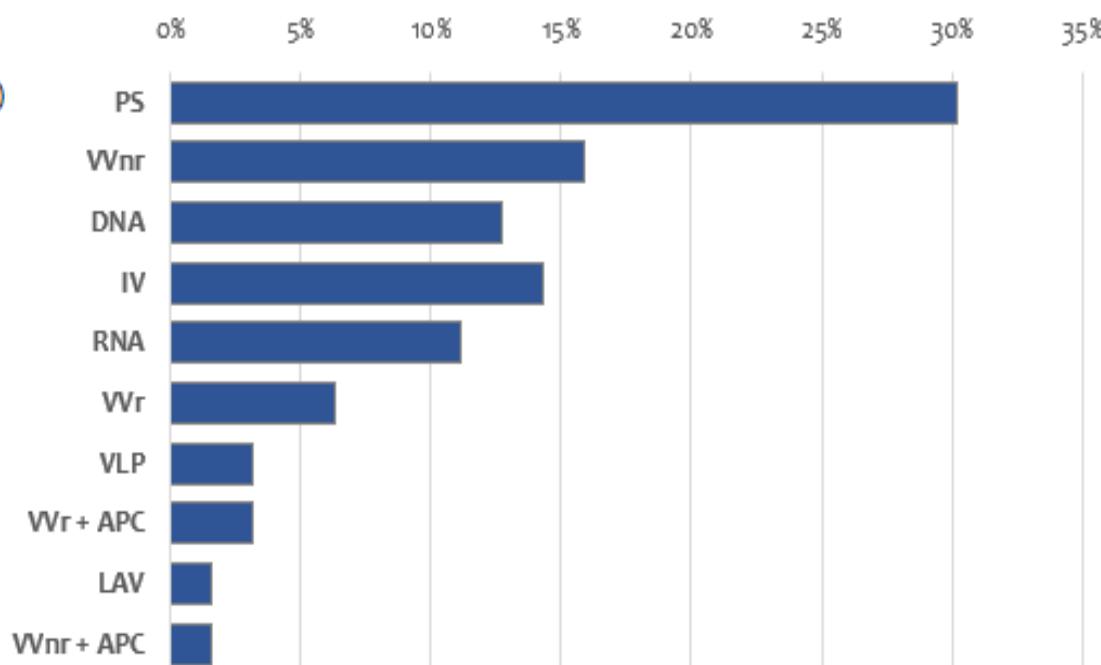
*Las vacunas a las que se hace referencia ejemplos y no representan la totalidad de las vacunas en estudio.

Vacunas	Ventajas	Desventajas	Ejemplos de vacunas en curso
Virus inactivados El virus es inactivado de tal manera que no es posible replicarse ni multiplicarse por lo tanto no causa enfermedad. Normalmente se administra por vía intramuscular (1-3)	<ul style="list-style-type: none"> - Procedimiento de fabricación bien establecido y relativamente sencillo. - El virus inactivado no causa enfermedad y estimula el sistema inmunológico del cuerpo para que produzca defensas. 	<ul style="list-style-type: none"> - Es necesario cultivar o desarrollar el virus en grandes cantidades. - Puede requerir dosis de refuerzo para lograr y mantener la protección. 	<ul style="list-style-type: none"> • Sinovac • Instituto de Biología de Wuhan/Sinopharm • Instituto de Biología de Beijing/Sinopharm
Vivas atenuadas Crea una versión genéticamente debilitada del virus que al momento de replicarse no causa enfermedad, sin embargo, permite que el cuerpo genere una respuesta inmune o de protección similar a la producida por una infección natural. Se pueden administrar por vía intranasal (1-3).	<ul style="list-style-type: none"> - Debido a su fácil forma de administración induce a respuestas inmunitarias de la mucosa protegiendo el tracto respiratorio la principal puerta de entrada del virus. 	<ul style="list-style-type: none"> - Requiere mucho tiempo modificar el virus si se lleva a cabo con métodos tradicionales. 	<ul style="list-style-type: none"> • Codagenix/Serum Institute of India • Indian Immunologicals Ltd/Griffith University • Mehmet Ali Aydinlar University/Acibadem Labmed Health Services A.S.
Proteínas Ha sido la más utilizada a lo largo de la historia, pueden utilizar proteínas virales completas o solo un fragmento de esta. En el caso de las vacunas contra el SARS-CoV-2, la proteína de pico, que es la proteína objetivo de las vacunas, se une a las células donde los virus pueden replicarse generando respuestas inmunitarias protectoras sin causar enfermedad. Se administra típicamente por vía intramuscular (1,3).	<ul style="list-style-type: none"> - Tienen una larga historia de seguridad y eficacia (hepatitis B, el herpes zóster y las bacterias que causan la tosferina) - Se pueden producir sin manipular virus vivos. - Pueden combinarse con adyuvantes de vacunas (aditivos en pequeñas cantidades) que mejoran o potencian las respuestas inmunitarias. 	<ul style="list-style-type: none"> - Pueden causar reacciones locales, como enrojecimiento, hinchazón y dolor en el lugar de la inyección y reacciones sistémicas como fiebre, escalofríos y dolores corporales. 	<ul style="list-style-type: none"> • Novavax • Sanofi Pasteur/GSK • Vaxine Pty Ltd/Medytox • COVAXX / United Biomedical Inc. Asia • University of Queensland/CSL/Seqirus
Vectores virales Utiliza otro virus diseñado para expresar la proteína de pico del SARS-CoV-2, este virus no se replica para administrar en forma de ADN, en células humanas donde se producen proteínas virales para inducir respuestas inmunes protectoras. Generalmente se administra de forma intramuscular (19,21).	<ul style="list-style-type: none"> - Han sido utilizados con gran éxito para otro tipo de adenovirus como el ébola y la viruela. 	<ul style="list-style-type: none"> - Se pueden requerir dos dosis. - Riesgo de inmunidad preexistente debido al uso de adenovirus humanos que podría impedir la entrada del vector en las células huésped. 	<ul style="list-style-type: none"> • University of Oxford/AstraZeneca • Janssen Pharmaceutical Companies • CanSino Biological Inc./Beijing Institute of Biotechnology • Instituto de Investigación Gamaleya
Genéticas Se administran genes del virus a células humanas, los genes pueden administrarse directamente como ADN o ARN. Las vacunas de ARN mensajero (ARNm) que administran el gen de la proteína de pico, se encuentran en fase 3 (1-3). Las vacunas de ADN se componen típicamente de moléculas de ADN, son superiores a las vacunas de ARNm en cuanto a estabilidad, suministro y eficiencia (2,3).	<ul style="list-style-type: none"> - Fácil desarrollo y fabricación, dado que no requieren cultivo de células. - Inducen respuestas inmunitarias protectoras, incluso en adultos mayores. 	<ul style="list-style-type: none"> - Algunas deben administrarse mediante dispositivos médicos como el electroporador para que sean eficientes. - Debido a que emplea tecnología de punta, pueden presentarse inconvenientes en la producción a gran escala y estabilidad de almacenamiento. - Aún no ha entrado en el mercado ninguna vacuna de ARNm, por lo que puede llevar más tiempo establecer estándares de calidad y evaluar la seguridad. 	<ul style="list-style-type: none"> • Moderna/NIAID • BioNTech/Fosun Pharma/Pfizer • Curevac • Cadila Healthcare Limited • Imperial College London • Inovio Pharmaceuticals Inc/ International Vaccine Institute

COVID-19 - Landscape of novel coronavirus candidate vaccine development worldwide
martes, 5 de enero de 2021
1.- Number of vaccines in clinical development
63
2.- Number of vaccines in pre-clinical development
172

3.- Candidates in clinical phase

 Filter **All** ▼ Select phase of development (default is all)

Platform		Candidate vaccines (no. and %)	
PS	Protein subunit	19	30%
VVnr	Viral Vector (non-replicating)	10	16%
DNA	DNA	8	13%
IV	Inactivated Virus	9	14%
RNA	RNA	7	11%
VWr	Viral Vector (replicating)	4	6%
VLP	Virus Like Particle	2	3%
Wr + APC	Wr + Antigen Presenting Cell	2	3%
LAV	Live Attenuated Virus	1	2%
VVnr + APC	VVnr + Antigen Presenting Cell	1	2%

63


Vacunas Candidatas SARS-CoV-2 en Desarrollo:

4.- Dosage, schedule and route of administration of candidates in clinical phase

Dosage & schedule	Candidate vaccines (no. and %)	
1 dose	10	17%
Day 0	10	
2 doses	37	62%
Day 0 + 14	5	
Day 0 + 21	14	
Day 0 + 28	18	
3 doses	1	2%
Day 0 + 28 + 56	1	
TBD / No Data (ND)	12	20%

Route of administration

Oral	3	5%
Injectable	51	85%
SC Sub cutaneous	2	3%
ID Intra dermal	3	5%
IM Intra muscular	46	77%
TBD / No Data (ND)	6	10%

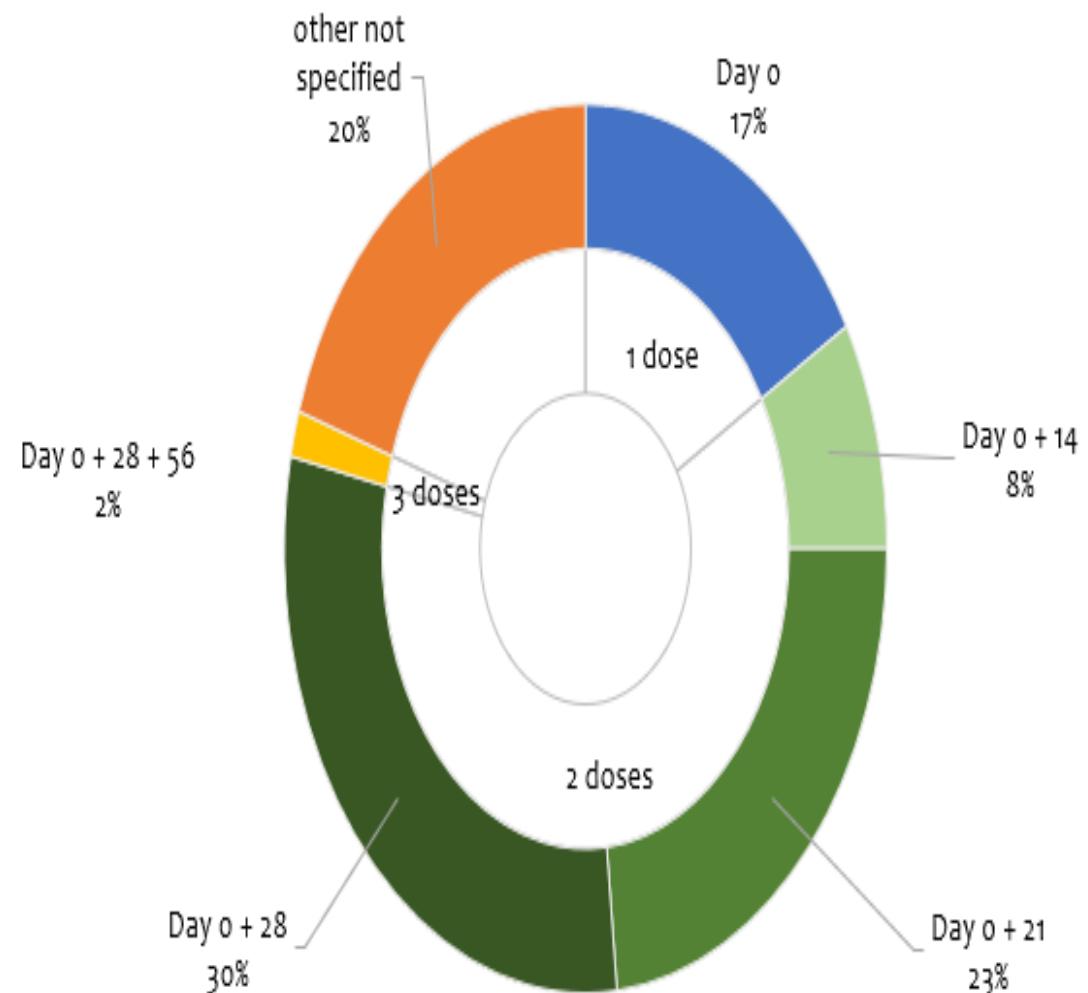


Table 2 | Overview of phase I/II results

Company (reference)	Vaccine (type)	Dose range (route)	Neut. titre after prime	Neut. titre after boost	T cell response	Trial registration number
Sinovac ³⁵	CoronaVac (inactivated SARS-CoV-2 + aluminium hydroxide)	3–6 µg (i.m.) 2× (day 0 and 14 (0/14) or 0/28)	ND	1:30–1:60 range ^a	ND	NCT04352608
Sinopharm ⁸⁰	Inactivated whole virus COVID-19 vaccine (inactivated SARS-CoV-2 + aluminium hydroxide)	2.5, 5 or 10 µg (i.m.) 3× (0/28/56) 5 µg (i.m.) 2× (0/14 or 0/21)	Not reported in detail	1:316 (2.5 µg, 0/28/58) ^b , 1:206 (5 µg, 0/28/58) ^b , 1:297 (10 µg, 0/28/58) ^b , 1:121 (5 µg, 0/14) ^b , 1:247 (5 µg, 0/21) ^b	ND	ChiCTR2000031809
CanSino ⁴⁸	Ad5 nCoV (non-replicating AdV5 expressing spike protein)	5 × 10 ¹⁰ , 10 ¹¹ VP (i.m.)	1:18.3–1:19.5 range ^c	NA	Yes	NCT04341389
AstraZeneca ⁴⁷	ChAdOx1 nCoV-19 (non-replicating chimpanzee AdV expressing spike protein)	5 × 10 ¹⁰ VP 1× or 2× (i.m.)	Median 1:21 ^b Median 1:51 ^d Range 1:4–1:16 ^e	Median 1:136 ^d Median 1:29 ^d	Yes	NCT04324606
Moderna ⁵⁹	mRNA-1273 (mRNA expressing spike protein)	2× 25, 100, 250 µg (i.m.)	Low	1:112.3 (25 µg) ^f , 1:343.8 (100 µg) ^f , 1:332.2 (250 µg) ^f , 1:339.7 (25 µg) ^g , 1:654.3 (100 µg) ^g	Good CD4 ⁺ and low CD8 ⁺ response	NCT04283461
Pfizer ⁸⁰	BNT162b1 (mRNA expressing a trimeric RBD)	2× 10, 30, 100 µg (i.m.)	Low	1:180 (10 µg) ^h , 1:437 (30 µg) ^h	ND	NCT04368728
Pfizer ⁸¹	BNT162b1 (mRNA expressing a trimeric RBD) and BNT162b2 (mRNA expressing spike protein)	2× 10, 20, 30 µg	Low	Day 28 ^h BNT126b1 (18–55 years): 1:168 (10 µg), 1:267 (30 µg) BNT126b1 (65–85 years): 1:37 (10 µg), 1:179 (20 µg), 1:101 (30 µg) BNT126b2 (18–55 years): 1:157 (10 µg), 1:363 (20 µg), 1:361 (30 µg) BNT126b2 (65–85 years): 1:84 (20 µg), 1:147 (30 µg)	ND	NCT04368728
Novavax ⁸⁷	NVX CoV2373 (Matrix-M) spike protein 'rosettes'	2× 2.5–25 µg (i.m. ± Matrix-M)	1:128 (25 µg + Matrix-M) ⁱ	1:3,906 (5 µg + Matrix-M) ⁱ , 1:3,305 (25 µg + Matrix-M) ⁱ	CD4 ⁺	NCT04368988

SARS-CoV-2 immunity: review and applications to phase 3 vaccine candidates

Gregory A Poland*, Inna G Ovsyannikova*, Richard B Kennedy*

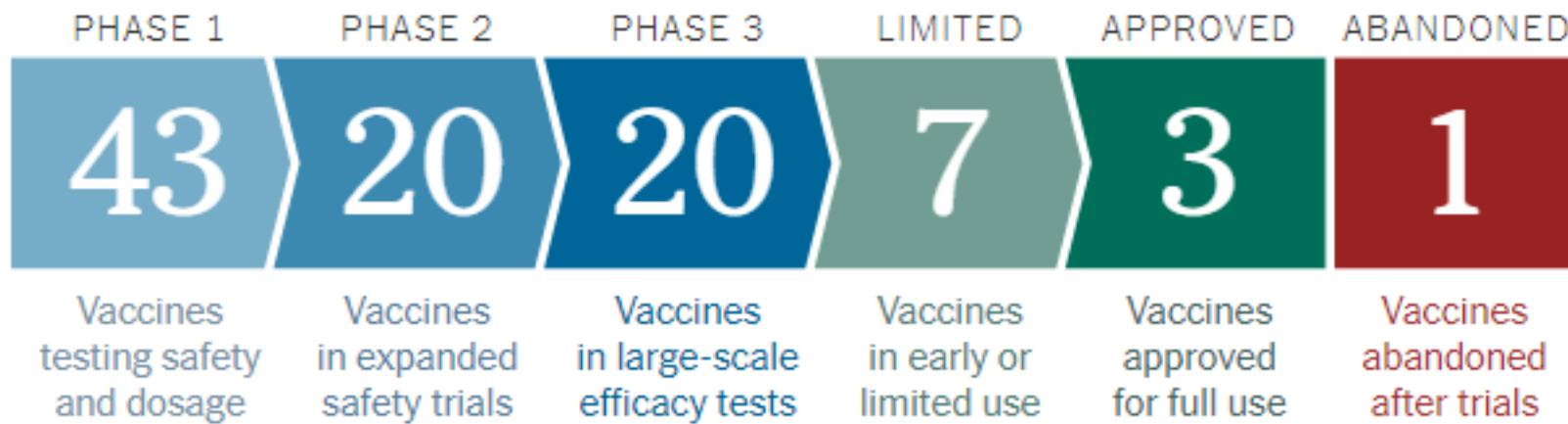
Phase 3 trials

AstraZeneca; University of Oxford (30 000 participants)	Chimpanzee adenovirus (ChAdOx1/AXD1222)	UK; India; Brazil; South Africa; USA	NCT04516746
Moderna; National Institutes of Health (30 000 participants)	RNA (mRNA-1273)	USA	NCT04470427
Pfizer; BioNTech (44 000 participants)	RNA (BNT162b1 and BNT162b2)	USA	NCT04368728
The Janssen Pharmaceutical Companies of Johnson & Johnson (60 000 participants)	Adenovirus serotype 26 vector (Ad26.COV2.S)	USA; Argentina; Brazil; Chile; Columbia; Mexico; Peru; Philippines; South Africa; Ukraine	NCT04505722
The Gamaleya National Research Centre for Epidemiology and Microbiology; Academy of Military Medical Sciences (40 000 participants)	Adenovirus serotype 5 vector and adenovirus serotype 26 vector (Sputnik V)	Russia	NCT04530396
CanSino Biologics; Academy of Military Medical Sciences (40 000 participants)	Adenovirus serotype 5 vector (Ad5CoV)	China; Pakistan	NCT04526990
Sinovac Biotech (9000 participants)	Inactivated virus (CoronaVac)	Brazil; Indonesia	..
Sinopharm; Wuhan Institute of Biological Products (21 000 participants)	Inactivated virus	The United Arab Emirates; Bahrain; Peru; Morocco; Argentina; Jordan	..
Sinopharm; Beijing Institute of Biological Products (5000 participants)	Inactivated virus (BBIBP-CorV)	The United Arab Emirates	..

Table: COVID-19 vaccine clinical trials

Coronavirus Vaccine Tracker

By Carl Zimmer, Jonathan Corum and Sui-Lee Wee Updated Jan. 6, 2021



Vaccines typically require years of research and testing before reaching the clinic, but in 2020, scientists embarked on a race to produce safe and effective coronavirus vaccines in record time. Researchers are currently testing **64 vaccines** in clinical trials on humans, and 20 have reached the final stages of testing. At least 85 preclinical vaccines are under active investigation in animals.

Vacunas Aprobadas y Aprobadas uso limitado

Leading vaccines

Developer	Type	Phase	Status
 Pfizer-BioNTech	mRNA	 	Approved in Canada, other countries. Emergency use in U.S., other countries.
 Moderna	mRNA		Approved in Canada. Emergency use in U.S., E.U., Israel.
 Gamaleya	Adenovirus		Early use in Russia. Emergency use in Belarus, Argentina.
 Oxford-AstraZeneca	Adenovirus	 	Emergency use in Britain, India, Argentina, Mexico.
 CanSino	Adenovirus		Limited use in China.
 Johnson & Johnson	Adenovirus		
 Vector Institute	Protein		Early use in Russia.
 Novavax	Protein		
 Sinopharm	Inactivated		Approved in China, U.A.E., Bahrain. Emergency use in Egypt.
 Sinovac	Inactivated		Limited use in China.
 Sinopharm-Wuhan	Inactivated		Limited use in China, U.A.E.
 Bharat Biotech	Inactivated		Emergency use in India.

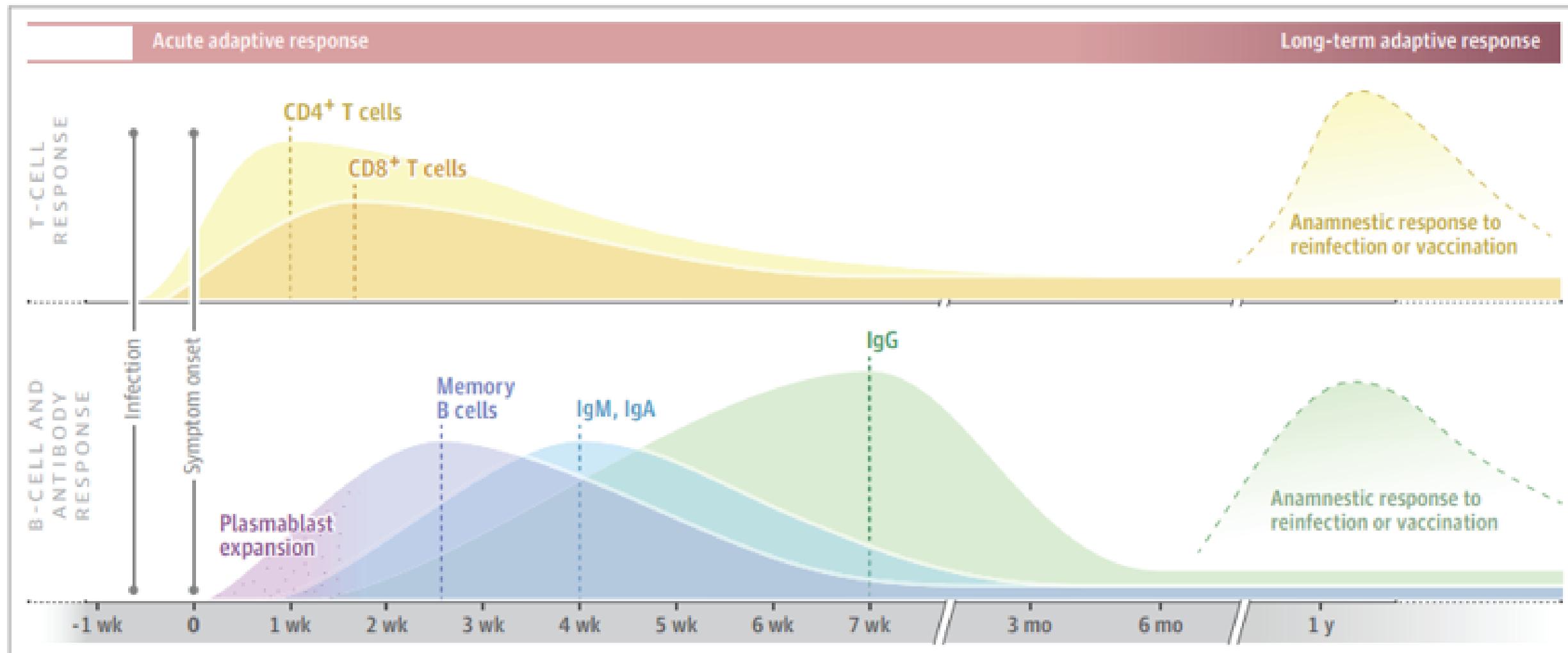
Vacunas Fases

PRUEBAS DE EFICACIA DE LA FASE 3: Los científicos administran la vacuna a miles de personas y **esperan ver cuántas se infectan**, en **comparación** con los **voluntarios que recibieron un placebo**. Estos ensayos pueden determinar si la vacuna protege contra el coronavirus. En junio, la FDA dijo que una vacuna contra el coronavirus tendría que proteger al menos al 50% de las personas vacunadas para que **se considere eficaz**. Además, los ensayos de fase 3 son lo suficientemente grandes como para **revelar** evidencia de **efectos secundarios relativamente raros** que podrían pasarse por alto en estudios anteriores.

APROBACIÓN ANTICIPADA O LIMITADA : China y Rusia han aprobado vacunas sin esperar los resultados de los ensayos de fase 3. Los expertos dicen que el proceso apresurado tiene serios riesgos.

APROBACIÓN : Los reguladores de cada país revisan los resultados del ensayo y deciden si aprueban o no la vacuna. **Durante una pandemia, una vacuna puede recibir una autorización de uso de emergencia antes de obtener una aprobación formal.** Una vez que se autoriza una vacuna, los **investigadores continúan monitoreando a las personas que la reciben para asegurarse de que sea segura y efectiva.**

FASES COMBINADAS : Una forma de acelerar el desarrollo de vacunas es combinar fases. Algunas vacunas contra el coronavirus se encuentran ahora en ensayos de fase 1/2, por ejemplo, en las que se prueban por primera vez en cientos de personas. (Tenga en cuenta que nuestro rastreador contaría una prueba combinada de Fase 1/2 como Fase 1 y Fase 2.)

Figure. Adaptive Immunity to Coronavirus Disease 2019

La vacuna ideal contra SARS CoV-2

Vacuna ideal

Inmunidad
humoral



Inmunidad
celular



Previene infección

Previene enfermedad

Inmunidad de rebaño

Protección a largo plazo

Draft landscape of COVID-19 candidate vaccines

martes, 5 de enero de 2021



1.- Number of vaccines in clinical development

63

2.- Number of vaccines in pre-clinical development

172

ID	Vaccine platform acronymn	Vaccine platform description	Type of candidate vaccine	Number of doses	Dosing schedule	Route of administration	Developers	Phase
1	IV	Inactivated virus	SARS-CoV-2 vaccine (inactivated)	2	Day 0 + 14	IM	Sinovac Research and Development Co., Ltd	Phase 3
2	IV	Inactivated virus	Inactivated SARS-CoV-2 vaccine (Vero cell)	2	Day 0 + 21	IM	Sinopharm + Wuhan Institute of Biological Products	Phase 3
3	IV	Inactivated virus	Inactivated SARS-CoV-2 vaccine (Vero cell)	2	Day 0 + 21	IM	Sinopharm + Beijing Institute of Biological Products	Phase 3
4	VVnr	Viral vector (Non-replicating)	ChAdOx1-S - (AZD1222) (Covishield)	1-2	Day 0 + 28	IM	AstraZeneca + University of Oxford	Phase 3
5	VVnr	Viral vector (Non-replicating)	Recombinant novel coronavirus vaccine (Adenovirus type 5 vector)	1	Day 0	IM	CanSino Biological Inc./Beijing Institute of Biotechnology	Phase 3

ID	Vaccine platform acronymn	Vaccine platform description	Type of candidate vaccine	Number of doses	Dosing schedule	Route of administration	Developers	Phase
6	VVnr	Viral vector (Non-replicating)	Gam-COVID-Vac Adeno-based (rAd26-S+rAd5-S)	2	Day 0 + 21	IM	Gamaleya Research Institute ; Health Ministry of the Russian Federation	Phase 3
7	VVnr	Viral vector (Non-replicating)	Ad26.COV2.S	1-2	Day 0 or Day 0 +56	IM	Janssen Pharmaceutical	Phase 3
8	PS	Protein subunit	SARS-CoV-2 rS/Matrix M1-Adjuvant (Full length recombinant SARS CoV-2 glycoprotein nanoparticle vaccine adjuvanted with Matrix M)	2	Day 0 + 21	IM	Novavax	Phase 3
9	RNA	RNA based vaccine	mRNA -1273	2	Day 0 + 28	IM	Moderna + National Institute of Allergy and Infectious Diseases (NIAID)	Phase 3
10	RNA	RNA based vaccine	BNT162 (3 LNP-mRNAs)	2	Day 0 + 28	IM	BioNTech + Fosun Pharma ; Jiangsu Provincial Center for Disease Prevention and Control + Pfizer	Phase 2/3
11	PS	Protein subunit	Recombinant SARS-CoV-2 vaccine (CHO Cell)	2-3	Day 0 +28 or Day 0 +28 +56	IM	Anhui Zhifei Longcom Biopharmaceutical + Institute of Microbiology, Chinese Academy of Sciences	Phase 3

ID	Vaccine platform acronym	Vaccine platform description	Type of candidate vaccine	Number of doses	Dosing schedule	Route of administration	Developers	Phase
12	RNA	RNA based vaccine	CVnCoV Vaccine	2	Day 0 + 28	IM	CureVac AG	Phase 2/3
13	IV	Inactivated virus	SARS-CoV-2 vaccine (vero cells)	2	Day 0 + 28	IM	Institute of Medical Biology + Chinese Academy of Medical Sciences	Phase 1/2
14	IV	Inactivated virus	QazCovid-in® - COVID-19 inactivated vaccine	2	Day 0 + 21	IM	Research Institute for Biological Safety Problems, Rep of Kazakhstan	Phase 1/2
15	DNA	DNA based vaccine	INO-4800+electroporation	2	Day 0 + 28	ID	Inovio Pharmaceuticals + International Vaccine Institute	Phase 2/3
16	DNA	DNA based vaccine	AG0301-COVID19	2	Day 0 + 14	IM	AnGes + Takara Bio + Osaka University	Phase 1/2
17	DNA	DNA based vaccine	nCov vaccine	3	Day 0 + 28 + 56	ID	Cadila Healthcare Ltd.	Phase 1/2
18	DNA	DNA based vaccine	GX-19	2	Day 0 + 28	IM	Genexine Consortium	Phase 1/2
19	IV	Inactivated virus	Whole-Virion Inactivated SARS-CoV-2 Vaccine (BBV152)	2	Day 0 + 14	IM	Bharat Biotech International Limited	Phase 3
20	PS	Protein subunit	KBP-COVID-19 (RBD-based)	2	Day 0 + 21	IM	Kentucky Bioprocessing Inc.	Phase 1/2
21	PS	Protein subunit	SARS-CoV-2 vaccine formulation 1 with adjuvant 1 (S protein (baculovirus production)	2	Day 0 + 21	IM	Sanofi Pasteur + GSK	Phase 1/2
22	RNA	RNA based vaccine	ARCT-021	ND	ND	IM	Arcturus Therapeutics	Phase 1/2
23	VLP	Virus like particle	RBD SARS-CoV-2 HBsAg VLP vaccine	2	Day 0 + 28	IM	Serum Institute of India + Accelagen Pty	Phase 1/2
24	IV	Inactivated virus	Inactivated SARS-CoV-2 vaccine (Vero cell)	1,2 or 3	ND	IM	Shenzhen Kangtai Biological Products Co., Ltd.	Phase 2
25	VVnr	Viral vector (Non-replicating)	GRAd-COV2 (Replication defective Simian Adenovirus (GRAd) encoding S)	1	Day 0	IM	ReiThera + Leukocare + Univercells	Phase 1
26	VVnr	Viral vector (Non-replicating)	VXA-CoV2-1 Ad5 adjuvanted Oral Vaccine platform	2	Day 0 + 28	Oral	Vaxart	Phase 1
27	VVnr	Viral vector (Non-replicating)	MVA-SARS-2-S	2	Day 0 + 28	IM	University of Munich (Ludwig-Maximilians)	Phase 1

Aprobadas

<https://www.nytimes.com/search?query=covid-19+vaccine>

Vacunas genéticas

Pfizer

Vacunas que utilizan uno o más genes propios del coronavirus para provocar una respuesta inmune. DNA/ **RNA**

PHASE 2 PHASE 3 COMBINED PHASES

APPROVED IN SEVERAL COUNTRIES EMERGENCY USE IN U.S., ELSEWHERE



VACCINE NAME: Comirnaty (also known as tozinameran or BNT162b2)

EFFICACY: 95%

DOSE: 2 doses, 3 weeks apart

TYPE: Muscle injection

STORAGE: Freezer storage only at -94°F (-70°C)

On Nov. 9, New York-based **Pfizer** and the German company **BioNTech** made history by presenting preliminary data indicating that their coronavirus vaccine was over 90 percent effective. It was the first time anyone had found such evidence. Just over a month later, on Dec. 11, the Food and Drug Administration granted it the first emergency use authorization ever given by the United States to a coronavirus vaccine.

Vacuna basada en ARN que codifica la proteína S completa de SARS-CoV-2 en una nanopartícula lipídica

Fase 1

Sep/2020
Protocolo de estudio

14/oct • Walsh EE
N Engl J Med. 2020, 14/oct.
DOI:10.1056/NEJMoa2027906

Diseño

- 195 adultos sanos, 18-55 y 65-85 años
- Aleatorizado, simple ciego, controlado con placebo, escala de dosis (10, 20 y 30 mcg) de BNT162b1 o BNT162b2, o bien 100 mcg de BNT162b1
- 2 dosis, intervalo 3 semanas

Resultados

- Respuesta Ac similar en ambos compuestos y superior a suero convaleciente con dosis de 30 mcg

Seguridad

- Efectos adversos locales leves-moderados, similar con ambos compuestos
- Efectos adversos generales más frecuentes y graves con BNT162b1
- Conservación a -70 °C (24h: +2 a +8 °C)

Fase 1/2

12/ago • Mulligan MJ
Nature. 2020;586:589-93

Diseño

- 45 adultos sanos, 18-55 años
- Aleatorizado, simple ciego, controlado con placebo, escala de dosis (10, 30 y 100 mcg) de BNT162b1
- 2 dosis, intervalo de 3 semanas

Resultados

- Todos los participantes con 10 y 30 mcg consiguen Ac neutralizantes

Seguridad

- Efectos adversos locales más frecuentes con la 2.ª dosis
- No efectos adversos graves

<http://vacunasaep.org/>
@CAV_AEP • 1/dic, 2020

Fase 3

Nov/2020 • Notas de prensa ([9/nov](#) y [18/nov](#)) de Pfizer y BioNTech

Diseño

- 43.661 adultos ≥16 años, 41 % con 56-85 años
- Aleatorizado, doble ciego, controlado con placebo
- 2 dosis de BNT162b2

*Solicitada
aprobación
EMA
1/dic/2020*

Resultados

- 170 casos: 162 en grupo placebo y 8 en de vacuna
- 10 casos graves, 9 en el grupo placebo
- Eficacia vacunal 95 %, ≥65 años 94 %

Limitación

- Análisis provisional, datos aportados en nota de prensa

• Comentarios.
[IDSA](#), 20/nov/2020

• Comentarios.
[Callaway E.](#) *Nature.* 2020, 9/nov

• Limitaciones. Doshi P. *BMJ Opinion.* 2020, 26 de noviembre

ORIGINAL ARTICLE

Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine

Fernando P. Polack, M.D., Stephen J. Thomas, M.D., Nicholas Kitchin, M.D., Judith Absalon, M.D., Alejandra Gurtman, M.D., Stephen Lockhart, D.M., John L. Perez, M.D., Gonzalo Pérez Marc, M.D., Edson D. Moreira, M.D., Cristiano Zerbini, M.D., Ruth Bailey, B.Sc., Kena A. Swanson, Ph.D., Satrajit Roychoudhury, Ph.D., Kenneth Koury, Ph.D., Ping Li, Ph.D., Warren V. Kalina, Ph.D., David Cooper, Ph.D., Robert W. Frenck, Jr., M.D., Laura L. Hammitt, M.D., Özlem Türeci, M.D., Haylene Nell, M.D., Axel Schaefer, M.D., Serhat Ünal, M.D., Dina B. Tresnan, D.V.M., Ph.D., Susan Mather, M.D., Philip R. Dormitzer, M.D., Ph.D., Uğur Şahin, M.D., Kathrin U. Jansen, Ph.D., and William C. Gruber, M.D., for the C4591001 Clinical Trial Group*

ABSTRACT

BACKGROUND

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and the resulting coronavirus disease 2019 (Covid-19) have afflicted tens of millions of people in a worldwide pandemic. Safe and effective vaccines are needed urgently.

METHODS

In an ongoing multinational, placebo-controlled, observer-blinded, pivotal efficacy trial, we randomly assigned persons 16 years of age or older in a 1:1 ratio to receive two doses, 21 days apart, of either placebo or the BNT162b2 vaccine candidate (30 μ g per dose). BNT162b2 is a lipid nanoparticle-formulated, nucleoside-modified RNA vaccine that encodes a prefusion stabilized, membrane-anchored SARS-CoV-2 full-length spike protein. The primary end points were efficacy of the vaccine against laboratory-confirmed Covid-19 and safety.

The authors' affiliations are listed in the Appendix. Address reprint requests to Dr. Absalon at Pfizer, 401 N. Middletown Rd., Pearl River, NY 10965, or at judith.absalon@pfizer.com.

*A complete list of investigators in the C4591001 Clinical Trial Group is provided in the Supplementary Appendix, available at NEJM.org.

Drs. Polack and Thomas contributed equally to this article.

This article was published on December 10, 2020, and updated on December 16, 2020, at NEJM.org.

DOI: 10.1056/NEJMoa2034577

Table 2. Vaccine Efficacy against Covid-19 at Least 7 days after the Second Dose.*

Efficacy End Point	BNT162b2	Placebo	Vaccine Efficacy, % (95% Credible Interval)‡	Posterior Probability >30%§
	No. of Cases (N=18,198)	Surveillance Time (n)†	No. of Cases (N=18,325)	Surveillance Time (n)†
Covid-19 occurrence at least 7 days after the second dose in participants without evidence of infection	8	2.214 (17,411)	162	2.222 (17,511) 95.0 (90.3–97.6) >0.9999
	(N=19,965)		(N=20,172)	
Covid-19 occurrence at least 7 days after the second dose in participants with and those without evidence of infection	9	2.332 (18,559)	169	2.345 (18,708) 94.6 (89.9–97.3) >0.9999

* The total population without baseline infection was 36,523; total population including those with and those without prior evidence of infection was 40,137.

† The surveillance time is the total time in 1000 person-years for the given end point across all participants within each group at risk for the end point. The time period for Covid-19 case accrual is from 7 days after the second dose to the end of the surveillance period.

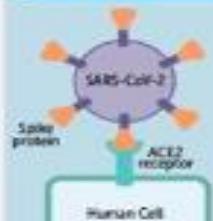
‡ The credible interval for vaccine efficacy was calculated with the use of a beta-binomial model with prior beta (0.700102, 1) adjusted for the surveillance time.

§ Posterior probability was calculated with the use of a beta-binomial model with prior beta (0.700102, 1) adjusted for the surveillance time.

BNT162b2 mRNA Covid-19 Vaccine

How safe and effective is the BioNTech and Pfizer's new BNT162b2 vaccine?

BACKGROUND



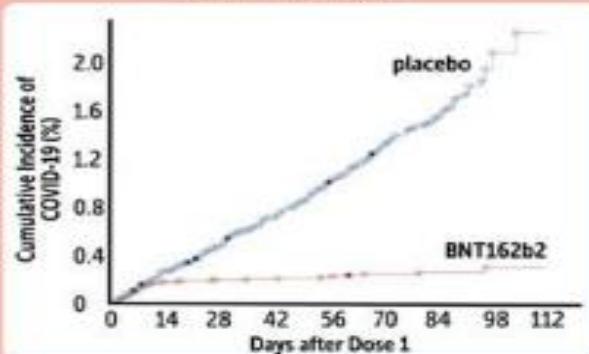
SARS-CoV-2 infects human cells by endocytosis when the viral spike protein binds to **ACE2**, a receptor on human respiratory epithelial cells.

BNT162b2 is a modified RNA vaccine that encodes the SARS-CoV-2 full-length spike protein.

EFFICACY

- 1 does BNT162b2 prevent COVID-19 onset >7 days after second dose?
- 2 does BNT162b2 protect against severe COVID-19?
(severe systemic illness; respiratory failure; shock, acute renal, hepatic, or neurologic dysfunction; admission to ICU; death)

95% effective
COVID-19 cases >7 days onset after second dose:
8 cases with BNT162b2
162 cases with placebo



2 cases of severe COVID-19 with onset after first dose:
1 case with BNT162b2
9 cases with placebo

similar vaccine efficacy observed across subgroups defined by age, sex, race, ethnicity, baseline BMI, and the presence of coexisting conditions

METHODS

43,448 participants randomized

2 doses,
21 days apart,
avg 2 month follow-up

Inclusion: 16+yo, healthy, stable medical conditions including (but not limited to): HIV, HBV, HCV.
exclusion: history of COVID-19, on immunosuppressive therapy, immunocompromising condition

18,556 received BNT162b2 (30 µg per dose)
18,530 received placebo



SAFETY

pain at injection site headache fatigue muscle and joint pain
most common side effects with vaccine

27%

adverse events with BNT162b2, compared to 12% with placebo

4

BNT162b2 serious adverse events: shoulder injury, lymphadenopathy, arrhythmia, paresthesia

0

vaccine related deaths

safety monitoring will continue for 2 years after second dose

LIMITATIONS

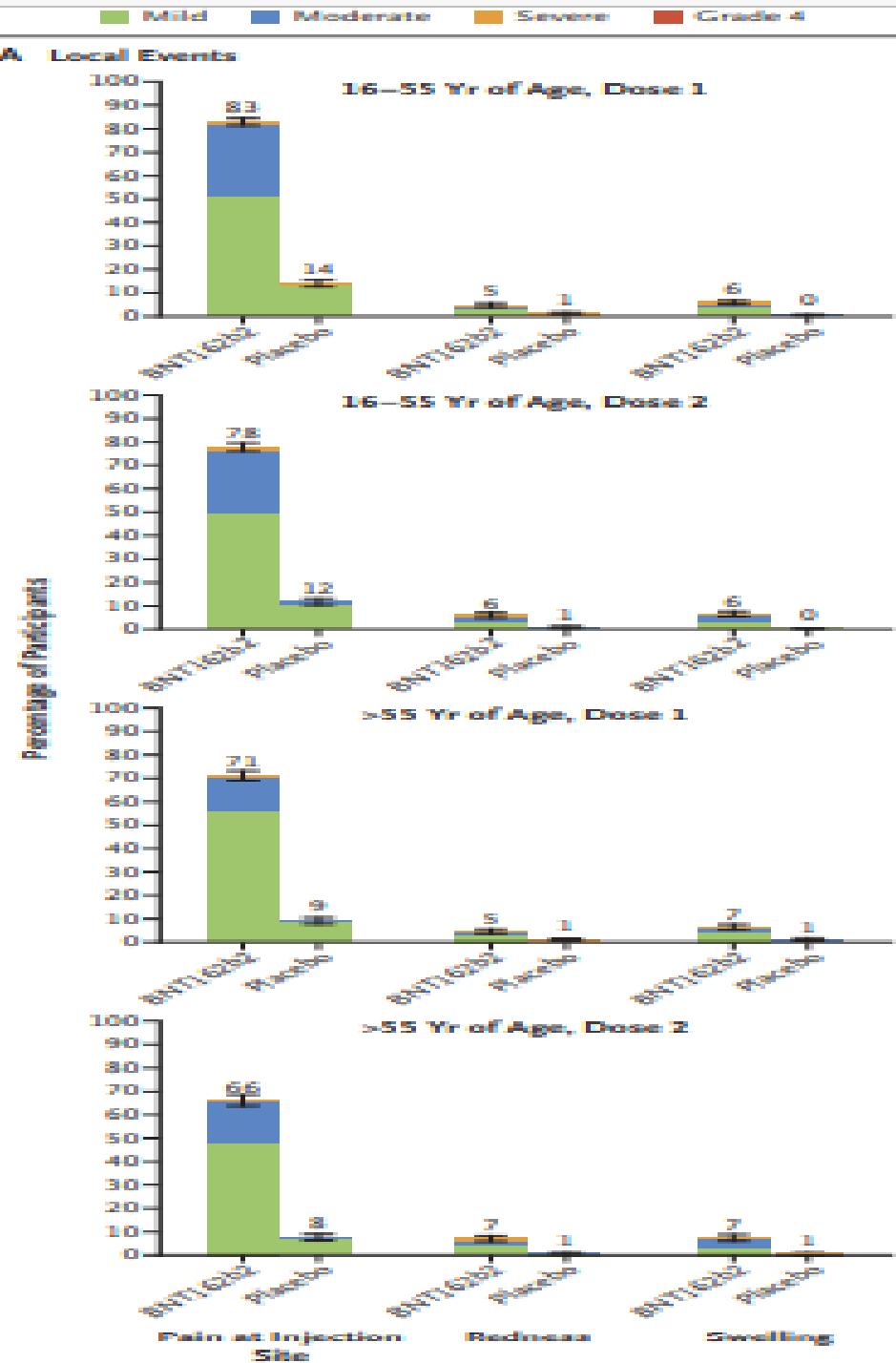
data is not large enough to detect less common adverse events reliably

ethical and practical barriers prevent following placebo recipients for 2 years without offering active immunization; once vaccine is approved by regulators

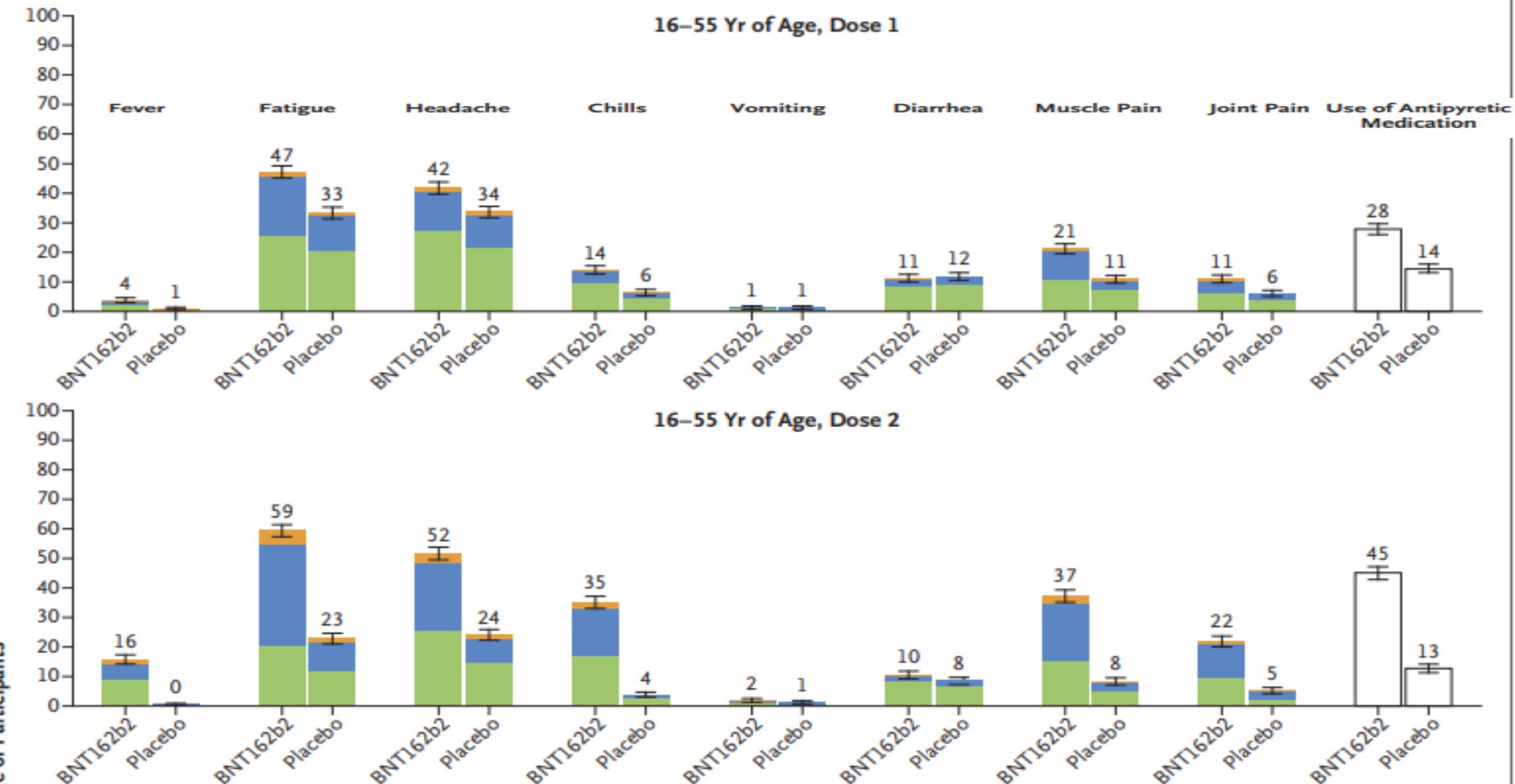
unknown whether vaccination prevents asymptomatic infection

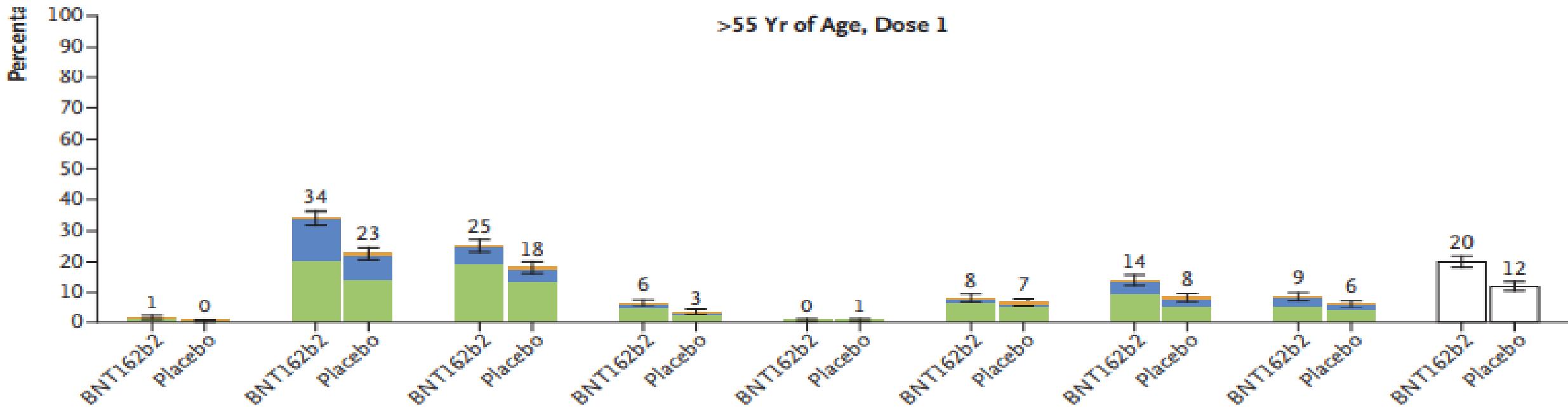
A two-dose regimen of BNT162b2 is safe and 95% effective against Covid-19 in persons 16+ years old.

n engl j med nejm.org Safety and Efficacy of the BNT162b2 Vaccine December 16, 2020

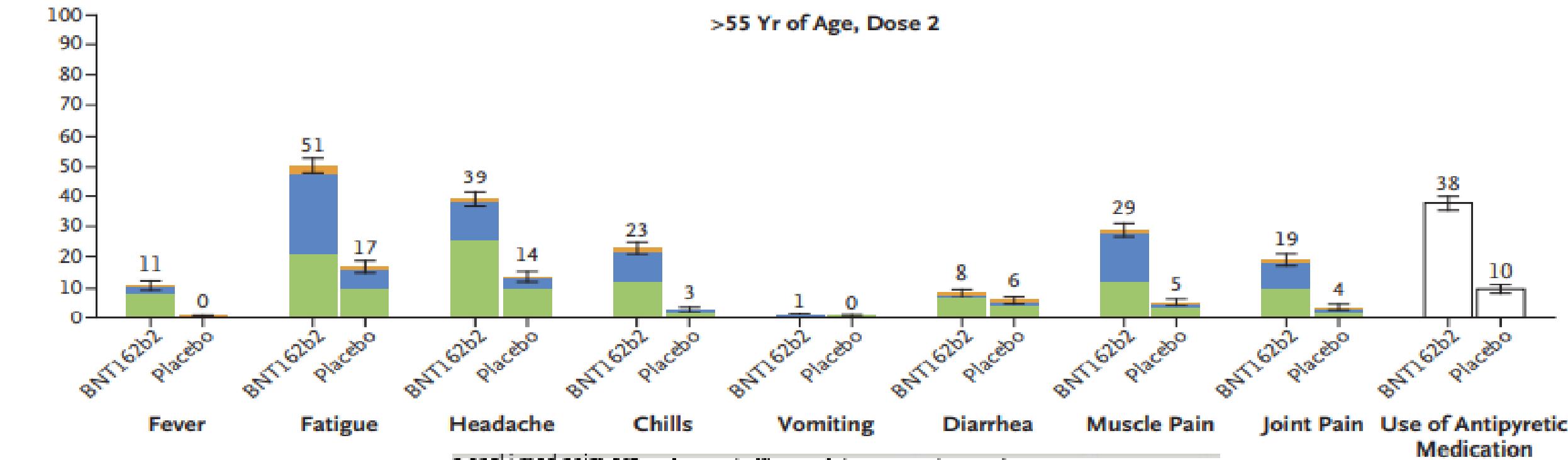


B Systemic Events and Use of Medication





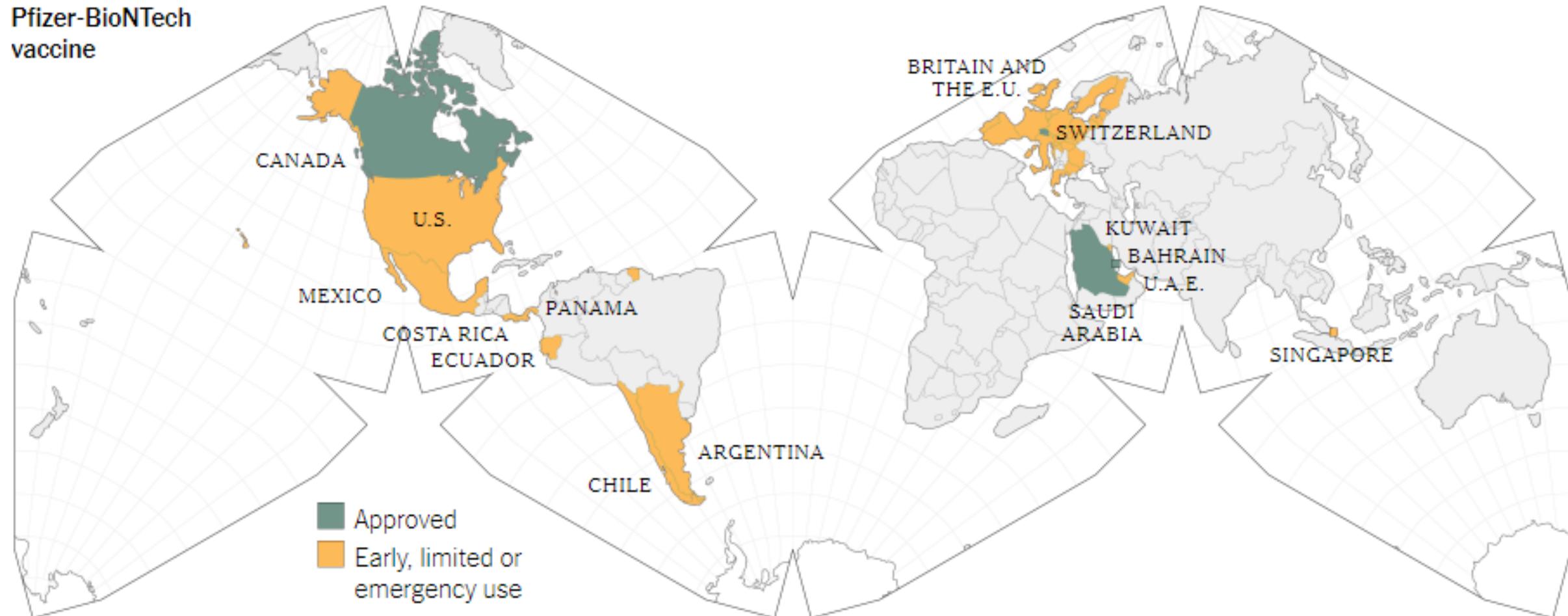
>55 Yr of Age, Dose 2



For more details, see [How the Pfizer-BioNTech Vaccine Works](#).

Updated Jan. 2

Pfizer-BioNTech
vaccine



Vacunas genéticas

Vacunas que utilizan uno o más genes propios del coronavirus para provocar una respuesta inmune. DNA/**RNA**

PHASE 3

APPROVED IN CANADA

EMERGENCY USE IN U.S.



National Institutes of Health
Turning Discovery Into Health

VACCINE NAME: mRNA-1273

EFFICACY: 94.5%

DOSE: 2 doses, 4 weeks apart

TYPE: Muscle injection

STORAGE: 30 days with refrigeration, 6 months at -4°F (-20°C)

On Dec. 18., the F.D.A. gave emergency use authorization for a vaccine made by the Boston-based company **Moderna**. The decision cleared the way for 5.9 million doses to be distributed across the United States starting over the weekend. The Moderna vaccine is the second one authorized by the F.D.A., coming a week after the vaccine made by Pfizer and BioNTech. Canada approved the vaccine on Dec. 23.

<https://www.nytimes.com/search?query=covid-19+vaccine>

Vacunas #covid | Vacunas de ARN | Moderna & NIAID, EE. UU. | mRNA-1273 | Resumen

Vacuna basada en ARN que codifica la proteína S de SARS-CoV-2 en su conformación prefusión, en una nanopartícula lipídica

Fase 1

14/jul/2020 • Jackson LA
[N Engl J Med. 2020;383:1920-31](https://doi.org/10.1056/NEJMoa2028436)

Diseño

- 45 adultos sanos 18-55 años
- Abierto, escala de dosis (25, 100 y 250 mcg)
- 2 dosis, 28 días intervalo

Resultados

- Respuesta Ac mayor con dosis alta y 1.^a dosis
- 2.^a dosis aumenta títulos
- Todos los participantes con ABS después de la 2.^a dosis

Seguridad

- Efectos adversos leves-moderados, más frecuentes tras la 2.^a dosis
- No efectos adversos graves

14/jul/2020
• Editorial
• Heaton PM
[N Engl J Med. 2020;383:1986-8](https://doi.org/10.1056/NEJMoa2028436)

17/sep/2020
• Cartas y respuestas
• Schaefer JR, Schadar RA, Jackson LA.
[N Engl J Med. 2020;383:1986-8](https://doi.org/10.1056/NEJMoa2028436)

20/ago/2020
[Protocolo de estudio](#)



<http://vacunasaep.org/>
@CAV_AEP • v.2 • 30/nov, 2020

Fase 3

30/nov/2020 • [Nota de prensa](#), Moderna

Diseño

- ≈30 000 adultos ≥18 años
- Doble ciego, aleatorizado, frente a placebo (SSF)
- 2 dosis de 100 mcg, intervalo de 1 mes

Resultados

- 196 casos: 185 con placebo y 11 con vacuna
- Eficacia vacunal estimada 94,1 % ($p<0,0001$)
- 30 casos de enfermedad grave y 1 muerte, todos en el grupo placebo

Seguridad: no efectos adversos graves; mialgias, fatiga 9-10 %

Más información

- Datos aportados por la empresa desarrolladora
- Moderna solicita autorización condicional a FDA y EMA
- Conservación: 6 meses congelador, 1 mes frigorífico (ambos convencionales), 12 horas temperatura ambiente

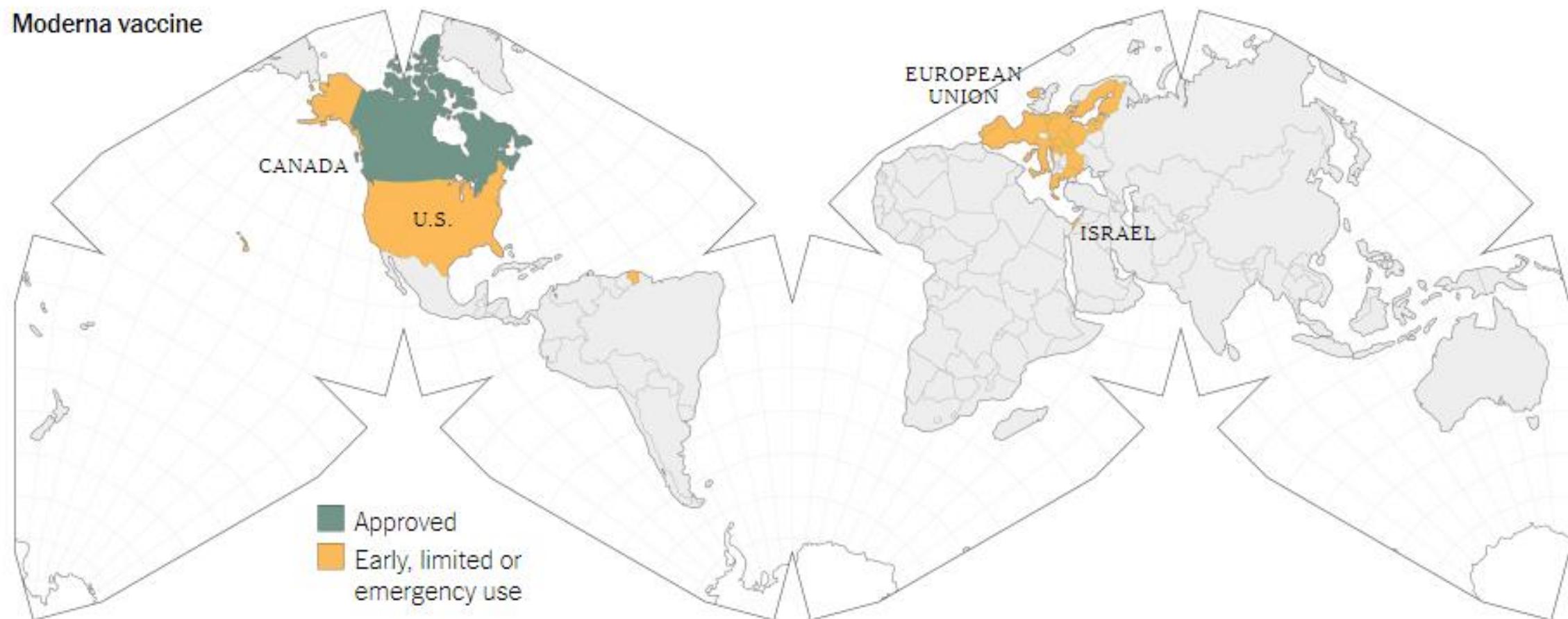
• Información adicional. Mahase E.
[BMJ. 2020;371:m4471](https://doi.org/10.1136/bmjjournals.2020.m4471)

• Comentarios. Callaway E. [Nature. 2020;587:337-8](https://doi.org/10.1038/d41586-020-0337-8)

• Limitaciones. Doshi P. [BMJ Opinion. 2020, 26 de noviembre](https://doi.org/10.1136/bmjjournals.2020.m4471)

For more details, see [How Moderna's Vaccine Works](#).

Updated Jan. 6



Aprobación uso temprano Rusia / Argentina

APROBACIÓN ANTICIPADA O LIMITADA

Vacunas vectoriales virales

Vacunas que utilizan un virus para introducir genes de coronavirus en las células. Las células producen proteínas virales que provocan una respuesta inmunitaria, pero el virus no puede replicarse.

PHASE 3

EARLY USE IN RUSSIA, ELSEWHERE



МИНИСТЕРСТВО
ЗДРАВООХРАНЕНИЯ
РОССИЙСКОЙ ФЕДЕРАЦИИ

VACCINE NAME: Sputnik V (formerly Gam-Covid-Vac)

EFFICACY: 91.4%

DOSE: 2 doses, 3 weeks apart

TYPE: Muscle injection

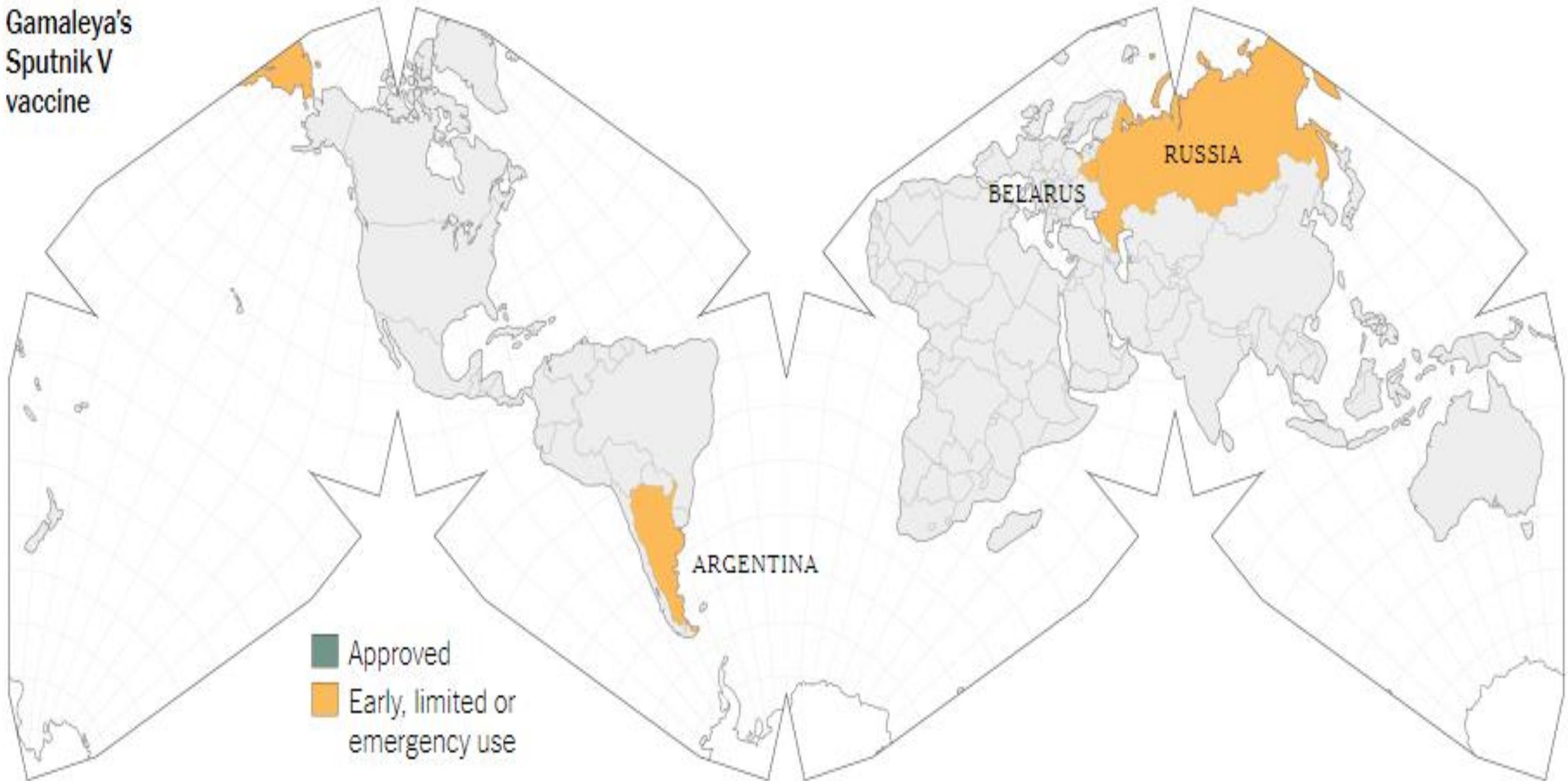
STORAGE: Freezer storage. Developing an alternative formulation that can be refrigerated.

The **Gamaleya Research Institute**, part of Russia's Ministry of Health, has created a vaccine with an efficacy rate of 91.4 percent, according to a [Dec. 14 announcement](#).

Gamaleya produced the vaccine, initially called Gam-Covid-Vac, from a combination of two adenoviruses called Ad5 and Ad26. Both kinds

<https://www.nytimes.com/search?query=covid-19+vaccine>

Gamaleya's
Sputnik V
vaccine



Oxford Aprobada Emergencia

Vacunas que utilizan un virus para introducir genes de coronavirus en las células. Las células producen proteínas virales que provocan una respuesta inmunitaria, pero el virus no puede replicarse.

PHASE 2

PHASE 3

COMBINED PHASES

EMERGENCY USE IN BRITAIN, ELSEWHERE



UNIVERSITY OF
OXFORD

AstraZeneca 

VACCINE NAME: AZD1222 (also known as Covishield in India)

EFFICACY: Up to 90%

DOSE: 2 doses, 4 weeks apart

TYPE: Muscle injection

STORAGE: Stable in refrigerator for at least 6 months

On Dec. 8, researchers with the **University of Oxford** and the British-Swedish company **AstraZeneca** published [the first scientific paper](#) on a Phase 3 clinical trial of a coronavirus vaccine. The trial demonstrated that the vaccine can protect people from Covid-19, but it [left many questions unresolved](#) about the results.

Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: an interim analysis of four randomised controlled trials in Brazil, South Africa, and the UK

Merryn Voysey*, Sue Ann Costa Clemens*, Shabir A Madhi*, Lily Y Weckx*, Pedro M Folegatti*, Parvinder K Aley, Brian Angus, Vicky L Baillie, Shaun L Barnabas, Qasim E Bhorat, Sagida Bibi, Carmen Briner, Paola Cicconi, Andrea M Collins, Rachel Colin-Jones, Clare L Cutland, Thomas C Darton, Keertan Dheda, Christopher J A Duncan, Katherine R W Emery, Katie J Ewer, Lee Fairlie, Saul N Faust, Shuo Feng, Daniela M Ferreira, Adam Finn, Anna L Goodman, Catherine M Green, Christopher A Green, Paul T Heath, Catherine Hill, Helen Hill, Ian Hirsch, Susanne H C Hodgson, Alane Izu, Susan Jackson, Daniel Jenkin, Carina C D Joe, Simon Kerridge, Anthonet Koen, Gaurav Kwatra, Rajeka Lazarus, Alison M Lawrie, Alice Lelliott, Vincenzo Libri, Patrick J Lillie, Raburn Mallory, Ana V A Mendes, Eveline P Milan, Angela M Minassian, Alastair McGregor, Hazel Morrison, Yama F Mujadidi, Anusha Nana, Peter J O'Reilly, Sherman D Padayachee, Ana Pittella, Emma Plested, Katrina M Pollock, Maheshi N Ramasamy, Sarah Rhead, Alexandre V Schwarzbald, Nisha Singh, Andrew Smith, Rinn Song, Matthew D Snape, Eduardo Sprinz, Rebecca K Sutherland, Richard Tarrant, Emma C Thomson, M Estée Török, Mark Toshner, David P J Turner, Johan Vekemans, Tonya L Villafana, Marion E E Watson, Christopher J Williams, Alexander D Douglas*, Adrian V S Hill*, Teresa Lambe*, Sarah C Gilbert*, Andrew J Pollard* on behalf of the Oxford COVID Vaccine Trial Group†



Summary

Background A safe and efficacious vaccine against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), if deployed with high coverage, could contribute to the control of the COVID-19 pandemic. We evaluated the safety and efficacy of the ChAdOx1 nCoV-19 vaccine in a pooled interim analysis of four trials.

Methods This analysis includes data from four ongoing blinded, randomised, controlled trials done across the UK, Brazil, and South Africa. Participants aged 18 years and older were randomly assigned (1:1) to ChAdOx1 nCoV-19 vaccine or control (meningococcal group A, C, W, and Y conjugate vaccine or saline). Participants in the ChAdOx1 nCoV-19 group received two doses containing 5×10^{10} viral particles (standard dose; SD/SD cohort); a subset in the UK trial received a half dose as their first dose (low dose) and a standard dose as their second dose (LD/SD cohort). The primary efficacy analysis included symptomatic COVID-19 in seronegative participants with a nucleic acid amplification test-positive swab more than 14 days after a second dose of vaccine. Participants were analysed according to treatment received, with data cutoff on Nov 4, 2020. Vaccine efficacy was calculated as 1–relative risk derived from a robust Poisson regression model adjusted for age. Studies are registered at ISRCTN89951424 and ClinicalTrials.gov, NCT04324606, NCT04400838, and NCT04444674.

Findings Between April 23 and Nov 4, 2020, 23 848 participants were enrolled and 11 636 participants (7548 in the UK, 4088 in Brazil) were included in the interim primary efficacy analysis. In participants who received two standard doses, vaccine efficacy was 62·1% [95% CI 41·0–75·7; 27 [0·6%] of 4440 in the ChAdOx1 nCoV-19 group vs 71 [1·6%] of 4455 in the control group) and in participants who received a low dose followed by a standard dose, efficacy was 90·0% (67·4–97·0; three [0·2%] of 1367 vs 30 [2·2%] of 1374; $p_{interaction}=0·010$). Overall vaccine efficacy across both groups was 70·4% (95·8% CI 54·8–80·6; 30 [0·5%] of 5807 vs 101 [1·7%] of 5829). From 21 days after the first dose, there were ten cases hospitalised for COVID-19, all in the control arm; two were classified as severe COVID-19, including one death. There were 74341 person-months of safety follow-up (median 3·4 months, IQR 1·3–4·8); 175 severe adverse events occurred in 168 participants, 84 events in the ChAdOx1 nCoV-19 group and 91 in the control group. Three events were classified as possibly related to a vaccine: one in the ChAdOx1 nCoV-19 group, one in the control group, and one in a participant who remains masked to group allocation.

Interpretation ChAdOx1 nCoV-19 has an acceptable safety profile and has been found to be efficacious against symptomatic COVID-19 in this interim analysis of ongoing clinical trials.

Funding UK Research and Innovation, National Institutes for Health Research (NIHR), Coalition for Epidemic Preparedness Innovations, Bill & Melinda Gates Foundation, Lemann Foundation, Rede D'Or, Brava and Telles Foundation, NIHR Oxford Biomedical Research Centre, Thames Valley and South Midland's NIHR Clinical Research Network, and AstraZeneca.

Published Online
December 8, 2020
[https://doi.org/10.1016/S0140-6736\(20\)32661-1](https://doi.org/10.1016/S0140-6736(20)32661-1)

See Online/Comment
[https://doi.org/10.1016/S0140-6736\(20\)32623-4](https://doi.org/10.1016/S0140-6736(20)32623-4)

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Vacunas #covid | Vacunas de Vectores virales | ChAdOx1 / AZD1222

Universidad de Oxford y AstraZeneca | Resumen

Vacuna basada en un vector viral (adenovirus de chimpancé) no replicante con genes que codifican la expresión de la proteína S completa de SARS-CoV-2 en superficie

Fase 1/2

20/jul • Folegatti PM
[Lancet. 2020;396:467-78](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7507000/)

Diseño

- 1077 adultos sanos, 18-55 años, en RU
- Aleatorizado, simple ciego, controlado con placebo (vacuna MenACWY)
- 1 dosis (10 reciben una 2.^a dosis)

Resultados

- >90 % Ac neutralizantes
- Respuesta células T sostenida

Seguridad

- Efectos adversos locales y generales comunes; neutropenia transitoria

Fase 2

18/nov • Ramasamy MN
[Lancet. 2020. Doi:10.1016/S0140-6736\(20\)32466-1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7700000/)

Diseño

- 560 adultos sanos, 18-55, 56-69 y ≥70 años
- Aleatorizado, simple ciego, controlado con placebo (vacuna MenACWY)
- 1-2 dosis

Resultados

- Inmunogenicidad similar en los 3 grupos
- Tolerancia mejor a más edad

Fase 2/3

17/sep/2020
[Protocolo de estudio](#)
fase 3 en EE. UU.

23/nov • Nota de prensa de [AstraZeneca](#) y de la Universidad de Oxford

Análisis intermedio

Diseño

- 11.636 en RU y Brasil
- Pautas: media dosis y 2.^a completa; 2 dosis completas
- Aleatorizado, simple ciego, placebo MenACWY

Resultados

- 131 casos
- EV: 62 % pauta de 2 dosis completas; 90 % pauta media dosis inicial; combinada 70 %

Limitación

- Datos incompletos
- Pauta de media dosis inicial por error

Comentarios, dudas y necesidad de más información

- Nature. 2020;588:16-8
- Wired, 25/nov
- The New York Times, 27/nov

- Coste: 3-4 dólares/dosis
- Conservación: +2 a +8 °C
- Procesos de fabricación optimizados



For more details, see [How the Oxford-AstraZeneca Vaccine Works](#).

Updated Jan. 4

Oxford-AstraZeneca
vaccine





Línea de tiempo

Junio	Julio	Agosto	Septiembre
Inicio conversaciones con distintas casas farmacéuticas y Covax	Primer borrador de estrategia de acceso. 2 frentes de negociación: Bilateral Multilateral	Comité Estratégico de Salud del MSPS comienza análisis de las vacunas candidatas.	15 de septiembre Creación Instancia de Coordinación y Asesoría para el Acceso a Vacunas Seguras y Eficaces contra el Covid-19. Incluye entidades del Estado y expertos científicos.
	29 de julio Creación Comité Asesor MSPS para Proceso Estratégico de Inmunización de la Población Colombiana frente a la covid-19		Recomendaciones y evaluación de: <ul style="list-style-type: none">• Criterios técnicos• Selección de vacunas• Experiencias exitosas internacionales
		<ul style="list-style-type: none">• Vacunas candidatas• Fuentes de financiación• Esquemas de contratación	<ul style="list-style-type: none">• Estrategias de negociación• Criterios de priorización y distribución
		Las funciones de este comité incluyen la evaluación y el análisis de	

Diciembre



Conversaciones y negociaciones con las distintas **casas farmacéuticas**:

9 de diciembre

Expedición Ley 2064: declara de interés general la estrategia de vacunación contra el covid.

- Destinación y obtención de recursos para facilitar vacunación.
- Mejoramiento de capacidades científicas del país.
- Análisis de reacciones adversas de las vacunas el trámite de posibles indemnizaciones.
- **Gratuidad de la vacuna.**

Negociación con AstraZeneca

- 24 de septiembre. AstraZeneca presenta a Colombia la estrategia de acceso a su vacuna.
- 15 de octubre. Inicio formal de negociaciones.
- 16 de diciembre. Firma del contrato de suministro.

Negociación con Pfizer

- 30 de junio. Primera reunión de alto nivel Gobierno-Pfizer.
- Julio-noviembre. Presentación sobre el manejo de la cadena de frío e inicio formal de negociación.
- 17 de diciembre. Firma del contrato.



Tier 1 Target groups

Workers in health and social care settings

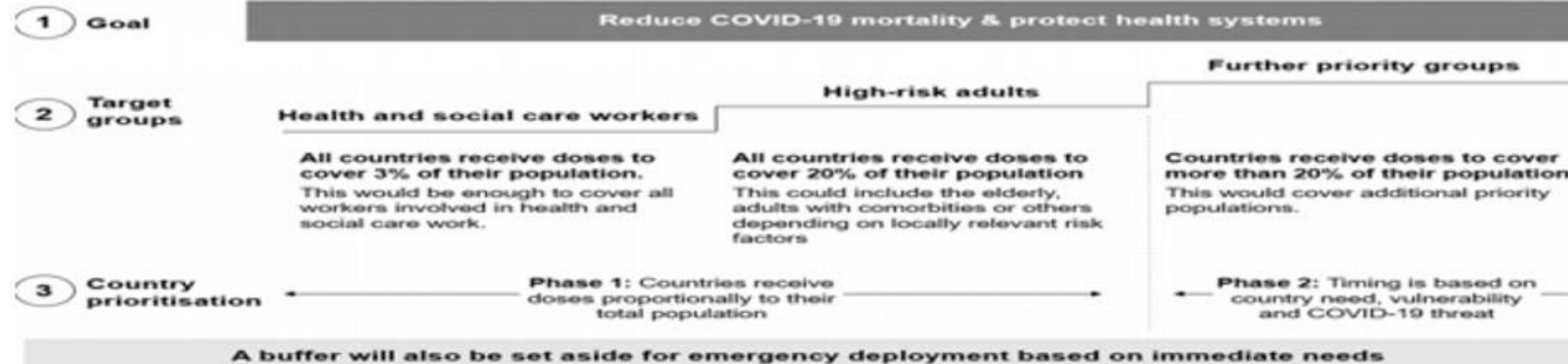
Adults > 65 years old

Adults with underlying conditions (comorbidities)

Estrategia COVAX : OPS - GAVI -CEPI

Covering ~ 20% of the population in each country would cover most of these groups, and enable to achieve a significant step change in COVID-19 response

Figure 3: Potential Tier 1 global target populations to reduce mortality





Contenido

1. Epidemiología SARS CoV 2 / COVID-19 Colombia
2. Aspectos clínicos
3. Vacunas en desarrollo
4. **Equidad- Oportunidad- Calidad**
5. Resumen



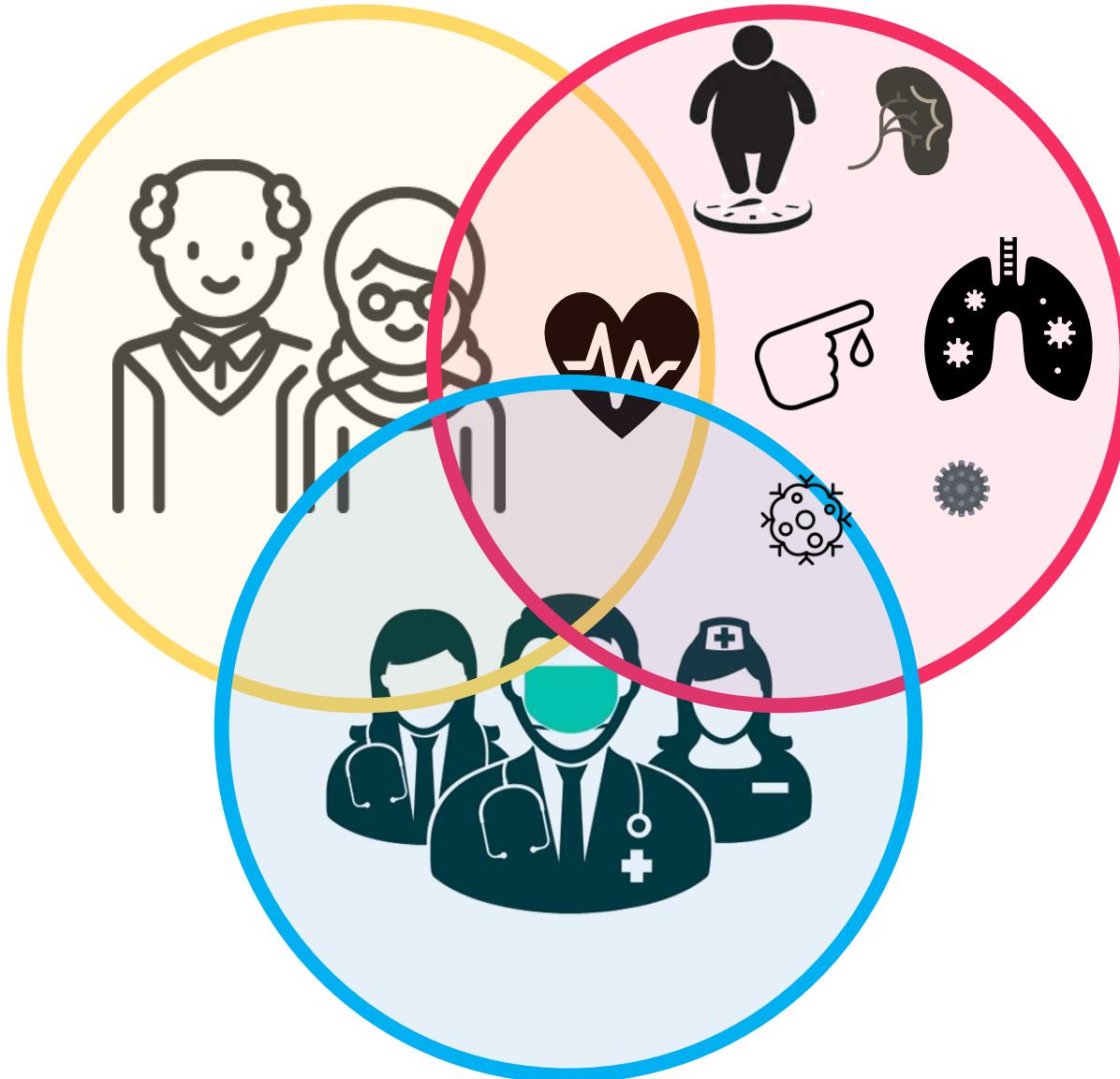
Objetivos Primera fase

- ▶ Reducir la mortalidad por Covid-19
- ▶ Reducir la incidencia de casos graves por Covid-19
- ▶ Proteger a los trabajadores de la salud

Objetivo Segunda fase

- ▶ Reducir el contagio

Poblaciones fase 1 2021



- Enfermedades hipertensivas
 - Diabetes
 - Insuficiencia renal
 - EPOC
 - Asma
- VIH
 - Cáncer
 - TBC
 - Hepatitis C
 - Obesidad

*Se incluyen aquellas patologías para las cuales existe evidencia de mayor letalidad

Personas priorizadas*



Programación de la vacunación

FASE 1 - 2021

INICIO FASE 2 - 2021

01

ETAPA 1

- **100%** Trabajadores de la salud y de apoyo 1° línea
- **100%** Mayores de 80 años

02

ETAPA 2

- **100%** Población de 60 a 79 años
- **100%** Trabajadores de la salud 2° y 3° línea

03

ETAPA 3

- **100%** Población de 16 a 59 años con comorbilidades
- **100%** Profesores básica y secundaria

04

ETAPA 4

- **100%** Cuidadores institucionales
- **100%** Población en ocupaciones y situaciones de riesgo

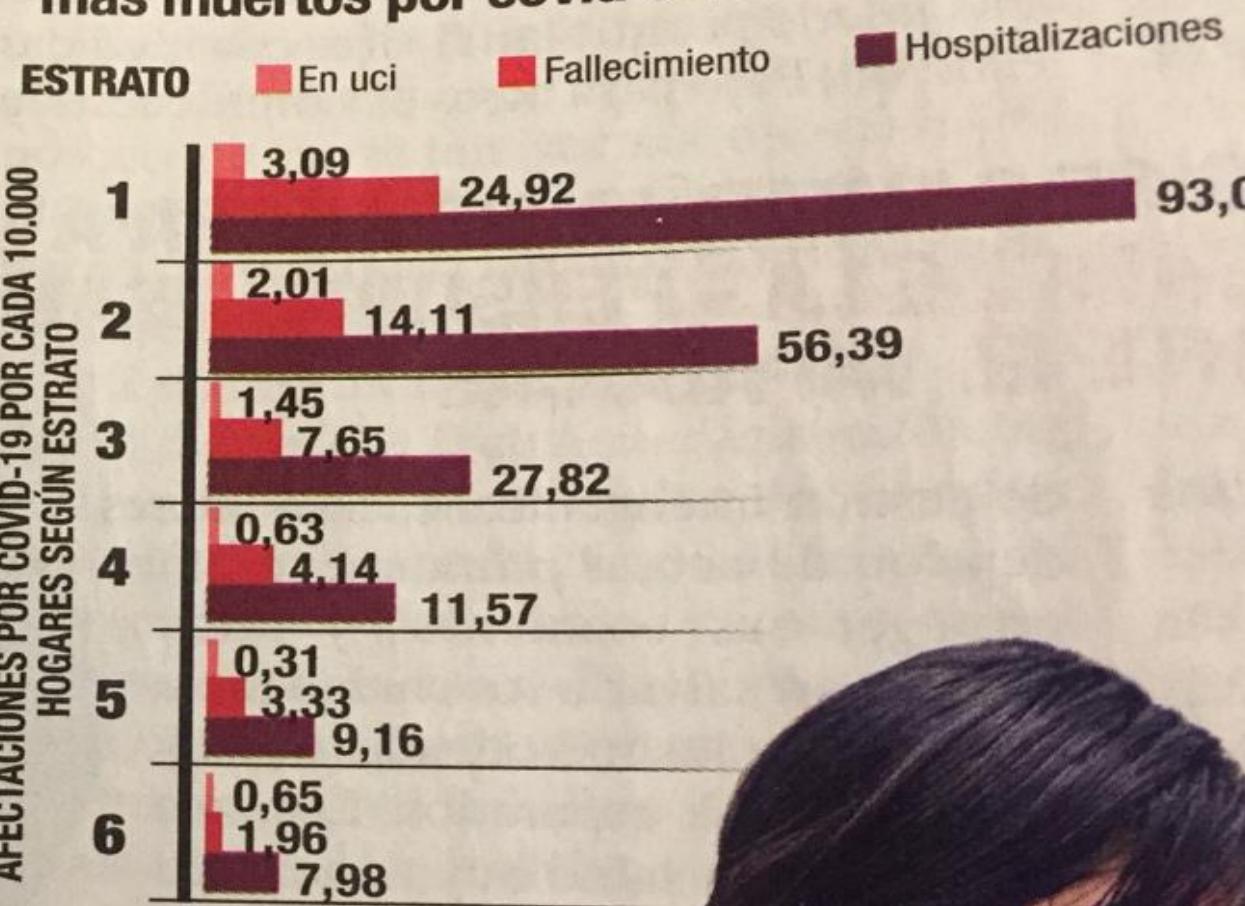
05

ETAPA 5

- Población entre 16 y 59 años libres de comorbilidades
 - 50 – 59
 - 40 – 49
 - 30 – 39
 - 20 – 29
 - 16 – 19

POR ESTRATO

Los estratos 1, 2 y 3 son los que han puesto más muertos por covid en Colombia.



Fuente: Nota Macroeconómica n.º23, Grupo de Investigación en Macroeconomía, Facultad de Economía, Universidad de los Andes <http://www.ins.gov.co/Noticias/Paginas/Coronavirus.aspx>

Equidad Colombia COVID 19

COVID-19 en población indígena en Colombia



COVID-19 en población afrocolombiana



COVID-19 en extranjeros en Colombia



Vacunas Plataformas Oportunidad

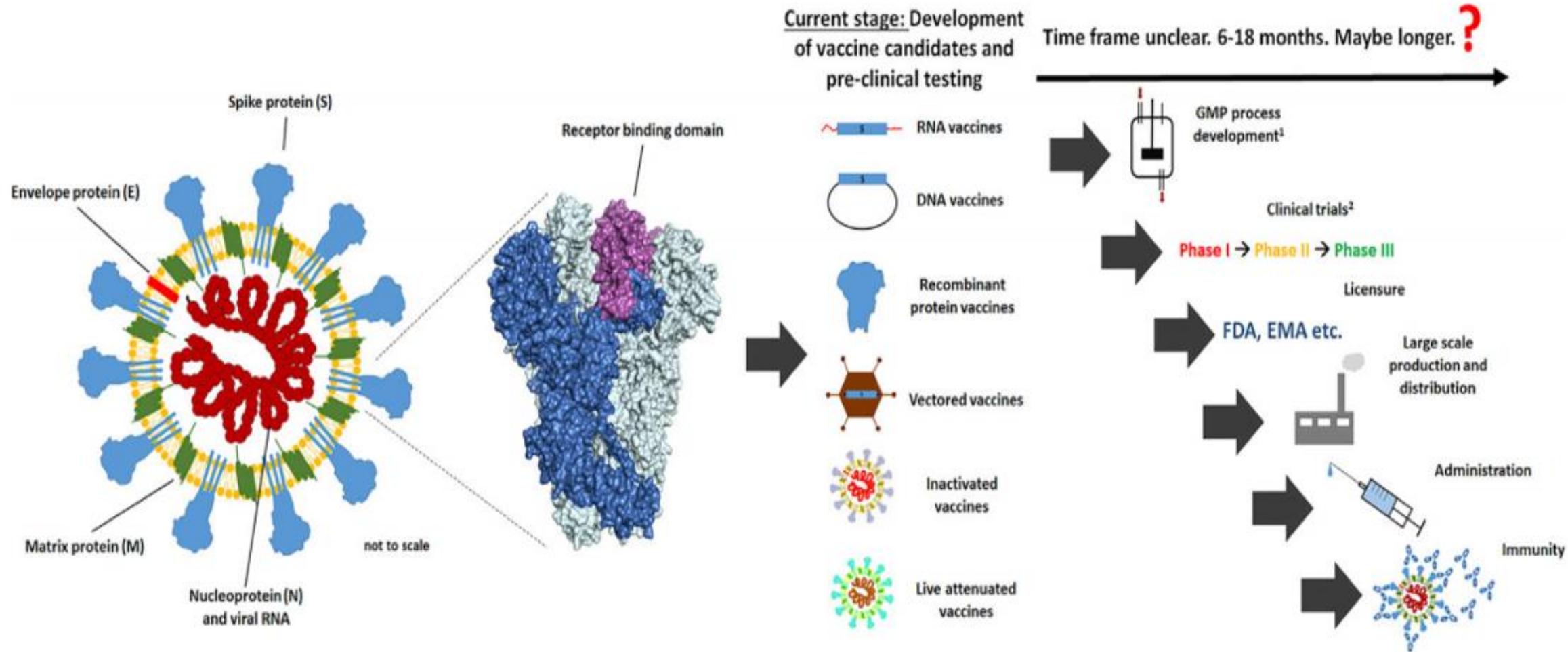


Figure 1. Overview of Potential SARS-CoV-2 Vaccine Platforms

Resumen Vacunas COVID-19

- Vacunación objetivo **reducir mortalidad, morbilidad y proteger sistema de Salud**
1^a fase: T de salud , > 60 años y Comorbilidades
2da fase: Reducir la transmisión de la infección y generar inmunidad rebaño:
Vulnerabilidad, situación epidemiológica: Seroprevalencia
- Prevención **enfermedad, Severidad, Transmisibilidad ? Modificación Asintomáticos ? Temporal – permanente?**
- **Perfil de seguridad a corto y a largo plazo**
- **Inmunidad Humoral y Celular, Reinfección, Mutaciones**
- **COVAX:** Acuerdos directos: Pfizer, Astra Zeneca
- **Equidad-Oportunidad- Calidad**



La salud
es de todos

Minsalud

Principios del Plan Nacional



La salud
es de todos

Minsalud



Beneficencia



Solidaridad



Equidad y justicia



Transparencia



Progresividad



Primacía del
interés general



Eficiencia



Mensajes claves

1. Únicas medidas efectivas a la fecha

- Mantener el distanciamiento
- Usar correctamente el tapabocas
- Practicar buenos hábitos de higiene
- Aislarse ante la presencia de cualquier síntoma

2. Medidas de prevención y autocuidado deberán mantenerse

Mientras exista una circulación elevada del virus, **independientemente del avance en fármacos y vacunas**, las medidas de prevención y autocuidado deberán mantenerse. De igual forma, **los territorios y EPS** deberán continuar con el fortalecimiento del programa PRASS.