IN THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

No. 21-3091

ERICH SMITH, FRANK E. GARWOOD, MARIBEL LORENZO, AND DR. DANIEL DONOFRIO,

Plaintiffs-Appellants

v.

President JOSEPH R. BIDEN, in his official capacity and any successors for the Office of President,
Defendant-Appellees,

On appeal from the United States District Court of New Jersey's denial of a preliminary injunction pursuant to *Fed. R. Civ. P.* 65

APPENDIX VOLUME 1

Pages 1-186

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UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY

ERICH SMITH, FRANK E. GARWOOD, JR., MARIBEL LORENZO, and Dr. DANIEL DONOFRIO Plaintiffs, vs. PRESIDENT JOSEPH R. BIDEN, JR. (in his official capacity and any successor to the Office of the President) Defendant.	IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF NEW JERSEY CIVIL ACTION **NOTICE OF APPEAL**

Notice of Appeal

Notice is hereby given that Plaintiffs in the above named case hereby appealed to the United States Court of Appeals for the Third Circuit.

Appellants include: Erich Smith, Frank E. Garwood, Maribel Lorenzo, and Dr. Daniel Donofrio

Order appealed: Opinion & Order Denying Injunction (ECF 20), entered in this action on November 8, 2021.

Respectfully Submitted,

Dated: November 10, 2021

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Attorney for Plaintiffs

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY
CAMDEN VICINAGE

ERICH SMITH, FRANK E. GARWOOD, JR., MARIBEL LORENZO, and DR. DANIEL DONOFRIO, Plaintiffs, v. PRESIDENT JOSEPH R. BIDEN, JR., Defendant.	Civil Action No. 21-19457 **ORDER**

THIS MATTER having come before the Court on a Motion for a Temporary Restraining Order and/or Preliminary Injunction filed by Plaintiffs [ECF No. 4], and the Court having considered the parties' arguments in their briefs [ECF Nos. 4, 9, and 12] as well as the arguments made at Oral Argument on November 8, 2021, and for the reasons expressed in the Opinion of today's date, and for good cause shown, it is hereby **ORDERED** that Plaintiffs' Motion for a Temporary Restraining Order and/or Preliminary Injunction [ECF No. 4] is **DENIED**.

Dated: 11/8/21

/s Christine P. O'Hearn

United States District Judge

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

ERICH SMITH, FRANK E. GARWOOD, JR., MARIBEL LORENZO, AND DR. DANIEL DONOFRIO,

Plaintiffs,

v.

PRESIDENT JOSEPH R. BIDEN, JR. (in his official capacity and any successor to the Office of the President),

Defendant.

No. 1:21-cv-19457

OPINION

APPEARANCES:

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On behalf of Plaintiffs, Erich Smith, Frank E. Garwood, Jr., Maribel Lorenzo, and Dr. Daniel Donofrio

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On behalf of Defendant, President Joseph R. Biden, Jr.

INTRODUCTION

This matter comes before the Court upon a Motion for Temporary Restraining Order and/or for a Preliminary Injunction (ECF No. 4, "the Motion") filed by Plaintiffs, Erich Smith, Frank E. Garwood, Jr., Maribel Lorenzo, and Dr. Daniel Donofrio (collectively "Plaintiffs") seeking to enjoin Defendants from enforcing Executive Order 14042 and Executive Order 14043 mandating COVID-19 vaccination for federal employees and employees of federal contractors. For the reasons stated herein, the Motion is denied.

I. PROCEDURAL HISTORY

On October 29, 2021, Plaintiffs filed a Verified Complaint and on the same date, an Amended Verified Complaint for Declaratory and Injunctive Relief, against Defendant, President Joseph R. Biden, Jr., ("Defendant" or "President") seeking to enjoin Executive Orders 14042 and 14043 issued on September 9, 2021 (collectively the "Executive Orders" or "mandates"). (ECF No. 1, "Complaint" and ECF No. 2, "Amended Complaint" ¶¶ 1-3). Plaintiffs' Amended Complaint contained a single Count claiming the Executive Orders are unconstitutional and violate their Fifth Amendment rights of privacy and liberty, including the right to refuse medical procedures and the right to protect private medical information. (Id. ¶ 96-104).

On November 3, 2021, Plaintiffs filed this Motion. (ECF No. 4). On November 4, 2021, the Court issued an Order to Show Cause why a temporary restraining order and/or preliminary injunction should not be issued and directed Plaintiffs' counsel to give notice to Defendant, and/or file an affidavit pursuant to Federal Rule of Civil Procedure 65(b)(1)(B) as to efforts to do so and to effectuate service upon Defendant pursuant to Federal Rule of Civil Procedure 4(i). (ECF No. 6). The Court further set a briefing schedule and hearing for November 8, 2021. (ECF No. 6).

On November 5, 2021, the Defendant filed Opposition to the Motion. (ECF No. 9, "Def. Opp. Br."). On November 6, 2021, Plaintiffs filed a Reply Brief (ECF No. 12, "Pl. Reply") and a Motion for Leave to File a Second Amended Complaint (ECF No. 13, "Motion to Amend") to name Merrick B. Garland, in his official capacity as Attorney General of the United States, Kilolo Kijakazi, in her official capacity as Acting Commissioner of the Social Security Administration, and the United States of America as Defendants, and to further add a claim that the Executive Orders violate the Plaintiffs' Fifth Amendment Right to Equal Protection. (ECF No. 13-2). On November 7, 2021, Plaintiffs filed a Motion to Expedite their Motion to Amend filed the day prior. (ECF No. 14).

Oral argument was held on November 8, 2021. As of the date of the hearing, Plaintiffs had not complied with Federal Rule of Civil

Procedure 65(b)(1)(B) as to the proposed newly added Defendants, and thus, the Court considers the request for relief as to those Defendants to be ex parte and without notice. For purposes of this Motion, the Court will consider the proposed Second Amended Complaint with the newly added Defendants and claims.

II. FACTUAL BACKGROUND

On September 9, 2021, the President issued two Executive Orders. First, Executive Order 14043 "Requiring Coronavirus Disease 2019 Vaccination for Federal Employees." Exec. Order No. 14043, 86 Fed. Reg. 50989 (Sept. 9, 2021). Executive Order 14043 states that "it is the policy of my Administration to halt the spread of the coronavirus disease 2019 (COVID-19), including the B.1.617.2 (Delta) variant, by relying on the best available data and science-based public health measures." Id. § 1. Executive Order 14043 further states "the health and safety of the Federal workforce, and the health and safety of members of the public with whom they interact, are foundational to the efficiency of the civil service." Id. Thus, Executive Order 14043 provides "in light of public health guidance regarding the most effective and necessary defenses against COVID-19, I have determined that to promote the health and safety of the Federal workforce and the efficiency of civil service, it is necessary to require COVID-19 vaccination for all Federal employees, subject to such exceptions as required by

law." Id. The Safer Federal Workforce Task Force issued guidance on September 13, 2021 requiring federal employees be fully vaccinated no later than November 22, 2021. U.S. SAFER FED. WORKFORCE TASK FORCE, COVID-19 WORKPLACE SAFETY: AGENCY MODEL SAFETY PRINCIPLES (Sept. 2021). Per additional guidance, "people are considered fully vaccinated for COVID-19 two weeks after they have received the second dose in a two-dose series, or two weeks after they have received a single dose vaccine." U.S. SAFER FED. WORKFORCE TASK FORCE, COVID-19 WORKPLACE SAFETY: GUIDANCE FOR FEDERAL CONTRACTORS AND SUBCONTRACTORS, 4 (Sept. 2021). Employees must receive the second dose or single dose of their vaccine no later than November 8, 2021 to meet the deadline. U.S. SAFER FED. WORKFORCE TASK FORCE, FAQ, VACCINATIONS, https://www.saferfederalworkforce.gov/faq/vaccinations/ (last visited Nov. 8, 2021).

Executive Order 14042 "Ensuring Adequate COVID Safety Protocols for Federal Contractors" was issued on the same date. Exec. Order No. 14042, 86 Fed. Reg. 50985 (Sept. 9, 2021). Executive Order 14042 states that "this order promotes economy and efficiency in Federal procurement by ensuring that the parties that contract with the Federal Government provide adequate COVID-19 safeguards to their workers performing on or in connection with a Federal Government contract." Id. § 1. Thus, Executive Order 14042 directs that federal departments and agencies "shall . . . include a clause that the contractor and any subcontractors . . .

shall, for the duration of the contract, comply with all guidance for contractor or subcontractor workplace locations published by the Safer Federal Workforce Task Force." Id. § 2. The Safer Federal Workforce Task Force issued guidance on September 23, 2021 requiring covered contractor employees be fully vaccinated no later than December 8, 2021. U.S. SAFER FED. WORKFORCE TASK FORCE, COVID-19 WORKPLACE SAFETY: GUIDANCE FOR FEDERAL CONTRACTORS AND SUBCONTRACTORS, 5 (Sept. 2021). The deadline was subsequently extended to January 4, 2022. (EFC No. 12, "Def. Opp. Br." at 8).

Plaintiffs Erich Smith, Frank E. Garwood, Jr. and Dr. Donofrio (collectively, the "employee Plaintiffs") are federal employees subject to Executive Order 14043. (ECF No. 2, "Amended Complaint" ¶ 9). Plaintiff Smith works for the Department of Justice, Federal Bureau of Prisons as a foreman for a factory within the prison. (Id. ¶ 92). Plaintiff Garwood is an employee of the Department of Justice, Federal Bureau of Prisons as a training instructor. (Id. ¶ 93). Plaintiff Dr. Donofrio is a chiropractor employed by the Social Security Administration. (Id. ¶ 95). Plaintiff Maribel Lorenzo (the "contractor Plaintiff") is employed as an underwriter by Horizon Blue Cross and Blue Shield and is subject to Executive Order 14042 due to her employer's federal contracts. (Id. ¶ 94). Plaintiffs do not want to be vaccinated for "a range of personal reasons." (ECF No. 2, "Amended Complaint" ¶¶ 91-95; ECF No. 4, "Pl. Moving Br." at 7). None of the Plaintiffs

raise or present issues with respect to a request for an exemption, for example, on religious or medical grounds, from the mandate. (Id.). There are no allegations in the Complaint, Amended Complaint, proposed Second Amended Complaint, or in any of the briefs filed by Plaintiffs, that indicated any of the Plaintiffs had submitted or intended to submit a request for an exception. (Id.). However, upon questioning by the Court as to this issue during oral argument, Plaintiffs' counsel advised for the first time that one or more of the Plaintiffs had in fact submitted a request for an exception. [1] The Court issued an Order (ECF No. 17) directing Plaintiffs' counsel to provide information related to any exceptions requested by the Plaintiffs and the status thereof. On November 8, 2021, Plaintiffs' counsel filed a Declaration (ECF No. 18) stating: (1) Plaintiff Lorenzo was not able to file an exception request as her employer would not accept it; (2) Plaintiff Donofrio submitted an exception request on September 28, 2021; (3) Plaintiff Smith submitted an exception request on September 15, 2021; and (4) Plaintiff Garwood filed an exception request on September 15, 2021. (Id.). All submitted requests remain pending. (Id.)

[1] The Court expressed serious concerns regarding the Plaintiffs' seemingly purposeful failure to previously disclose this information.

III. PARTIES' ARGUMENTS

A. Plaintiffs' Arguments

Plaintiffs do not dispute that the Supreme Court's decision in Jacobson v. Massachusetts, 197 U.S. 11 (1905), which has been relied upon by many courts in reviewing employer mandates for COVID-19 vaccination, is controlling precedent by which this Court is bound. Rather, Plaintiffs argue Jacobson does not apply because the COVID-19 vaccines are not actually vaccines "because they do not fall under any relevant statutory definition or traditional dictionary definition of the word 'vaccine.'" (ECF No. 2, "Amended Complaint" ¶¶ 31-47). Instead, Plaintiffs allege they are "gene therapy products." (Id.). Plaintiffs therefore argue that the Court should apply strict scrutiny in reviewing the Executive Orders. (ECF No. 4, "Pl. Moving Br." at 5).

Plaintiffs argue that the Executive Orders violate the Due Process Clause of the Fifth Amendment because they intrude on Plaintiffs' fundamental rights of liberty and privacy to make their own healthcare decisions and decline unwanted medical procedures. (Id. at 8). Plaintiffs argue that the Executive Orders cannot survive strict scrutiny because even if it is assumed that the government has a compelling interest in combating the spread of COVID-19 and protecting the health of its citizens, the Plaintiffs' liberty and privacy rights are stronger and more compelling than

that of the government. (Id. at 12-26). In support, Plaintiffs argue: (1) there is uncertainty concerning the efficacy and duration of protection of the vaccines; (2) the vaccines are experimental and novel in nature; (3) the vaccines carry risks; (4) the vaccines are likely to cause short-term illness; (5) the vaccines are manufactured by corporations they allege have extensive criminal records or no track record; (6) the U.S. Food and Drug Administration, the agency tasked with ensuring pharmaceutical safety, is plagued with scandals and failures; (7) the Executive Orders are not narrowly tailored as they fail to adequately consider "natural immunity"; (8) there are a wide range of treatments for COVID-19 available; (9) there is a low infection fatality rate for COVID-19; and (10) the government has navigated similar viruses without mandating vaccination. (Id. at 13-26).

Plaintiffs further argue in the proposed Second Amended Complaint that the mandates "create two groups of people and set forth government-mandated different treatment between the groups . . . based on Plaintiffs' exercise of a fundamental right." (ECF No. 13-2, "Second Amended Complaint" ¶ 27).

Plaintiffs argue that they face irreparable harm in that they are at risk of becoming unemployed and will be "unemployable in two-thirds of existing jobs." (ECF No. 4, "Pl. Moving Br." at 7).

Plaintiffs argue that granting injunctive relief will preserve the status quo and pose no harm to the government. (Id.).

B. Defendant's Opposition

Defendant argues that this Court lacks jurisdiction and/or Plaintiffs have no standing to assert claims seeking declaratory or injunctive relief against the President in his official capacity. (ECF No. 4, "Def. Opp. Br." at 11-13). Defendant further argues that the Civil Service Reform Act ("CSRA") precludes Plaintiffs from bringing their claims in this Court. (Id. at 13-15). Finally, Defendant argues that Plaintiffs' claims are not ripe as they have neither sought nor been denied an exemption from the mandate and they have not been subject to or notified of any discipline as of this date. (Id. at 16-18).

Defendant further argues that injunctive relief is not warranted as Plaintiffs are not likely to succeed on the merits of their claims. Defendant argues that vaccine mandates have long survived rational basis review under Jacobson, (id. at 18-29); that Plaintiffs have failed to show irreparable harm, (id. at 29-37); and that the balance of equities and public interest in stemming the spread of COVID-19 far outweigh any alleged harm by Plaintiffs, (id. at 37-41).

C. Plaintiffs' Reply

In Plaintiffs' reply, Plaintiffs claim that the well-established exception for mandatory vaccinations is limited to instances of the reasonable exercise of a state's police power and that the federal government has no such power. (ECF No. 12, "Pl. Reply" at 4-6). Plaintiffs further allege the unconstitutional conditions doctrine establishes irreparable harm as the coercion to be vaccinated is the irreparable harm. (Id. at 3-4, 8). Plaintiffs argue that their claims are ripe, that the CSRA does not apply since no adverse employment action has yet occurred, and that they should not have to wait for adverse employment action to be taken in order to challenge the mandates. (Id. at 8-9, n.1). Plaintiffs further argue that as to Plaintiff Lorenzo, "who is subject to the Contractor Mandate, it is not clear who she could enjoin other than the President himself" and urge the Court to enjoin the President from enforcing the mandate. (Id. at 9-13).

IV. LEGAL STANDARD

Federal Rule of Civil Procedure 65 governs the issuance of temporary restraining orders and preliminary injunctions. FED. R. CIV. P. 65; Vuitton v. White, 945 F.2d 569, 573 (3d Cir. 1991).

Preliminary injunctive relief is "an extraordinary remedy" and "should be granted only in limited circumstances." American Tel. & Tel. Co. v. Winback & Conserve Program, Inc., 42 F.3d 1421,

1427 (3d Cir. 1994) (quoting Frank's GMC Truck Center, Inc. v. General Motors Corp., 847 F.2d 100, 102 (3d Cir. 1988)). To obtain relief, the moving party must show: (1) a likelihood of success on the merits; (2) he or she will suffer irreparable harm if the injunction is denied; (3) granting relief will not result in even greater harm to the nonmoving party; and (4) the public interest favors such relief. Child Evangelism Fellowship of N.J. Inc. v. Stafford Twp. Sch. Dist., 386 F.3d 514, 524 (3d Cir. 2004).

While courts must balance all four factors, Kershner v. Mazurkiewicz, 670 F.2d 440, 443 (3d Cir. 1982), this Circuit has placed significant weight "on the probability of irreparable harm and the likelihood of success on the merits" factors. FM 103.1, Inc. v. Universal Broad., 929 F. Supp. 187, 193 (D.N.J. 1996) (quoting Hoxworth v. Blinder, Robinson & Co., 903 F.2d 186, 197 (3d Cir. 1990)). A court should only issue an injunction "if the plaintiff produces evidence to convince the district court that all four factors favor preliminary relief." AT&T v. Winback & Conserve Program, 42 F.3d 1421, 1427 (3d Cir. 1994).

V. DISCUSSION

A. Jurisdiction, Standing and Ripeness

(1) Ripeness

Defendant argues the Plaintiffs' claims are not ripe because Plaintiffs have not been terminated and/or no decision has been issued as to their request for an exception.

The ripeness doctrine limits judicial power to resolve actual cases and controversies, prohibiting courts from resolving hypothetical or speculative disputes. U.S. CONST. art. III, § 2. Reviewing ripeness is a two-step evaluation: the hardship of denying review and whether the issues are fit for review. Abbott Labs. v. Gardner, 387 U.S. 136, 149 (1969). The hardship of denying review requires a threat of constitutional injury that is "credible," and not merely "speculative." Artway v. Attorney Gen., 81 F.3d 1235, 1247 (3d Cir. 1996). The moving party "need not have suffered a 'completed harm'" in order to present a ripe claim, Presbytery of the Orthodox Presbyterian Church v. Florio, 40 F.3d 1454, 1463 (3d Cir. 1994) (citing Armstrong World Industries, Inc. v. Adams, 961 F.2d 405, 412 (3d Cir. 1992)), simply one that is "certainly impending," Pac. Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n, 461 U.S. 190, 201 (1983). "[W]hen the plaintiff has alleged an intention to engage in a course of conduct arguably affected with a constitutional interest, but proscribed

by a statute, and there exists a credible threat of prosecution thereunder, he should not be required to await and undergo a criminal prosecution as the sole means of seeking relief." Artway, 81 F.3d at 1247 (quoting Babbitt v. United Farm Workers Nat'l Union, 442 U.S. 289, 298 (1979)). The second factor for evaluating ripeness is whether the issue is fit for judicial review. Abbott Labs., 387 U.S. at 149. "The principal consideration is whether the record is factually adequate to enable the court to make the necessary legal determinations. The more that the question presented is purely one of law, and the less that additional facts will aid the court in its inquiry, the more likely the issue is to be ripe, and vice-versa." Artway, 81 F.3d at 1249.

The Court finds the claims of the Plaintiffs ripe for review. Plaintiffs seek to enjoin the entire process set forth in Executive Orders 14042 and 14043, including the exception process. The contractor Plaintiff alleges she has been precluded from submitting an exception to her employer and thus faces the choice of compliance or potential loss of employment. Thus, the Plaintiffs have alleged a course of conduct and there exists a credible threat of adverse action. Further, the case presents a pure legal question and the record is adequate. See, e.g., Messina v. The College of N.J., 2021 WL 4786114, at *3 (D.N.J. Oct. 14, 2021) (deciding application for injunctive relief in case involving COVID-19 vaccine mandate issued by university where the plaintiffs had

received exemptions from the vaccine requirement); Bauer v. Summey, 2021 WL 4900922, at *2 (D.S.C. Oct. 21, 2021) (deciding application for injunctive relief in case involving COVID-19 vaccine mandate issued by employer where plaintiffs' requests for exemptions remained pending); Klaasen v. Trustees of Indiana Univ., 2021 WL 4073926, at *14-15 (N.D. Ind. 2021)(deciding issues of standing related to COVID-19 vaccine mandate challenge where some plaintiffs sought and received an exception and others had not). The Court finds this factor is more appropriately considered in the context of irreparable harm.

(2) Injunctive Relief Against the President

As Defendant has argued, "a court -- whether via injunctive or declaratory relief -- does not sit in judgment of a President's executive decisions." Newdow v. Roberts, 603 F.3d 1002, 1012 (D.C. Cir. 2010) (citing Mississippi v. Johnson, 71 U.S. (4 Wall.) 475, 499 (1867)). "An attempt on the part of the judicial department . . . to enforce the performance of [executive and political] duties by the President [is] 'an absurd and excessive extravagance.'" Mississippi, 71 U.S. (4 Wall) at 499. In Franklin v. Massachusetts, the Supreme Court declined to determine whether jurisdiction exists to enjoin the President; however, the Court's decision and language left open the avenue to claim jurisdiction in suits against heads of Executive agencies. 505 U.S. 788, 802-

03 (1992). For purposes of this Motion, the Court considers Defendant's argument in this regard moot as to the claims brought by the employee Plaintiffs since the Second Amended Complaint proposes to name their employing agencies as defendants.

However, the filing of the proposed Second Amended Complaint does not cure this defect as to Plaintiff Lorenzo, whose claims lie solely against the President. Plaintiff Lorenzo claims "it is not clear who she could enjoin other than the President himself. She only knows that she has been told she is subject to the Mandate because Horizon BlueCross Blue Shield holds government contracts." (ECF No. 12, "Pl. Reply" at 11). Plaintiff provides no legal authority by which this Court could grant injunctive relief against the President because she cannot determine the proper defendant against whom to bring suit. As such, the Court finds it lacks jurisdiction over the contractor Plaintiff's claims and/or she fails to state a claim upon which injunctive relief can be granted. Therefore, the remainder of this Opinion will only address the employee Plaintiffs' claims under Executive Order 14043 and will not address Executive Order 14042.

(3) The Civil Service Reform Act

Defendant argues that the claims of the employee Plaintiffs are precluded by failure to exhaust their administrative remedies under the CSRA. Congress enacted the CSRA to create "a framework

for evaluating personnel actions taken against federal employees." Kloeckner v. Solis, 568 U.S. 41, 44 (2012). The "comprehensive and exclusive" remedial scheme, Grosdidier v. Chairman, Broad. Bd. of Governors, 560 F.3d 495, 497 (D.C. Cir.), cert. denied, 558 U.S 989 (2009), enumerates thirteen "prohibited personnel practices," which, if taken against a federal employee, must be brought before the Office of Special Counsel ("OSC") in the first instance, 5 U.S.C. § 2302(b). If OSC determines that there are reasonable grounds to believe that a violation has occurred, then it "shall report the determination together with any findings or recommendations" to the Merit Systems Protection Board ("MSPB") and the employing agency. Id. § 1214(b)(2)(B). Only if the employee exhausts this administrative procedure and does not prevail before the MSPB, may they pursue judicial review in the Federal Circuit. Id. §§ 1214(c), 7703(a)(1).

However, in this case adverse action is being threatened but has not yet been taken against the employee Plaintiffs. The Plaintiffs do not, as of yet, have cognizable claims to be brought under the CSRA. It is further illogical to suggest that the subordinate agencies of the Executive Branch have exclusive jurisdiction to determine whether an Executive Order issued by the President, that they have been directed to implement, is constitutional. Thus, the Court rejects the Defendant's argument that the claims of the employee Plaintiffs are barred by the CSRA.

B. Injunctive Relief

(1) Likelihood of Success on the Merits

Based upon Jacobson, as well as persuasive authority from other circuits which have addressed employer mandates for the COVID-19 vaccine, this Court concludes that the employee Plaintiffs have not met their burden to show they are likely to succeed on the merits.

In Jacobson, the seminal case regarding vaccine mandates, the Supreme Court upheld a Massachusetts statute which authorized the board of health of any town to require citizens to be vaccinated against smallpox as necessary for the public health and safety. Jacobson, 197 U.S. at 12. Jacobson refused to be vaccinated and was criminally charged and convicted. Id. at 13. On appeal, Jacobson argued that the vaccine mandate violated his constitutional rights. Id. at 26. The Supreme Court rejected Jacobson's arguments and held that the State had the right to impose vaccine mandates. Id. at 27. The Court noted "in every well-ordered society charged with the duty of conserving the safety of its members the rights of the individual with respect of his liberty may, at times, under pressure of great dangers, be subjected to such restraint to be enforced by reasonable regulations as the safety of the general public may demand." Id. at 29. Based upon Jacobson, courts across the country have held

that there is no fundamental right to refuse a COVID-19 vaccination. Indeed, every court that has considered the constitutionality of a COVID-19 vaccine mandate by an employer or university has deemed Jacobson controlling, rejected claims of a fundamental right to refuse a vaccine, and applied a rational basis standard of review. See, e.g., Norris v. Stanley, 2021 WL 4738827, at *2-3 (W.D. Mich. Oct. 8, 2021); Messina, 2021 WL 4786114, at *8-9; Does 1-6 v. Mills, 2021 WL 4783626, at *12-13 (D. Me. Oct. 13, 2021); Mass. Corr. Officers Fed. Union v. Baker, 2021 WL 4822154, at *6-7 (D. Mass. Oct. 15, 2021); Williams v. Brown, 2021 WL 4894264, at *8-9 (D. Or. Oct. 19, 2021).

Plaintiffs argue that Jacobson does not apply and strict scrutiny review applies because (1) the COVID-19 vaccines are not actually vaccines but are "gene therapy products" and (2) the federal government lacks police power. Both arguments fail.

First, Plaintiffs provide no medical authority or competent evidence to support the argument that COVID-19 vaccines are not actually vaccines. In addition, courts have rejected such arguments. See Messina, 2021 WL 4786114, at *7-8.

Second, Plaintiffs' argument that Jacobson does not apply because the federal government lacks police power fails because the government's role and source of authority in this case is that of an employer under 5 U.S.C §§ 3301, 3302, 7301. See We the

Patriots, USA, Inc. v. Hochul, 2021 WL 5121983, at *18 (2nd Cir. Nov. 4, 2021) (finding the state's actions as an employer in mandating public employee vaccination to be "considerably narrower" than the city-wide mandate in Jacobson). It has long been recognized that when the government acts as an employer, "there is a crucial difference, with respect to constitutional analysis, between the government exercising 'the power to regulate or license, as lawmaker,' and the government acting 'as proprietor, to manage [its] internal operation.'" Engquist v. Or. Dept. of Agr., 553 U.S. 591, 598 (2008) (quoting Cafeteria & Rest. Wkrs. v. McElroy, 367 U.S. 886, 896 (1961)). There are "unique considerations applicable when the government acts as employer as opposed to sovereign." Id. at 598. The government has both "far broader powers," Waters v. Churchill, 511 U.S. 661, 671 (1994), and "significantly greater leeway in its dealings with citizen employees than it does when it brings its sovereign power to bear on citizens at large," Engquist, 553 U.S. at 598; see also Kelley v. Johnson, 425 U.S. 238, 244-48 (1976) (stating the government's role as employer is "highly significant" and applying essentially a rational basis test in such circumstances). "The extra power the government has in this area comes from the nature of the government's mission as employer." Engquist, 553 U.S. at 598. The Supreme Court has explained,

> The government's interest in achieving its goals as effectively and efficiently as possible is elevated from a relatively subordinate interest when it acts as sovereign to a significant one when it acts as employer. Given the commonsense realization that government offices could not function if every employment decision became a constitutional matter, constitutional review of government employment decisions must rest on different principles than review of restraints imposed by the government as sovereign.

Id. at 598-99 (citations and quotations omitted); see also Mahoney v. Sessions, 817 F.3d 9305, 879-880 (9th Cir. 2017) (discussing the lesser standard of review of constitutional claims when the government is not acting as a sovereign lawmaker); Bonidy v. U.S. Postal Serv., 790 F.3d 1121, 1126 (10th Cir. 2015) (applying lesser standard of review where USPS prohibited firearms on Postal Property and stating "[a]s a government-owned business acting as a proprietor rather than as a sovereign, the USPS has broad discretion to govern its business operations according to the rules it deems appropriate"); Wasatch Equality v. Alta Ski Lifts Co., 55 F. Supp. 3d 1351, 1362-64 (D. Utah 2014) (applying lesser standard of review where the federal government is acting as the owner of Its property and not as a lawmaker).

Thus, contrary to Plaintiffs' arguments, the Court finds that the federal government has at least as much, if not broader, power and deference in this instance where it is acting as an employer

than the State of Massachusetts had in Jacobson in exercising its police power. See Mass. Corr. Officers Fed. Union, 2021 WL 4822154, at *6-7 (applying rational basis test to review COVID-19 mandate for State employees based on the State's status as an employer). As such, the Court finds rational basis review applies.

Under rational basis review, the action of the government "need only be rationally related to a legitimate government interest." Wilce v. Dir., Off. of Workers' Comp. Programs, 144 F. App'x 223, 226 (3d Cir. 2005) (citing Heller v. Doe, 509 U.S. 312, 320 (1993)). There is a presumption of constitutionality and "the burden is on the one attacking [it] to negative every conceivable basis which might support it." Heller, 509 U.S. at 320 (quotation omitted). Here, there can be no serious question that the government has a legitimate interest in preventing the spread of COVID-19. The Supreme Court has described the government's interest in combating the spread of COVID-19 as "compelling." S. Bay United Pentecostal Church v. Newsom, 140 S. Ct. 1613, 1614 (2020); see also Roman Cath. Diocese of Brooklyn v. Cuomo, 141 S. Ct. 63, 67 (2020) (describing curbing the spread of COVID-19 as "unquestionably a compelling interest"). Indeed, Plaintiffs assume for purposes of this motion that the government's interest is compelling. (ECF No. 4, "Pl. Moving Br." at 12). Thus, the only question is whether the mandates are rationally related to the government's interest in stemming the spread of COVID-19. This

Court, like every other Court that has considered the issue to date, easily concludes that such a rational relationship exists -- vaccines are a safe and effective way to prevent the spread of COVID-19. Courts have repeatedly refused to enjoin an employer's COVID-19 vaccine mandate, provided they contain legally required exemptions, finding they pass muster under the rational basis test. See, e.g., Mass. Corr. Officers Fed. Union, 2021 WL 4822154, at *8; Does 1-6, 2021 WL 4783626, at *18; Harsman v. Cincinnati Child.'s Hosp. Med. Ctr., 2021 WL 4504245, at *6 (S.D. Ohio Sept. 30, 2021); Norris, 2021 WL 4738827, at *4; Williams, 2021 WL 4894262, at *11; Maniscalo v. The N.Y.C. Dept. of Ed., 2021 WL 4344267, at *6 (E.D.N.Y. Sept. 23, 2021); Andrew-Rodney v. Hochul, 2021 WL 5050067, at *9 (N.D.N.Y. Nov. 1, 2021); Johnson v. Brown, 2021 WL 4846060, at *27 (D. Or. Oct. 18, 2021); Kehearty v. Regents of Cal., 2021 WL 4714664, at *9 (C.D. Cal. Sept. 29, 2021); see also We the Patriots, 2021 WL 5121983 at *21. Plaintiffs provide no legal or factual basis to distinguish the federal government's issuance of a vaccine mandate for its workforce from that of any other employer that has taken the same action or to compel a different result in this case.

Plaintiffs also fail to show a likelihood of success on the merits as to their equal protection claim alleged in Count Two of the proposed Second Amended Complaint. The first step to evaluate an equal protection claim is to determine the standard of review.

Donatelli v. Mitchell, 2 F.3d 508, 513 (3d Cir. 1993). Since Plaintiffs' claims do not involve a suspect class or fundamental right, the same rational basis standard of review applies. Id. Thus, for the same reasons set forth above, Plaintiffs are not likely to succeed on the merits of this claim. See Does 1-6, 2021 WL 4783626, at *16 (applying rational basis review to equal protection claim by employees related to employer's COVID-19 mandate).

For all these reasons, the employee Plaintiffs have failed to show they are likely to succeed on the merits.

(2) Irreparable Harm

Consideration of the irreparable harm factor heavily weighs against injunctive relief. Irreparable harm is defined as "potential harm which cannot be redressed by a legal or an equitable remedy following a trial." Instant Air Freight Co. v. C.F. Air Freight, Inc., 882 F.2d 797, 801 (3d Cir. 1989). As such, "the preliminary injunction must be the only way of protecting plaintiff from harm." Id. The harm alleged by the employee Plaintiffs is that they would be required to "undergo an irreversible medical procedure that carries risk or lose their jobs and become effectively disqualified from two-thirds of American jobs. Either road constitutes irreparable harm." (ECF No. 4, "Pl. Moving Br." at 27-28). As a preliminary matter, the fact

that one or more of the Plaintiffs have sought exceptions negates any imminent harm, let alone irreparable harm, since the most recent guidance indicates agencies should refrain from initiating enforcement action if the employee has received an exception and/or the agency is considering an exception request from the employee. U.S. OFFICE OF PERSONNEL MANAGEMENT, Guidance on Enforcement of Coronavirus Disease 2019 Vaccination Requirements for Federal Employees – Executive Order 14043 (2021).

Plaintiffs argue the unconstitutional conditions doctrine applies and that the coercion itself is the irreparable harm. (ECF No. 12, "Pl. Reply" at 1). Plaintiffs are undeniably being presented with a difficult choice -- comply with the vaccine mandate or risk losing their employment. They are, however, presented with a choice and are not being coerced to give up a fundamental right since there is no fundamental right to refuse vaccination. See Klaasen, 2021 WL 4073926, at *23-26 (rejecting student's argument that university's vaccine mandate violated the unconstitutional conditions doctrine); Norris, 2021 WL 4738827, at *3 (rejecting employee's unconstitutional conditions argument

because a vaccine mandate does not violate a fundamental right); Andre-Rodney, 2021 WL 5050067, at *7 (same).[2]

Further, Plaintiffs ignore well established precedent that "loss of employment itself is not sufficient to give rise to irreparable injury." Hong Zhuang v. EMD Performance Materials Corp., 2018 WL 3814282, at *11 (D.N.J. Aug. 10, 2018); see also Sampson v. Murray, 415 U.S. 61, 92 n.68 (1974). To date, every court that has considered the allegation that the potential loss of employment due to an employee's decision not to comply with an employer's COVID-19 vaccine mandate constitutes irreparable harm has rejected it. See, e.g., Harsman, 2021 WL 4504245, at *4; Norris, 2021 WL 4738827, at *3; Williams, 2021 WL 4894262, at *10-11; Mass. Corr. Officers Fed. Union, 2021 WL 4822154, at *7-8; Does 1-6, 2021 WL 2782626, at *16-17; Andre-Rodney, 2021 WL 5050067, at *8. This Court agrees and finds no factual or legal reason to depart from this well-established precedent.

Finally, the fact that Plaintiffs waited nearly two (2) months to seek relief dispels any claim of irreparable harm. The Executive Orders were issued on September 9, 2021. Plaintiffs did not file a Complaint until October 29, 2021 and did not file a motion for

[2] The Court agrees with the Defendant that Plaintiffs' comparison of the vaccine mandate to forcible and invasive medical procedures is misplaced. See Klaasen, 2021 WL 3072926, at *25. The mandates do not force Plaintiffs to receive a medical procedure. Rather, they may seek an exemption or may choose to seek other employment.

injunctive relief until November 3, 2021, just five (5) days prior to the date by which they must receive the vaccine in order to comply with the mandate. "[P]reliminary injunctions are generally granted under the theory that there is an urgent need for speedy action to protect the plaintiffs' rights. Delay in seeking enforcement of those rights . . . tends to indicate at least a reduced need for such drastic, speedy action." Lanin v. Borough of Tenafly, 2013 WL 936363, at *3 (3d Cir. 2013) (quoting Citibank, N.A. v. Citytrust, 756 F.2d 273, 275 (2d Cir. 1985)); see also Messina, 2021 WL 4786114, at *9 (considering Plaintiff's delay in seeking injunctive relief related to COVID-19 mandates for college students as negating irreparable harm); Child.'s Health Defense, Inc. v. Rutgers, the State Univ. of N.J., 2021 WL 4398743, at *7 (D.N.J. Sept. 27, 2021) (same). Plaintiffs offer no excuse for their delay in seeking relief in this case.[3]

For all these reasons, the employee Plaintiffs fail to show irreparable harm.

(3) Balance of Equities and Public Interest

The third and fourth factors for the issuance of injunctive relief merge when the government is the opposing party. Nken v.

[3] Even assuming the contractor Plaintiff identified an appropriate defendant against whom the Court could issue injunctive relief, her claim would nevertheless fail as she too cannot show irreparable harm.

Holder, 556 U.S. 418, 435 (2009). Given the Court's findings as to the likelihood of success on the merits and irreparable harm factors, the Court will only briefly address these factors. The federal government employs over 4 million people. Julie Jennings & Jared C. Nagel, CONG. RSCH. SERV., R43590, Federal Workforce Statistics Sources: OPM and OMB 17 (2021). The stated goal of the vaccine mandate is to prevent the spread of COVID-19 and keep people safe. Exec. Order No. 14043, 86 Fed. Reg. 50989 (Sept. 9, 2021). As stated in Executive Order 14043, "[t]he health and safety of the Federal workforce, and the health and safety of the members of the public with whom they interact, are foundational to the efficiency of the civil service." Exec. Order No. 14043, 86 Fed. Reg. 50989 (Sept. 9, 2021). Given the ongoing COVID-19 pandemic, the balance of equities and public interest far outweigh the interests of the employee Plaintiffs. In this case, the granting of injunctive relief would likely increase the risk of harm to the public.

VI. CONCLUSION

For the reasons set forth above, the Court has no authority to enjoin any action by the President as to any of the Plaintiffs' claims. Further, the employee Plaintiffs have not met their burden to show that a temporary restraining order and/or preliminary

injunction is warranted. As such, Plaintiffs' motion is denied. An appropriate order will follow.

Dated: 11/8/2021

s/ Christine P. O'Hearn

United States District Judge

APPEAL

U.S. District Court
District of New Jersey [LIVE] (Camden)
CIVIL DOCKET FOR CASE #: 1:21-cv-19457-CPO-SAK

SMITH et al v. BIDEN
Assigned to: Judge Christine P. O'Hearn
Referred to: Magistrate Judge Sharon A. King
Case in other court: 3rd circuit, 21-03091
Cause: 42:1981 Civil Rights

Date Filed: 10/29/2021
Jury Demand: None
Nature of Suit: 440 Civil Rights: Other
Jurisdiction: U.S. Government Defendant

Plaintiff

ERICH SMITH

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Plaintiff

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represented by **DANA WEFER**
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ATTORNEY TO BE NOTICED

Plaintiff

DR. DANIEL DONOFRIO

represented by **DANA WEFER**
(See above for address)
ATTORNEY TO BE NOTICED

V.

Defendant

PRESIDENT JOSEPH R. BIDEN, JR.
IN HIS OFFICIAL CAPACITY AND ANY SUCCESSOR TO THE OFFICE OF THE PRESIDENT

represented by **ANGELA JUNEAU**
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Date Filed	#	Docket Text
10/29/2021	1	COMPLAINT against JOSEPH ROBINTETTE BIDEN, JR. (Filing and Admin fee $ 402 receipt number CNJDC-12939336), filed by ERICH SMITH, DANIEL DONOFRIO, MARIBEL LORENZO, FRANK E GARWOOD. (Attachments: # 1 Civil Cover Sheet JS-44, # 2 Exhibit Transcript of President's speech, # 3 Exhibit Modifications in an Emergency journal article, # 4 Exhibit NYT article concerning how "vaccines" work, # 5 Exhibit Moderna S-1 Excerpt, # 6 Exhibit Pfizer Fact Sheet for Recipients and Caregivers, # 7 Exhibit Moderna Fact Sheet for Recipients and Caregivers, # 8 Exhibit Johnson and Johnson Fact Sheet for Recipients and Caregivers, # 9 Exhibit Pfizer systemic reactions from CDC, # 10 Exhibit Moderna systemic reactions from CDC, # 11 Exhibit Janssen systemic reactions from CDC, # 12 Exhibit DOJ press release on historic Pfizer fines, # 13 Exhibit SEC press release on Pfizer and FCPA, # 14 Exhibit DOH Press release Pfizer Detrol, # 15 Exhibit Pfizer settlement for child experimentation in Nigeria, # 16 Exhibit DOJ press release on J&J historic fines, # 17 Exhibit AG announcement on vaginal mesh, # 18 Exhibit DOJ press release on J&J FCPA violations, # 19 Exhibit Press release of J&J subsidiary pleading guilty on contaminated children's medicine, # 20 Exhibit NYT article on J&J subsidiary shredding evidential documents, # 21 Exhibit EO 14043, # 22 Exhibit Task Force implementation of EO 14043, # 23 Exhibit EO 14042, # 24 Exhibit Task Force Implementation of EO 14042)(WEFER, DANA) (Entered: 10/29/2021)
10/29/2021	2	AMENDED COMPLAINT against JOSEPH ROBINTETTE BIDEN, JR., filed by ERICH SMITH, DANIEL DONOFRIO, MARIBEL LORENZO, FRANK E GARWOOD. (Attachments: # 1 Exhibit Transcript of President's Speech, # 2 Exhibit Modifications in an Emergency paper, # 3 Exhibit NYT How vaccines work, # 4 Exhibit Moderna S-1 Excerpt, # 5 Exhibit Pfizer Fact Sheet, # 6 Exhibit Moderna Fact Sheet, # 7 Exhibit J&J Fact sheet, # 8 Exhibit Pfizer Systemic Reactions, # 9 Exhibit Moderna Systemic Reactions, # 10 Exhibit J&J Systemic Reactions, # 11 Exhibit DOJ press release Pfizer historic settlement, # 12 Exhibit SEC charges Pfizer, # 13 Exhibit Pfizer illegal marketing Detrol, # 14 Exhibit Pfizer settles with Nigerian gov't over testing on children, # 15 Exhibit J&J historic settlement, # 16 Exhibit AG's settle vaginal mesh, # 17 Exhibit J&J FCPA, # 18 Exhibit J&J subsidiary contaminated children's meds, # 19 Exhibit J&J subsidiary fined for shredding evidence, # 20 Exhibit EO 14043, # 21 Exhibit Task Force on federal employees, # 22 Exhibit EO 14042, # 23 Exhibit Task force on federal contractors and subcontractors, # 24 Civil Cover Sheet civil cover sheet)(WEFER, DANA) (Entered: 10/29/2021)
10/29/2021		Judge Christine P. O'Hearn and Magistrate Judge Sharon A. King added. (dd,) (Entered: 11/01/2021)
11/01/2021	3	SUMMONS ISSUED as to JOSEPH R. BIDEN, JR. Attached is the official court Summons, please fill out Defendant and Plaintiffs attorney information and serve. (amv) (Entered: 11/01/2021)
11/01/2021		CLERK'S QUALITY CONTROL MESSAGE - The case you electronically filed has been processed, however, the following deficiencies were found: Caption,Party Information, . The Clerk's Office has made the appropriate changes. Please refer to the Attorney Case Opening Guide for processing electronically filed cases. (amv) (Entered: 11/01/2021)
11/03/2021	4	First MOTION for Temporary Restraining Order *enjoining Executive Orders 14042 and 14043 from taking effect*, First MOTION for Preliminary Injunction *enjoining executive orders 14042 and 14043* by DANIEL DONOFRIO, FRANK E. GARWOOD, JR, MARIBEL LORENZO, ERICH SMITH. (Attachments: # 1 Declaration Declaration of

		Counsel with all exhibits, # 2 Text of Proposed Order Text of proposed order, # 3 Certificate of Service certificate of service)(WEFER, DANA) (Entered: 11/03/2021)
11/04/2021	5	TEXT ORDER: Counsel shall promptly provide two (2) courtesy copies of all filed pleadings and motions to Chambers of the Hon. Christine P. OHearn. So Ordered by Judge Christine P. O'Hearn on 11/4/2021. (db,) (Entered: 11/04/2021)
11/04/2021	6	ORDER TO SHOW CAUSE: ORDERED that the defendant show cause before this court on November 8th, 2021 at 11:00 am in Courtroom 5A as to why a temporary restraining order and/or preliminary injunction should not be issued. Signed by Judge Christine P. O'Hearn on 11/4/2021. (db,) (Entered: 11/04/2021)
11/04/2021	7	CERTIFICATE OF SERVICE by DANIEL DONOFRIO, FRANK E. GARWOOD, JR, MARIBEL LORENZO, ERICH SMITH re 4 First MOTION for Temporary Restraining Order *enjoining Executive Orders 14042 and 14043 from taking effect*First MOTION for Preliminary Injunction *enjoining executive orders 14042 and 14043* (WEFER, DANA) (Entered: 11/04/2021)
11/05/2021	8	Letter from Plaintiffs' counsel to prevent confusion due to captioning error on brief. (WEFER, DANA) (Entered: 11/05/2021)
11/05/2021	9	BRIEF in Opposition filed by JOSEPH R. BIDEN, JR re 4 First MOTION for Temporary Restraining Order *enjoining Executive Orders 14042 and 14043 from taking effect*First MOTION for Preliminary Injunction *enjoining executive orders 14042 and 14043* (JUNEAU, ANGELA) (Entered: 11/05/2021)
11/05/2021	10	NOTICE of Appearance by ANGELA JUNEAU on behalf of JOSEPH R. BIDEN, JR (JUNEAU, ANGELA) (Entered: 11/05/2021)
11/05/2021	11	Letter from Defendant seeking leave to file an over-length brief re 9 Brief in Opposition to Motion,. (JUNEAU, ANGELA) (Entered: 11/05/2021)
11/06/2021	12	REPLY BRIEF to Opposition to Motion filed by DANIEL DONOFRIO, FRANK E. GARWOOD, JR, MARIBEL LORENZO, ERICH SMITH re 4 First MOTION for Temporary Restraining Order *enjoining Executive Orders 14042 and 14043 from taking effect*First MOTION for Preliminary Injunction *enjoining executive orders 14042 and 14043* (WEFER, DANA) (Entered: 11/06/2021)
11/06/2021	13	First MOTION for Leave to File *Second Amended Complaint* by DANIEL DONOFRIO, FRANK E. GARWOOD, JR, MARIBEL LORENZO, ERICH SMITH. (Attachments: # 1 Text of Proposed Order, # 2 Exhibit Redlined Amendments)(WEFER, DANA) (Entered: 11/06/2021)
11/07/2021	14	First MOTION to Expedite *Plaintiffs' Motion for Leave to Amend* by DANIEL DONOFRIO, FRANK E. GARWOOD, JR, MARIBEL LORENZO, ERICH SMITH. (Attachments: # 1 Text of Proposed Order)(WEFER, DANA) (Entered: 11/07/2021)
11/08/2021	15	TEXT ORDER: Defendants request to file an overlength brief (ECF No. 11) is hereby GRANTED. So Ordered by Judge Christine P. O'Hearn on 11/8/2021. (db,) Modified on 11/9/2021 (db). (Entered: 11/08/2021)
11/08/2021	16	Minute Entry for proceedings held before Judge Christine P. O'Hearn: Show Cause Hearing Cause on why a Temporary Restraining Order should not be issued against Defendant. Ordered Decision Reserved. held on 11/8/2021. (Court Reporter, Camille Pedano) (db,) (Entered: 11/08/2021)
11/08/2021	17	TEXT ORDER: Plaintiffs counsel shall file affidavits by 4:00 p.m. today indicating whether any of the Plaintiffs have requested an exception to Executive Order 14042 or 14043. The information provided shall be limited to the date on which any such request

		was submitted and the status of that request. So Ordered by Judge Christine P. O'Hearn on 11/8/2021. (db,) (Entered: 11/08/2021)
11/08/2021	18	DECLARATION *of Dana Wefer concerning exception requests by Plaintiffs* by DANIEL DONOFRIO, FRANK E. GARWOOD, JR, MARIBEL LORENZO, ERICH SMITH. (WEFER, DANA) (Entered: 11/08/2021)
11/08/2021	19	OPINION. Signed by Judge Christine P. O'Hearn on 11/8/2021. (db,) (Entered: 11/08/2021)
11/08/2021	20	ORDER denying plaintiff's 4 Motion for TRO; denying 4 Motion for Preliminary Injunction. Signed by Judge Christine P. O'Hearn on 11/8/2021. (db,) (Entered: 11/08/2021)
11/08/2021	21	Letter. (JUNEAU, ANGELA) (Entered: 11/08/2021)
11/10/2021		Set/Reset Deadlines as to 14 First MOTION to Expedite *Plaintiffs' Motion for Leave to Amend*, 13 First MOTION for Leave to File *Second Amended Complaint*. Motion set for 12/6/2021 before Magistrate Judge Sharon A. King. Unless otherwise directed by the Court, this motion will be decided on the papers and no appearances are required. Note that this is an automatically generated message from the Clerk`s Office and does not supersede any previous or subsequent orders from the Court. (dmr) (Entered: 11/10/2021)
11/10/2021	22	NOTICE OF INTERLOCUTORY APPEAL as to 19 Opinion, 20 Order on Motion for TRO, Order on Motion for Preliminary Injunction by DANIEL DONOFRIO, FRANK E. GARWOOD, JR, MARIBEL LORENZO, ERICH SMITH. Filing fee $ 505, receipt number ANJDC-12972082. The Clerk's Office hereby certifies the record and the docket sheet available through ECF to be the certified list in lieu of the record and/or the certified copy of the docket entries. Appeal Record due by 12/8/2021. (WEFER, DANA) (Entered: 11/10/2021)
11/10/2021	23	USCA Case Number 21-3091 for 22 Notice of Interlocutory Appeal, filed by FRANK E. GARWOOD, JR., MARIBEL LORENZO, ERICH SMITH, DANIEL DONOFRIO. USCA Case Manager Tim McIntyre (Document Restricted - Court Only) (ca3tmm,) (Entered: 11/10/2021)
11/11/2021	25	Transcript of Proceedings held on 11/8/2021, before Judge CHRISTINE P. O'HEARN. Court Reporter/Transcriber Camille Pedano (609-774-1494). **NOTICE REGARDING (1) REDACTION OF PERSONAL IDENTIFIERS IN TRANSCRIPTS AND (2) MOTION TO REDACT AND SEAL:** The parties have seven (7) calendar days to file with the Court a Notice of Intent to Request Redaction of this Transcript to comply with Fed.R.Civ.P.5.2(a) (personal identifiers). Parties seeking to redact and seal this Transcript, or portions thereof, pursuant to L.Civ.R. 5.3(g) must e-file a Motion to Redact and Seal utilizing the event `Redact and Seal Transcript/Digital Recording`. Redaction Request to Court Reporter/Transcription Agency due, but not filed, by 12/2/2021. Redacted Transcript Deadline set for 12/13/2021. Release of Transcript Restriction set for 2/9/2022. (tf,) (Entered: 11/12/2021)
11/12/2021	24	ORDER Denying as Moot 14 Motion to Expedite. Signed by Magistrate Judge Sharon A. King on 11/12/2021. (rtm,) (Entered: 11/12/2021)
11/19/2021	26	Letter from Defendant seeking an adjournment of Plaintiffs' Motion for Leave to Amend. (JUNEAU, ANGELA) (Entered: 11/19/2021)
11/19/2021	27	ORDER granting letter request to adjourn the return date of the Motion to Amend to 12/20/2021. Signed by Magistrate Judge Sharon A. King on 11/19/2021. (dmr) (Entered: 11/19/2021)
11/19/2021		Set/Reset Deadlines as to 13 First MOTION for Leave to File *Second Amended Complaint*.

		Motion set for 12/20/2021 before Magistrate Judge Sharon A. King. Unless otherwise directed by the Court, this motion will be decided on the papers and no appearances are required. Note that this is an automatically generated message from the Clerk`s Office and does not supersede any previous or subsequent orders from the Court. (dmr) (Entered: 11/19/2021)
11/23/2021	28	TRANSCRIPT REQUEST by DANIEL DONOFRIO, FRANK E. GARWOOD, JR, MARIBEL LORENZO, ERICH SMITH for proceedings held on November 8, 2021 before Judge Christine P. O'Hearn, (WEFER, DANA) (Entered: 11/23/2021)

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11/27/2021 13:36:24

PACER Login:	danawefer	**Client Code:**	
Description:	Docket Report	**Search Criteria:**	1:21-cv-19457-CPO-SAK Start date: 1/1/1980 End date: 11/29/2021
Billable Pages:	4	**Cost:**	0.40

Presidential Documents

Executive Order 14042 of September 9, 2021

Ensuring Adequate COVID Safety Protocols for Federal Contractors

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Federal Property and Administrative Services Act, 40 U.S.C. 101 *et seq.,* and section 301 of title 3, United States Code, and in order to promote economy and efficiency in procurement by contracting with sources that provide adequate COVID–19 safeguards for their workforce, it is hereby ordered as follows:

Section 1. *Policy.* This order promotes economy and efficiency in Federal procurement by ensuring that the parties that contract with the Federal Government provide adequate COVID–19 safeguards to their workers performing on or in connection with a Federal Government contract or contract-like instrument as described in section 5(a) of this order. These safeguards will decrease the spread of COVID–19, which will decrease worker absence, reduce labor costs, and improve the efficiency of contractors and subcontractors at sites where they are performing work for the Federal Government. Accordingly, ensuring that Federal contractors and subcontractors are adequately protected from COVID–19 will bolster economy and efficiency in Federal procurement.

Sec. 2. *Providing for Adequate COVID–19 Safety Protocols for Federal Contractors and Subcontractors.* (a) Executive departments and agencies, including independent establishments subject to the Federal Property and Administrative Services Act, 40 U.S.C. 102(4)(A) (agencies), shall, to the extent permitted by law, ensure that contracts and contract-like instruments (as described in section 5(a) of this order) include a clause that the contractor and any subcontractors (at any tier) shall incorporate into lower-tier subcontracts. This clause shall specify that the contractor or subcontractor shall, for the duration of the contract, comply with all guidance for contractor or subcontractor workplace locations published by the Safer Federal Workforce Task Force (Task Force Guidance or Guidance), provided that the Director of the Office of Management and Budget (Director) approves the Task Force Guidance and determines that the Guidance, if adhered to by contractors or subcontractors, will promote economy and efficiency in Federal contracting. This clause shall apply to any workplace locations (as specified by the Task Force Guidance) in which an individual is working on or in connection with a Federal Government contract or contract-like instrument (as described in section 5(a) of this order).

(b) By September 24, 2021, the Safer Federal Workforce Task Force (Task Force) shall, as part of its issuance of Task Force Guidance, provide definitions of relevant terms for contractors and subcontractors, explanations of protocols required of contractors and subcontractors to comply with workplace safety guidance, and any exceptions to Task Force Guidance that apply to contractor and subcontractor workplace locations and individuals in those locations working on or in connection with a Federal Government contract or contract-like instrument (as described in section 5(a) of this order).

(c) Prior to the Task Force publishing new Guidance related to COVID–19 for contractor or subcontractor workplace locations, including the Guidance developed pursuant to subsection (b) of this section, the Director shall, as an exercise of the delegation of my authority under the Federal Property

and Administrative Services Act, *see* 3 U.S.C. 301, determine whether such Guidance will promote economy and efficiency in Federal contracting if adhered to by Government contractors and subcontractors. Upon an affirmative determination by the Director, the Director's approval of the Guidance, and subsequent issuance of such Guidance by the Task Force, contractors and subcontractors working on or in connection with a Federal Government contract or contract-like instrument (as described in section 5(a) of this order), shall adhere to the requirements of the newly published Guidance, in accordance with the clause described in subsection (a) of this section. The Director shall publish such determination in the *Federal Register*.

(d) Nothing in this order shall excuse noncompliance with any applicable State law or municipal ordinance establishing more protective safety protocols than those established under this order or with any more protective Federal law, regulation, or agency instructions for contractor or subcontractor employees working at a Federal building or a federally controlled workplace.

(e) For purposes of this order, the term ''contract or contract-like instrument'' shall have the meaning set forth in the Department of Labor's proposed rule, ''Increasing the Minimum Wage for Federal Contractors,'' 86 FR 38816, 38887 (July 22, 2021). If the Department of Labor issues a final rule relating to that proposed rule, that term shall have the meaning set forth in that final rule.

Sec. 3. *Regulations and Implementation.* (a) The Federal Acquisition Regulatory Council, to the extent permitted by law, shall amend the Federal Acquisition Regulation to provide for inclusion in Federal procurement solicitations and contracts subject to this order the clause described in section 2(a) of this order, and shall, by October 8, 2021, take initial steps to implement appropriate policy direction to acquisition offices for use of the clause by recommending that agencies exercise their authority under subpart 1.4 of the Federal Acquisition Regulation.

(b) By October 8, 2021, agencies shall take steps, to the extent permitted by law, to exercise any applicable authority to ensure that contracts and contract-like instruments as described in section 5(a) of this order that are not subject to the Federal Acquisition Regulation and that are entered into on or after October 15, 2021, consistent with the effective date of such agency action, include the clause described in section 2(a) of this order.

Sec. 4. *Severability.* If any provision of this order, or the application of any provision of this order to any person or circumstance, is held to be invalid, the remainder of this order and its application to any other person or circumstance shall not be affected thereby.

Sec. 5. *Applicability.* (a) This order shall apply to any new contract; new contract-like instrument; new solicitation for a contract or contract-like instrument; extension or renewal of an existing contract or contract-like instrument; and exercise of an option on an existing contract or contract-like instrument, if:

(i) it is a procurement contract or contract-like instrument for services, construction, or a leasehold interest in real property;

(ii) it is a contract or contract-like instrument for services covered by the Service Contract Act, 41 U.S.C. 6701 *et seq.;*

(iii) it is a contract or contract-like instrument for concessions, including any concessions contract excluded by Department of Labor regulations at 29 CFR 4.133(b); or

(iv) it is a contract or contract-like instrument entered into with the Federal Government in connection with Federal property or lands and related to offering services for Federal employees, their dependents, or the general public;

(b) This order shall not apply to:

(i) grants;

(ii) contracts, contract-like instruments, or agreements with Indian Tribes under the Indian Self-Determination and Education Assistance Act (Public Law 93–638), as amended;

(iii) contracts or subcontracts whose value is equal to or less than the simplified acquisition threshold, as that term is defined in section 2.101 of the Federal Acquisition Regulation;

(iv) employees who perform work outside the United States or its outlying areas, as those terms are defined in section 2.101 of the Federal Acquisition Regulation; or

(v) subcontracts solely for the provision of products.

Sec. 6. *Effective Date.* (a) Except as provided in subsection (b) of this section, this order is effective immediately and shall apply to new contracts; new contract-like instruments; new solicitations for contracts or contract-like instruments; extensions or renewals of existing contracts or contract-like instruments; and exercises of options on existing contracts or contract-like instruments, as described in section 5(a) of this order, where the relevant contract or contract-like instrument will be entered into, the relevant contract or contract-like instrument will be extended or renewed, or the relevant option will be exercised, on or after:

(i) October 15, 2021, consistent with the effective date for the action taken by the Federal Acquisition Regulatory Council pursuant to section 3(a) of this order; or

(ii) for contracts and contract-like instruments that are not subject to the Federal Acquisition Regulation and where an agency action is taken pursuant to section 3(b) of this order, October 15, 2021, consistent with the effective date for such action.

(b) As an exception to subsection (a) of this section, where agencies have issued a solicitation before the effective date for the relevant action taken pursuant to section 3 of this order and entered into a new contract or contract-like instrument resulting from such solicitation within 30 days of such effective date, such agencies are strongly encouraged to ensure that the safety protocols specified in section 2 of this order are applied in the new contract or contract-like instrument. But if that contract or contract-like instrument term is subsequently extended or renewed, or an option is subsequently exercised under that contract or contract-like instrument, the safety protocols specified in section 2 of this order shall apply to that extension, renewal, or option.

(c) For all existing contracts and contract-like instruments, solicitations issued between the date of this order and the effective dates set forth in this section, and contracts and contract-like instruments entered into between the date of this order and the effective dates set forth in this section, agencies are strongly encouraged, to the extent permitted by law, to ensure that the safety protocols required under those contracts and contract-like instruments are consistent with the requirements specified in section 2 of this order.

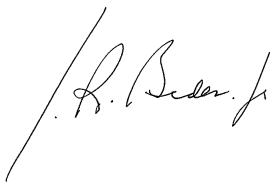
Sec. 7. *General Provisions.* (a) Nothing in this order shall be construed to impair or otherwise affect:

(i) the authority granted by law to an executive department or agency, or the head thereof; or

(ii) the functions of the Director of the Office of Management and Budget relating to budgetary, administrative, or legislative proposals.

(b) This order shall be implemented consistent with applicable law and subject to the availability of appropriations.

(c) This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.



THE WHITE HOUSE,
September 9, 2021.

[FR Doc. 2021–19924
Filed 9–13–21; 8:45 am]
Billing code 3295–F1–P

Safer Federal Workforce Task Force
COVID-19 Workplace Safety: Guidance for Federal Contractors and Subcontractors
Issued September 24, 2021

Introduction

On September 9, President Biden announced his Path Out of the Pandemic: COVID-19 Action Plan. One of the main goals of this science-based plan is to get more people vaccinated. As part of that plan, the President signed Executive Order 14042, Ensuring Adequate COVID Safety Protocols for Federal Contractors, ("the order") which directs executive departments and agencies, including independent establishments subject to the Federal Property and Administrative Services Act, 40 U.S.C. § 102(4)(A), to ensure that covered contracts and contract-like instruments include a clause ("the clause") that the contractor and any subcontractors (at any tier) shall incorporate into lower-tier subcontracts. This clause shall specify that the contractor or subcontractor shall, for the duration of the contract, comply with all guidance for contractor or subcontractor workplace locations published by the Safer Federal Workforce Task Force ("Task Force"), provided that the Director of the Office of Management and Budget ("OMB") approves the Task Force Guidance (the or this "Guidance") and determines that the Guidance, if adhered to by covered contractors, will promote economy and efficiency in Federal contracting.

The actions directed by the order will ensure that parties who contract with the Federal Government provide COVID-19 safeguards in workplaces with individuals working on or in connection with a Federal Government contract or contract-like instrument. These workplace safety protocols will apply to all covered contractor employees, including contractor or subcontractor employees in covered contractor workplaces who are not working on a Federal Government contract or contract-like instrument. These safeguards will decrease the spread of SARS-CoV-2, the virus that causes COVID-19, which will decrease worker absence, reduce labor costs, and improve the efficiency of contractors and subcontractors performing work for the Federal Government.

Pursuant to this Guidance, and in addition to any requirements or workplace safety protocols that are applicable because a contractor or subcontractor employee is present at a Federal workplace, Federal contractors and subcontractors with a covered contract will be required to conform to the following workplace safety protocols:

1. COVID-19 vaccination of covered contractor employees, except in limited circumstances where an employee is legally entitled to an accommodation;
2. Compliance by individuals, including covered contractor employees and visitors, with the Guidance related to masking and physical distancing while in covered contractor workplaces; and
3. Designation by covered contractors of a person or persons to coordinate COVID-19 workplace safety efforts at covered contractor workplaces.

The order also sets out a process for OMB and the Safer Federal Workforce Task Force to update the Guidance for covered contractors, which the Task Force will consider doing based on future changes to Centers for Disease Control and Prevention ("CDC") COVID-19 guidance and as warranted by the circumstances of the pandemic and public health conditions. It also sets out a process for the Federal Acquisition Regulatory Council ("FAR Council") to implement such protocols and guidance for covered Federal procurement solicitations and contracts subject to the Federal Acquisition Regulation ("FAR") and for agencies that are responsible for covered contracts and contract-like instruments not subject to the FAR to take prompt action to ensure that those covered contracts and contract-like instruments include the clause, consistent with the order.

Covered contractors shall adhere to the requirements of this Guidance. The Director of OMB has, as authorized by Executive Order 14042, approved this Guidance and has, an exercise of the delegation of authority (see 3 U.S.C. § 301) under the Federal Property and Administrative Services Act determined that this Guidance will promote economy and efficiency in Federal contracting if adhered to by Government contractors and subcontractors. The Director has published such determination in the Federal Register.

Definitions

Community transmission – means the level of community transmission as set forth in the CDC COVID-19 Data Tracker County View.

Contract and contract-like instrument – has the meaning set forth in the Department of Labor's proposed rule, "Increasing the Minimum Wage for Federal Contractors," 86 Fed. Reg. 38,816, 38,887 (July 22, 2021). If the Department of Labor issues a final rule relating to that proposed rule, this term shall have the meaning set forth in that final rule.

That proposed rule defines a contract or contract-like instrument as an agreement between two or more parties creating obligations that are enforceable or otherwise recognizable at law. This definition includes, but is not limited to, a mutually binding legal relationship obligating one party to furnish services (including construction) and another party to pay for them. The term contract includes all contracts and any subcontracts of any tier thereunder, whether negotiated or advertised, including any procurement actions, lease agreements, cooperative agreements, provider agreements, intergovernmental service agreements, service agreements, licenses, permits, or any other type of agreement, regardless of nomenclature, type, or particular form, and whether entered into verbally or in writing. The term contract shall be interpreted broadly as to include, but not be limited to, any contract within the definition provided in the FAR at 48 CFR chapter 1 or applicable Federal statutes. This definition includes, but is not limited to, any contract that may be covered under any Federal procurement statute. Contracts may be the result of competitive bidding or awarded to a single source under applicable authority to do so. In addition to bilateral instruments, contracts include, but are not limited to, awards and notices of awards; job orders or task letters issued under basic ordering agreements; letter contracts; orders, such as purchase orders, under which the contract becomes effective by written acceptance or performance; exercised contract options; and bilateral contract modifications. The term contract includes contracts covered by the Service Contract Act, contracts covered by the Davis-Bacon Act, concessions contracts not otherwise subject to the Service Contract Act, and contracts in connection with Federal property or land and related to offering services for Federal employees, their dependents, or the general public.

Contractor or subcontractor workplace location – means a location where covered contract employees work, including a covered contractor workplace or Federal workplace.

Covered contract – means any contract or contract-like instrument that includes the clause described in Section 2(a) of the order.

Covered contractor – means a prime contractor or subcontractor at any tier who is party to a covered contract.

Covered contractor employee – means any full-time or part-time employee of a covered contractor working on or in connection with a covered contract or working at a covered

contractor workplace. This includes employees of covered contractors who are not themselves working on or in connection with a covered contract.

Covered contractor workplace – means a location controlled by a covered contractor at which any employee of a covered contractor working on or in connection with a covered contract is likely to be present during the period of performance for a covered contract. A covered contractor workplace does not include a covered contractor employee's residence.

Federal workplace – means any place, site, installation, building, room, or facility in which any Federal executive department or agency conducts official business, or is within an executive department or agency's jurisdiction, custody, or control.

Fully vaccinated – People are considered fully vaccinated for COVID-19 two weeks after they have received the second dose in a two-dose series, or two weeks after they have received a single-dose vaccine. There is currently no post-vaccination time limit on fully vaccinated status; should such a limit be determined by the Centers for Disease Control and Prevention, that limit will be considered by the Task Force and OMB for possible updating of this Guidance.

For purposes of this Guidance, people are considered fully vaccinated if they have received COVID-19 vaccines currently approved or authorized for emergency use by the U.S. Food and Drug Administration (Pfizer-BioNTech, Moderna, and Johnson & Johnson [J&J]/Janssen COVID-19 vaccines) or COVID-19 vaccines that have been listed for emergency use by the World Health Organization (e.g., AstraZeneca/Oxford). More information is available at Interim Clinical Considerations for Use of COVID-19 Vaccines | CDC.

Clinical trial participants from a U.S. site who are documented to have received the full series of an "active" (not placebo) COVID-19 vaccine candidate, for which vaccine efficacy has been independently confirmed (e.g., by a data and safety monitoring board), can be considered fully vaccinated two weeks after they have completed the vaccine series. Currently, the Novavax COVID-19 vaccine meets these criteria. More information is available at the CDC website here.

Mask – means any mask that is consistent with CDC recommendations as set forth in Types of Masks and Respirators | CDC. This may include the following: disposable masks, masks that fit properly (snugly around the nose and chin with no large gaps around the sides of the face), masks made with breathable fabric (such as cotton), masks made with tightly woven fabric (i.e., fabrics that do not let light pass through when held up to a light source), masks with two or three layers, masks with inner filter pockets, and filtering facepiece respirators that are approved by the National Institute for Occupational Safety and Health or consistent with international standards. The following do not constitute masks for purposes of this Guidance: masks with exhalation valves, vents, or other openings; face shields only (without mask); or masks with single-layer fabric or thin fabric that does not block light.

Guidance

Covered contractors are responsible for ensuring that covered contractor employees comply with the workplace safety protocols detailed below. Covered contractor employees must also comply with agency COVID-19 workplace safety requirements while in Federal workplaces.

Consistent with applicable law, agencies are strongly encouraged to incorporate a clause requiring compliance with this Guidance into contracts that are not covered or directly addressed by the order because the contract is under the Simplified Acquisition Threshold as defined in section 2.101 of the FAR or is a contract or subcontract for the manufacturing of products. Agencies are also strongly encouraged to incorporate a clause requiring compliance with this Guidance into existing contracts and contract-like instruments prior to the date upon which the order requires inclusion of the clause.

1. *Vaccination of covered contractor employees, except in limited circumstances where an employee is legally entitled to an accommodation*

Covered contractors must ensure that all covered contractor employees are fully vaccinated for COVID-19, unless the employee is legally entitled to an accommodation. Covered contractor employees must be fully vaccinated no later than December 8, 2021. After that date, all covered contractor employees must be fully vaccinated by the first day of the period of performance on a newly awarded covered contract, and by the first day of the period of performance on an exercised option or extended or renewed contract when the clause has been incorporated into the covered contract.

A covered contractor may be required to provide an accommodation to covered contractor employees who communicate to the covered contractor that they are not vaccinated against COVID-19 because of a disability (which would include medical conditions) or because of a sincerely held religious belief, practice, or observance. A covered contractor should review and consider what, if any, accommodation it must offer. Requests for "medical accommodation" or "medical exceptions" should be treated as requests for a disability accommodation.

Should a Federal agency have an urgent, mission-critical need for a covered contractor to have covered contractor employees begin work on a covered contract or at a covered workplace before becoming fully vaccinated, the agency head may approve an exception for the covered contractor —in the case of such limited exceptions, the covered contractor must ensure these covered contractor employees are fully vaccinated within 60 days of beginning work on a covered contract or at a covered workplace. The covered contractor must further ensure that such employees comply with masking and physical distancing requirements for not fully vaccinated individuals in covered workplaces prior to being fully vaccinated.

The covered contractor must review its covered employees' documentation to prove vaccination status. Covered contractors must require covered contractor employees to show or provide their

employer with one of the following documents: a copy of the record of immunization from a health care provider or pharmacy, a copy of the COVID-19 Vaccination Record Card (CDC Form MLS-319813_r, published on September 3, 2020), a copy of medical records documenting the vaccination, a copy of immunization records from a public health or State immunization information system, or a copy of any other official documentation verifying vaccination with information on the vaccine name, date(s) of administration, and the name of health care professional or clinic site administering vaccine. Covered contractors may allow covered contractor employees to show or provide to their employer a digital copy of such records, including, for example, a digital photograph, scanned image, or PDF of such a record.

The covered contractor shall ensure compliance with the requirements in this Guidance related to the showing or provision of proper vaccination documentation.

Covered contractors are strongly encouraged to incorporate similar vaccination requirements into their non-covered contracts and agreements with non-covered contractors whose employees perform work at covered contractor workplaces but who do not work on or in connection with a Federal contract, such as those contracts and agreements related to the provision of food services, onsite security, or groundskeeping services at covered contractor workplaces.

2. *Requirements related to masking and physical distancing while in covered contractor workplaces*

Covered contractors must ensure that all individuals, including covered contractor employees and visitors, comply with published CDC guidance for masking and physical distancing at a covered contractor workplace, as discussed further in this Guidance.

In addition to the guidance set forth below, CDC's guidance for mask wearing and physical distancing in specific settings, including healthcare, transportation, correctional and detention facilities, and schools, must be followed, as applicable.

In areas of high or substantial community transmission, fully vaccinated people must wear a mask in indoor settings, except for limited exceptions discussed in this Guidance. In areas of low or moderate community transmission, fully vaccinated people do not need to wear a mask. Fully vaccinated individuals do not need to physically distance regardless of the level of transmission in the area.

Individuals who are not fully vaccinated must wear a mask indoors and in certain outdoor settings (see below) regardless of the level of community transmission in the area. To the extent practicable, individuals who are not fully vaccinated should maintain a distance of at least six feet from others at all times, including in offices, conference rooms, and all other communal and work spaces.

Covered contractors must require individuals in covered contractor workplaces who are required to wear a mask to:

- Wear appropriate masks consistently and correctly (over mouth and nose).
- Wear appropriate masks in any common areas or shared workspaces (including open floorplan office space, cubicle embankments, and conference rooms).
- For individuals who are not fully vaccinated, wear a mask in crowded outdoor settings or during outdoor activities that involve sustained close contact with other people who are not fully vaccinated, consistent with CDC guidance.

A covered contractor may be required to provide an accommodation to covered contractor employees who communicate to the covered contractor that they cannot wear a mask because of a disability (which would include medical conditions) or because of a sincerely held religious belief, practice, or observance. A covered contractor should review and consider what, if any, accommodation it must offer.

Covered contractors may provide for exceptions to mask wearing and/or physical distancing requirements consistent with CDC guidelines, for example, when an individual is alone in an office with floor to ceiling walls and a closed door, or for a limited time when eating or drinking and maintaining appropriate distancing. Covered contractors may also provide exceptions for covered contractor employees engaging in activities in which a mask may get wet; high intensity activities where covered contractor employees are unable to wear a mask because of difficulty breathing; or activities for which wearing a mask would create a risk to workplace health, safety, or job duty as determined by a workplace risk assessment. Any such exceptions must be approved in writing by a duly authorized representative of the covered contractor to ensure compliance with this Guidance at covered contractor workplaces, as discussed further below.

Masked individuals may be asked to lower their masks briefly for identification purposes in compliance with safety and security requirements.

Covered contractors must check the CDC COVID-19 Data Tracker County View website for community transmission information in all areas where they have a covered contractor workplace at least weekly to determine proper workplace safety protocols. When the level of community transmission in the area of a covered contractor workplace increases from low or moderate to substantial or high, contractors and subcontractors should put in place more protective workplace safety protocols consistent with published guidelines. However, when the level of community transmission in the area of a covered contractor workplace is reduced from high or substantial to moderate or low, the level of community transmission must remain at that lower level for at least two consecutive weeks before the covered contractor utilizes those protocols recommended for areas of moderate or low community transmission.

3. *Designation by covered contractors of a person or persons to coordinate COVID-19 workplace safety efforts at covered contractor workplaces.*

Covered contractors shall designate a person or persons to coordinate implementation of and compliance with this Guidance and the workplace safety protocols detailed herein at covered contractor workplaces. The designated person or persons may be the same individual(s) responsible for implementing any additional COVID-19 workplace safety protocols required by local, State, or Federal law, and their responsibilities to coordinate COVID-19 workplace safety protocols may comprise some or all of their regular duties.

The designated individual (or individuals) must ensure that information on required COVID-19 workplace safety protocols is provided to covered contractor employees and all other individuals likely to be present at covered contractor workplaces, including by communicating the required workplace safety protocols and related policies by email, websites, memoranda, flyers, or other means and posting signage at covered contractor workplaces that sets forth the requirements and workplace safety protocols in this Guidance in a readily understandable manner. This includes communicating the COVID-19 workplace safety protocols and requirements related to masking and physical distancing to visitors and all other individuals present at covered contractor workplaces. The designated individual (or individuals) must also ensure that covered contractor employees comply with the requirements in this guidance related to the showing or provision of proper vaccination documentation.

Frequently Asked Questions

Vaccination and Safety Protocols

Q1: How do covered contractors determine vaccination status of visitors to covered contractor workplaces?

A: Covered contractors should post signage at entrances to covered contractor workplaces providing information on safety protocols for fully vaccinated and not fully vaccinated individuals, including the protocols defined in the masking and physical distancing section above, and instruct individuals to follow the appropriate workplace safety protocols while at the covered contractor workplace. Covered contractors may take other reasonable steps, such as by communicating workplace safety protocols to visitors prior to their arrival at a covered contractor workplace or requiring all visitors to follow masking and physical distancing protocols for not fully vaccinated individuals.

Q2: Do covered contractors need to provide onsite vaccinations to their employees?

A: Covered contractors should ensure their employees are aware of convenient opportunities to be vaccinated. Although covered contractors may choose to provide vaccinations at their facilities or workplaces, given the widespread availability of vaccinations, covered contractors are not required to do so.

Q3: What should a contractor employee do if a covered contractor employee has lost or does not have a copy of required vaccination documentation?

A: If covered contractor employees need new vaccination cards or copies of other documentation proof of vaccination, they should contact the vaccination provider site where they received their vaccine. Their provider should be able to provide them with new cards or documentation with up-to-date information about the vaccinations they have received. If the location where the covered contractor employees received their COVID-19 vaccine is no longer operating, the covered contractor employees should contact their State or local health department's immunization information system (IIS) for assistance. Covered contractor employees should contact their State or local health department if they have additional questions about vaccination cards or vaccination records.

An attestation of vaccination by the covered contractor employee is not an acceptable substitute for documentation of proof of vaccination.

Q4: Who is responsible for determining if a covered contractor employee must be provided an accommodation because of a disability or because of a sincerely held religious belief, practice, or observance?

A: A covered contractor may be required to provide an accommodation to contractor employees who communicate to the covered contractor that they are not vaccinated for COVID-19, or that they cannot wear a mask, because of a disability (which would include medical conditions) or because of a sincerely held religious belief, practice, or observance. A covered contractor should review and consider what, if any, accommodation it must offer. The contractor is responsible for considering, and dispositioning, such requests for accommodations regardless of the covered contractor employee's place of performance. If the agency that is the party to the covered contract is a "joint employer" for purposes of compliance with the Rehabilitation Act and Title VII of the Civil Rights Act, both the agency and the covered contractor should review and consider what, if any, accommodation they must offer.

Q5: Are covered contractor employees who have a prior COVID-19 infection required to be vaccinated?

A: Yes, covered contractor employees who have had a prior COVID-19 infection are required to be vaccinated. More information from CDC can be found here.

Q6: Can a covered contractor accept a recent antibody test from a covered contractor employee to prove vaccination status?

A: No. A covered contractor cannot accept a recent antibody test from a covered contractor employee to prove vaccination status.

Workplaces

Q7: Does this Guidance apply to outdoor contractor or subcontractor workplace locations?

A: Yes, this Guidance applies to contractor or subcontractor workplace locations that are outdoors.

Q8: If a covered contractor employee is likely to be present during the period of performance for a covered contract on only one floor or a separate area of a building, site, or facility controlled by a covered contractor, do other areas of the building, site, or facility controlled by a covered contractor constitute a covered contractor workplace?

A: Yes, unless a covered contractor can affirmatively determine that none of its employees on another floor or in separate areas of the building will come into contact with a covered contractor employee during the period of performance of a covered contract. This would include affirmatively determining that there will be no interactions between covered contractor employees and non-covered contractor employees in those locations during the period of performance on a covered contract, including interactions through use of common areas such as lobbies, security clearance areas, elevators, stairwells, meeting rooms, kitchens, dining areas, and parking garages.

Q9: If a covered contractor employee performs their duties in or at only one building, site, or facility on a campus controlled by a covered contractor with multiple buildings, sites, or facilities, are the other buildings, sites, or facility controlled by a covered contractor considered a covered contractor workplace?

A: Yes, unless a covered contractor can affirmatively determine that none of its employees in or at one building, site, or facility will come into contact with a covered contractor employee during the period of performance of a covered contract. This would include affirmatively determining that there will be no interactions between covered contractor employees and non-covered contractor employees in those locations during the period of performance on a covered contract, including interactions through use of common areas such as lobbies, security clearance areas, elevators, stairwells, meeting rooms, kitchens, dining areas, and parking garages.

Q10: Are the workplace safety protocols enumerated above the same irrespective of whether the work is performed at a covered contractor workplace or at a Federal workplace?

A: Yes. The Guidance applies to all covered contractor employees and to all contractor or subcontractor workplace locations. While at a Federal workplace, covered contractor employees must also comply with any additional agency workplace safety requirements for that workplace. Because covered contractor employees working on a covered contract need to be fully vaccinated after December 8, 2021, covered contractor employees who work only at a Federal workplace need to be fully vaccinated by that date as well, unless legally entitled to an accommodation.

Q11: How does this Guidance apply to covered contractor employees who are authorized under the covered contract to perform work remotely from their residence?

A: An individual working on a covered contract from their residence is a covered contractor employee, and must comply with the vaccination requirement for covered contractor employees, even if the employee never works at either a covered contractor workplace or Federal workplace during the performance of the contract. A covered contractor employee's residence is not a covered contractor workplace, so while in the residence the individual need not comply with requirements for covered contractor workplaces, including those related to masking and physical distancing, even while working on a covered contract.

Scope and Applicability

Q12: By when must the requirements of the order be reflected in contracts?

A: Section 6 of the order lays out a phase-in of the requirements for covered contracts as follows:

- *Contracts awarded prior to October 15 where performance is ongoing* – the requirements must be incorporated at the point at which an option is exercised or an extension is made.
- *New contracts* – the requirements must be incorporated into contracts awarded on or after November 14. Between October 15 and November 14, agencies must include the clause in the solicitation and are encouraged to include the clause in contracts awarded during this time period but are not required to do so unless the solicitation for such contract was issued on or after October 15.

Q13: Must the order's requirements be flowed down to all lower-tier subcontractors and, if so, who is responsible for flowing the clause down?

A: Yes. The requirements in the order apply to subcontractors at all tiers, except for subcontracts solely for the provision of products. The prime contractor must flow the clause down to first-tier subcontractors; higher-tier subcontractors must flow the clause down to the next lower-tier subcontractor, to the point at which subcontract requirements are solely for the provision of products.

Q14: Does the Guidance apply to small businesses?

A: Yes, the requirement to comply with this Guidance applies equally to covered contractors regardless of whether they are a small business. This broad application of COVID-19 guidance will more effectively decrease the spread of COVID-19, which, in turn, will decrease worker absence, reduce labor costs, and improve the efficiency of contractors and subcontractors at workplaces where they are performing work for the Federal Government.

Q15: What steps are being taken to promote consistent application of the order's requirements across agencies?

A: The FAR Council will conduct a rulemaking to amend the FAR to include a clause that requires covered contractors performing under FAR-based contracts to comply with this Guidance for contractor and subcontractor workplace locations. Prior to rulemaking, by October 8, 2021, the FAR Council will develop a clause and recommend that agencies exercise their authority to deviate from the FAR using the procedures set forth in subpart 1.4. Agencies responsible for contracts and contract-like instruments that are not subject to the FAR, such as concession contracts, will be responsible for developing appropriate guidance by October 8, 2021 to incorporate requirements into their covered instruments entered into on or after October 15, 2021.

Q16: If the Safer Federal Workforce Task Force updates this Guidance to add new requirements, do those requirements apply to existing contracts?

A: Yes. Covered contractors are required to, for the duration of the contract, comply with all Task Force Guidance for contractor or subcontractor workplace locations, including any new

Guidance where the OMB Director approves the Guidance and determines that adherence to the Guidance will promote economy and efficiency in Federal contracting. The Task Force and OMB plan to ensure any workplace safety protocols reflect what is necessary to decrease the spread of COVID-19.

Q17: What constitutes work performed "in connection with" a covered contract?

A: Employees who perform duties necessary to the performance of the covered contract, but who are not directly engaged in performing the specific work called for by the covered contract, such as human resources, billing, and legal review, perform work in connection with a Federal Government contract.

Q18: Do the workplace safety protocols in the Guidance apply to covered contractor employees who perform work outside the United States?

A: No. The workplace safety protocols in the Guidance do not apply to covered contractor employees who only perform work outside the United States or its outlying areas, as those terms are defined in section 2.101 of the FAR.

Compliance

Q19: Does this clause apply in States or localities that seek to prohibit compliance with any of the workplace safety protocols set forth in this Guidance?

A: Yes. These requirements are promulgated pursuant to Federal law and supersede any contrary State or local law or ordinance. Additionally, nothing in this Guidance shall excuse noncompliance with any applicable State law or municipal ordinance establishing more protective workplace safety protocols than those established under this Guidance.

Q20: Can a covered contractor comply with workplace safety requirements from the Occupational Safety and Health Administration, including pursuant to any current or forthcoming Emergency Temporary Standard related to COVID-19, instead of the requirements of this Guidance?

A: No. Covered contractors must comply with the requirements set forth in this Guidance regardless of whether they are subject to other workplace safety standards.

Q21: What is the prime contractor's responsibility for verifying that subcontractors are adhering to the mandate?

A: The prime contractor is responsible for ensuring that the required clause is incorporated into its first-tier subcontracts in accordance with the implementation schedule set forth in section 6 of the order. When the clause is incorporated into a subcontract, a subcontractor is required to

comply with this Guidance and the workplace safety protocols detailed herein. Additionally, first-tier subcontractors are expected to flow the clause down to their lower-tier subcontractors in similar fashion so that accountability for compliance is fully established throughout the Federal contract supply chain for covered subcontractor employees and workplaces at all tiers through application of the clause.

Presidential Documents

Executive Order 14043 of September 9, 2021

Requiring Coronavirus Disease 2019 Vaccination for Federal Employees

By the authority vested in me as President by the Constitution and the laws of the United States of America, including sections 3301, 3302, and 7301 of title 5, United States Code, it is hereby ordered as follows:

Section 1. *Policy.* It is the policy of my Administration to halt the spread of coronavirus disease 2019 (COVID–19), including the B.1.617.2 (Delta) variant, by relying on the best available data and science-based public health measures. The Delta variant, currently the predominant variant of the virus in the United States, is highly contagious and has led to a rapid rise in cases and hospitalizations. The nationwide public health emergency, first declared by the Secretary of Health and Human Services on January 31, 2020, remains in effect, as does the National Emergency Concerning the Coronavirus Disease 2019 (COVID–19) declared pursuant to the National Emergencies Act in Proclamation 9994 of March 13, 2020 (Declaring a National Emergency Concerning the Novel Coronavirus Disease (COVID–19) Outbreak). The Centers for Disease Control and Prevention (CDC) within the Department of Health and Human Services has determined that the best way to slow the spread of COVID–19 and to prevent infection by the Delta variant or other variants is to be vaccinated.

COVID–19 vaccines are widely available in the United States. They protect people from getting infected and severely ill, and they significantly reduce the likelihood of hospitalization and death. As of the date of this order, one of the COVID–19 vaccines, the Pfizer-BioNTech COVID–19 Vaccine, also known as Comirnaty, has received approval from the Food and Drug Administration (FDA), and two others, the Moderna COVID–19 Vaccine and the Janssen COVID–19 Vaccine, have been authorized by the FDA for emergency use. The FDA has determined that all three vaccines meet its rigorous standards for safety, effectiveness, and manufacturing quality.

The health and safety of the Federal workforce, and the health and safety of members of the public with whom they interact, are foundational to the efficiency of the civil service. I have determined that ensuring the health and safety of the Federal workforce and the efficiency of the civil service requires immediate action to protect the Federal workforce and individuals interacting with the Federal workforce. It is essential that Federal employees take all available steps to protect themselves and avoid spreading COVID–19 to their co-workers and members of the public. The CDC has found that the best way to do so is to be vaccinated.

The Safer Federal Workforce Task Force (Task Force), established by Executive Order 13991 of January 20, 2021 (Protecting the Federal Workforce and Requiring Mask-Wearing), has issued important guidance to protect the Federal workforce and individuals interacting with the Federal workforce. Agencies have also taken important actions, including in some cases requiring COVID–19 vaccination for members of their workforce.

Accordingly, building on these actions, and in light of the public health guidance regarding the most effective and necessary defenses against COVID–19, I have determined that to promote the health and safety of the Federal workforce and the efficiency of the civil service, it is necessary to require COVID–19 vaccination for all Federal employees, subject to such exceptions as required by law.

Sec. 2. *Mandatory Coronavirus Disease 2019 Vaccination for Federal Employees.* Each agency shall implement, to the extent consistent with applicable law, a program to require COVID–19 vaccination for all of its Federal employees, with exceptions only as required by law. The Task Force shall issue guidance within 7 days of the date of this order on agency implementation of this requirement for all agencies covered by this order.

Sec. 3. *Definitions.* For the purposes of this order:

(a) The term ''agency'' means an Executive agency as defined in 5 U.S.C. 105 (excluding the Government Accountability Office).

(b) The term ''employee'' means an employee as defined in 5 U.S.C. 2105 (including an employee paid from nonappropriated funds as referenced in 5 U.S.C. 2105(c)).

Sec. 4. *General Provisions.* (a) Nothing in this order shall be construed to impair or otherwise affect:

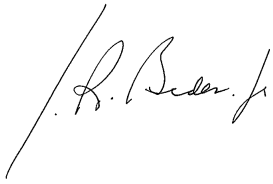
(i) the authority granted by law to an executive department or agency, or the head thereof; or

(ii) the functions of the Director of the Office of Management and Budget relating to budgetary, administrative, or legislative proposals.

(b) This order shall be implemented consistent with applicable law and subject to the availability of appropriations.

(c) This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

(d) If any provision of this order, or the application of any provision to any person or circumstance, is held to be invalid, the remainder of this order and the application of any of its other provisions to any other persons or circumstances shall not be affected thereby.



THE WHITE HOUSE,
September 9, 2021.

[FR Doc. 2021–19927
Filed 9–13–21; 8:45 am]
Billing code 3295–F1–P

Safer Federal Workforce Task Force

COVID-19 Workplace Safety: Agency Model Safety Principles

Last Updated September 13, 2021 (Previously Updated July 29, 2021)

Recent Updates

- Federal Executive Branch employees must be fully vaccinated, except in limited circumstances where an employee is legally entitled to a reasonable accommodation. Agencies must work expeditiously so that their employees are fully vaccinated as quickly as possible and by no later than November 22, 2021.
- With the government-wide adoption and implementation of these vaccination requirements, agencies are no longer required to establish a screening testing program for employees or onsite contractor employees who are not fully vaccinated, although they may do so.
- The President has announced that Federal contractor employees will be required to be vaccinated. Prior to being contractually required to be vaccinated, onsite contractor employees who are not fully vaccinated and are not part of an agency testing program must provide proof of a negative COVID-19 test from no later than the previous 3 days prior to entry to a Federal building.

Purpose

The purpose of this document is to provide model safety principles for executive departments and agencies (hereafter, "agency" and collectively, "agencies") for their COVID-19 workplace safety plans. In Executive Order No. 13991, President Biden established the Safer Federal Workforce Task Force to oversee the development and implementation of agency COVID-19 workplace safety plans across the Federal Government. In his Executive Order on *Requiring Coronavirus Disease 2019 Vaccination for Federal Employees* and his Executive Order on *Ensuring Adequate COVID Safety Protocols for Federal Contractors*, President Biden directed the Task Force to issue guidance on implementation of the requirements in those Orders.

Agencies should incorporate these model safety principles into their existing COVID-19 workplace safety plans.

Agencies with onsite contractor employees should address how the protocols below are applied to those individuals to promote Federal workplace safety in the context of COVID-19.

Overview of Model Principles

The Federal Government is committed to addressing essential work requirements consistent with best public health practices. The Administration's paramount concern is the health and safety of all Federal employees, onsite contractor employees, and individuals interacting with the Federal workforce.

The principles presented here are aligned with the latest guidance from the Centers for Disease Control and Prevention (CDC) for employers and for fully vaccinated people and the Occupational Safety and Health Administration (OSHA) on protecting workers, based on evolving understanding of the pandemic. These principles will be reassessed over time, as conditions warrant and as CDC guidelines are updated.

Where a locality has imposed additional pandemic-related requirements more protective than those set forth in these model safety principles, those requirements should be followed in Federal buildings and on Federal land in that locality.

Goal

The health and safety of the Federal workforce is the Administration's highest priority.

Health and Safety

Vaccination

To ensure the safety of the Federal workforce, Federal employees must be fully vaccinated, except in limited circumstances where an employee is legally entitled to a reasonable accommodation. Agencies must work expeditiously so that their employees are fully vaccinated as quickly as possible and by no later than November 22, 2021.

When a Federal employee is required to be vaccinated, the time the employee spends obtaining any COVID-19 vaccination (including travel time) is duty time; thus, there is no need for the employee to take administrative leave for such time during the employee's basic tour of duty. Employees may not be credited with administrative leave for time spent getting a vaccination. If, due to unforeseen circumstances, the employee is unable to obtain the vaccine during basic tour of duty hours the normal overtime hours of work rules apply.

Employees will receive paid time off to address any side effects. Employees will also receive paid time off to accompany a family member being vaccinated. For this purpose, a "family member" is an individual who meets the definition of that term in OPM's leave regulations (see 5 CFR 630.201).

Some contractor employees may not yet be subject to a contractual requirement to be vaccinated, and some visitors may not be fully vaccinated or decline to provide information on their vaccination status. Given the different safety protocols for individuals who are fully vaccinated and those who are not fully vaccinated, agencies need to ask about the vaccination status of visitors to Federal buildings and onsite contractor employees who are not yet contractually required to be vaccinated. Individuals must attest to the truthfulness of the response they provide. When an individual discloses that they are not fully vaccinated or declines to provide information on their vaccination status, agencies should treat that individual as not fully vaccinated for purposes of implementing safety measures, including with respect to mask wearing and physical distancing.

Onsite contractor employees who are not yet contractually required to be vaccinated and who are not fully vaccinated or who decline to provide information about their vaccination status must provide proof of a negative COVID-19 test from no later than the previous 3 days prior to entry to a Federal building—as noted below, if a contractor employee is regularly tested pursuant to an agency testing program, they do not need to provide proof of a negative COVID-19 test from no later than the previous 3 days prior to entry to a Federal building unless required to by the agency testing program.

Visitors to Federal buildings who are not fully vaccinated or who decline to provide information about their vaccination status must provide proof of a negative COVID-19 test from no later than the previous 3 days prior to entry to a Federal building. See the section below on Meetings, Events, and Conferences

for how visitor requirements apply to in-person participants in meetings, events, and conferences hosted by agencies.

These requirements related to the provision of information about vaccination and provision of proof of a recent negative COVID-19 test do not apply to members of the public entering a Federal building or Federal land to obtain a public service or benefit. If they are not fully vaccinated, these visitors must comply with all relevant CDC guidance, including wearing a mask and physically distancing from other people.

Levels of Community Transmission

For purposes of this guidance, when determining levels of community transmission in a given area, agencies should reference the CDC COVID-19 Data Tracker County View. Agencies can use discretion in determining the counties relevant to the determination of the level of community transmission in a given area for a given Federal facility. For example, agencies may consider the county in which an agency facility is located as well as the transmission levels of surrounding local counties from which employees commute to the facility.

Telework and Remote Work

Agencies should utilize telework and remote work consistent with the principles set forth in OMB Memorandum M-21-25 and agency plans for reentry and post-reentry.

COVID-19 Coordination Team

Each agency should maintain its COVID-19 Coordination Team, as detailed in OMB Memorandum M-21-15. This team should, at a minimum, include a representative from: each component agency (if applicable); the appropriate human resources office(s); occupational safety and health experts; executive leadership; legal counsel; and a public health expert. If such a public health expert does not exist at the agency, the Safer Federal Workforce Task Force will designate someone. The team should meet regularly to review compliance with agency COVID-19 workplace safety plans and protocols, consider potential revisions to agency COVID-19 workplace safety plans and protocols pursuant to guidance from the Safer Federal Workforce Task Force and current CDC guidelines, and evaluate any other operational needs related to COVID-19 workplace safety. The team should coordinate all decisions with Facility Security Committees, as appropriate. For privately owned facilities leased by the Federal Government, the team must coordinate with the General Services Administration (GSA), where appropriate, and the lessor's designated representative.

Face Masks and Physical Distancing

Federal employees must be fully vaccinated, except in limited circumstances where an employee is legally entitled to a reasonable accommodation. In addition, some contractor employees may not yet be subject to a contractual requirement to be vaccinated, and some visitors may not be fully vaccinated or decline to provide information on their vaccination status.

Individuals who are not fully vaccinated must wear a mask regardless of community transmission level. In areas of high or substantial transmission, fully vaccinated people must wear a mask in public indoor settings, except for limited exceptions discussed in this section.

In areas of low or moderate transmission, in most settings, fully vaccinated people generally do not need to wear a mask or physically distance in Federal buildings or on Federal land, except where required by Federal, State, local, Tribal, or territorial laws, rules, or regulations. Fully vaccinated individuals might choose to wear a mask regardless of the level of transmission for a variety of reasons. Nothing in CDC guidance precludes an employee from wearing a mask, if the employee so chooses. CDC's guidance for mask wearing and physical distancing in specific settings, including healthcare, transportation, correctional and detention facilities, and schools, should be followed, as applicable.

Individuals who are not fully vaccinated or who decline to provide their vaccination status—or who are in an area of substantial or high transmission—must wear a mask that covers their nose and mouth, and that is in accordance with current CDC guidance. CDC recommends the following: disposable masks, masks that fit properly (snugly around the nose and chin with no large gaps around the sides of the face), masks made with breathable fabric (such as cotton), masks made with tightly woven fabric (i.e., fabrics that do not let light pass through when held up to a light source), masks with two or three layers, and masks with inner filter pockets. Agencies should not allow novelty or non-protective masks, masks with ventilation valves, or face shields as a substitute for masks.

In addition to properly wearing a mask, individuals who are not fully vaccinated or who decline to provide information about their vaccination status must maintain distance. To the extent practicable, individuals who are not fully vaccinated or who decline to provide information about their vaccination status should maintain a distance of at least six feet from others at all times, consistent with CDC guidelines, including in offices, conference rooms, and all other communal and work spaces.

For individuals who are required to wear a mask:

- Appropriate masks should be worn consistently and correctly (over mouth and nose).
- Appropriate masks should be worn in any common areas or shared workspaces (including open floorplan office space, cubicle embankments, and conference rooms).
- In general, people do not need to wear masks when outdoors. However, consistent with CDC guidance, those who are not fully vaccinated should wear a mask in crowded outdoor settings or during outdoor activities that involve sustained close contact with other people who are not fully vaccinated.
- Agencies may provide for exceptions consistent with CDC guidelines, for example, when an individual is alone in an office with floor to ceiling walls and a closed door, or for a limited time when eating or drinking and maintaining distancing in accordance with CDC guidelines.

Masked individuals may be asked to lower their masks briefly for identification purposes in compliance with safety and security requirements.

Masks do not provide the same level of protection as respirators and should not replace personal protective equipment required or recommended at the workplace.

Testing

Agencies may establish a program to test Federal employees who are not fully vaccinated for COVID-19. Agencies may also test contractor employees working onsite who are not fully vaccinated as part of a

testing program—if contractor employees are tested as part of an agency testing program, they do not need to provide proof of a negative COVID-19 test from no later than the previous 3 days prior to entry to a Federal building unless required to by the agency testing program.

Agencies must have a process in place for employee diagnostic testing after a workplace exposure.

Contact Tracing

The agency's COVID-19 Coordination Team will collaborate with and support the contact tracing programs of local health departments to help identify, track, and manage contacts of COVID-19 cases.

The team will engage in coordination with facilities staff to implement infection control and workplace safety efforts once informed of a known or suspected case of COVID-19 (due either to specific symptoms or a positive test).

The team should ensure that the agency makes disclosures to local public health officials, as required or necessary, to provide for the health and safety of Federal employees, contractor employees, and the general public, in accordance with local public health mandates. If COVID-19 cases occur within a specific building or work setting, it will be the responsibility of that agency's COVID-19 Coordination Team (or a field office or agency component designee) to determine—in consultation with local public health officials—appropriate next steps. Agencies should be transparent in communicating related information to the workforce, as relevant and appropriate; disclosures must be consistent with Federal, State, and local privacy and confidentiality laws and regulations.

Travel

Federal employees should adhere strictly to CDC guidelines before, during, and after travel.

For Federal employees who are fully vaccinated, there are no Government-wide restrictions on travel (although agency travel policies still apply).

For the limited number of Federal employees who are not fully vaccinated, agencies should generally observe the following guidance, unless it is contrary to a reasonable accommodation to which an employee is legally entitled. Official domestic travel should be limited to only necessary mission-critical trips. International travel should also be avoided, if at all possible, unless it is mission critical (e.g., military deployments, COVID-19 response deployments or activities, diplomats traveling, high-level international negotiations that cannot occur remotely). Heads of agencies should issue specific guidance to account for the particulars of their agency's mission.

Meetings, Events, and Conferences

Should an agency intend to host an in-person meeting, conference, or event that will be attended by more than 50 participants—regardless of whether participants include members of the public—the agency must first seek the approval of its agency head, in consultation with the agency's COVID-19 Coordination Team.

In-person attendees at any meetings, conferences, and events hosted by an agency, regardless of size, must be asked to provide information about vaccination status. In requesting this information, agencies should comply with any applicable Federal laws, including requirements under the Privacy Act and the Paperwork Reduction Act. In-person attendees who are not fully vaccinated or decline to provide

information about their vaccination status must provide proof of a negative COVID-19 test completed no later than the previous 3 days and comply with masking and physical distancing requirements for individuals who are not fully vaccinated consistent with the requirements for visitors in the Face Masks and Physical Distancing section above. In-person attendees in areas of high or substantial transmission must wear a mask in public indoor settings regardless of vaccination status.

Symptom Monitoring

If Federal employees, onsite contractors, or visitors have symptoms consistent with COVID-19, they should not enter a Federal workplace.

Federal employees and contractor employees working on site should regularly complete virtual or in-person health checks (ask about symptoms, close contact with someone with SARS-CoV-2 infection, and SARS-CoV-2 testing and diagnosis status). The agency will use this information to assess the individual's risk level and to determine whether the individual should be allowed entry to the workplace. Visitors may be asked to complete symptom screening before entering a Federal facility. In developing these tools, agencies may adapt the one developed by CDC.

Any individual, regardless of vaccination status, who develops any symptoms consistent with COVID-19 during the workday must immediately isolate, wear a mask (if the individual is not already doing so and one is available), notify their supervisor, and promptly leave the workplace. Agencies should have processes in place to provide advice and support to supervisors on any related reporting or human resources requirements.

Quarantine, Isolation, and Steps for Fully Vaccinated Individuals Following Exposure to Someone with Suspected or Confirmed COVID-19

Any individual with a suspected or confirmed case of COVID-19 will be advised to isolate, pursuant to CDC guidelines, and in compliance with State, local, and Tribal laws and regulations. Personnel who are not fully vaccinated and who have had a close contact with someone who has tested positive for COVID-19 should follow CDC and State, local, and Tribal guidance for quarantine.

Individuals who have been fully vaccinated and have had close contact with someone with suspected or confirmed COVID-19 should get tested 3-5 days after exposure, even if they do not have symptoms. They should also wear a mask indoors in public for 14 days following exposure or until their test result is negative. If their test result is positive, they should isolate for 10 days.

Confidentiality and Privacy

All medical information collected from individuals, including vaccination information, test results, and any other information obtained as a result of testing and symptom monitoring, will be treated in accordance with applicable laws and policies on confidentiality and privacy, and will be accessible only to those with a need to know. Agencies should consult their Senior Agency Officials for Privacy on matters related to the handling of personally identifiable information and identify a point of contact for all questions relating to personal medical information.

Workplace Operations

Occupancy

Agencies may establish occupancy limits for specific workplaces as a means of facilitating physical distancing. Note that by reducing the number of people in a space, occupancy limits also increase the heating, ventilation, and air conditioning delivery of outdoor air per person.

Environmental Cleaning

Agencies should ensure regular cleaning of common use, high-touch, and high-density spaces, such as lobbies, restrooms, elevators, and stairwells. Office space that is in regular use is to be cleaned regularly, and in accordance with CDC guidelines. Wipes and other Environmental Protection Agency-approved disinfectants will be made available for use by individuals to wipe down workstations and related personal property. Physical barriers, such as plexiglass shields, may be installed, where appropriate.

In the event of a suspected or confirmed case of COVID-19 in the workplace, agencies should ensure enhanced environmental cleaning of the spaces that the individual occupied or accessed in accordance with CDC and, where applicable, GSA guidance, which provides as follows:

- If fewer than 24 hours have passed since the person who is sick or diagnosed with COVID-19 has been in the space, clean and disinfect the space.
- If more than 24 hours have passed since the person who is sick or diagnosed with COVID-19 has been in the space, cleaning is enough. You may choose to also disinfect depending on certain conditions or everyday practices required by your facility.
- If more than 3 days have passed since the person who is sick or diagnosed with COVID-19 has been in the space, no additional cleaning (beyond regular cleaning practices) is needed.

If enhanced cleaning is required, wait as long as possible (at least several hours) before cleaning and disinfecting. Extended wait periods allow increased opportunity for viral deactivation to occur naturally, while also allowing time for aerosols to settle, prior to surface disinfection.

The agency's COVID-19 Coordination Team will determine the appropriate scope of workplace closures needed—in some cases, it may be a suite or individual offices or part of a floor, in other cases, it may include an entire building.

Hygiene

Hand sanitizer stations are to be available at the building entrance and throughout workspaces. Hand sanitizers should contain at least 60% alcohol and be manufactured in accordance with the requirements of the U.S. Food and Drug Administration (FDA). Ingredients should be listed on a "Drug Facts" label. Agencies should ensure the hand sanitizer is not on the FDA's do not use list.

Ventilation and Air Filtration

Modifications to ventilation systems should be considered in accordance with CDC guidance, especially as building population density increases. To the maximum extent feasible, indoor ventilation will be optimized to increase the proportion of outdoor air and improve filtration. Deployment of portable high-efficiency particulate air (HEPA) cleaners should be considered for higher-risk spaces (e.g., health clinics).

Collective Bargaining Obligations

Consistent with President Biden's policy to support collective bargaining, agencies are reminded to satisfy applicable collective bargaining obligations under 5 U.S.C. Chapter 71 when implementing workplace safety plans, including on a post-implementation basis where necessary. Agencies are also strongly encouraged to communicate regularly with employee representatives on workplace safety matters.

The New York Times https://www.nytimes.com/2021/09/09/us/politics/biden-vaccine-mandates-transcript.html

Biden's Speech on Vaccine Mandates and the Delta Variant: Full Transcript

"My message to unvaccinated Americans is this: What more is there to wait for?" President Biden said on Thursday. "We've been patient, but our patience is wearing thin."

Sept. 9, 2021

The following is a transcript of President Biden's remarks on Thursday about his administration's push to mandate coronavirus vaccines for two-thirds of American workers as the Delta variant surges across the United States.

Good evening, my fellow Americans. I want to talk to you about where we are in the battle against Covid-19 — the progress we've made and the work we have left to do, and it starts in understanding this: Even as the Delta variant 19 has — Covid-19 has been hitting this country hard, we have the tools to combat the virus, if we can come together as a country and use those tools. If we raise our vaccination rate, protect ourselves and others with masking, expanding testing and identify people who are infected, we can and we will turn the tide on Covid-19.

It will take a lot of hard work, and it's going to take some time. Many of us are frustrated with the nearly 80 million Americans who are still not vaccinated, even though the vaccine is safe, effective and free. You might be confused about what is true and what is false about Covid-19. So, before I outline the new steps to fight Covid-19 that I'm going to be announcing tonight, let me give you some clear information about where we stand.

First, we've made considerable progress in battling Covid-19. When I became president, about two million Americans were fully vaccinated. Today, over 175 million Americans have that protection. Before I took office, we hadn't ordered enough vaccine for every American. Just weeks in office, we did. The week before I took office on Jan. 20 of this year, over 25,000 Americans died that week from Covid-19.

Last week, that grim weekly toll was down 70 percent. And then three months before I took office, our economy was faltering, creating just 50,000 jobs a month. We're now averaging 700,000 new jobs a month in the past three months. This progress is real. But while America is in much better shape than it was seven months ago, when I took office, I need to tell you a second fact. We're in the tough stretch, and it could last for a while.

Highly contagious Delta variant that I began to warn America back in July, spread late summer, like it did in other countries before us. While the vaccines provide strong protection for the vaccinated, we read about and hear about and we see the stories of hospitalized people, people on their death beds among the unvaccinated over the past few weeks. This is a pandemic of the unvaccinated.

And it's caused by the fact that despite America having unprecedented and successful vaccination program — despite the fact that for almost five months, free vaccines have been available in 80,000 different locations — we still have nearly 80 million Americans who have failed to get the shot. And to make matters worse, there are elected officials actively working to undermine the fight against Covid-19. Instead of encouraging people to get vaccinated and mask up, they are ordering mobile morgues for the unvaccinated dying from Covid in our communities. This is totally unacceptable.

Third, if you wonder how all this adds up, here's the math. The vast majority of Americans are doing the right thing. Nearly three-quarters of the eligible have gotten at least one shot. But one-quarter has not gotten any. That's nearly 80 million Americans not vaccinated. In a country as large as ours, that's 25 percent minority. That 25 percent can cause a lot of damage, and they are. The unvaccinated overcrowd our hospitals or overrun the emergency rooms and intensive care units, leaving no room for someone with a heart attack or pancreatitis or cancer.

And fourth, I want to emphasize that the vaccines provide very strong protection from Covid-19. I know there's a lot of confusion and misinformation, but the world's leading scientists confirm that if you're fully vaccinated, your risk of severe illness from Covid-19 is very low. In fact, based on available data from the summer, only one out of every 160,000 fully vaccinated Americans was hospitalized for Covid per day. These are the facts.

So here's where we stand. The path ahead, even with the Delta variant, is not nearly as bad as last winter. What makes it incredibly more frustrating is that we have the tools to combat Covid-19, and a distinct minority of Americans, supported by a distinct minority of elected officials, are keeping us from turning the corner. These pandemic politics, as I refer to, are making people sick, causing unvaccinated people to die.

We cannot allow these actions to stand in the way of the large majority of Americans who have done their part and want to get back to life as normal. As your president, I'm announcing tonight a new plan to require more Americans to be vaccinated to combat those blocking public health. My plan also increases testing, protects our economy and will make our kids safer in schools.

It consists of six broad areas of action and many specific measures of each of those actions that you can read more about at Whitehouse.gov. Whitehouse.gov. The measures, these are going to take time to have full impact. But if we implement them, I believe and the scientists indicate that the months ahead, we can reduce the number of unvaccinated Americans, decrease hospitalizations and deaths, and allow our children to go to school safely, and keep our economy strong by keeping businesses open.

First, we must increase vaccinations among the unvaccinated with new vaccination requirements. With nearly 80 million eligible Americans who have not gotten vaccinated, many said they were waiting for approval from the Food and Drug Administration, the F.D.A. Well, last month the F.D.A. granted that approval. So, the time for waiting is over.

This summer, we made progress through a combination of vaccine requirements and incentives as well as the F.D.A. approval. Four million more people got their first shot in August than they did in July. But we need to do more. This is not about freedom or personal choice. It's about protecting yourself and those around you — the people you work with, the people you care about, the people you love.

My job as president is to protect all Americans. So tonight, I'm announcing that the Department of Labor is developing an emergency rule to require all employers with 100 or more employees that together employ over 80 million workers to ensure their work forces are fully vaccinated or show a negative test at least once a week.

Some of the biggest companies are already requiring this: United Airlines, Disney, Tyson Foods and even Fox News. The bottom line: We're going to protect vaccinated workers from unvaccinated co-workers. We're going to reduce the spread of Covid-19 by increasing the share of the work force that is vaccinated in businesses all across America.

My plan will extend the vaccination requirements that I previously issued in the health care field. Already, I've announced we'll be requiring vaccinations that all nursing home workers who treat patients on Medicare and Medicaid, because I have that federal authority.

Tonight I'm using that same authority to expand that to cover those who work in hospitals, home health care facilities or other medical facilities. A total of 17 million health care workers. If you're seeking care at a health facility, you should be able to know that the people treating you are vaccinated — simple, straightforward, period.

Next, I will sign an executive order that will now require all executive branch federal employees to be vaccinated — all. I've signed another executive order that will require federal contractors to do the same. If you want to work with the federal government and do business with us, get vaccinated. If you want to do business with the federal government, vaccinate your work force.

And tonight I'm removing one of the last remaining obstacles that make it difficult for you to get vaccinated. The Department of Labor will require employers with 100 or more workers to give those workers paid time off to get vaccinated. No one should lose pay in order to get vaccinated or take a loved one to get vaccinated.

Today, in total, the vaccine requirements in my plan will affect about 100 million Americans — two-thirds of all workers. And for other sectors, I issue this appeal: To those of you running large entertainment venues from sports arenas to concert venues to movie theaters, please require folks to get vaccinated or show a negative test as a condition of entry.

And to the nation's family physicians, pediatricians, G.P.s — general practitioners — you're the most trusted medical voice to your patients. You may be the one person who can get someone to change their mind about being vaccinated. Tonight, I'm asking each of you to reach out to your unvaccinated patients over the next two weeks and make a personal appeal to them to get the shot. America needs your personal involvement in this critical effort.

My message to unvaccinated Americans is this: What more is there to wait for? What more do you need to see? We've made vaccinations free, safe and convenient. The vaccine is F.D.A. approved. Over 200 million Americans have gotten at least one shot. We've been patient, but our patience is wearing thin. And your refusal has cost all of us.

So, please, do the right thing. But don't just take it from me. Listen to the voices of unvaccinated Americans who are lying in hospital beds, taking their final breath, saying, "If only I had gotten vaccinated." If only. It's a tragedy. Please don't let it become yours.

The second piece of my plan is continuing to protect the vaccinated. The vast majority of you who have gotten vaccinated, I understand your anger at those who haven't gotten vaccinated. I understand the anxiety about getting a breakthrough case. But as the science makes clear, if you're fully vaccinated, you're highly protected from severe illness even if you get Covid-19.

In fact, recent data indicates there's only one confirmed positive case per 5,000 fully vaccinated Americans per day. You're as safe as possible, and we're doing everything we can to keep it that way — keep it that way and keep you safe. That's where boosters come in — the shots that give you even more protection than after your second shot.

Now, I know there's been some confusion about boosters, so let me be clear. Last month, our top government doctors announced an initial plan for booster shots for vaccinated Americans. They believe that a booster is likely to provide the highest level of protection yet. Of course, the decision of which booster shots to give or when to start them and who will give them will be left completely to the scientists at the F.D.A. and the Centers for Disease Control.

But while we wait, we've done our part. We bought enough boosters, enough booster shots, and the distribution shot is ready to administer them. As soon as they are authorized, those eligible will be able to get a booster right away at tens of thousands of sites across the country — for most Americans, at your nearby drugstore and for free.

The third piece of my plan is keeping — and maybe the most important — is keeping our children safe and our schools open. For any parent, it doesn't matter how low the risk of any illness or accident is when it comes to your child or grandchild. Trust me. I know. So, let me speak to you directly. Let me speak to you directly to help ease some of your worries.

It comes down to two separate categories: children ages 12 and older, who are eligible for a vaccine now, and children ages 11 and under, who are not yet eligible. The safest thing for your child 12 and older is to get them vaccinated. They get vaccinated for a lot of things. That's it. Get them vaccinated.

As with the adults, almost all of the serious Covid-19 cases we're seeing among adolescents are in unvaccinated 12- to 17-year-olds, an age group that lags behind in vaccination rates. So parents, please get your teenager vaccinated.

What about children under the age of 12 who can't get vaccinated yet? Well, the best way for a parent to protect their child under the age of 12 starts at home. Every parent, every teen sibling, every caregiver around them should be vaccinated. Children have a four times higher chance of getting hospitalized if they live in a state with low vaccination rates rather than states with high vaccination rates.

Now if you're a parent of a young child and you're wondering when will it be, when will it be — the vaccine — available for them? I strongly support independent scientific review for vaccine uses for children under 12. We can't take shortcuts of that scientific work.

But I've made it clear, I will do everything within my power to support the F.D.A. with any resource it needs to continue to do this as safely and as quickly as possible. And our nation's top doctors are committed to keeping the public at large updated on the process so parents can plan.

What to Know About Covid-19 Booster Shots

Who is eligible for a booster shot?

The F.D.A. has authorized booster shots for millions of recipients of the Pfizer-BioNTech, Moderna and Johnson & Johnson vaccines. Pfizer and Moderna recipients who are eligible for a booster include people 65 and older, and younger adults at high risk of severe Covid-19 because of medical conditions or where they work. Eligible Pfizer and Moderna recipients can get a booster at least six months after their second dose. All Johnson & Johnson recipients will be eligible for a second shot at least two months after the first.

Can I switch Covid vaccines for a booster?

What underlying medical conditions qualify for a booster shot?

What occupations are eligible for boosters?

Can I get a flu shot at the same time as a Covid vaccine or booster shot?

Now to the schools. We know that if schools follow the science and implement the safety measures like testing, masking, adequate ventilation systems that we provided the money for, social distancing and vaccinations, then children can be safe from Covid-19 in schools. Today, about 90 percent of school staff and teachers are vaccinated. We should get that to 100 percent.

My administration has already required teachers at the schools run by the Defense Department — because I have the authority, as president, in the federal system, the Defense Department and the Interior Department — to get vaccinated. That's the authority I possess. Tonight I'm announcing that we'll require all of nearly 300,000 educators in the federal paid program, Head Start program, must be vaccinated as well to protect your youngest, our youngest, most precious Americans, and give parents the comfort.

And tonight I'm calling on all governors to require vaccinations for all teachers and staff. Some already have done so. We need more to step up. Vaccination requirements in schools are nothing new. They work. They are overwhelmingly supported by educators and their unions and all school officials trying do the right thing by our children. I'll always be on your side.

Let me be blunt. My plan also takes on elected officials in states that are undermining you and these lifesaving actions. Right now, local school officials are trying to keep children safe in a pandemic while their governor picks a fight with them and even threatens their salaries or their jobs. Talk about bullying in schools.

If they will not help, if those governors won't help us beat the pandemic, I'll use my power as president to get them out of the way. The Department of Education has already begun to take legal action against states undermining protection that local school officials have ordered. Any teacher or school official whose pay is withheld for doing the right thing, we will have that pay restored by the federal government, 100 percent. I promise you, I will have your back.

The fourth piece of my plan is increasing testing and masking. From the start, America has failed to do enough Covid-19 testing. In order to better detect and control the Delta variant, I'm taking steps tonight to make testing more available, more affordable and more convenient. I'll use the Defense Production Act to increase production of rapid tests, including those that you can use at home.

While that production is ramping up, my administration has worked with top retailers like Walmart, Amazon and Kroger, and tonight we're announcing that no later than next week each of these outlets will start to sell at-home rapid test kits at cost for the next three months.

This is immediate price reduction for at-home test kits for up to 35 percent reduction. We'll also expand free testing at 10,000 pharmacies around the country. And we'll commit, we're committing $2 billion to purchase nearly 300 million rapid tests for distribution to community health centers, food banks, schools, so that every American, no matter their income, can access free and convenient tests.

This is important to everyone, particularly for a parent or a child — with a child not old enough to be vaccinated. You'll be able to test them at home and test those around them. In addition to testing, we know masking helps stop the spread of Covid-19. That's why when I came into office, I required masks for all federal buildings and on federal lands, on airlines and other modes of transportation.

Today, tonight, I'm announcing that the Transportation Safety Administration, the T.S.A., will double the fines on travelers that refuse to mask. If you break the rules, be prepared to pay. And by the way, show some respect. The anger you see on television toward flight attendants and others doing their jobs is wrong. It's ugly.

The fifth piece of my plan is protecting our economic recovery. Because of our vaccination program, and the American Rescue Plan, which we passed early in my administration, we've had record job creation for a new administration. Economic growth unmatched in 40 years. We cannot let unvaccinated do this progress — undo it. Turn it back. So tonight I'm announcing additional steps to strengthen our economic recovery.

We'll be expanding Covid-19 economic injury disaster loan programs. That's a program that's going to allow small businesses to borrow up to $2 million, from the current $500,000, to keep going if Covid-19 impacts on their sales. These low-interest, long-term loans require no repayment for two years and can be used to hire and retain workers, purchase inventory or even pay down higher-cost debt racked up since the pandemic began. I'll also be taking additional steps to help small businesses stay afloat during the pandemic.

Sixth, we're going to continue to improve the care of those who do get Covid-19. In early July, I announced the deployment of surge response teams. These are teams comprised of experts from the Department of Health and Human Services, the C.D.C., the Defense Department and the Federal Emergency Management Agency, FEMA, to areas in the country that need help to stem the spread of Covid-19. Since then, the federal government has deployed nearly 1,000 staff including doctors, nurses, paramedics, into 18 states. Today, I'm announcing that the Defense Department will double the number of military health teams that they will deploy to help their fellow Americans and hospitals around the country.

Additionally, we're increasing the availability of new medicines recommended by real doctors, not conspiracy theorists. The monoclonal antibody treatments have been shown to reduce the risk of hospitalization by up to 70 percent for unvaccinated people at risk of developing severe disease. We've already distributed 1.4 million courses of these treatments to save lives and reduce the strain on hospitals. Tonight, I'm announcing we'll increase the average pace of shipment across the country of free monoclonal antibody treatments by another 50 percent.

Before I close, let me say this: Communities of color are disproportionately impacted by this virus. As we continue to battle Covid-19, we will ensure that equity continues to be at the center of our response. We'll ensure that everyone is reached. My first responsibility as president is to protect the American people and make sure we have enough vaccine for every American, including enough boosters for every American who's approved to get one.

We also know this virus transcends borders. That's why even as we execute this plan at home we need to continue fighting the virus overseas, continue to be the arsenal of vaccines. We're proud to have donated nearly 140 million vaccines to over 90 countries, more than all other countries combined — including Europe, China and Russia combined. That's American leadership on a global stage, and that's just the beginning. We've also now started to ship another 500 million Covid vaccines, Pfizer vaccines, purchased to donate to 100 lower-income countries in need of vaccines, and I'll be announcing additional steps to help the rest of the world later this month.

As I recently released the key parts of my pandemic preparedness plan so that America isn't caught flat-footed with a new pandemic comes again, as it will. Next month I'm also going to release a plan in greater detail.

So let me close with this: We've made so much progress during the past seven months of this pandemic. The recent increases in vaccinations in August already are having an impact in some states, where case counts are dropping in recent days. Even so, we remain at a critical moment, a critical time. We have the tools. Now we just have to finish the job with truth, with science, with confidence, and together as one nation.

Look, we're the United States of America. There's nothing, not a single thing we're unable to do if we do it together. So let's stay together.

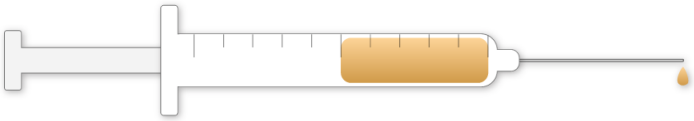
God bless you all, and all those who continue to serve of on the front lines of this pandemic, and may God protect our troops.

Get vaccinated.

The New York Times https://nyti.ms/2WuvMsA

How the Johnson & Johnson Vaccine Works

By Jonathan Corum and Carl Zimmer Updated May 7, 2021

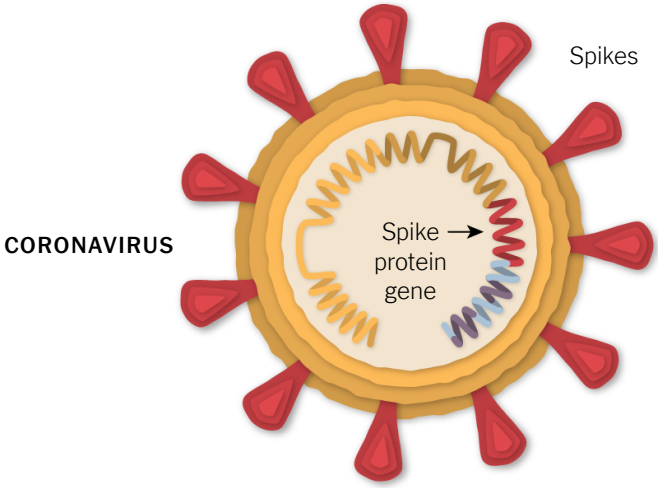


Johnson & Johnson is testing a coronavirus vaccine known as **JNJ-78436735** or **Ad26.COV2.S**. Clinical trials showed that a single dose of the vaccine had an efficacy rate of 72 percent in the United States, and a lower efficacy in countries where more contagious variants are widespread. The vaccine has been authorized for emergency use by the European Union, the United States and other countries.

Janssen Pharmaceutica, a Belgium-based division of Johnson & Johnson, developed the vaccine in collaboration with Beth Israel Deaconess Medical Center.

A Piece of the Coronavirus

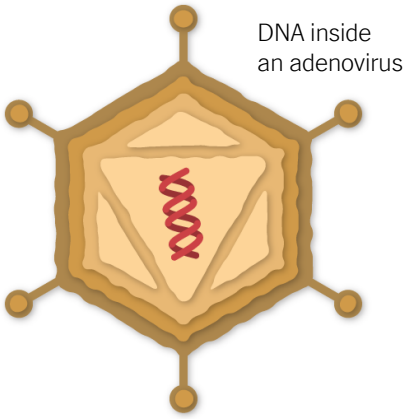
The SARS-CoV-2 virus is studded with proteins that it uses to enter human cells. These so-called spike proteins make a tempting target for potential vaccines and treatments.



The Johnson & Johnson vaccine is based on the virus's genetic instructions for building the spike protein. But unlike the Pfizer-BioNTech and Moderna vaccines, which store the instructions in single-stranded RNA, the Johnson & Johnson vaccine uses double-stranded DNA.

DNA Inside an Adenovirus

The researchers added the gene for the coronavirus spike protein to another virus called Adenovirus 26. Adenoviruses are common viruses that typically cause colds or flu-like symptoms. The Johnson & Johnson team used a modified adenovirus that can enter cells but can't replicate inside them or cause illness.

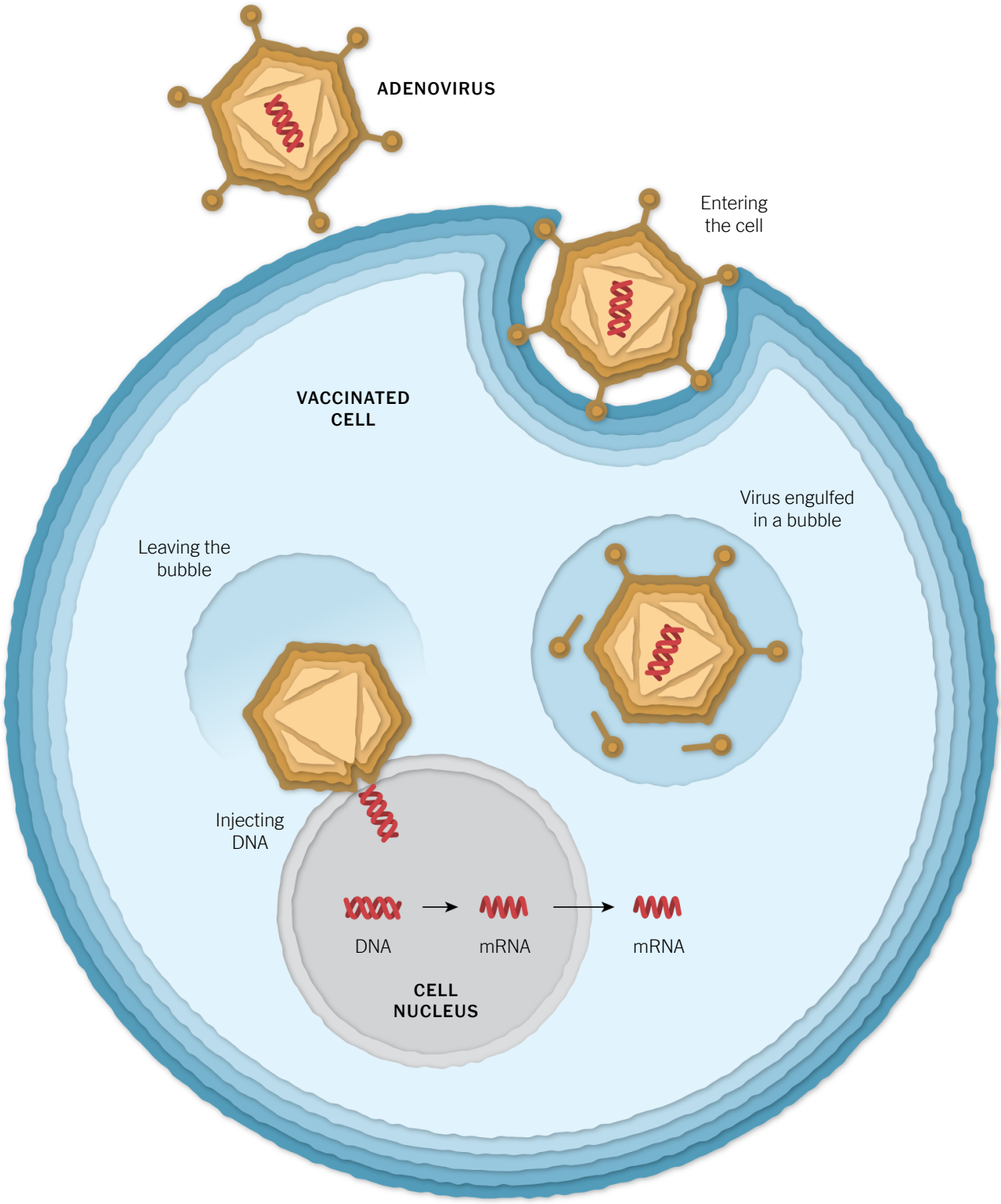


Johnson & Johnson's vaccine comes out of decades of research on adenovirus-based vaccines. In July, the first one was approved for general use — a vaccine for Ebola, also made by Johnson & Johnson. The company is also running trials on adenovirus-based vaccines for other diseases, including H.I.V. and Zika. Some other coronavirus vaccines are also based on adenoviruses, such as the one developed by the University of Oxford and AstraZeneca using a chimpanzee adenovirus.

Adenovirus-based vaccines for Covid-19 are more rugged than mRNA vaccines from Pfizer and Moderna. DNA is not as fragile as RNA, and the adenovirus's tough protein coat helps protect the genetic material inside. As a result, the Johnson & Johnson vaccine can be refrigerated for up to three months at 36–46°F (2–8°C).

Entering a Cell

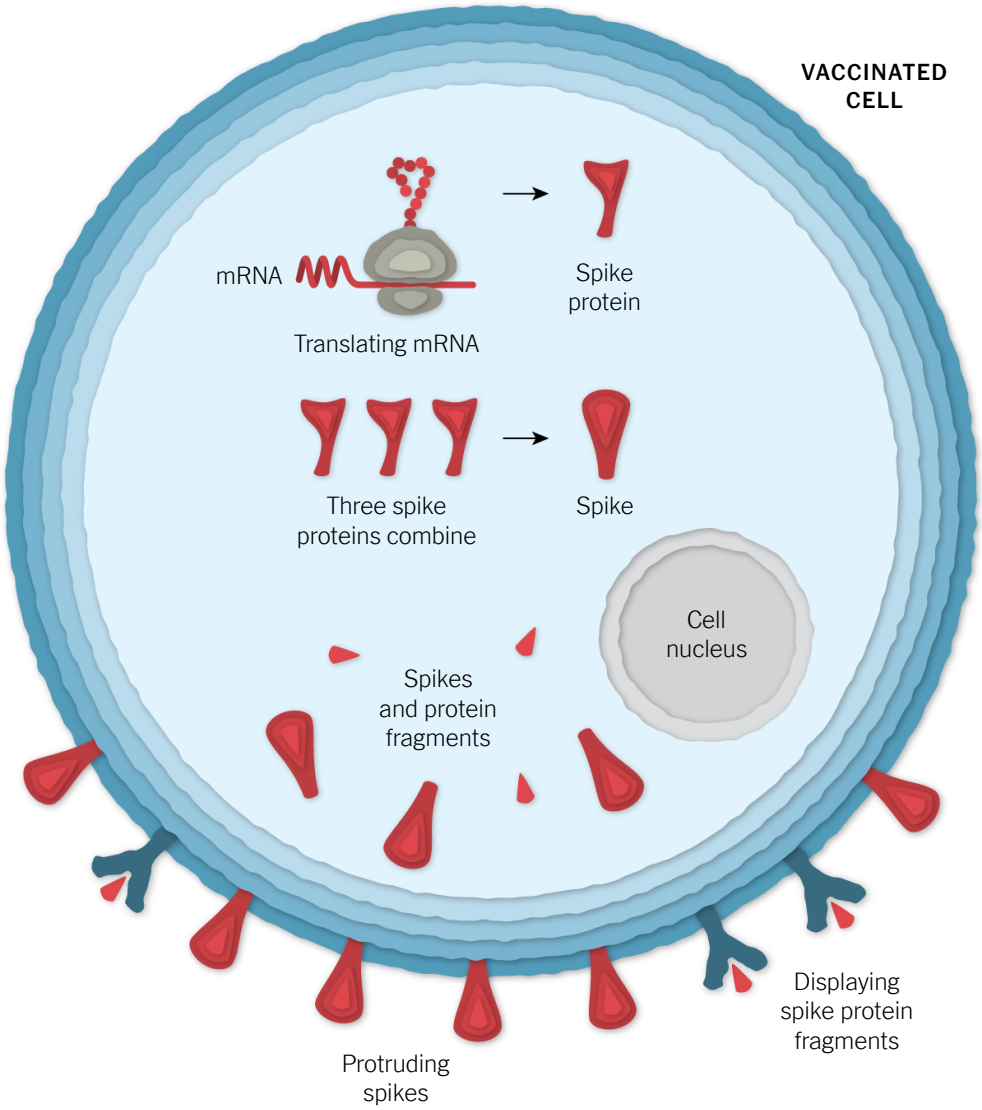
After the vaccine is injected into a person's arm, the adenoviruses bump into cells and latch onto proteins on their surface. The cell engulfs the virus in a bubble and pulls it inside. Once inside, the adenovirus escapes from the bubble and travels to the nucleus, the chamber where the cell's DNA is stored.



The adenovirus pushes its DNA into the nucleus. The adenovirus is engineered so it can't make copies of itself, but the gene for the coronavirus spike protein can be read by the cell and copied into a molecule called messenger RNA, or mRNA.

Building Spike Proteins

The mRNA leaves the nucleus, and the cell's molecules read its sequence and begin assembling spike proteins.

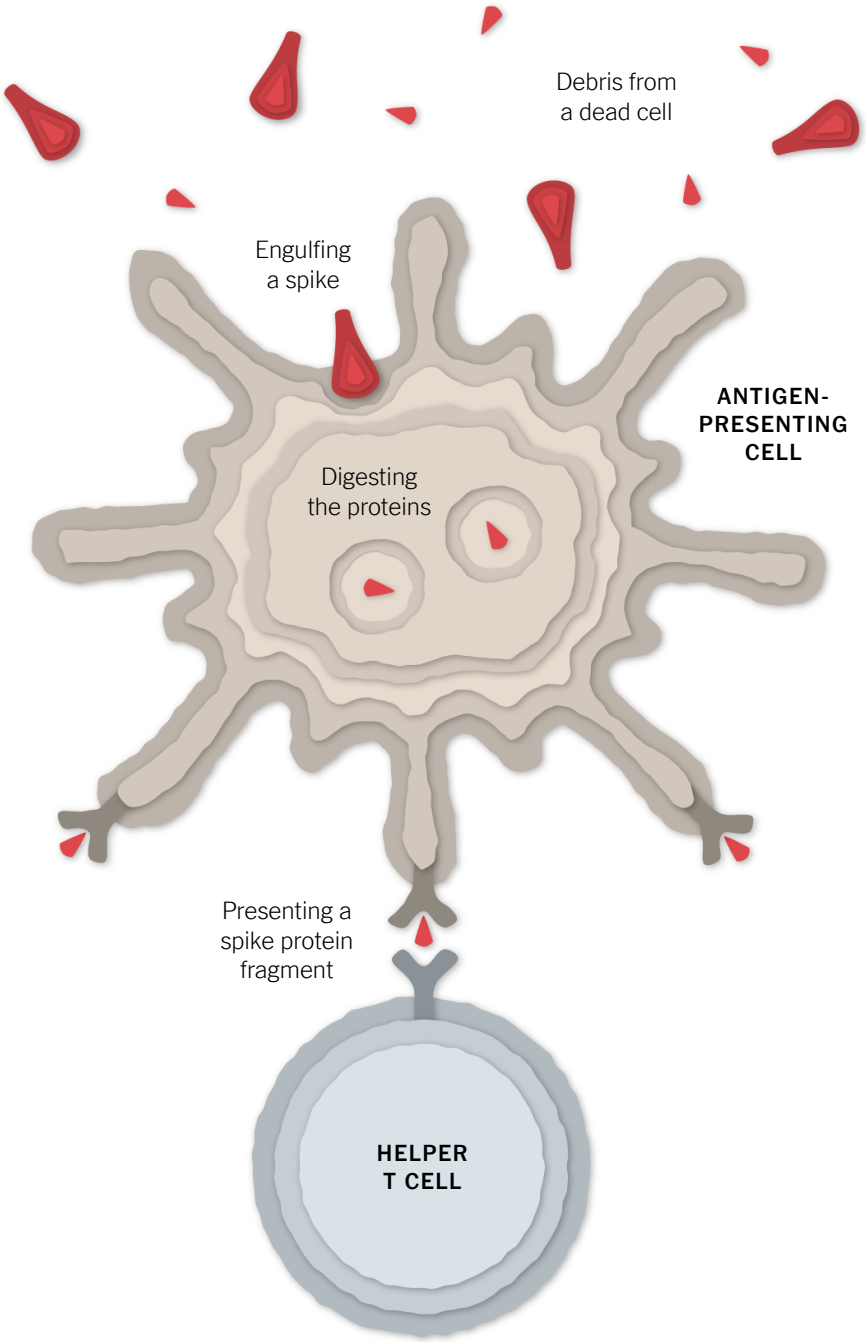


Some of the spike proteins produced by the cell form spikes that migrate to its surface and stick out their tips. The vaccinated cells also break up some of the proteins into fragments, which they present on their surface. These protruding spikes and spike protein fragments can then be recognized by the immune system.

The adenovirus also provokes the immune system by switching on the cell's alarm systems. The cell sends out warning signals to activate immune cells nearby. By raising this alarm, the Johnson & Johnson vaccine causes the immune system to react more strongly to the spike proteins.

Spotting the Intruder

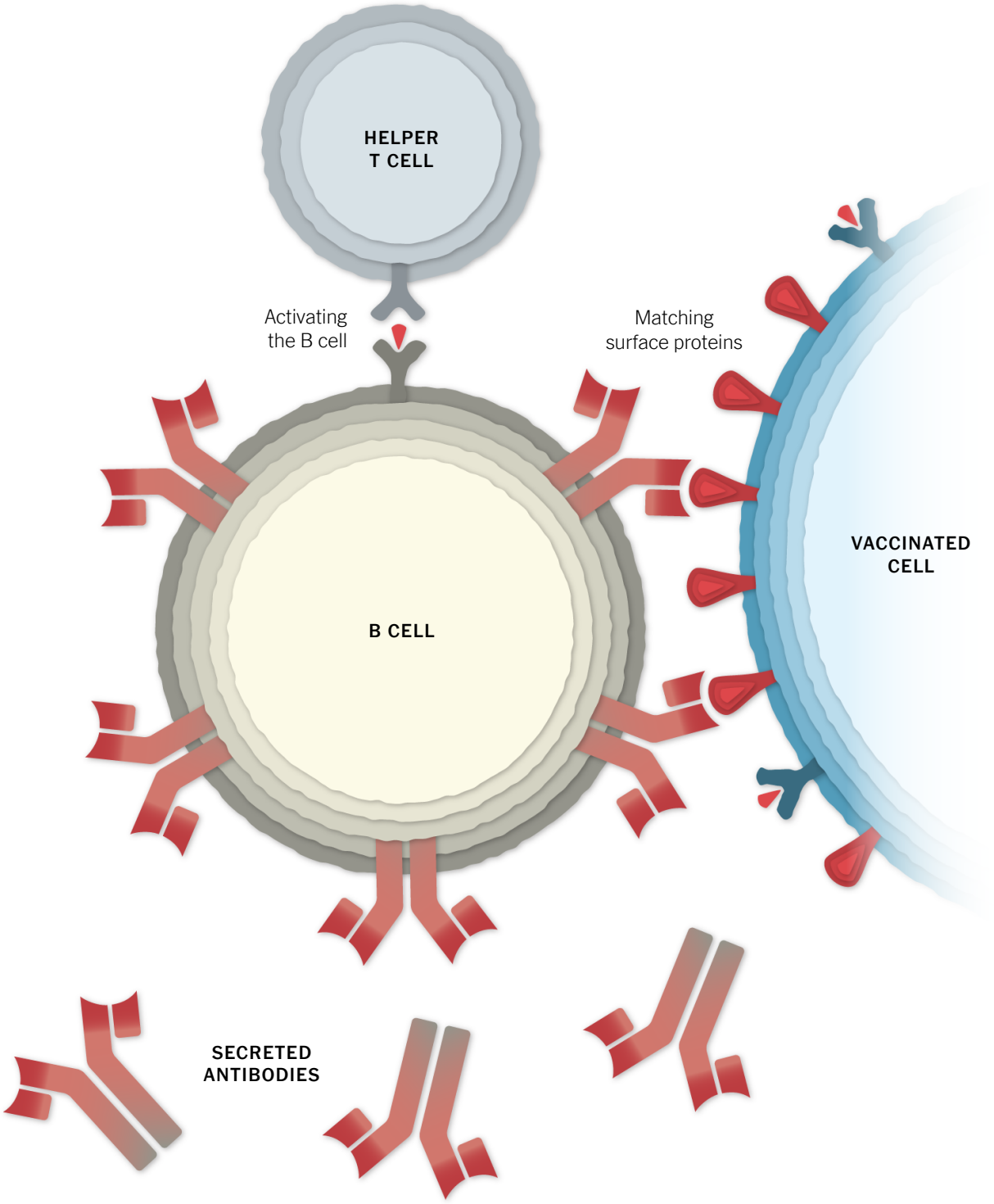
When a vaccinated cell dies, the debris contains spike proteins and protein fragments that can then be taken up by a type of immune cell called an antigen-presenting cell.



The cell presents fragments of the spike protein on its surface. When other cells called helper T cells detect these fragments, the helper T cells can raise the alarm and help marshal other immune cells to fight the infection.

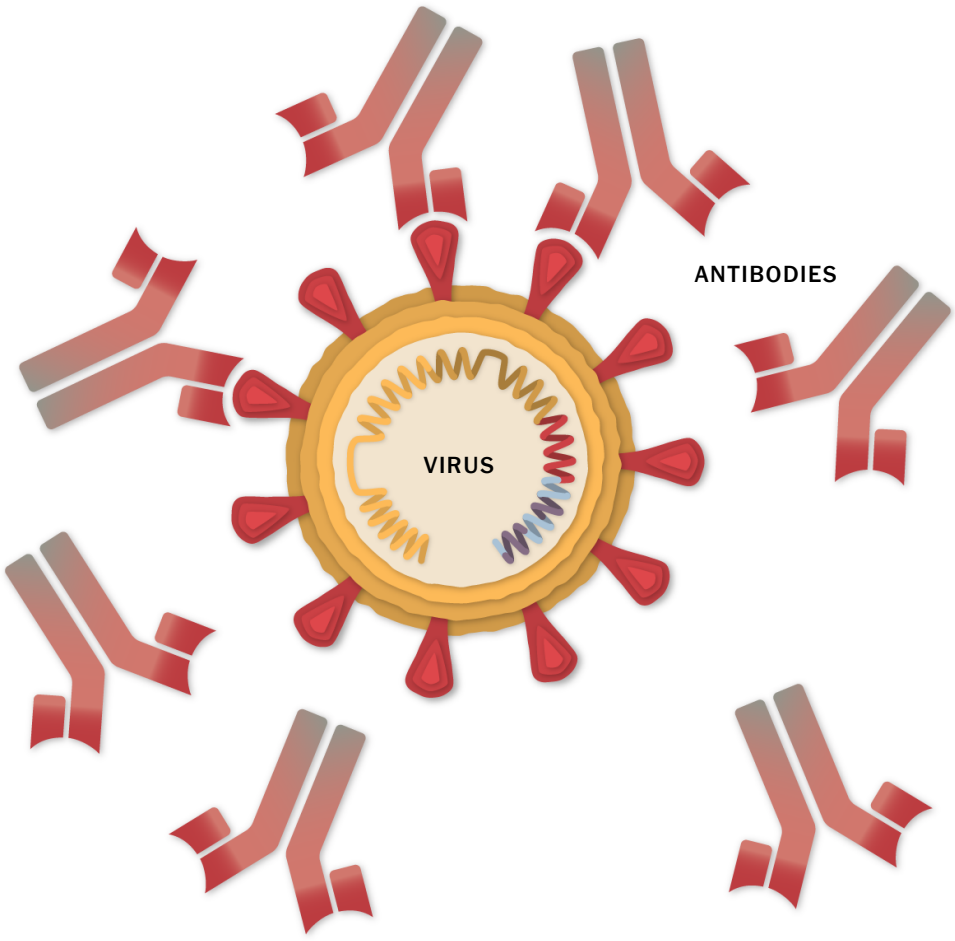
Making Antibodies

Other immune cells, called B cells, may bump into the coronavirus spikes on the surface of vaccinated cells, or free-floating spike protein fragments. A few of the B cells may be able to lock onto the spike proteins. If these B cells are then activated by helper T cells, they will start to proliferate and pour out antibodies that target the spike protein.



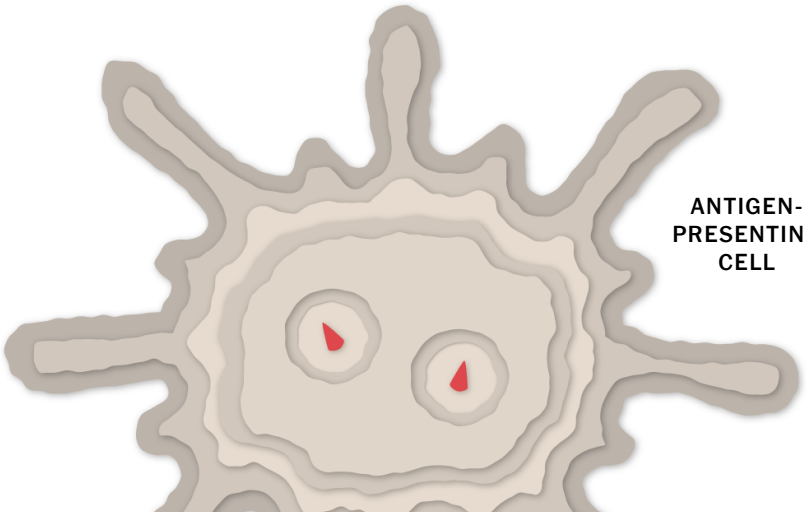
Stopping the Virus

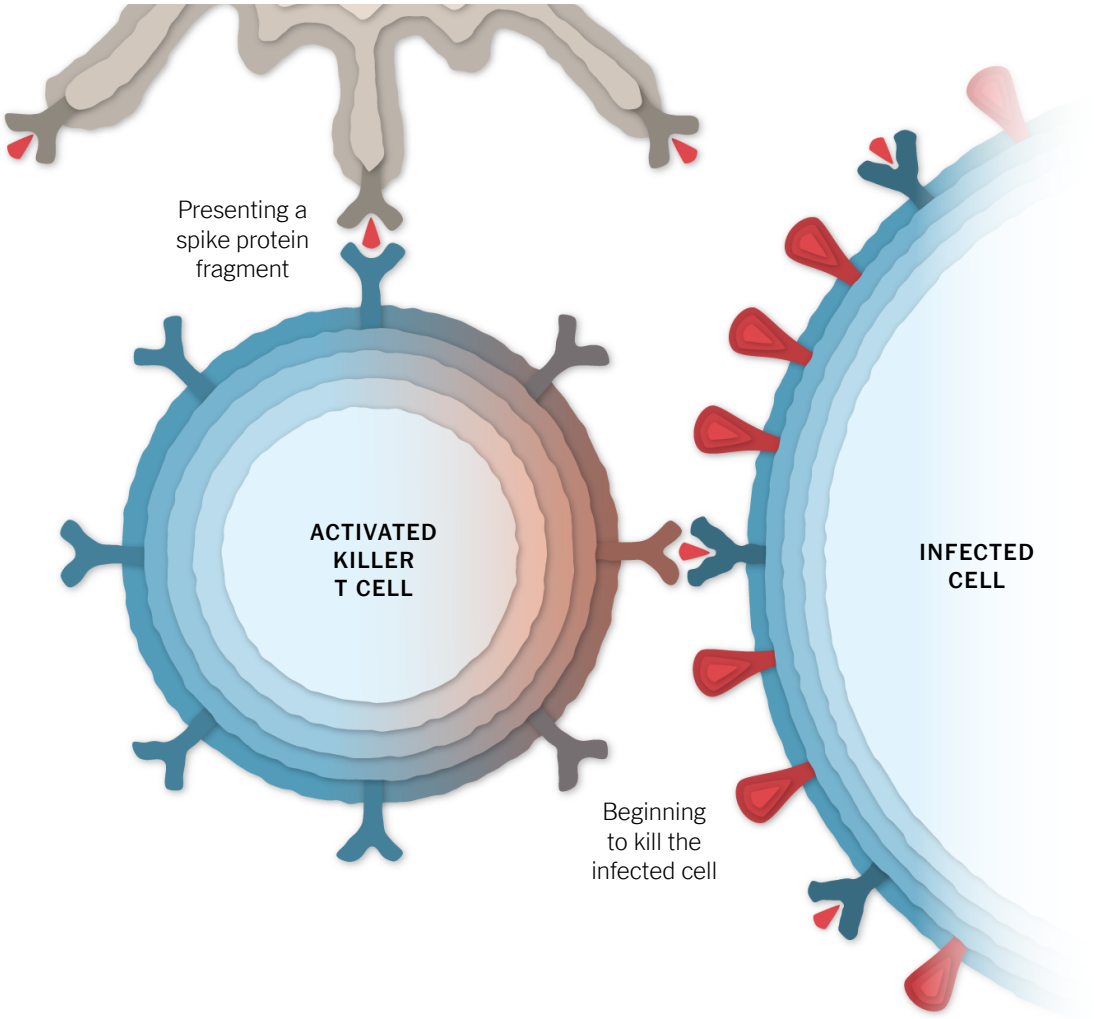
The antibodies can latch onto coronavirus spikes, mark the virus for destruction and prevent infection by blocking the spikes from attaching to other cells.



Killing Infected Cells

The antigen-presenting cells can also activate another type of immune cell called a killer T cell to seek out and destroy any coronavirus-infected cells that display the spike protein fragments on their surfaces.





Remembering the Virus

Johnson & Johnson's vaccine is given as a single dose, unlike the two-dose coronavirus vaccines from Pfizer, Moderna and AstraZeneca.

Researchers don't yet know how long the vaccine's protection might last. It's possible that the number of antibodies and killer T cells will drop in the months after vaccination. But the immune system also contains special cells called memory B cells and memory T cells that might retain information about the coronavirus for years or even decades.

Vaccine Timeline

January, 2020 Johnson & Johnson begins work on a coronavirus vaccine.

March Johnson & Johnson receives $456 million from the United States government to help develop and produce the vaccine.

July A Phase 1/2 trial begins. Unlike the clinical trials for other leading vaccines, the trial involves one dose, not two.

A dose of the Johnson & Johnson vaccine. Michael Ciaglo/Getty Images

August The federal government agrees to pay Johnson & Johnson $1 billion for 100 million doses, if the vaccine is approved.

September Johnson & Johnson launches a Phase 3 trial.

Oct. 8 The European Union reaches a deal to obtain 200 million doses.

Oct. 12 The company pauses its Phase 3 trial to investigate an adverse reaction in a volunteer.

Oct. 23 The trial resumes.

Nov. 16 Johnson & Johnson announces a second Phase 3 trial to observe the effects of two doses of their vaccine, instead of just one.

Dec. 17 Johnson & Johnson announces its Phase 3 trial is fully enrolled, with around 45,000 participants.

January, 2021 Preliminary results from the Phase 3 trial are expected in January. The company is aiming to produce at least a billion doses this year.

Jan. 13 Johnson & Johnson expects to release trial results in as little as two weeks. But the company is falling behind on its original production schedule.

Feb. 24 The vaccine had a 72 percent overall efficacy rate in the United States and 64 percent in South Africa, where a highly contagious variant called B.1.351 emerged in the fall and is now driving most cases. The vaccine also showed efficacy against severe forms of Covid-19.

Feb. 27 The Food and Drug Administration authorizes the vaccine for emergency use.

March 2 Merck will help manufacture the Johnson & Johnson vaccine.

April A plant in Baltimore run by Emergent BioSolutions ruined 15 million doses of the Johnson & Johnson vaccine.

April 13 Federal health officials call for a halt in the use of Johnson & Johnson's vaccine, after six women develop a rare blood-clotting disorder.

April 23 Researchers are examining how components of the Oxford-AstraZeneca vaccine might disrupt the normal blood clotting process under certain rare conditions.

April 23 Use of the vaccine will resume within days in the United States, but with a warning label about the risk of rare blood-clots.

May 3 Denmark announces it will no longer use Johnson & Johnson's vaccine, citing a risk of rare blood clots and the country's ample supply of other vaccines.

Sources: National Center for Biotechnology Information; Nature; Lynda Coughlan, University of Maryland School of Medicine.

Tracking the Coronavirus

United States

Latest Maps and Data
Cases and deaths for every county

Vaccinations
How many have been vaccinated, and who's eligible

Your Places
Build your own dashboard to track cases

Mask Mandates
See state mask guidance for schools and indoors

Your County's Risk
See guidance for your local area

Hospitals Near You
How many I.C.U. beds are occupied

World

Latest Maps and Data
Cases and deaths for every country

Global Vaccinations
How many have been vaccinated, by country

Health

Vaccines
Track their development

Treatments
Rated by effectiveness and safety

Previous Projects

Nursing Homes
The hardest-hit states and facilities

Colleges and Universities
Cases at more than 1,800 schools

Deaths Above Normal
The true toll of the pandemic in the U.S.

Deaths Above Normal
The true toll of coronavirus around the world

Countries

Australia
Brazil
Canada
France
Germany
India
Italy
Japan
Mexico
Spain
U.K.
United States

States, Territories and Cities

Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Florida
Georgia
Guam
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Northern Mariana Islands
Ohio
Oklahoma
Oregon
Pennsylvania
Puerto Rico
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
U.S. Virgin Islands
Utah
Vermont
Virginia
Washington
Washington, D.C.
West Virginia
Wisconsin
Wyoming

Data

Frequently Asked Questions About the Covid Data

Access the Open Source Covid Data

EXCERPT PAGES 1 AND 20

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As filed with the Securities and Exchange Commission on November 28, 2018.

Registration No. 333-228300

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Amendment No. 1
to
FORM S-1
REGISTRATION STATEMENT
Under
The Securities Act of 1933

MODERNA, INC.
(Exact name of registrant as specified in its charter)

Delaware	2836	81-3467528
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

200 Technology Square
Cambridge, MA 02139
(617) 714-6500
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Stéphane Bancel
Chief Executive Officer
200 Technology Square
Cambridge, MA 02139
(617) 714-6500
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Stuart Cable, Esq. Kingsley Taft, Esq. Gregg Katz, Esq. Goodwin Procter LLP 100 Northern Avenue Boston, MA 02210 (617) 570-1000	Lori Henderson, Esq. General Counsel Moderna, Inc. 200 Technology Square Cambridge, MA 02139 (617) 714-6500	Patrick O'Brien, Esq. Michael S. Pilo, Esq. Ropes & Gray LLP Prudential Tower 800 Boylston Street Boston, MA 02116 (617) 951-7527

Approximate date of commencement of proposed sale to the public: As soon as practicable after the effective date of this registration statement.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, as amended, check the following box. ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer	☐	Accelerated Filer	☐
Non-Accelerated Filer	☒	Smaller Reporting Company	☐
		Emerging Growth Company	☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided to Section 7(a)(2)(B) of the Securities Act. ☐

CALCULATION OF REGISTRATION FEE

Title of each Class of Securities to be Registered	Amount to be Registered(1)	Proposed Maximum Offering Price per Share(2)	Proposed Maximum Aggregate Offering Price(2)	Amount of Registration Fee(3)(4)
Common Stock, par value $0.0001 per share	25,000,000	$24.00	$600,000,000	$72,720.00

(1) Includes 3,260,869 shares that the underwriters have an option to purchase.
(2) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(a) under the Securities Act of 1933, as amended.
(3) Calculated pursuant to Rule 457(a) under the Securities Act of 1933, as amended, based on an estimate of the proposed maximum aggregate offering price.
(4) $60,600 of this registration fee was previously paid by the Registrant in connection with the filing of its Registration Statement on Form S-1 on November 9, 2018.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment that specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until this registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

- our improvements in the manufacturing processes for this new class of potential medicines may not be sufficient to satisfy the clinical or commercial demand of our mRNA investigational medicines or regulatory requirements for clinical trials;
- changes that we make to optimize our manufacturing, testing or formulating of cGMP materials could impact the safety, tolerability, and efficacy of our investigational medicines and development candidates;
- pricing or reimbursement issues or other factors that delay clinical trials or make any mRNA medicine uneconomical or noncompetitive with other therapies;
- failure to timely advance our programs or receive the necessary regulatory approvals or a delay in receiving such approvals, due to, among other reasons, slow or failure to complete enrollment in clinical trials, withdrawal by trial participants from trials, failure to achieve trial endpoints, additional time requirements for data analysis, data integrity issues, biologics license application, or BLA, or the equivalent application, discussions with the FDA or EMA, a regulatory request for additional nonclinical or clinical data, or safety formulation or manufacturing issues may lead to our inability to obtain sufficient funding; and
- the proprietary rights of others and their competing products and technologies that may prevent our mRNA medicines from being commercialized.

Currently, mRNA is considered a gene therapy product by the FDA. Unlike certain gene therapies that irreversibly alter cell DNA and could act as a source of side effects, mRNA based medicines are designed to not irreversibly change cell DNA; however, side effects observed in gene therapy could negatively impact the perception of mRNA medicines despite the differences in mechanism. In addition, because no product in which mRNA is the primary active ingredient has been approved, the regulatory pathway for approval is uncertain. The number and design of the clinical and preclinical studies required for the approval of these types of medicines have not been established, may be different from those required for gene therapy products or may require safety testing like gene therapy products. Moreover, the length of time necessary to complete clinical trials and to submit an application for marketing approval for a final decision by a regulatory authority varies significantly from one pharmaceutical product to the next, and may be difficult to predict.

We have incurred significant losses since our inception and anticipate that we will continue to incur significant losses for the foreseeable future.

We have incurred net losses in each year since our inception in 2009, including net losses of $216.2 million and $255.9 million for the years ended December 31, 2016 and 2017, respectively. As of December 31, 2017, we had an accumulated deficit of $621.9 million. As of September 30, 2018, we had an accumulated deficit of $865.2 million.

We have devoted most of our financial resources to research and development, including our clinical and preclinical development activities and the development of our platform. To date, we have financed our operations primarily through the sale of equity securities and proceeds from strategic alliances and, to a lesser extent, through grants from governmental and private organizations. The amount of our future net losses will depend, in part, on the rate of our future expenditures and our ability to obtain funding through equity or debt financings, sales of assets, strategic alliances, or additional grants. We have not commenced or completed pivotal clinical studies for any of our programs in clinical trials, or investigational medicines, and it will be several years, if ever, before we or our strategic collaborators have an investigational medicine ready for commercialization. Even if we obtain regulatory approval to market an investigational medicine, our future revenues will depend upon the size of any markets in which our investigational medicines have received approval, and our ability to achieve sufficient market acceptance, reimbursement from third-party payors, and adequate market share in those markets. We may never achieve profitability.

We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. We anticipate that our expenses will increase substantially if and as we:

- continue or expand our research or development of our programs in preclinical development;

VACCINE INFORMATION FACT SHEET FOR RECIPIENTS AND CAREGIVERS ABOUT COMIRNATY (COVID-19 VACCINE, mRNA) AND PFIZER-BIONTECH COVID-19 VACCINE TO PREVENT CORONAVIRUS DISEASE 2019 (COVID-19)

You are being offered either COMIRNATY (COVID-19 Vaccine, mRNA) or the Pfizer-BioNTech COVID-19 Vaccine to prevent Coronavirus Disease 2019 (COVID-19) caused by SARS-CoV-2.

This Vaccine Information Fact Sheet for Recipients and Caregivers comprises the Fact Sheet for the authorized Pfizer-BioNTech COVID-19 Vaccine and also includes information about the FDA-licensed vaccine, COMIRNATY (COVID-19 Vaccine, mRNA).

The FDA-approved COMIRNATY (COVID-19 Vaccine, mRNA) and the FDA-authorized Pfizer-BioNTech COVID-19 Vaccine under Emergency Use Authorization (EUA) have the same formulation and can be used interchangeably to provide the COVID-19 vaccination series.[1]

COMIRNATY (COVID-19 Vaccine, mRNA) is an FDA-approved COVID-19 vaccine made by Pfizer for BioNTech.

- **It is approved as a 2-dose series for prevention of COVID-19 in individuals 16 years of age and older.**
- **It is also authorized under EUA to be administered to:**
  - **prevent COVID-19 in individuals 12 through 15 years, and**
  - **provide a third dose to individuals 12 years of age and older who have been determined to have certain kinds of immunocompromise.**

The Pfizer-BioNTech COVID-19 Vaccine has received EUA from FDA to:

- **prevent COVID-19 in individuals 12 years of age and older, and**
- **provide a third dose to individuals 12 years of age and older who have been determined to have certain kinds of immunocompromise.**

This Vaccine Information Fact Sheet contains information to help you understand the risks and benefits of COMIRNATY (COVID-19 Vaccine, mRNA) and the Pfizer-BioNTech COVID-19 Vaccine, which you may receive because there is currently a pandemic of COVID-19. Talk to your vaccination provider if you have questions.

COMIRNATY (COVID-19 Vaccine, mRNA) and the Pfizer-BioNTech COVID-19 Vaccine are administered as a 2-dose series, 3 weeks apart, into the muscle.

[1] The licensed vaccine has the same formulation as the EUA-authorized vaccine and the products can be used interchangeably to provide the vaccination series without presenting any safety or effectiveness concerns. The products are legally distinct with certain differences that do not impact safety or effectiveness.

Under EUA for individuals who are determined to have certain kinds of immunocompromise, a third dose may be administered at least 4 weeks after the second dose.

COMIRNATY (COVID-19 Vaccine, mRNA) and the Pfizer-BioNTech COVID-19 Vaccine may not protect everyone.

This Fact Sheet may have been updated. For the most recent Fact Sheet, please see www.cvdvaccine.com.

WHAT YOU NEED TO KNOW BEFORE YOU GET THIS VACCINE

WHAT IS COVID-19?

COVID-19 disease is caused by a coronavirus called SARS-CoV-2. You can get COVID-19 through contact with another person who has the virus. It is predominantly a respiratory illness that can affect other organs. People with COVID-19 have had a wide range of symptoms reported, ranging from mild symptoms to severe illness leading to death. Symptoms may appear 2 to 14 days after exposure to the virus. Symptoms may include: fever or chills; cough; shortness of breath; fatigue; muscle or body aches; headache; new loss of taste or smell; sore throat; congestion or runny nose; nausea or vomiting; diarrhea.

WHAT IS COMIRNATY (COVID-19 VACCINE, mRNA) AND HOW IS IT RELATED TO THE PFIZER-BIONTECH COVID-19 VACCINE?

COMIRNATY (COVID-19 Vaccine, mRNA) and the Pfizer-BioNTech COVID-19 Vaccine have the same formulation and can be used interchangeably to provide the COVID-19 vaccination series.[1]

For more information on EUA, see the "**What is an Emergency Use Authorization (EUA)?**" section at the end of this Fact Sheet.

[1] The licensed vaccine has the same formulation as the EUA-authorized vaccine and the products can be used interchangeably to provide the vaccination series without presenting any safety or effectiveness concerns. The products are legally distinct with certain differences that do not impact safety or effectiveness.

WHAT SHOULD YOU MENTION TO YOUR VACCINATION PROVIDER BEFORE YOU GET THE VACCINE?

Tell the vaccination provider about all of your medical conditions, including if you:

- have any allergies
- have had myocarditis (inflammation of the heart muscle) or pericarditis (inflammation of the lining outside the heart)
- have a fever
- have a bleeding disorder or are on a blood thinner
- are immunocompromised or are on a medicine that affects your immune system
- are pregnant or plan to become pregnant
- are breastfeeding
- have received another COVID-19 vaccine
- have ever fainted in association with an injection

WHO SHOULD GET THE VACCINE?

FDA has approved COMIRNATY (COVID-19 Vaccine, mRNA) for use in individuals 16 years of age and older and has authorized it for emergency use in individuals 12 through 15 years.

FDA has authorized the emergency use of the Pfizer-BioNTech COVID-19 Vaccine in individuals 12 years of age and older.

WHO SHOULD <u>NOT</u> GET THE VACCINE?

You should not get the COMIRNATY (COVID-19 Vaccine, mRNA) or the Pfizer-BioNTech COVID-19 Vaccine if you:

- had a severe allergic reaction after a previous dose of this vaccine
- had a severe allergic reaction to any ingredient of this vaccine.

WHAT ARE THE INGREDIENTS IN COMIRNATY (COVID-19 VACCINE, mRNA) AND THE PFIZER-BIONTECH COVID-19 VACCINE?

COMIRNATY (COVID-19 Vaccine, mRNA) and the Pfizer-BioNTech COVID-19 Vaccine include the following ingredients: mRNA, lipids ((4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate), 2 [(polyethylene glycol)-2000]-N,N-ditetradecylacetamide, 1,2-Distearoyl-sn-glycero-3-phosphocholine, and cholesterol), potassium chloride, monobasic potassium phosphate, sodium chloride, dibasic sodium phosphate dihydrate, and sucrose.

HOW IS THE VACCINE GIVEN?

COMIRNATY (COVID-19 Vaccine, mRNA) and the Pfizer-BioNTech COVID-19 Vaccine will be given to you as an injection into the muscle.

The vaccination series is 2 doses given 3 weeks apart.

If you receive one dose of the vaccine, you should receive a second dose of the vaccine 3 weeks later to complete the vaccination series.

HAVE COMIRNATY (COVID-19 VACCINE, mRNA) AND THE PFIZER-BIONTECH COVID-19 VACCINE BEEN USED BEFORE?

In clinical trials, approximately 23,000 individuals 12 years of age and older have received at least 1 dose of the Pfizer-BioNTech COVID-19 Vaccine. Data from these clinical trials supported the Emergency Use Authorization of the Pfizer-BioNTech COVID-19 Vaccine and the approval of COMIRNATY (COVID-19 Vaccine, mRNA). Millions of individuals have received the Pfizer-BioNTech COVID-19 Vaccine under EUA since December 11, 2020.

WHAT ARE THE BENEFITS OF COMIRNATY (COVID-19 VACCINE, mRNA) AND THE PFIZER-BIONTECH COVID-19 VACCINE?

The vaccine has been shown to prevent COVID-19 following 2 doses given 3 weeks apart. The duration of protection against COVID-19 is currently unknown.

WHAT ARE THE RISKS OF COMIRNATY (COVID-19 VACCINE, mRNA) AND THE PFIZER-BIONTECH COVID-19 VACCINE?

There is a remote chance that the vaccine could cause a severe allergic reaction. A severe allergic reaction would usually occur within a few minutes to one hour after getting a dose of the vaccine. For this reason, your vaccination provider may ask you to stay at the place where you received your vaccine for monitoring after vaccination. Signs of a severe allergic reaction can include:

- Difficulty breathing
- Swelling of your face and throat
- A fast heartbeat
- A bad rash all over your body
- Dizziness and weakness

Myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the lining outside the heart) have occurred in some people who have received COMIRNATY (COVID-19 Vaccine, mRNA) or the Pfizer-BioNTech COVID-19 Vaccine. In most of these people, symptoms began within a few days following receipt of the second dose of vaccine. The chance of having this occur is very low. You should seek medical attention right away if you have any of the following symptoms after receiving the vaccine:

- Chest pain
- Shortness of breath
- Feelings of having a fast-beating, fluttering, or pounding heart

Side effects that have been reported with COMIRNATY (COVID-19 Vaccine, mRNA) or the Pfizer-BioNTech COVID-19 Vaccine include:

- severe allergic reactions
- non-severe allergic reactions such as rash, itching, hives, or swelling of the face
- myocarditis (inflammation of the heart muscle)
- pericarditis (inflammation of the lining outside the heart)
- injection site pain
- tiredness
- headache

- muscle pain
- chills
- joint pain
- fever
- injection site swelling
- injection site redness
- nausea
- feeling unwell
- swollen lymph nodes (lymphadenopathy)
- diarrhea
- vomiting
- arm pain

These may not be all the possible side effects of the vaccine. Serious and unexpected side effects may occur. The possible side effects of the vaccine are still being studied in clinical trials.

WHAT SHOULD I DO ABOUT SIDE EFFECTS?
If you experience a severe allergic reaction, call 9-1-1, or go to the nearest hospital.

Call the vaccination provider or your healthcare provider if you have any side effects that bother you or do not go away.

Report vaccine side effects to FDA/CDC Vaccine Adverse Event Reporting System (VAERS). The VAERS toll-free number is 1-800-822-7967 or report online to https://vaers.hhs.gov/reportevent.html. Please include either "COMIRNATY (COVID-19 Vaccine, mRNA)" or "Pfizer-BioNTech COVID-19 Vaccine EUA", as appropriate, in the first line of box #18 of the report form.

In addition, you can report side effects to Pfizer Inc. at the contact information provided below.

Website	Fax number	Telephone number
www.pfizersafetyreporting.com	1-866-635-8337	1-800-438-1985

You may also be given an option to enroll in v-safe. V-safe is a new voluntary smartphone-based tool that uses text messaging and web surveys to check in with people who have been vaccinated to identify potential side effects after COVID-19 vaccination. V-safe asks questions that help CDC monitor the safety of COVID-19 vaccines. V-safe also provides second-dose reminders if needed and live telephone follow-up by CDC if participants report a significant health impact following COVID-19 vaccination. For more information on how to sign up, visit: www.cdc.gov/vsafe.

WHAT IF I DECIDE NOT TO GET COMIRNATY (COVID-19 VACCINE, mRNA) OR THE PFIZER-BIONTECH COVID-19 VACCINE?
Under the EUA, it is your choice to receive or not receive the vaccine. Should you decide not to receive it, it will not change your standard medical care.

ARE OTHER CHOICES AVAILABLE FOR PREVENTING COVID-19 BESIDES COMIRNATY (COVID-19 VACCINE, mRNA) OR PFIZER-BIONTECH COVID-19 VACCINE?
Other vaccines to prevent COVID-19 may be available under Emergency Use Authorization.

CAN I RECEIVE THE COMIRNATY (COVID-19 VACCINE, mRNA) OR PFIZER-BIONTECH COVID-19 VACCINE AT THE SAME TIME AS OTHER VACCINES?
Data have not yet been submitted to FDA on administration of COMIRNATY (COVID-19 Vaccine, mRNA) or the Pfizer-BioNTech COVID-19 Vaccine at the same time with other vaccines. If you are considering receiving COMIRNATY (COVID-19 Vaccine, mRNA) or the Pfizer-BioNTech COVID-19 Vaccine with other vaccines, discuss your options with your healthcare provider.

WHAT IF I AM IMMUNOCOMPROMISED?
If you are immunocompromised, you may receive a third dose of the vaccine. The third dose may still not provide full immunity to COVID-19 in people who are immunocompromised, and you should continue to maintain physical precautions to help prevent COVID-19. In addition, your close contacts should be vaccinated as appropriate.

WHAT IF I AM PREGNANT OR BREASTFEEDING?
If you are pregnant or breastfeeding, discuss your options with your healthcare provider.

WILL COMIRNATY (COVID-19 VACCINE, mRNA) OR THE PFIZER-BIONTECH COVID-19 VACCINE GIVE ME COVID-19?
No. The vaccine does not contain SARS-CoV-2 and cannot give you COVID-19.

KEEP YOUR VACCINATION CARD
When you get your first dose, you will get a vaccination card to show you when to return for your second dose or if you have certain kinds of immunocompromise, your third dose of COMIRNATY (COVID-19 Vaccine, mRNA) or Pfizer-BioNTech COVID-19 Vaccine. Remember to bring your card when you return.

ADDITIONAL INFORMATION
If you have questions, visit the website or call the telephone number provided below.

To access the most recent Fact Sheets, please scan the QR code provided below.

Global website	Telephone number
www.cvdvaccine.com	1-877-829-2619 (1-877-VAX-CO19)

HOW CAN I LEARN MORE?
- Ask the vaccination provider.
- Visit CDC at https://www.cdc.gov/coronavirus/2019-ncov/index.html.
- Visit FDA at https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization.
- Contact your local or state public health department.

WHERE WILL MY VACCINATION INFORMATION BE RECORDED?
The vaccination provider may include your vaccination information in your state/local jurisdiction's Immunization Information System (IIS) or other designated system. This will ensure that you receive the same vaccine when you return for the second dose. For more information about IISs visit: https://www.cdc.gov/vaccines/programs/iis/about.html.

CAN I BE CHARGED AN ADMINISTRATION FEE FOR RECEIPT OF THE COVID-19 VACCINE?
No. At this time, the provider cannot charge you for a vaccine dose and you cannot be charged an out-of-pocket vaccine administration fee or any other fee if only receiving a COVID-19 vaccination. However, vaccination providers may seek appropriate reimbursement from a program or plan that covers COVID-19 vaccine administration fees for the vaccine recipient (private insurance, Medicare, Medicaid, Health Resources & Services Administration [HRSA] COVID-19 Uninsured Program for non-insured recipients).

WHERE CAN I REPORT CASES OF SUSPECTED FRAUD?
Individuals becoming aware of any potential violations of the CDC COVID-19 Vaccination Program requirements are encouraged to report them to the Office of the Inspector General, U.S. Department of Health and Human Services, at 1-800-HHS-TIPS or https://TIPS.HHS.GOV.

WHAT IS THE COUNTERMEASURES INJURY COMPENSATION PROGRAM?
The Countermeasures Injury Compensation Program (CICP) is a federal program that may help pay for costs of medical care and other specific expenses of certain people who have been seriously injured by certain medicines or vaccines, including this vaccine. Generally, a claim must be submitted to the CICP within one (1) year from the

date of receiving the vaccine. To learn more about this program, visit www.hrsa.gov/cicp/ or call 1-855-266-2427.

WHAT IS AN EMERGENCY USE AUTHORIZATION (EUA)?
An Emergency Use Authorization (EUA) is a mechanism to facilitate the availability and use of medical products, including vaccines, during public health emergencies, such as the current COVID-19 pandemic. An EUA is supported by a Secretary of Health and Human Services (HHS) declaration that circumstances exist to justify the emergency use of drugs and biological products during the COVID-19 pandemic.

The FDA may issue an EUA when certain criteria are met, which includes that there are no adequate, approved, available alternatives. In addition, the FDA decision is based on the totality of scientific evidence available showing that the product may be effective to prevent COVID-19 during the COVID-19 pandemic and that the known and potential benefits of the product outweigh the known and potential risks of the product. All of these criteria must be met to allow for the product to be used in the treatment of patients during the COVID-19 pandemic.

This EUA for the Pfizer-BioNTech COVID-19 Vaccine and COMIRNATY will end when the Secretary of HHS determines that the circumstances justifying the EUA no longer exist or when there is a change in the approval status of the product such that an EUA is no longer needed.

Pfizer

Manufactured by
Pfizer Inc., New York, NY 10017

BIONTECH

Manufactured for
BioNTech Manufacturing GmbH
An der Goldgrube 12
55131 Mainz, Germany

LAB-1451-7.2

Revised: 23 August 2021

Scan to capture that this Fact Sheet was provided to vaccine recipient for the electronic medical records/immunization information systems.

Barcode Date: 08/2021

FACT SHEET FOR RECIPIENTS AND CAREGIVERS
EMERGENCY USE AUTHORIZATION (EUA) OF THE MODERNA COVID-19 VACCINE TO PREVENT CORONAVIRUS DISEASE 2019 (COVID-19) IN INDIVIDUALS 18 YEARS OF AGE AND OLDER

You are being offered the Moderna COVID-19 Vaccine to prevent Coronavirus Disease 2019 (COVID-19) caused by SARS-CoV-2. This Fact Sheet contains information to help you understand the risks and benefits of the Moderna COVID-19 Vaccine, which you may receive because there is currently a pandemic of COVID-19.

The Moderna COVID-19 Vaccine is a vaccine and may prevent you from getting COVID-19.

Read this Fact Sheet for information about the Moderna COVID-19 Vaccine. Talk to the vaccination provider if you have questions. It is your choice to receive the Moderna COVID-19 Vaccine.

The Moderna COVID-19 Vaccine is administered as a 2-dose series, 1 month apart, into the muscle.

The Moderna COVID-19 Vaccine may not protect everyone.

This Fact Sheet may have been updated. For the most recent Fact Sheet, please visit www.modernatx.com/covid19vaccine-eua.

WHAT YOU NEED TO KNOW BEFORE YOU GET THIS VACCINE

WHAT IS COVID-19?
COVID-19 is caused by a coronavirus called SARS-CoV-2. This type of coronavirus has not been seen before. You can get COVID-19 through contact with another person who has the virus. It is predominantly a respiratory illness that can affect other organs. People with COVID-19 have had a wide range of symptoms reported, ranging from mild symptoms to severe illness. Symptoms may appear 2 to 14 days after exposure to the virus. Symptoms may include: fever or chills; cough; shortness of breath; fatigue; muscle or body aches; headache; new loss of taste or smell; sore throat; congestion or runny nose; nausea or vomiting; diarrhea.

WHAT IS THE MODERNA COVID-19 VACCINE?
The Moderna COVID-19 Vaccine is an unapproved vaccine that may prevent COVID-19.

The FDA has authorized the emergency use of the Moderna COVID-19 Vaccine to prevent COVID-19 in individuals 18 years of age and older under an Emergency Use Authorization (EUA).

For more information on EUA, see the "**What is an Emergency Use Authorization (EUA)?**" section at the end of this Fact Sheet.

WHAT SHOULD YOU MENTION TO YOUR VACCINATION PROVIDER BEFORE YOU GET THE MODERNA COVID-19 VACCINE?

Tell your vaccination provider about all of your medical conditions, including if you:

- have any allergies
- have had myocarditis (inflammation of the heart muscle) or pericarditis (inflammation of the lining outside the heart)
- have a fever
- have a bleeding disorder or are on a blood thinner
- are immunocompromised or are on a medicine that affects your immune system
- are pregnant or plan to become pregnant
- are breastfeeding
- have received another COVID-19 vaccine
- have ever fainted in association with an injection

WHO SHOULD GET THE MODERNA COVID-19 VACCINE?

FDA has authorized the emergency use of the Moderna COVID-19 Vaccine in individuals 18 years of age and older.

WHO SHOULD NOT GET THE MODERNA COVID-19 VACCINE?

You should not get the Moderna COVID-19 Vaccine if you:

- had a severe allergic reaction after a previous dose of this vaccine
- had a severe allergic reaction to any ingredient of this vaccine

WHAT ARE THE INGREDIENTS IN THE MODERNA COVID-19 VACCINE?

The Moderna COVID-19 Vaccine contains the following ingredients: messenger ribonucleic acid (mRNA), lipids (SM-102, polyethylene glycol [PEG] 2000 dimyristoyl glycerol [DMG], cholesterol, and 1,2-distearoyl-sn-glycero-3-phosphocholine [DSPC]), tromethamine, tromethamine hydrochloride, acetic acid, sodium acetate trihydrate, and sucrose.

HOW IS THE MODERNA COVID-19 VACCINE GIVEN?

The Moderna COVID-19 Vaccine will be given to you as an injection into the muscle.

The Moderna COVID-19 Vaccine vaccination series is 2 doses given 1 month apart.

If you receive one dose of the Moderna COVID-19 Vaccine, you should receive a second dose of the same vaccine 1 month later to complete the vaccination series.

If you are immunocompromised, you may receive a third dose of the Moderna COVID-19 Vaccine at least 1 month after the second dose.

HAS THE MODERNA COVID-19 VACCINE BEEN USED BEFORE?

The Moderna COVID-19 Vaccine is an unapproved vaccine. In clinical trials, approximately 15,400 individuals 18 years of age and older have received at least 1 dose of the Moderna COVID-19 Vaccine.

WHAT ARE THE BENEFITS OF THE MODERNA COVID-19 VACCINE?
In an ongoing clinical trial, the Moderna COVID-19 Vaccine has been shown to prevent COVID-19 following 2 doses given 1 month apart. The duration of protection against COVID-19 is currently unknown.

WHAT ARE THE RISKS OF THE MODERNA COVID-19 VACCINE?
There is a remote chance that the Moderna COVID-19 Vaccine could cause a severe allergic reaction. A severe allergic reaction would usually occur within a few minutes to one hour after getting a dose of the Moderna COVID-19 Vaccine. For this reason, your vaccination provider may ask you to stay at the place where you received your vaccine for monitoring after vaccination. Signs of a severe allergic reaction can include:

- Difficulty breathing
- Swelling of your face and throat
- A fast heartbeat
- A bad rash all over your body
- Dizziness and weakness

Myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the lining outside the heart) have occurred in some people who have received the Moderna COVID-19 Vaccine. In most of these people, symptoms began within a few days following receipt of the second dose of the Moderna COVID-19 Vaccine. The chance of having this occur is very low. You should seek medical attention right away if you have any of the following symptoms after receiving the Moderna COVID-19 Vaccine:

- Chest pain
- Shortness of breath
- Feelings of having a fast-beating, fluttering, or pounding heart

Side effects that have been reported in a clinical trial with the Moderna COVID-19 Vaccine include:

- Injection site reactions: pain, tenderness and swelling of the lymph nodes in the same arm of the injection, swelling (hardness), and redness
- General side effects: fatigue, headache, muscle pain, joint pain, chills, nausea and vomiting, and fever

Side effects that have been reported during post-authorization use of the Moderna COVID-19 Vaccine include:

- Severe allergic reactions
- Myocarditis (inflammation of the heart muscle)
- Pericarditis (inflammation of the lining outside the heart)

These may not be all the possible side effects of the Moderna COVID-19 Vaccine. Serious and unexpected side effects may occur. The Moderna COVID-19 Vaccine is still being studied in clinical trials.

WHAT SHOULD I DO ABOUT SIDE EFFECTS?
If you experience a severe allergic reaction, call 9-1-1, or go to the nearest hospital.

Call the vaccination provider or your healthcare provider if you have any side effects that bother you or do not go away.

Report vaccine side effects to **FDA/CDC Vaccine Adverse Event Reporting System (VAERS)**. The VAERS toll-free number is 1-800-822-7967 or report online to https://vaers.hhs.gov/reportevent.html. Please include "Moderna COVID-19 Vaccine EUA" in the first line of box #18 of the report form.

In addition, you can report side effects to ModernaTX, Inc. at 1-866-MODERNA (1-866-663-3762).

You may also be given an option to enroll in **v-safe. V-safe** is a new voluntary smartphone-based tool that uses text messaging and web surveys to check in with people who have been vaccinated to identify potential side effects after COVID-19 vaccination. **V-safe** asks questions that help CDC monitor the safety of COVID-19 vaccines. **V-safe** also provides second-dose reminders if needed and live telephone follow-up by CDC if participants report a significant health impact following COVID-19 vaccination. For more information on how to sign up, visit: www.cdc.gov/vsafe.

WHAT IF I DECIDE NOT TO GET THE MODERNA COVID-19 VACCINE?
It is your choice to receive or not receive the Moderna COVID-19 Vaccine. Should you decide not to receive it, it will not change your standard medical care.

ARE OTHER CHOICES AVAILABLE FOR PREVENTING COVID-19 BESIDES MODERNA COVID-19 VACCINE?
Another choice for preventing COVID-19 is Comirnaty, an FDA-approved COVID-19 vaccine. Other vaccines to prevent COVID-19 may be available under Emergency Use Authorization.

CAN I RECEIVE THE MODERNA COVID-19 VACCINE WITH OTHER VACCINES?
There is no information on the use of the Moderna COVID-19 Vaccine with other vaccines.

WHAT IF I AM IMMUNOCOMPROMISED?
If you are immunocompromised, you may receive a third dose of the Moderna COVID-19 Vaccine. The third dose may still not provide full immunity to COVID-19 in people who are immunocompromised, and you should continue to maintain physical precautions to help prevent COVID-19. In addition, your close contacts should be vaccinated as appropriate.

WHAT IF I AM PREGNANT OR BREASTFEEDING?
If you are pregnant or breastfeeding, discuss your options with your healthcare provider.

WILL THE MODERNA COVID-19 VACCINE GIVE ME COVID-19?
No. The Moderna COVID-19 Vaccine does not contain SARS-CoV-2 and cannot give you COVID-19.

KEEP YOUR VACCINATION CARD
When you receive your first dose, you will get a vaccination card to show you when to return for your second dose of the Moderna COVID-19 Vaccine. Remember to bring your card when you return.

ADDITIONAL INFORMATION
If you have questions, visit the website or call the telephone number provided below.

To access the most recent Fact Sheets, please scan the QR code provided below.

Moderna COVID-19 Vaccine website	Telephone number
www.modernatx.com/covid19vaccine-eua	1-866-MODERNA (1-866-663-3762)

HOW CAN I LEARN MORE?
- Ask the vaccination provider
- Visit CDC at https://www.cdc.gov/coronavirus/2019-ncov/index.html
- Visit FDA at https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization
- Contact your state or local public health department

WHERE WILL MY VACCINATION INFORMATION BE RECORDED?
The vaccination provider may include your vaccination information in your state/local jurisdiction's Immunization Information System (IIS) or other designated system. This will ensure that you receive the same vaccine when you return for the second dose. For more information about IISs, visit: https://www.cdc.gov/vaccines/programs/iis/about.html.

CAN I BE CHARGED AN ADMINISTRATION FEE FOR RECEIPT OF THE COVID-19 VACCINE?
No. At this time, the provider cannot charge you for a vaccine dose and you cannot be charged an out-of-pocket vaccine administration fee or any other fee if only receiving a COVID-19 vaccination. However, vaccination providers may seek appropriate reimbursement from a program or plan that covers COVID-19 vaccine administration fees for the vaccine recipient (private insurance, Medicare, Medicaid, HRSA COVID-19 Uninsured Program for non-insured recipients).

WHERE CAN I REPORT CASES OF SUSPECTED FRAUD?
Individuals becoming aware of any potential violations of the CDC COVID-19 Vaccination Program requirements are encouraged to report them to the Office of the Inspector General, U.S. Department of Health and Human Services, at 1-800-HHS-TIPS or TIPS.HHS.GOV.

WHAT IS THE COUNTERMEASURES INJURY COMPENSATION PROGRAM?
The Countermeasures Injury Compensation Program (CICP) is a federal program that may help pay for costs of medical care and other specific expenses of certain people who have been seriously injured by certain medicines or vaccines, including this vaccine. Generally, a claim must be submitted to the CICP within one (1) year from the date of receiving the vaccine. To learn more about this program, visit www.hrsa.gov/cicp/ or call 1-855-266-2427.

WHAT IS AN EMERGENCY USE AUTHORIZATION (EUA)?
The United States FDA has made the Moderna COVID-19 Vaccine available under an emergency access mechanism called an EUA. The EUA is supported by a Secretary of Health and Human Services (HHS) declaration that circumstances exist to justify the emergency use of drugs and biological products during the COVID-19 pandemic.

The Moderna COVID-19 Vaccine has not undergone the same type of review as an FDA-approved or cleared product. FDA may issue an EUA when certain criteria are met, which includes that there are no adequate, approved, and available alternatives. In addition, the FDA decision is based on the totality of the scientific evidence available showing that the product may be effective to prevent COVID-19 during the COVID-19 pandemic and that the known and potential benefits of the product outweigh the known and potential risks of the product. All of these criteria must be met to allow for the product to be used during the COVID-19 pandemic.

The EUA for the Moderna COVID-19 Vaccine is in effect for the duration of the COVID-19 EUA declaration justifying emergency use of these products, unless terminated or revoked (after which the products may no longer be used).

Moderna US, Inc.
Cambridge, MA 02139

Patent(s): www.modernatx.com/patents
Revised: Aug/27/2021

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Barcode Date: 04/2021

FACT SHEET FOR RECIPIENTS AND CAREGIVERS

EMERGENCY USE AUTHORIZATION (EUA) OF THE JANSSEN COVID-19 VACCINE TO PREVENT CORONAVIRUS DISEASE 2019 (COVID-19) IN INDIVIDUALS 18 YEARS OF AGE AND OLDER

You are being offered the Janssen COVID-19 Vaccine to prevent Coronavirus Disease 2019 (COVID-19) caused by SARS-CoV-2. This Fact Sheet contains information to help you understand the risks and benefits of receiving the Janssen COVID-19 Vaccine, which you may receive because there is currently a pandemic of COVID-19.

The Janssen COVID-19 Vaccine may prevent you from getting COVID-19.

Read this Fact Sheet for information about the Janssen COVID-19 Vaccine. Talk to the vaccination provider if you have questions. It is your choice to receive the Janssen COVID-19 Vaccine.

The Janssen COVID-19 Vaccine is administered as a **single dose**, into the muscle.

The Janssen COVID-19 Vaccine may not protect everyone.

This Fact Sheet may have been updated. For the most recent Fact Sheet, please visit www.janssencovid19vaccine.com.

WHAT YOU NEED TO KNOW BEFORE YOU GET THIS VACCINE

WHAT IS COVID-19?

COVID-19 is caused by a coronavirus called SARS-CoV-2. This type of coronavirus has not been seen before. You can get COVID-19 through contact with another person who has the virus. It is predominantly a respiratory illness that can affect other organs. People with COVID-19 have had a wide range of symptoms reported, ranging from mild symptoms to severe illness. Symptoms may appear 2 to 14 days after exposure to the virus. Common symptoms may include: fever or chills; cough; shortness of breath; fatigue; muscle or body aches; headache; new loss of taste or smell; sore throat; congestion or runny nose; nausea or vomiting; diarrhea.

WHAT IS THE JANSSEN COVID-19 VACCINE?

The Janssen COVID-19 Vaccine is an unapproved vaccine that may prevent COVID-19.

The FDA has authorized the emergency use of the Janssen COVID-19 Vaccine to prevent COVID-19 in individuals 18 years of age and older under an Emergency Use Authorization (EUA).

For more information on EUA, see the "**What is an Emergency Use Authorization (EUA)?**" section at the end of this Fact Sheet.

WHAT SHOULD YOU MENTION TO YOUR VACCINATION PROVIDER BEFORE YOU GET THE JANSSEN COVID-19 VACCINE?

Tell the vaccination provider about all of your medical conditions, including if you:

- have any allergies,
- have a fever,
- have a bleeding disorder or are on a blood thinner,
- are immunocompromised or are on a medicine that affects your immune system,
- are pregnant or plan to become pregnant,
- are breastfeeding,
- have received another COVID-19 vaccine,
- have ever fainted in association with an injection.

WHO SHOULD GET THE JANSSEN COVID-19 VACCINE?

FDA has authorized the emergency use of the Janssen COVID-19 Vaccine in individuals 18 years of age and older.

WHO SHOULD NOT GET THE JANSSEN COVID-19 VACCINE?

You should not get the Janssen COVID-19 Vaccine if you:

- had a severe allergic reaction to any ingredient of this vaccine.

WHAT ARE THE INGREDIENTS IN THE JANSSEN COVID-19 VACCINE?

The Janssen COVID-19 Vaccine includes the following ingredients: recombinant, replication-incompetent adenovirus type 26 expressing the SARS-CoV-2 spike protein, citric acid monohydrate, trisodium citrate dihydrate, ethanol, 2-hydroxypropyl-β-cyclodextrin (HBCD), polysorbate-80, sodium chloride.

HOW IS THE JANSSEN COVID -19 VACCINE GIVEN?

The Janssen COVID-19 Vaccine will be given to you as an injection into the muscle.

The Janssen COVID-19 Vaccine vaccination schedule is a **single dose**.

HAS THE JANSSEN COVID-19 VACCINE BEEN USED BEFORE?

The Janssen COVID-19 Vaccine is an unapproved vaccine. In an ongoing clinical trial, 21,895 individuals 18 years of age and older have received the Janssen COVID-19 Vaccine.

WHAT ARE THE BENEFITS OF THE JANSSEN COVID-19 VACCINE?

In an ongoing clinical trial, the Janssen COVID-19 Vaccine has been shown to prevent COVID-19 following a single dose. The duration of protection against COVID-19 is currently unknown.

WHAT ARE THE RISKS OF THE JANSSEN COVID-19 VACCINE?

Side effects that have been reported with the Janssen COVID-19 Vaccine include:

- Injection site reactions: pain, redness of the skin and swelling.
- General side effects: headache, feeling very tired, muscle aches, nausea, and fever.
- Swollen lymph nodes.
- Unusual feeling in the skin (such as tingling or a crawling feeling) (paresthesia), decreased feeling or sensitivity, especially in the skin (hypoesthesia).
- Persistent ringing in the ears (tinnitus).
- Diarrhea, vomiting.

Severe Allergic Reactions

There is a remote chance that the Janssen COVID-19 Vaccine could cause a severe allergic reaction. A severe allergic reaction would usually occur within a few minutes to one hour after getting a dose of the Janssen COVID-19 Vaccine. For this reason, your vaccination provider may ask you to stay at the place where you received your vaccine for monitoring after vaccination. Signs of a severe allergic reaction can include:

- Difficulty breathing,
- Swelling of your face and throat,
- A fast heartbeat,
- A bad rash all over your body,
- Dizziness and weakness.

Blood Clots with Low Levels of Platelets

Blood clots involving blood vessels in the brain, lungs, abdomen, and legs along with low levels of platelets (blood cells that help your body stop bleeding), have occurred in some people who have received the Janssen COVID-19 Vaccine. In people who developed these blood clots and low levels of platelets, symptoms began approximately one to two weeks after vaccination. Reporting of these blood clots and low levels of platelets has been highest in females ages 18 through 49 years. The chance of having this occur is remote. You should seek medical attention right away if you have any of the following symptoms after receiving Janssen COVID-19 Vaccine:

- Shortness of breath,

- Chest pain,
- Leg swelling,
- Persistent abdominal pain,
- Severe or persistent headaches or blurred vision,
- Easy bruising or tiny blood spots under the skin beyond the site of the injection.

These may not be all the possible side effects of the Janssen COVID-19 Vaccine. Serious and unexpected effects may occur. The Janssen COVID-19 Vaccine is still being studied in clinical trials.

Guillain Barré Syndrome

Guillain Barré syndrome (a neurological disorder in which the body's immune system damages nerve cells, causing muscle weakness and sometimes paralysis) has occurred in some people who have received the Janssen COVID-19 Vaccine. In most of these people, symptoms began within 42 days following receipt of the Janssen COVID-19 Vaccine. The chance of having this occur is very low. You should seek medical attention right away if you develop any of the following symptoms after receiving the Janssen COVID-19 Vaccine:

- Weakness or tingling sensations, especially in the legs or arms, that's worsening and spreading to other parts of the body.
- Difficulty walking.
- Difficulty with facial movements, including speaking, chewing, or swallowing.
- Double vision or inability to move eyes.
- Difficulty with bladder control or bowel function.

WHAT SHOULD I DO ABOUT SIDE EFFECTS?

If you experience a severe allergic reaction, call 9-1-1, or go to the nearest hospital.

Call the vaccination provider or your healthcare provider if you have any side effects that bother you or do not go away.

Report vaccine side effects to **FDA/CDC Vaccine Adverse Event Reporting System (VAERS)**. The VAERS toll-free number is 1-800-822-7967 or report online to https://vaers.hhs.gov/reportevent.html. Please include "Janssen COVID-19 Vaccine EUA" in the first line of box #18 of the report form.

In addition, you can report side effects to Janssen Biotech, Inc. at the contact information provided below.

e-mail	Fax number	Telephone numbers
JNJvaccineAE@its.jnj.com	215-293-9955	US Toll Free: 1-800-565-4008 US Toll: (908) 455-9922

You may also be given an option to enroll in **v-safe**. **V-safe** is a new voluntary smartphone-based tool that uses text messaging and web surveys to check in with people who have been vaccinated to identify potential side effects after COVID-19 vaccination. **V-safe** asks questions that help CDC monitor the safety of COVID-19 vaccines. **V-safe** also provides live telephone follow-up by CDC if participants report a significant health impact following COVID-19 vaccination. For more information on how to sign up, visit: www.cdc.gov/vsafe.

WHAT IF I DECIDE NOT TO GET THE JANSSEN COVID-19 VACCINE?

It is your choice to receive or not receive the Janssen COVID-19 Vaccine. Should you decide not to receive it, it will not change your standard medical care.

ARE OTHER CHOICES AVAILABLE FOR PREVENTING COVID-19 BESIDES JANSSEN COVID-19 VACCINE?

Another choice for preventing COVID-19 is Comirnaty, an FDA-approved COVID-19 vaccine. Other vaccines to prevent COVID-19 may be available under Emergency Use Authorization.

CAN I RECEIVE THE JANSSEN COVID-19 VACCINE WITH OTHER VACCINES?

There is no information on the use of the Janssen COVID-19 Vaccine with other vaccines.

WHAT IF I AM PREGNANT OR BREASTFEEDING?

If you are pregnant or breastfeeding, discuss your options with your healthcare provider.

WILL THE JANSSEN COVID-19 VACCINE GIVE ME COVID-19?

No. The Janssen COVID-19 Vaccine does not contain SARS-CoV-2 and cannot give you COVID-19.

KEEP YOUR VACCINATION CARD

When you receive the Janssen COVID-19 Vaccine, you will get a vaccination card to document the name of the vaccine and date of when you received the vaccine.

ADDITIONAL INFORMATION

If you have questions or to access the most recent Janssen COVID-19 Vaccine Fact Sheets, scan the QR code using your device, visit the website or call the telephone numbers provided below.

QR Code	Fact Sheets Website	Telephone numbers
	www.janssencovid19vaccine.com.	US Toll Free: 1-800-565-4008 US Toll: (908) 455-9922

HOW CAN I LEARN MORE?

- Ask the vaccination provider.
- Visit CDC at https://www.cdc.gov/coronavirus/2019-ncov/index.html.
- Visit FDA at https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization.

Contact your local or state public health department.

WHERE WILL MY VACCINATION INFORMATION BE RECORDED?

The vaccination provider may include your vaccination information in your state/local jurisdiction's Immunization Information System (IIS) or other designated system. For more information about IISs visit: https://www.cdc.gov/vaccines/programs/iis/about.html.

CAN I BE CHARGED AN ADMINISTRATION FEE FOR RECEIPT OF THE COVID-19 VACCINE?

No. At this time, the provider cannot charge you for a vaccine dose and you cannot be charged an out-of-pocket vaccine administration fee or any other fee if only receiving a COVID-19 vaccination. However, vaccination providers may seek appropriate reimbursement from a program or plan that covers COVID-19 vaccine administration fees for the vaccine recipient (private insurance, Medicare, Medicaid, HRSA COVID-19 Uninsured Program for non-insured recipients).

WHERE CAN I REPORT CASES OF SUSPECTED FRAUD?

Individuals becoming aware of any potential violations of the CDC COVID-19 Vaccination Program requirements are encouraged to report them to the Office of the Inspector General, U.S. Department of Health and Human Services, at 1-800-HHS-TIPS or TIPS.HHS.GOV.

WHAT IS THE COUNTERMEASURE INJURY COMPENSATION PROGRAM?

The Countermeasures Injury Compensation Program (CICP) is a federal program that may help pay for costs of medical care and other specific expenses for certain people who have been seriously injured by certain medicines or vaccines, including this vaccine. Generally, a claim must

be submitted to the CICP within one (1) year from the date of receiving the vaccine. To learn more about this program, visit www.hrsa.gov/cicp or call 1-855-266-2427.

WHAT IS AN EMERGENCY USE AUTHORIZATION (EUA)?

The United States FDA has made the Janssen COVID-19 Vaccine available under an emergency access mechanism called an EUA. The EUA is supported by a Secretary of Health and Human Services (HHS) declaration that circumstances exist to justify the emergency use of drugs and biological products during the COVID-19 pandemic.

The Janssen COVID-19 Vaccine has not undergone the same type of review as an FDA-approved or cleared product. FDA may issue an EUA when certain criteria are met, which includes that there are no adequate, approved, and available alternatives. In addition, the FDA decision is based on the totality of scientific evidence available showing that the product may be effective to prevent COVID-19 during the COVID-19 pandemic and that the known and potential benefits of the product outweigh the known and potential risks of the product. All of these criteria must be met to allow for the product to be used during the COVID-19 pandemic.

The EUA for the Janssen COVID-19 Vaccine is in effect for the duration of the COVID-19 declaration justifying emergency use of these products, unless terminated or revoked (after which the products may no longer be used).

Manufactured by:
Janssen Biotech, Inc.
a Janssen Pharmaceutical Company of Johnson & Johnson
Horsham, PA 19044, USA

janssen | PHARMACEUTICAL COMPANIES OF Johnson & Johnson

For more information, call US Toll Free: 1-800-565-4008, US Toll: (908) 455-9922 or go to www.janssencovid19vaccine.com

Revised: Aug/27/2021

Scan to capture that this Fact Sheet was provided to vaccine recipient for the electronic medical records/immunization information systems.

Barcode Date: 02/2021

Centers for Disease Control and Prevention

Pfizer-BioNTech COVID-19 Vaccine Reactions & Adverse Events

On This Page

Persons Aged ≥18 Years

Local Reactions

Among all study vaccine recipients asked to complete diaries of their symptoms during the 7 days after vaccination, 84.7% reported at least one local injection site reaction. By age group, 88.7% in the younger group (aged 18 to 55 years) and 79.7% in the older group (aged >55 years) reported at least one local reaction. Pain at the injection site was the most frequent and severe solicited local reaction among vaccine recipients. After dose 1, the younger age group reported pain more frequently than the older age group (83.1% vs 71.1%); a similar pattern was observed after dose 2 (77.8% vs 66.1%). Injection site redness and swelling following either dose were reported less frequently than injection site pain. Redness and swelling were slightly more common after dose 2. No grade 4 local reactions were reported. Overall, the median onset of local reactions in the vaccine group was 0 (day of vaccination) to 2 days after either dose and lasted a median duration between 1 and 2 days. Data on local reactions were not solicited from persons aged 16-17 years. However, their reactions to vaccination are expected to be similar to those of young adults who were included. In addition, reactogenicity data from adolescents aged 12-15 years were obtained and reviewed, and were similar to those from adults aged 18-55 years. This data is presented in Table 1 and Table 2 immediately below this paragraph.

Table 1. Local reactions in persons aged 18–55 years, Pfizer-BioNTech COVID-19 vaccine and placebo

	Dose 1		Dose 2	
	Pfizer-BioNTech Vaccine N=2291	Placebo N=2298	Pfizer-BioNTech Vaccine N=2098	Placebo N=2103
Redness[a], n (%)				
Any	104 (4.5)	26 (1.1)	123 (5.9)	14 (0.7)
Mild	70 (3.1)	16 (0.7)	73 (3.5)	8 (0.4)
Moderate	28 (1.2)	6 (0.3)	40 (1.9)	6 (0.3)
Severe	6 (0.3)	4 (0.2	10 (0.5)	0 (0)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Swelling[a], n (%)				
Any	132 (5.8)	11 (0.5)	132 (6.3)	5 (0.2)

	Dose 1		Dose 2	
	Pfizer-BioNTech Vaccine N=2291	Placebo N=2298	Pfizer-BioNTech Vaccine N=2098	Placebo N=2103
Mild	88 (3.8)	3 (0.1)	80 (3.8)	3 (0.1)
Moderate	39 (1.7)	5 (0.2)	45 (2.1)	2 (0.1)
Severe	5 (0.2)	3 (0.1)	7 (0.3)	0 (0)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Pain at the injection site[b], n (%)				
Any	1904 (83.1)	322 (14.0)	1632 (77.8)	245 (11.7)
Mild	1170 (51.1)	308 (13.4)	1039 (49.5)	225 (10.7)
Moderate	710 (31.0)	12 (0.5)	568 (27.1)	20 (1.0)
Severe	24 (1.0)	2 (0.1)	25 (1.2)	0 (0)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)

[a]Mild: >2.0 to 5.0 cm; moderate: >5.0 to 10.0 cm; severe: >10.0 cm; Grade 4: necrosis (redness and swelling categories) or exfoliative dermatitis (redness category only).

[b]Mild: does not interfere with activity; moderate: interferes with activity; severe: prevents daily activity; Grade 4: emergency room visit or hospitalization for severe pain at the injection site.

Table 2. Local reactions in persons aged >55 years, Pfizer-BioNTech COVID-19 vaccine and placebo

	Dose 1		Dose 2	
	Pfizer-BioNTech Vaccine N=1802	Placebo N=1792	Pfizer-BioNTech Vaccine N=1660	Placebo N=1646
Redness[a], n (%)				
Any	85 (4.7)	19 (1.1)	120 (7.2)	12 (0.7)
Mild	55 (3.1)	12 (0.7)	59 (3.6)	8 (0.5)
Moderate	27 (1.5)	5 (0.3)	53 (3.2)	3 (0.2)
Severe	3 (0.2)	2 (0.1)	8 (0.5)	1 (0.1)
Grade 4	0 (0.0)	0 (0)	0 (0)	0 (0)
Swelling[a], n (%)				
Any	118 (6.5)	21 (1.2)	124 (7.5)	11 (0.7)
Mild	71 (3.9)	10 (0.6)	68 (4.1)	5 (0.3)
Moderate	45 (2.5)	11 (0.6)	53 (3.2)	5 (0.3)
Severe	2 (0.1)	0 (0)	3 (0.2)	1 (0.1)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Pain at the injection site[b], n (%)				
Any	1282 (71.1)	166 (9.3)	1098 (66.1)	127 (7.7)
Mild	1008 (55.9)	160 (8.9)	792 (47.7)	127 (7.7)
Moderate	270 (15.0)	6 (0.3)	298 (18.0)	2 (0.1)
Severe	4 (0.2)	0 (0)	8 (0.5)	0 (0)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)

[a] Mild: >2.0 to 5.0 cm; moderate: >5.0 to 10.0 cm; severe: >10.0 cm; Grade 4: necrosis (redness and swelling categories) or exfoliative dermatitis (redness category only).

[b] Mild: does not interfere with activity; moderate: interferes with activity; severe: prevents daily activity; Grade 4: emergency room visit or hospitalization for severe pain at the injection site.

Systemic Reactions

Among all vaccine recipients asked to complete diaries of their symptoms during the 7 days after vaccination, 77.4% reported at least one systemic reaction. The frequency of systemic adverse events was higher in the younger than the older age group (82.8% vs 70.6%). Within each age group, the frequency and severity of systemic adverse events was higher after dose 2 than dose 1. Vomiting and diarrhea were exceptions, and similar between vaccine and placebo groups and regardless of dose. For both age groups, fatigue, headache and new or worsened muscle pain were most common. The majority of systemic events were mild or moderate in severity, after both doses and in both age groups. Fever was more common after the second dose and in the younger group (15.8%) compared to the older group (10.9%). Overall, the median onset of systemic adverse events in the vaccine group in general was 1 to 2 days after either dose and lasted a median duration of 1 day. Four grade 4 fevers (>40.0°C) were reported, two in the vaccine group and two in the placebo group. No other systemic grade 4 reactions were reported. Data on systemic reactions were not solicited from persons aged 16-17 years. However, their reactions to vaccination are expected to be similar to those of young adults who were included. In addition, reactogenicity data from adolescents aged 12-15 years were obtained and reviewed, and were similar to those from adults aged 18-55 years. This data is presented in Table 3 and Table 4 immediately below this paragraph.

Table 3. Systemic reactions in persons aged 18–55 years, Pfizer-BioNTech COVID-19 vaccine and placebo

	Dose 1		Dose 2	
	Pfizer-BioNTech Vaccine N=2291	Placebo N=2298	Pfizer-BioNTech Vaccine N=2098	Placebo N=2103
Fever, n (%)				
≥38.0°C	85 (3.7)	20 (0.9)	331 (15.8)	10 (0.5)
≥38.0°C to 38.4°C	64 (2.8)	10 (0.4)	194 (9.2)	5 (0.2)
>38.4°C to 38.9°C	15 (0.7)	5 (0.2)	110 (5.2)	3 (0.1)
>38.9°C to 40.0°C	6 (0.3)	3 (0.1)	26 (1.2)	2 (0.1)
>40.0°C	0 (0)	2 (0.1)	1 (0)	0 (0)
Fatigue[a], n (%)				
Any	1085 (47.4)	767 (33.4)	1247 (59.4)	479 (22.8)
Mild	597 (26.1)	467 (20.3)	442 (21.1)	248 (11.8)
Moderate	455 (19.9)	289 (12.6)	708 (33.7)	217 (10.3)
Severe	33 (1.4)	11 (0.5)	97 (4.6)	14 (0.7)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Headache[a], n (%)				
Any	959 (41.9)	775 (33.7)	1085 (51.7)	506 (24.1)
Mild	628 (27.4)	505 (22.0)	538 (25.6)	321)15.3)
Moderate	308 (13.4)	251 (10.9)	480 (22.9)	170 (8.1)
Severe	23 (1.0)	19 (0.8)	67 (3.2)	15 (0.7)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Chills[a], n (%)				
Any	321 (14.0)	146 (6.4)	737 (35.1)	79 (3.8)
Mild	230 (10.0)	111 (4.8)	359 (17.1)	65 (3.1)
Moderate	82 (3.6)	33 (1.4)	333 (15.9)	14 (0.7)
Severe	9 (0.4)	2 (0.1)	45 (2.1)	0 (0)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Vomiting[b], n (%)				
Any	28 (1.2)	28 (1.2)	40 (1.9)	25 (1.2)
Mild	24 (1.0)	22 (1.0)	28 (1.3)	16 (0.8)
Moderate	4 (0.2)	5 (0.2)	8 (0.4)	9 (0.4)
Severe	0 (0)	1 (0)	4 (0.2)	0 (0)

	Dose 1		Dose 2	
	Pfizer-BioNTech Vaccine N=2291	Placebo N=2298	Pfizer-BioNTech Vaccine N=2098	Placebo N=2103
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Diarrhea[c], n (%)				
Any	255 (11.1)	270 (11.7)	219 (10.4)	177 (8.4)
Mild	206 (9.0)	217 (9.4)	179 (8.5)	144 (6.8)
Moderate	46 (2.0)	52 (2.3)	36 (1.7)	32 (1.5)
Severe	3 (0.1)	1 (0)	4 (0.2)	1 (0)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
New or worsening muscle pain[a], n (%)				
Any	487 (21.3)	249 (10.8)	783 (37.3)	173 (8.2)
Mild	256 (11.2)	175 (7.6)	326 (15.5)	111 (5.3)
Moderate	218 (9.5)	72 (3.1)	410 (19.5)	59 (2.8)
Severe	13 (0.6)	2 (0.1)	47 (2.2)	3 (0.1)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
New or worsening joint pain[a], n (%)				
Any	251 (11.0)	138 (6.0)	459 (21.9)	109 (5.2)
Mild	147 (6.4)	95 (4.1)	205 (9.8)	54 (2.6)
Moderate	99 (4.3)	43 (1.9)	234 (11.2)	51 (2.4)
Severe	5 (0.2)	0 (0)	20 (1.0)	4 (0.2)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Use of antipyretic or pain medication	638 (27.8)	332 (14.4)	945 (45.0)	266 (12.6)

[a] Mild: does not interfere with activity; moderate: some interference with activity; severe: prevents daily activity; Grade 4: emergency room visit or hospitalization for severe fatigue, severe headache, severe muscle pain, or severe joint pain.

[b] Mild: 1 to 2 times in 24 hours; moderate: >2 times in 24 hours; severe: requires intravenous hydration; Grade 4: emergency room visit or hospitalization for severe vomiting.

[c]Mild: 2 to 3 loose stools in 24 hours; moderate: 4 to 5 loose stools in 24 hours; severe: 6 or more loose stools in 24 hours; Grade 4: emergency room visit or hospitalization for severe diarrhea.

Table 4. Systemic reactions in persons aged >55 years, Pfizer-BioNTech COVID-19 vaccine and placebo

	Dose 1		Dose 2	
	Pfizer-BioNTech Vaccine N=1802	Placebo N=1792	Pfizer-BioNTech Vaccine N=1660	Placebo N=1646
Fever				
≥38.0°C	26 (1.4)	7 (0.4)	181 (10.9)	4 (0.2)
≥38.0°C to 38.4°C	23 (1.3)	2 (0.1)	131 (7.9)	2 (0.1)
>38.4°C to 38.9°C	1 (0.1)	3 (0.2)	45 (2.7)	1 (0.1)
>38.9°C to 40.0°C	1 (0.1)	2 (0.1)	5 (0.3)	1 (0.1)
>40.0°C	1 (0.1)	0 (0)	0 (0)	0 (0)
Fatigue[a], n (%)				
Any	615 (34.1)	405 (22.6)	839 (50.5)	277 (16.8)
Mild	373 (20.7)	252 (14.1)	351 (21.1)	161 (9.8)
Moderate	240 (13.3)	150 (8.4)	442 (26.6)	114 (6.9)
Severe	2 (0.1)	3 (0.2)	46 (2.8)	2 (0.1)

	Dose 1		Dose 2	
	Pfizer-BioNTech Vaccine N=1802	Placebo N=1792	Pfizer-BioNTech Vaccine N=1660	Placebo N=1646
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Headache[a], n (%)				
Any	454 (25.2)	325 (18.1)	647 (39.0)	229 (13.9)
Mild	348 (19.3)	242 (13.5)	422 (25.4)	165 (10.0)
Moderate	104 (5.8)	80 (4.5)	216 (13.0)	60 (3.6)
Severe	2 (0.1)	3 (0.2)	9 (0.5)	4 (0.2)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Chills[a], n (%)				
Any	113 (6.3)	57 (3.2)	377 (22.7)	46 (2.8)
Mild	87 (4.8)	40 (2.2)	199 (12.0)	35 (2.1)
Moderate	26 (1.4)	16 (0.9)	161 (9.7)	11 (0.7)
Severe	0 (0)	1 (0.1)	17 (1.0)	0 (0)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Vomiting[b], n (%)				
Any	9 (0.5)	9 (0.5)	11 (0.7)	5 (0.3)
Mild	8 (0.4)	9 (0.5)	9 (0.5)	5 (0.3)
Moderate	1 (0.1)	0 (0)	1 (0.1)	0 (0)
Severe	3 (0.2)	0 (0)	1 (0.1)	0 (0)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Diarrhea[c], n (%)				
Any	147 (8.2)	118 (6.6)	137 (8.3)	99 (6.0)
Mild	118 (6.5)	100 (5.6)	114 (6.9)	73 (4.4)
Moderate	26 (1.4)	17 (0.9)	21 (1.3)	22 (1.3)
Severe	3 (0.2)	1 (0.1)	2 (0.1)	4 (0.2)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
New or worsening muscle pain[a], n (%)				
Any	251 (13.9)	149 (8.3)	477 (28.7)	87 (5.3)
Mild	168 (9.3)	100 (5.6)	202 (12.2)	57 (3.5)
Moderate	82 (4.6)	46 (2.6)	259 (15.6)	29 (1.8)
Severe	1 (0.1)	3 (0.2)	16 (1.0)	1 (0.1)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
New or worsening joint pain[a], n (%)				
Any	155 (8.6)	109 (6.1)	313 (18.9)	61 (3.7)
Mild	101 (5.6)	68 (3.8)	161 (9.7)	35 (2.1)
Moderate	52 (2.9)	40 (2.2)	145 (8.7)	25 (1.5)
Severe	2 (0.1)	1 (0.1)	7 (0.4)	1 (0.1)
Grade 4	0 (0)	0 (0)	0 (0)	0 (0)
Use of antipyretic or pain medication	358 (19.9)	213 (11.9)	625 (37.7)	161 (9.8)

[a] Mild: does not interfere with activity; moderate: some interference with activity; severe: prevents daily activity; Grade 4: emergency room visit or hospitalization for severe fatigue, severe headache, severe muscle pain, or severe joint pain.

[b] Mild: 1 to 2 times in 24 hours; moderate: >2 times in 24 hours; severe: requires intravenous hydration; Grade 4: emergency room visit or hospitalization for severe vomiting.

[c] Mild: 2 to 3 loose stools in 24 hours; moderate: 4 to 5 loose stools in 24 hours; severe: 6 or more loose stools in 24 hours; Grade 4: emergency room visit or hospitalization for severe diarrhea.

Unsolicited Adverse Events

Reports of lymphadenopathy were imbalanced with 58 more cases in the vaccine group (64) than the placebo group (6); lymphadenopathy is plausibly related to the vaccine. Lymphadenopathy occurred in the arm and neck region and was reported within 2 to 4 days after vaccination. The average duration of lymphadenopathy was approximately 10 days. Bell's palsy was reported by four vaccine recipients and none of the placebo recipients. The observed frequency of reported Bell's palsy in the vaccine group is consistent with the background rate in the general population, and there is no basis upon which to conclude a causal relationship.

Serious Adverse Events

Serious adverse events were defined as any untoward medical occurrence that resulted in death, was life-threatening, required inpatient hospitalization or prolongation of existing hospitalization, or resulted in persistent disability/incapacity. The proportions of participants who reported at least 1 serious adverse event were 0.6% in the vaccine group and 0.5% in the placebo group. The most common serious adverse events in the vaccine group which were numerically higher than in the placebo group were appendicitis (7 in vaccine vs 2 in placebo), acute myocardial infarction (3 vs 0), and cerebrovascular accident (3 vs 1). Cardiovascular serious adverse events were balanced between vaccine and placebo groups. Two serious adverse events were considered by U.S. Food and Drug Administration (FDA) as possibly related to vaccine: shoulder injury possibly related to vaccine administration or to the vaccine itself, and lymphadenopathy involving the axilla contralateral to the vaccine injection site. Otherwise, occurrence of severe adverse events involving system organ classes and specific preferred terms were balanced between vaccine and placebo groups.

Data source: FDA briefing document

Persons Aged 12 – 15 Years

Local Reactions

Among all study vaccine recipients aged 12–15 years, 90.9% reported at least one local injection site reaction in the 7 days after vaccination. Pain at the injection site was the most frequent and severe solicited local reaction among vaccine recipients and was slightly more common after dose 2. No grade 4 local reactions were reported. The median onset of local reactions in the vaccine group was 0 (day of vaccination) to 2 days after either dose and lasted a median duration between 1 and 3 days. This data is presented in Table 5 below.

Table 5. Local reactions in persons aged 12-15 years, Pfizer-BioNTech COVID-19 vaccine and placebo

	Dose 1 12-15 Years		Dose 2 12-15 Years	
	Pfizer-BioNTech Vaccine N=1127	Placebo N=1127	Pfizer-BioNTech Vaccine N=1097	Placebo N=1078
Redness[a], n (%)				
Any	65 (5.8)	12 (1.1)	55 (5.0)	10 (0.9)
Mild	44 (3.9)	11 (1.0)	29 (2.6)	8 (0.7)
Moderate	20 (1.8)	1 (0.1)	26 (2.4)	2 (0.2)
Severe	1 (0.1)	0	0	0
Grade 4	0	0	0	0
Swelling[a], n (%)				
Any	78 (6.9)	11 (1.0)	54 (4.9)	6 (0.6)
Mild	55 (4.9)	9 (0.8)	36 (3.3)	4 (0.4)
Moderate	23 (2.0)	2 (0.2)	18 (1.6)	2 (0.2)
Severe	0	0	0	0
Grade 4	0	0	0	0

	Dose 1 12-15 Years		Dose 2 12-15 Years	
	Pfizer-BioNTech Vaccine N=1127	Placebo N=1127	Pfizer-BioNTech Vaccine N=1097	Placebo N=1078
Pain at the injection site[b], n (%)				
Any	971 (86.2)	263 (23.3)	866 (78.9)	193 (17.9)
Mild	467 (41.4)	227 (20.1)	466 (42.5)	164 (15.2)
Moderate	493 (43.7)	36 (3.2)	393 (35.8)	29 (2.7)
Severe	11 (1.0)	0	7 (0.6)	0
Grade 4	0	0	0	0

[a]Mild: >2.0 to 5.0 cm; moderate: >5.0 to 10.0 cm; severe: >10.0 cm; Grade 4: necrosis (redness and swelling categories) or exfoliative dermatitis (redness category only).

[b]Mild: does not interfere with activity; moderate: interferes with activity; severe: prevents daily activity; Grade 4: emergency room visit or hospitalization for severe pain at the injection site.

Systemic Reactions

Among all vaccine recipients, 90.7% reported at least one systemic reaction in the 7 days after vaccination. The frequency and severity of systemic adverse events was higher after dose 2 than dose 1. Vomiting and diarrhea were exceptions, and similar between vaccine and placebo groups and regardless of dose. Fatigue, headache, chills, and new or worsened muscle pain were most common. The majority of systemic events were mild or moderate in severity, after both doses. Fever was more common after the second dose than after the first dose. Overall, the median onset of systemic adverse events in the vaccine group in general was 1 to 3 days after either dose and lasted a median duration of 1 to 2 days. One grade 4 fever (>40.0°C) was reported in the vaccine group. No other systemic grade 4 reactions were reported. This data is presented in Table 6 below.

Table 6. Systemic reactions in persons aged 12-15 years, Pfizer-BioNTech COVID-19 vaccine and placebo

	Dose 1		Dose 2	
	Pfizer-BioNTech Vaccine N=1127	Placebo N=1127	Pfizer-BioNTech Vaccine N=1097	Placebo N=1078
Fever, n (%)				
≥38.0°C	114 (10.1)	12 (1.1)	215 (19.6)	7 (0.6)
≥38.0°C to 38.4°C	74 (6.6)	8 (0.7)	107 (9.8)	5 (0.5)
>38.4°C to 38.9°C	29 (2.6)	2 (0.2)	83 (7.6)	1 (0.1)
>38.9°C to 40.0°C	10 (0.9)	2 (0.2)	25 (2.3)	1 (0.1)
>40.0°C	1 (0.1)	0	0	0
Fatigue[a], n (%)				
Any	677 (60.1)	457 (40.6)	726 (66.2)	264 (24.5)
Mild	278 (24.7)	250 (22.2)	232 (21.1)	133 (12.3)
Moderate	384 (34.1)	199 (17.7)	468 (42.7)	127 (11.8)
Severe	15 (1.3)	8 (0.7)	26 (2.4)	4 (0.4)
Grade 4	0	0	0	0
Headache[a], n (%)				
Any	623 (55.3)	396 (35.1)	708 (64.5)	263 (24.4)
Mild	361 (32.0)	256 (22.7)	302 (27.5)	169 (15.7)
Moderate	251 (22.3)	131 (11.6)	384 (35.0)	93 (8.6)
Severe	11 (1.0)	9 (0.8)	22 (2.0)	1 (0.1)
Grade 4	0	0	0	0

	Dose 1		Dose 2	
	Pfizer-BioNTech Vaccine N=1127	Placebo N=1127	Pfizer-BioNTech Vaccine N=1097	Placebo N=1078
Chills[a], n (%)				
Any	311 (27.6)	109 (9.7)	455 (41.5)	73 (6.8)
Mild	195 (17.3)	82 (7.3)	221 (20.1)	52 (4.8)
Moderate	111 (9.8)	25 (2.2)	214 (19.5)	21 (1.9)
Severe	5 (0.4)	2 (0.2)	20 (1.8)	0
Grade 4	0	0	0	0
Vomiting[b], n (%)				
Any	31 (2.8)	10 (0.9)	29 (2.6)	12 (1.1)
Mild	30 (2.7)	8 (0.7)	25 (2.3)	11 (1.0)
Moderate	0	2 (0.2)	4 (0.4)	1 (0.1)
Severe	1 (0.1)	0	0	0
Grade 4	0	0	0	0
Diarrhea[c], n (%)				
Any	90 (8.0)	82 (7.3)	65 (5.9)	43 (4.0)
Mild	77 (6.8)	72 (6.4)	59 (5.4)	38 (3.5)
Moderate	13 (1.2)	10 (0.9)	6 (0.5)	5 (0.5)
Severe	0	0	0	0
Grade 4	0	0	0	0
New or worsening muscle pain[a], n (%)				
Any	272 (24.1)	148 (13.1)	355 (32.4)	90 (8.3)
Mild	125 (11.1)	88 (7.8)	152 (13.9)	51 (4.7)
Moderate	145 (12.9)	60 (5.3)	197 (18.0)	37 (3.4)
Severe	2 (0.2)	0	6 (0.5)	2 (0.2)
Grade 4	0	0	0	0
New or worsening joint pain[a], n (%)				
Any	109 (9.7)	77 (6.8)	173 (15.8)	51 (4.7)
Mild	66 (5.9)	50 (4.4)	91 (8.3)	30 (2.8)
Moderate	42 (3.7)	27 (2.4)	78 (7.1)	21 (1.9)
Severe	1 (0.1)	0	4 (0.4)	0
Grade 4	0	0	0	0
Any systemic event	877 (77.8)	636 (56.4)	904 (82.4)	439 (40.7)
Use of antipyretic or pain medication, n (%)	413 (36.6)	111 (9.8)	557 (50.8)	95 (8.8)

[a] Mild: does not interfere with activity; moderate: some interference with activity; severe: prevents daily activity; Grade 4: emergency room visit or hospitalization for severe fatigue, severe headache, severe muscle pain, or severe joint pain.

[b] Mild: 1 to 2 times in 24 hours; moderate: >2 times in 24 hours; severe: requires intravenous hydration; Grade 4: emergency room visit or hospitalization for severe vomiting.

[c] Mild: 2 to 3 loose stools in 24 hours; moderate: 4 to 5 loose stools in 24 hours; severe: 6 or more loose stools in 24 hours; Grade 4: emergency room visit or hospitalization for severe diarrhea.

Unsolicited Adverse Events

Reports of lymphadenopathy were imbalanced with 6 more cases in the vaccine group (7) than the placebo group (1); lymphadenopathy is plausibly related to the vaccine. Lymphadenopathy occurred in the arm and neck region and was reported within 2 to 4 days after vaccination. Most cases of lymphadenopathy resolved in 10 days or less. No bell's palsy or anaphylaxis was reported among vaccine recipients in this age group.

Serious Adverse Events

The proportions of participants who reported at least 1 serious adverse event were 0.4% in the vaccine group and 0.2% in the placebo group. No serious adverse events were considered by FDA as possibly related to vaccine.

Data source: FDA Decision Memo

Page last reviewed: October 12, 2021

Centers for Disease Control and Prevention

The Moderna COVID-19 Vaccine's Local Reactions, Systemic Reactions, Adverse Events, and Serious Adverse Events

Local Reactions

Local reactions were reported by the majority of vaccine recipients and at higher rates than placebo recipients. Vaccine recipients reported higher rates of local reactions after dose 2 than dose 1. The frequency of local reactions was higher in the younger age group (aged 18 to 64 years) than the older age group (aged ≥65 years) (90.5% vs 83.9% after dose 2). Pain at the injection site was the most frequent and severe reported solicited local reaction among vaccine recipients. After dose 1, the younger age group reported pain more frequently than the older age group (86.9% vs 74.0%); a similar pattern was observed after dose 2 (90.1% vs 83.4%). Axillary swelling or tenderness was the second most frequently reported local reaction. Axillary swelling or tenderness was reported more frequently in the younger age group than the older age group (16.0% vs 8.4% after dose 2). Injection site redness and swelling following either dose were reported less frequently. Redness and swelling were slightly more common after dose 2. No grade 4 local reactions were reported. Overall, the median onset of local reactions in the vaccine group was 1 day after either dose, with a median duration between 2 and 3 days. (Table 1, Table 2)

Table 1. Local reactions in persons aged 18-64 years, Moderna COVID-19 vaccine and placebo

	Dose 1		Dose 2	
	Moderna Vaccine N=11401	Placebo N=11404	Moderna Vaccine N=10357	Placebo N=10317
Any Local, n (%)				
Any	9960 (87.4)	2432 (21.3)	9371 (90.5)	2134 (20.7)
Grade 3	452 (4.0)	39 (0.3)	766 (7.4)	41 (0.4)
Pain[a], n (%)				
Any	9908 (86.9)	2179 (19.1)	9335 (90.1)	1942 (18.8)
Grade 3	367 (3.2)	23 (0.2)	479 (4.6)	21 (0.2)
Redness[a], n (%)				
Any	345 (3.0)	46 (0.4)	928 (9.0)	42 (0.4)
Severe	34 (0.3)	11 (<0.1)	206 (2.0)	12 (0.1)
Swelling[b], n (%)				
Any	768 (6.7)	33 (0.3)	1309 (12.6)	35 (0.3)
Grade 3	62 (0.5)	3 (<0.1)	176 (1.7)	4 (<0.1)
Axillary Swelling/Tenderness[c], n (%)				
Any	1322 (11.6)	567 (5.0)	1654 (16.0)	444 (4.3)
Grade 3	36 (0.3)	13 (0.1)	45 (0.4)	10 (<0.1)

[a] Pain grade 3: any use of prescription pain reliever or prevented daily activity; grade 4: required emergency room visit or hospitalization.

[b] Swelling grade 3: >100mm/>10cm; grade 4: necrosis/exfoliative dermatitis.

[c] Axillary swelling or tenderness was collected as a solicited local adverse reaction (i.e., lymphadenopathy: localized axillary swelling or tenderness ipsilateral to the vaccination arm); grade 3: any use of prescription pain reliever or prevented daily activity; grade 4: required emergency room visit or hospitalization.

Note: No grade 4 local reactions were reported.

Table 2. Local reactions in persons aged ≥65 years, Moderna COVID-19 vaccine and placebo

	Dose 1		Dose 2	
	Moderna Vaccine N=3762	Placebo N=3746	Moderna Vaccine N=3587	Placebo N=3549
Any Local, n (%)				
Any	2805 (74.6)	566 (15.1)	3010 (83.9)	473 (13.3)
Grade 3	77 (2.0)	39 (1.0)	212 (5.9)	29 (0.8)
Pain[a], n (%)				
Any	2782 (74.0)	481(12.8)	2990 (83.4)	421 (11.9)
Grade 3	50 (1.3)	32 (0.9)	96 (2.7)	17 (0.5)
Redness[a], n (%)				
Any	86 (2.3)	19 (0.5)	265 (7.4)	13 (0.4)
Grade 3	8 (0.2)	2 (<0.1)	75 (2.1)	3 (<0.1)
Swelling[b], n (%)				
Any	166 (4.4)	19 (0.5)	386 (10.8)	13 (0.4)
Grade 3	20 (0.5)	3 (<0.1)	69 (1.9)	7 (0.2)
Axillary Swelling/Tenderness[c], n (%)				
Any	231 (6.1)	155 (4.1)	302 (8.4)	90 (2.5)
Grade 3	12 (0.3)	14 (0.4)	21 (0.6)	8 (0.2)

[a] Pain grade 3: any use of prescription pain reliever or prevented daily activity; grade 4: required emergency room visit or hospitalization.

[b] Swelling grade 3: >100mm/>10cm; grade 4: necrosis/exfoliative dermatitis.

[c] Axillary swelling or tenderness was collected as a solicited local adverse reaction (i.e. lymphadenopathy: localized axillary swelling or tenderness ipsilateral to the vaccination arm); grade 3: any use of prescription pain reliever or prevented daily activity; grade 4: required emergency room visit or hospitalization.

Note: No grade 4 local reactions were reported.

Systemic Reactions

Systemic reactions were reported by the majority of vaccine recipients and at higher rates than placebo recipients. The frequency of systemic reactions was higher in the younger age group than the older age group (81.9% vs 71.9% after dose 2). Within each age group, the frequency and severity of systemic reactions was higher after dose 2 than dose 1. For both age groups, fatigue, headache and myalgia were the most common. The majority of systemic reactions were mild or moderate in severity, after both doses and in both age groups. Fever was more common after the second dose and in the younger group (17.6%) compared to the older group (10.2%). Among vaccine recipients, the median onset of systemic reactions was 1 to 2 days after either dose, with a median duration of 2 days. Grade 4 fever (>40.0°C) was reported by four vaccine recipients after dose 1 and 11 vaccine recipients after dose 2. There was one report of grade 4 fatigue and one report of grade 4 arthralgia, both in the younger age group after dose 1. In the older age group, there was one report of grade 4 nausea or vomiting after dose 2. No other systemic grade 4 reactions were reported. (Table 3, Table 4)

Table 3. Systemic reactions in persons aged 18-64 years, Moderna COVID-19 vaccine and placebo

	Dose 1		Dose 2	
	Moderna Vaccine N=11405	Placebo N=11406	Moderna Vaccine N=10358	Placebo N=10320
Any systemic, n (%)				
Any	6503 (57.0)	5063 (44.4)	8484 (81.9)	3967 (38.4)
Grade 3	363 (3.2)	248 (2.2)	1801 (17.4)	215 (2.1)
Grade 4	5 (<0.1)	4 (<0.1)	10 (<0.1)	2 (<0.1)
Fever[a], n (%)				
Any	105 (0.9)	39 (0.3)	1806 (17.4)	38 (0.4)
Grade 3	10 (<0.1)	1 (<0.1)	168 (1.6)	1 (<0.1)
Grade 4	4 (<0.1)	4 (<0.1)	10 (<0.1)	1 (<0.1)
Headache[b], n (%)				
Any	4031(35.4)	3303 (29.0)	6500 (62.8)	2617 (25.4)
Grade 3	219 (1.9)	162 (1.4)	515 (5.0)	124 (1.2)
Fatigue[c], n (%)				
Any	4384 (38.5)	3282 (28.8)	7002 (67.6)	2530 (24.5)
Grade 3	120 (1.1)	83 (0.7)	1099 (10.6)	81 (0.8)
Grade 4	1 (<0.1)	0 (0)	0 (0)	0 (0)
Myalgia[c], n (%)				
Any	2698 (23.7)	1626 (14.3)	6353 (61.3)	1312 (12.7)
Grade 3	73 (0.6)	38 (0.3)	1032 (10.0)	39 (0.4)
Arthralgia[c], n (%)				
Any	1892 (16.6)	1327 (11.6)	4685 (45.2)	1087 (10.5)
Grade 3	47 (0.4)	29 (0.3)	603 (5.8)	36 (0.3)
Grade 4	1 (<0.1)	0 (0)	0 (0)	0 (0)
Nausea/Vomiting[d], n (%)				
Any	1069 (9.3)	908 (8.0)	2209 (21.3)	754 (7.3)
Grade 3	6 (<0.1)	8 (<0.1)	8 (<0.1)	8 (<0.1)
Chills[e], n (%)				
Any	1051 (9.2)	730 (6.4)	5001 (48.3)	611 (5.9)
Grade 3	17 (0.1)	8 (<0.1)	151 (1.5)	14 (0.1)

[a] Fever – Grade 3: ≥39.0 – ≤40.0°C or ≥102.1 – ≤104.0°F; Grade 4: >40.0°C or >104.0°F
[b] Headache – Grade 3: significant; any use of prescription pain reliever or prevented daily activity; Grade 4: required emergency room visit or hospitalization.
[c] Fatigue, Myalgia, Arthralgia – Grade 3: significant; prevented daily activity; Grade 4: required emergency room visit or hospitalization.
[d] Nausea/Vomiting – Grade 3: prevented daily activity, required outpatient intravenous hydration; Grade 4: required emergency room visit or hospitalization for hypotensive shock.
[e] Chills – Grade 3: prevented daily activity and required medical intervention; Grade 4: required emergency room visit or hospitalization.

Table 4. Systemic reactions in persons aged ≥65 years, Moderna COVID-19 vaccine and placebo

	Dose 1		Dose 2	
	Moderna Vaccine N=3761	Placebo N=3748	Moderna Vaccine N=3589	Placebo N=3549

	Dose 1		Dose 2	
	Moderna Vaccine N=3761	Placebo N=3748	Moderna Vaccine N=3589	Placebo N=3549
Any systemic, n (%)				
Any	1818 (48.3)	1335 (35.6)	2580 (71.9)	1102 (31.1)
Grade 3	84 (2.2)	63 (1.7)	387 (10.8)	58 (1.6)
Grade 4	0 (0)	0 (0)	2 (<0.1)	1 (<0.1)
Fever[a], n (%)				
Any	10 (0.3)	7 (0.2)	366 (10.2)	5 (0.1)
Grade 3	1 (<0.1)	1 (<0.1)	18 (0.5)	0 (0)
Grade 4	0 (0)	2 (<0.1)	1 (<0.1)	1 (<0.1)
Headache[b], n (%)				
Any	921 (33.3)	443 (11.8)	1665 (46.4)	635 (17.9)
Grade 3	30 (0.8)	34 (0.9)	107 (3.0)	32 (0.9)
Fatigue[c], n (%)				
Any	1251 (38.5)	851 (22.7)	2094 (58.4)	695 (19.6)
Grade 3	120 (1.1)	23 (0.6)	248 (6.9)	20 (0.6)
Myalgia[c], n (%)				
Any	743 (19.8)	443 (11.8)	1683 (46.9)	385 (10.8)
Grade 3	17 (0.5)	9 (0.3)	201 (5.6)	10 (0.3)
Arthralgia[c], n (%)				
Any	618 (16.4)	456 (12.2)	1252 (34.9)	381 (10.7)
Grade 3	13 (0.3)	8 (0.2)	122 (3.4)	7 (0.2)
Nausea/Vomiting[d], n (%)				
Any	194 (5.2)	166 (4.4)	425 (11.8)	129 (3.6)
Grade 3	4 (0.1)	4 (0.1)	10 (0.3)	3 (<0.1)
Grade 4	0 (0)	0 (0)	1 (<0.1)	0 (0)
Chills[e], n (%)				
Any	202 (5.4)	148 (4.0)	1099 (30.6)	144 (4.1)
Grade 3	7 (0.2)	6 (0.2)	27 (0.8)	2 (<0.1)

[a] Fever – Grade 3: ≥39.0 – ≤40.0°C or ≥102.1 – ≤104.0°F; Grade 4: >40.0°C or >104.0°F

[b] Headache – Grade 3: significant; any use of prescription pain reliever or prevented daily activity; Grade 4: requires emergency room visit or hospitalization.

[c] Fatigue, Myalgia, Arthralgia – Grade 3: significant; prevented daily activity; Grade 4: required emergency room visit or hospitalization.

[d] Nausea/Vomiting – Grade 3: prevented daily activity, required outpatient intravenous hydration; Grade 4: Requires emergency room visit or hospitalization for hypotensive shock.

[e] Chills – Grade 3: prevented daily activity and required medical intervention; Grade 4: required emergency room visit or hospitalization.

Unsolicited Adverse Events

A higher frequency of unsolicited adverse events was reported in the vaccine group compared to the placebo group and was primarily attributed to local and systemic reactogenicity following vaccination. Reports of lymphadenopathy were imbalanced with 1.1 % of persons in the vaccine group and 0.6% in the placebo group reporting such events; lymphadenopathy is plausibly related to the vaccine. Lymphadenopathy occurred in the arm and neck region and was reported within 2 to 4 days after vaccination. The median duration of lymphadenopathy was 1 to 2 days. Bell's palsy was reported by three vaccine recipients and one placebo recipient. One case of Bell's palsy in the vaccine group was considered a serious adverse event. Currently available information is insufficient to determine a causal relationship with the vaccine.

Serious Adverse Events

Serious adverse events were defined as any untoward medical occurrence that resulted in death, was life-threatening, required inpatient hospitalization or prolongation of existing hospitalization, or resulted in persistent disability or incapacity. The proportions of participants who reported at least one serious adverse event were 1% in the vaccine group and 1% in the placebo group. The most common serious adverse events occurring at higher rates in the vaccine group than the placebo group were myocardial infarction (5 cases in vaccine group vs. 3 cases in placebo group), cholecystitis (3 vs. 0), and nephrolithiasis (3 vs. 0). Three serious adverse events were considered by the U.S. Food and Drug Administration (FDA) as possibly related to vaccine: the one report of intractable nausea/vomiting and two reports of facial swelling in persons who had a previous history of cosmetic filler injections. The possibility that the vaccine contributed to the serious adverse event reports of rheumatoid arthritis (n=1), peripheral edema/dyspnea with exertion (n=1), and autonomic dysfunction (n=1) cannot be excluded.

Data source: FDA briefing document

Page last reviewed: August 9, 2021

Centers for Disease Control and Prevention

The Janssen COVID-19 Vaccine's Local Reactions, Systemic Reactions, Adverse Events, and Serious Adverse Events

Local Reactions

Local reactions were reported at higher rates by vaccine recipients than placebo recipients. The frequency of any local reaction was higher in participants aged 18 to 59 years than participants aged ≥60 years (59.8% vs 35.4%). Pain at the injection site was the most frequently reported solicited local reaction among vaccine recipients (58.6% of 18-59-year-olds and 33.3% ≥60-year-olds). Erythema and swelling were reported less frequently. No grade 4 local reactions were reported. Overall, the median onset of local reactions in the vaccine group was within two days of vaccination, with a median duration 2 days for erythema and pain and 3 days for swelling. (Table 1)

Table 1. Local reactions in persons aged 18-59 years and persons aged ≥60 years, Janssen COVID-19 vaccine and placebo[a]

	18-59 years		≥60 years	
	Janssen Vaccine N=2036	Placebo N=2049	Janssen Vaccine N=1320	Placebo N=1331
Any Local, n (%)				
Any	1218 (59.8)	413 (20.2)	467 (35.4)	244 (18.3)
Grade 3	18 (0.9)	4 (0.2)	5 (0.4)	2 (0.2)
Pain[b], n (%)				
Any	1193 (58.6)	357 (17.4)	439 (33.3)	207 (15.6)
Grade 3	8 (0.4)	0 (0.0)	3 (0.2)	2 (0.2)
Erythema[c], n (%)				
Any	184 (9.0)	89 (4.3)	61 (4.6)	42 (3.2)
Grade 3	6 (0.3)	2 (0.1)	1 (0.1)	0 (0.0)
Swelling[c], n (%)				
Any	142 (7.0)	32 (1.6)	36 (2.7)	21 (1.6)
Grade 3	5 (0.2)	2 (0.1)	2 (0.2)	0 (0.0)

[a] Solicited local and systemic adverse reactions collected for participants in a safety subset (N=6,736)

[b] Pain – Grade 3: any use of prescription pain reliever or prevented daily activity

[c] Erythema and Swelling – Grade 3: >100mm

Note: No grade 4 local reactions were reported.

Systemic Reactions

Systemic reactions were reported at higher rates by vaccine recipients than placebo recipients. The frequency of systemic reactions was higher in participants aged 18-59 years than participants ≥60 years (61.5% vs 45.3%). For both age groups, fatigue and headache were the most commonly reported systemic reactions. Fever was more common in participants 18-59

years (12.8%) compared to those ≥60 years (3.1%). The majority of systemic reactions were mild or moderate in severity. The most common grade 3 reactions were fatigue and myalgia. No grade 4 reactions were reported. Among vaccine recipients, the median onset of systemic reactions within 2 days of vaccination, with a median duration of 1-2 days. (Table 2)

Table 2. Systemic reactions in persons aged 18–59 years and persons aged ≥60 years, Janssen COVID-19 vaccine and placebo[a]

	18-59 years		≥60 years	
	Janssen Vaccine N=2036	Placebo N=2049	Janssen Vaccine N=1320	Placebo N=1331
Any systemic, n (%)				
Any	1252 (61.5)	745 (36.4)	598 (45.3)	440 (33.1)
Grade 3	47 (2.3)	12 (0.6)	14 (1.1)	9 (0.7)
Fatigue[b], n (%)				
Any	891 (43.8)	451 (22.0)	392 (29.7)	277 (20.8)
Grade 3	25 (1.2)	4 (0.2)	10 (0.8)	5 (0.4)
Headache[b], n (%)				
Any	905 (44.4)	508 (24.8)	401 (30.4)	294 (22.1)
Grade 3	18 (0.9)	5 (0.2)	5 (0.4)	4 (0.3)
Myalgia[b], n (%)				
Any	796 (39.1)	248 (12.1)	317 (24.0)	182 (13.7)
Grade 3	29 (1.4)	1 (<0.1)	3 (0.2)	5 (0.4)
Nausea[c], n (%)				
Any	315 (15.5)	183 (8.9)	162 (12.3)	144 (10.8)
Grade 3	3 (0.1)	3 (0.1)	3 (0.2)	3 (0.2)
Fever[d], n (%)				
Any	261 (12.8)	14 (0.7)	41 (3.1)	6 (0.5)
Grade 3	7 (0.3)	0 (0.0)	1 (0.1)	0 (0.0)

[a] Solicited local and systemic adverse reactions collected for participants in a safety subset (N=6,736)

[b] Fatigue, Headache, Myalgia – Grade 3: use of prescription pain reliever or prevented daily activity

[c] Nausea – Grade 3: prevented daily activity

[d] Fever – Grade 3: ≥39.0 – ≤40.0°C or ≥102.1 – ≤104.0°F

Note: No grade 4 systemic reactions were reported.

Analgesic/Antipyretics Use

Among vaccine recipients aged 18-59 years, 26.4% reported using antipyretic or analgesic medications, compared to 6.0% of placebo recipients. Among vaccine recipients aged ≥60 years, 9.8% reported using antipyretic or analgesic medications, compared to 5.1% of placebo recipients. The reason for medication use (e.g. fever, pain) was not ascertained.

Unsolicited Adverse Events

Overall, rates of reported unsolicited adverse events were similar in the vaccine and placebo groups (13.1% vs 12.0%). Reports of embolic and thrombotic events had a slight numerical imbalance with 0.06% of vaccine recipients and 0.05% of placebo recipients reporting such events. Risk factors for these events were present in the participants, however vaccine cannot be excluded as a contributing factor. Reports of tinnitus had a numerical imbalance with 6 events in vaccine recipients and no events in placebo recipients. Data are insufficient at this time to determine if there is a casual relationship between the

vaccine and tinnitus. Angioedema demonstrated a numerical imbalance with events reported among 0.2% of vaccine recipients and 0.1% of placebo recipients. Of these, urticaria was reported in 8 vaccine recipients and 3 placebo recipients. Based on temporal and biologic plausibility, reports of urticaria are possibly related to vaccine.

Serious Adverse Events

Serious adverse events were defined as any untoward medical occurrence that resulted in death, was life-threatening, required inpatient hospitalization or prolongation of existing hospitalization, or resulted in persistent disability or incapacity. The proportions of participants who reported at least one serious adverse event, excluding those attributed to COVID-19, were 0.4% in the vaccine group and 0.4% in the placebo group. The most common serious adverse event occurring at higher rates in the vaccine group than the placebo group was appendicitis (6 cases in vaccine group vs. 5 cases in placebo group). Three serious adverse events occurring among vaccine recipients were considered by the U.S. Food and Drug Administration (FDA) as likely related to vaccine: the one report of hypersensitivity reaction to study vaccine, one report of pain at the injection site initially evaluated for brachial neuritis, and one report of systemic reactogenicity.

Data source: FDA briefing document

Page last reviewed: August 12, 2021

gencer

COVID-19 | UPDATED APR. 1, 2021

CDC Data Suggests Vaccinated Don't Carry, Can't Spread Virus

By Paola Rosa-Aquino

The good news keeps coming. Photo: Grant Hindsley/AFP via Getty Images

After warning for months that vaccinated people should still be cautious in order to not infect others, the Centers for Disease Control and Prevention suggests they may not be at much risk of transmitting the coronavirus.

"Vaccinated people do not carry the virus — they don't get sick," Dr. Rochelle Walensky, director of the CDC, told MSNBC's Rachel Maddow on Tuesday. That's "not just in the clinical trials, but it's also in real-world data."

Walensky was referring to a new CDC study that suggests those fully inoculated with the vaccines produced by Moderna and Pfizer don't transmit the virus. Researchers looked at how the shots protected nearly 4,000 health-care workers, first responders, and other essential workers toiling in eight U.S. locations against the virus and more-contagious variants. Following a single dose of either vaccine, the participants' risk of infection was reduced by 80 percent, and that figure jumped to 90 percent after the second dose. Without infection, people are unable to spread the virus. The results are similar to what scientists saw in clinical trials for the vaccines, which found that two doses of either two-dose vaccine had an efficacy rate of around 95 percent.

The study is the agency's first to analyze how well the vaccines worked among working-age front-line adults, who are at a higher risk of being exposed to the virus and spreading it. "These findings should offer hope to the millions of Americans receiving COVID-19 vaccines each day and to those who will have the opportunity to roll up their sleeves and get vaccinated in the weeks ahead," Dr. Rochelle Walensky, director of the CDC, said in a statement. "The authorized vaccines are the key tool that will help bring an end to this devastating pandemic." Still, the CDC has not issued new guidance on how the vaccinated should behave; its current guidance is that they continue to take precautions such as masking.

Though the study is an impressive piece of evidence of the effectiveness of the Moderna and Pfizer vaccines, some public-health experts pushed back on Walensky's pandemic-changing takeaway. "There cannot be any daylight between what the research shows — really impressive but incomplete protection — and how it is described," Dr. Peter Bach, director of the Center for Health Policy and Outcomes at Memorial Sloan Kettering Cancer Center, told the New York *Times* on Thursday. "This opens the door to the skeptics who think the government is sugarcoating the science," Bach added, "and completely undermines any remaining argument why people should keep wearing masks after being vaccinated."

Even the Centers for Disease Control hedged on Walensky's claims. "Dr. Walensky spoke broadly during this interview," a CDC spokesperson told the *Times*. "It's possible that some people who are fully vaccinated could get Covid-19. The evidence isn't clear whether they can spread the virus to others. We are continuing to evaluate the evidence."

More than 142 million doses of the Moderna and Pfizer vaccines have been administered in the U.S. as of March 30, according to the CDC. The third vaccine currently on the American market is a single-dose shot made by Johnson & Johnson, which was shown to be 66 percent effective in thwarting moderate to severe COVID-19-related illness.

This post has been updated to reflect a statement from the CDC provided to the New York Times.

TAGS: COVID-19 COVID-19 VACCINES CDC

44 COMMENTS

Centers for Disease Control and Prevention

Statement from CDC Director Rochelle P. Walensky, MD, MPH on Today's MMWR

Media Statement

For Immediate Release: Friday, July 30, 2021
Contact: Media Relations
(404) 639-3286

On July 27th, CDC updated its guidance for fully vaccinated people, recommending that everyone wear a mask in indoor public settings in areas of substantial and high transmission, regardless of vaccination status. This decision was made with the data and science available to CDC at the time, including a valuable public health partnership resulting in rapid receipt and review of unpublished data.

Today, some of those data were published in CDC's *Morbidity and Mortality Weekly Report (MMWR)*, demonstrating that Delta infection resulted in similarly high SARS-CoV-2 viral loads in vaccinated and unvaccinated people. High viral loads suggest an increased risk of transmission and raised concern that, unlike with other variants, vaccinated people infected with Delta can transmit the virus. This finding is concerning and was a pivotal discovery leading to CDC's updated mask recommendation. The masking recommendation was updated to ensure the vaccinated public would not unknowingly transmit virus to others, including their unvaccinated or immunocompromised loved ones.

This outbreak investigation and the published report were a collaboration between the Commonwealth of Massachusetts Department of Public Health and CDC. I am grateful to the commonwealth for their collaboration and rigorous investigation. I would also like to humbly thank the residents of Barnstable County who leaned in to assist with the investigation through their swift participation in interviews by contact tracers, willingness to provide samples for testing, and adherence to safety protocols following notification of exposure.

This outbreak investigation is one of many CDC has been involved in across the country and data from those investigations will be rapidly shared with the public when available. The agency works every day to use the best available science and data to quickly and transparently inform the American public about threats to health.

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

CDC works 24/7 protecting America's health, safety and security. Whether disease start at home or abroad, are curable or preventable, chronic or acute, or from human activity or deliberate attack, CDC responds to America's most pressing health threats. CDC is headquartered in Atlanta and has experts located throughout the United States and the world.

Page last reviewed: July 30, 2021

AXIOS

Oct 22, 2021 - Health

CDC director: U.S. may change definition of "fully vaccinated" as boosters roll out

Oriana Gonzalez

CDC Director Rochelle Walensky. Photo: Greg Nash-Pool/Getty Images

Rochelle Walensky, director of the Centers for Disease Control and Prevention, said Friday the U.S. "may need

AXIOS

The big picture: The CDC and the FDA have officially approved boosters with every authorized vaccine in the U.S. for people who meet specific requirements. Walensky explained that since not everyone is eligible for a booster, the definition has not been changed "yet."

- Currently, the CDC's definition is the following: "Fully vaccinated persons are those who are ≥14 days post-completion of the primary series of an FDA-authorized COVID-19 vaccine."

What they're saying: "We have not yet changed the definition of 'fully vaccinated.' We will continue to look at this. We may need to update our definition of 'fully vaccinated' in the future," Walensky said during a press briefing.

- She also encouraged those eligible to get boosters: "If you're eligible for a booster, go ahead and get your booster," she said.

Go deeper

Yacob Reyes
Updated 22 hours ago - Politics & Policy

COVID-19 Vaccines and the Menstrual Cycle

Update: October 5, 2021

NICHD recently awarded five institutions one-year supplemental grants totaling $1.67 million to explore potential links between COVID-19 vaccination and menstrual changes. Researchers at Boston University, Harvard Medical School, Johns Hopkins University, Michigan State University, and Oregon Health and Science University will investigate whether such changes may be linked to the COVID-19 vaccine itself or if they are coincidental, the mechanism underlying any vaccine-related changes, and how long any changes last.

Several of these studies will use blood, tissue, and saliva samples collected before and after vaccination to analyze any immune or hormone changes. Other studies will use established resources — such as large cohort studies and menstrual cycle tracking apps — to collect and analyze data from racially, ethnically, and geographically diverse populations. Two studies will focus on specific populations, including adolescents and people with endometriosis.

People have reported menstrual cycle changes after COVID-19 vaccines, but more research is needed to understand if they are related, which women may be affected, and the exact mechanisms for why.

What you need to know

Increased stress, changes in weight and exercise, and other major lifestyle changes can affect menstrual cycles — and all of those changes are common during the COVID-19 pandemic. Additionally, studies have shown that some women who had COVID-19 experienced changes in the duration and flow of their menstrual cycles.

Some people have reported changes in their menstruation after receiving the COVID-19 vaccine, including changes in duration, flow, and accompanying symptoms such as pain.

What will researchers be doing?

To learn whether there is a connection between vaccination and changes in menstruation, the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) recently released a notice of special interest for researchers to compare the menstruation experiences of vaccinated and unvaccinated people. NICHD will support research focused on menstruation before and after vaccination and how vaccination as well as other factors, such as stress, might influence menstrual changes.

Why is this research important?

As more people are vaccinated for COVID-19, it is possible to gain better understanding of short- and long-term effects of the vaccines. Scientific evidence could also help unvaccinated people understand what, if any, menstruation-related side effects to expect from a COVID-19 vaccine.

Where can I go to learn more?

Notice of Special Interest (NOSI) to Encourage Administrative Supplement Applications to Investigate COVID-19 Vaccination and Menstruation

- NICHD calls on researchers to study the possible effects of the COVID-19 vaccine on menstruation.

Top

Menstruation and Menstrual Problems

- NICHD shares information about menstruation and menstrual cycle irregularities.

Sources

Li, K., Chen, G., Hou, H., Liao, Q., Chen, J., Bai, H., Lee, S., Wang, C., Li, H., Cheng, L., & Ai, J. (2021). Analysis of sex hormones and menstruation in COVID-19 women of child-bearing age. *Reproductive Biomedicine Online, 42*(1), 260–267. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7522626/

This article has been updated and edited for clarity.

News and Stories

Read stories about the efforts underway to prevent, detect, and treat COVID-19 and its effects on our health.

NIH COVID-19 Resources by Topic

COVID-19 research information and resources by topic from NIH institutes and centers

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Page last updated: October 5, 2021

For NIH Staff

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THE UNITED STATES DEPARTMENT of JUSTICE
JUSTICE NEWS

Department of Justice

Office of Public Affairs

FOR IMMEDIATE RELEASE Wednesday, September 2, 2009

Justice Department Announces Largest Health Care Fraud Settlement in Its History

Pfizer to Pay $2.3 Billion for Fraudulent Marketing

WASHINGTON – American pharmaceutical giant Pfizer Inc. and its subsidiary Pharmacia & Upjohn Company Inc. (hereinafter together "Pfizer") have agreed to pay $2.3 billion, the largest health care fraud settlement in the history of the Department of Justice, to resolve criminal and civil liability arising from the illegal promotion of certain pharmaceutical products, the Justice Department announced today.

Pharmacia & Upjohn Company has agreed to plead guilty to a felony violation of the Food, Drug and Cosmetic Act for misbranding Bextra with the intent to defraud or mislead. Bextra is an anti-inflammatory drug that Pfizer pulled from the market in 2005. Under the provisions of the Food, Drug and Cosmetic Act, a company must specify the intended uses of a product in its new drug application to FDA. Once approved, the drug may not be marketed or promoted for so-called "off-label" uses – *i.e.*, any use not specified in an application and approved by FDA. Pfizer promoted the sale of Bextra for several uses and dosages that the FDA specifically declined to approve due to safety concerns. The company will pay a criminal fine of $1.195 billion, the largest criminal fine ever imposed in the United States for any matter. Pharmacia & Upjohn will also forfeit $105 million, for a total criminal resolution of $1.3 billion.

In addition, Pfizer has agreed to pay $1 billion to resolve allegations under the civil False Claims Act that the company illegally promoted four drugs – Bextra; Geodon, an anti-psychotic drug; Zyvox, an antibiotic; and Lyrica, an anti-epileptic drug – and caused false claims to be submitted to government health care programs for uses that were not medically accepted indications and therefore not covered by those programs. The civil settlement also resolves allegations that Pfizer paid kickbacks to health care providers to induce them to prescribe these, as well as other, drugs. The federal share of the civil settlement is $668,514,830 and the state Medicaid share of the civil settlement is $331,485,170. This is the largest civil fraud settlement in history against a pharmaceutical company.

As part of the settlement, Pfizer also has agreed to enter into an expansive corporate integrity agreement with the Office of Inspector General of the Department of Health and Human Services. That agreement provides for procedures and reviews to be put in place to avoid and promptly detect conduct similar to that which gave rise to this matter.

Whistleblower lawsuits filed under the *qui tam* provisions of the False Claims Act that are pending in the District of Massachusetts, the Eastern District of Pennsylvania and the Eastern District of Kentucky triggered this investigation. As a part of today's resolution, six whistleblowers will receive payments totaling more than $102 million from the federal share of the civil recovery.

The U.S. Attorney's offices for the District of Massachusetts, the Eastern District of Pennsylvania, and the Eastern District of Kentucky, and the Civil Division of the Department of Justice handled these cases. The U.S. Attorney's Office for the District of Massachusetts led the criminal investigation of Bextra. The investigation was conducted by the Office of Inspector General for the Department of Health and Human Services (HHS), the FBI, the Defense Criminal Investigative Service (DCIS), the Office of Criminal Investigations for the Food and Drug Administration (FDA), the

Veterans' Administration's (VA) Office of Criminal Investigations, the Office of the Inspector General for the Office of Personnel Management (OPM), the Office of the Inspector General for the United States Postal Service (USPS), the National Association of Medicaid Fraud Control Units and the offices of various state Attorneys General.

"Today's landmark settlement is an example of the Department of Justice's ongoing and intensive efforts to protect the American public and recover funds for the federal treasury and the public from those who seek to earn a profit through fraud. It shows one of the many ways in which federal government, in partnership with its state and local allies, can help the American people at a time when budgets are tight and health care costs are increasing," said Associate Attorney General Tom Perrelli. "This settlement is a testament to the type of broad, coordinated effort among federal agencies and with our state and local partners that is at the core of the Department of Justice's approach to law enforcement."

"This historic settlement will return nearly $1 billion to Medicare, Medicaid, and other government insurance programs, securing their future for the Americans who depend on these programs,"said Kathleen Sebelius, Secretary of Department of Health and Human Services"The Department of Health and Human Services will continue to seek opportunities to work with its government partners to prosecute fraud wherever we can find it. But we will also look for new ways to prevent fraud before it happens. Health care is too important to let a single dollar go to waste."

"Illegal conduct and fraud by pharmaceutical companies puts the public health at risk, corrupts medical decisions by health care providers, and costs the government billions of dollars," said Tony West, Assistant Attorney General for the Civil Division. "This civil settlement and plea agreement by Pfizer represent yet another example of what penalties will be faced when a pharmaceutical company puts profits ahead of patient welfare."

"The size and seriousness of this resolution, including the huge criminal fine of $1.3 billion, reflect the seriousness and scope of Pfizer's crimes," said Mike Loucks, acting U.S. Attorney for the District of Massachusetts. "Pfizer violated the law over an extensive time period. Furthermore, at the very same time Pfizer was in our office negotiating and resolving the allegations of criminal conduct by its then newly acquired subsidiary, Warner-Lambert, Pfizer was itself in its other operations violating those very same laws. Today's enormous fine demonstrates that such blatant and continued disregard of the law will not be tolerated."

"Although these types of investigations are often long and complicated and require many resources to achieve positive results, the FBI will not be deterred from continuing to ensure that pharmaceutical companies conduct business in a lawful manner," said Kevin Perkins, FBI Assistant Director, Criminal Investigative Division.

"This resolution protects the FDA in its vital mission of ensuring that drugs are safe and effective. When manufacturers undermine the FDA's rules, they interfere with a doctor's judgment and can put patient health at risk," commented Michael L. Levy, U.S. Attorney for the Eastern District of Pennsylvania. "The public trusts companies to market their drugs for uses that FDA has approved, and trusts that doctors are using independent judgment. Federal health dollars should only be spent on treatment decisions untainted by misinformation from manufacturers concerned with the bottom line."

"This settlement demonstrates the ongoing efforts to pursue violations of the False Claims Act and recover taxpayer dollars for the Medicare and Medicaid programs," noted Jim Zerhusen, U.S. Attorney for the Eastern District of Kentucky.

"This historic settlement emphasizes the government's commitment to corporate and individual accountability and to transparency throughout the pharmaceutical industry," said Daniel R. Levinson, Inspector General of the United States Department of Health and Human Services. "The corporate integrity agreement requires senior Pfizer executives and board members to complete annual compliance certifications and opens Pfizer to more public scrutiny by requiring it to make detailed disclosures on its Web site. We expect this agreement to increase integrity in the marketing of pharmaceuticals."

"The off-label promotion of pharmaceutical drugs by Pfizer significantly impacted the integrity of TRICARE, the Department of Defense's healthcare system," said Sharon Woods, Director, Defense Criminal Investigative Service. "This illegal activity increases patients' costs, threatens their safety and negatively affects the delivery of healthcare services to the over nine million military members, retirees and their families who rely on this system. Today's charges and settlement demonstrate the ongoing commitment of the Defense Criminal Investigative Service and its law

enforcement partners to investigate and prosecute those that abuse the government's healthcare programs at the expense of the taxpayers and patients."

"Federal employees deserve health care providers and suppliers, including drug manufacturers, that meet the highest standards of ethical and professional behavior," said Patrick E. McFarland, Inspector General of the U.S. Office of Personnel Management. "Today's settlement reminds the pharmaceutical industry that it must observe those standards and reflects the commitment of federal law enforcement organizations to pursue improper and illegal conduct that places health care consumers at risk."

"Health care fraud has a significant financial impact on the Postal Service. This case alone impacted more than 10,000 postal employees on workers' compensation who were treated with these drugs," said Joseph Finn, Special Agent in Charge for the Postal Service's Office of Inspector General. "Last year the Postal Service paid more than $1 billion in workers' compensation benefits to postal employees injured on the job."

Component(s):
Civil Division

Press Release Number:
09-900

Updated September 15, 2014

Press Release

SEC Charges Pfizer with FCPA Violations

FOR IMMEDIATE RELEASE
2012-152

Washington, D.C., Aug. 7, 2012 — The Securities and Exchange Commission today charged Pfizer Inc. with violating the Foreign Corrupt Practices Act (FCPA) when its subsidiaries bribed doctors and other health care professionals employed by foreign governments in order to win business.

The SEC alleges that employees and agents of Pfizer's subsidiaries in Bulgaria, China, Croatia, Czech Republic, Italy, Kazakhstan, Russia, and Serbia made improper payments to foreign officials to obtain regulatory and formulary approvals, sales, and increased prescriptions for the company's pharmaceutical products. They tried to conceal the bribery by improperly recording the transactions in accounting records as legitimate expenses for promotional activities, marketing, training, travel and entertainment, clinical trials, freight, conferences, and advertising.

The SEC separately charged another pharmaceutical company that Pfizer acquired a few years ago – Wyeth LLC – with its own FCPA violations. Pfizer and Wyeth agreed to separate settlements in which they will pay more than $45 million combined to settle their respective charges. In a parallel action, the Department of Justice announced that Pfizer H.C.P. Corporation agreed to pay a $15 million penalty to resolve its investigation of FCPA violations.

"Pfizer subsidiaries in several countries had bribery so entwined in their sales culture that they offered points and bonus programs to improperly reward foreign officials who proved to be their best customers," said Kara Brockmeyer, Chief of the SEC Enforcement Division's Foreign Corrupt Practices Act Unit. "These charges illustrate the pitfalls that exist for companies that fail to appropriately monitor potential risks in their global operations."

According to the SEC's complaint against Pfizer filed in U.S. District Court for the District of Columbia, the misconduct dates back as far as 2001. Employees of Pfizer's subsidiaries authorized and made cash payments and provided other incentives to bribe government doctors to utilize Pfizer products. In China, for example, Pfizer employees invited "high-prescribing doctors" in the Chinese government to club-like meetings that included extensive recreational and entertainment activities to reward doctors' past product sales or prescriptions. Pfizer China also created various "point programs" under which government doctors could accumulate points based on the number of Pfizer prescriptions they wrote. The points were redeemed for various gifts ranging from medical books to cell phones, tea sets, and reading glasses. In Croatia, Pfizer employees created a "bonus program" for Croatian doctors who were employed in senior positions in Croatian government health care institutions. Once a doctor agreed to use Pfizer products, a percentage of the value purchased by a doctor's institution would be funneled back to the doctor in the form of cash, international travel, or free products.

According to the SEC's complaint, Pfizer made an initial voluntary disclosure of misconduct by its subsidiaries to the SEC and Department of Justice in October 2004, and fully cooperated with SEC investigators. Pfizer took such extensive remedial actions as undertaking a comprehensive worldwide review of its compliance program.

The SEC further alleges that Wyeth subsidiaries engaged in FCPA violations primarily before but also after the company's acquisition by Pfizer in late 2009. Starting at least in 2005, subsidiaries marketing Wyeth nutritional products in China, Indonesia, and Pakistan bribed government doctors to recommend their products to patients by making cash payments or in some cases providing BlackBerrys and cell phones or travel incentives. They often used fictitious invoices to conceal the true nature of the payments. In Saudi Arabia, Wyeth's subsidiary made an

improper cash payment to a customs official to secure the release of a shipment of promotional items used for marketing purposes. The promotional items were held in port because Wyeth Saudi Arabia had failed to secure a required Saudi Arabian Standards Organization Certificate of Conformity.

Following Pfizer's acquisition of Wyeth, Pfizer undertook a risk-based FCPA due diligence review of Wyeth's global operations and voluntarily reported the findings to the SEC staff. Pfizer diligently and promptly integrated Wyeth's legacy operations into its compliance program and cooperated fully with SEC investigators.

In settling the SEC's charges, Wyeth neither admitted nor denied the allegations. Pfizer consented to the entry of a final judgment ordering it to pay disgorgement of $16,032,676 in net profits and prejudgment interest of $10,307,268 for a total of $26,339,944. Wyeth also is required to report to the SEC on the status of its remediation and implementation of compliance measures over a two-year period, and is permanently enjoined from further violations of Sections 13(b)(2)(A) and 13(b)(2)(B) of the Securities Exchange Act of 1934. Wyeth consented to the entry of a final judgment ordering it to pay disgorgement of $17,217,831 in net profits and prejudgment interest of $1,658,793, for a total of $18,876,624. As a Pfizer subsidiary, the status of Wyeth's remediation and implementation of compliance measures will be subsumed in Pfizer's two-year self-reporting period. Wyeth also is permanently enjoined from further violations of Sections 13(b)(2)(A) and 13(b)(2)(B) of the Exchange Act. The settlements are subject to court approval.

The SEC's investigation was conducted by Michael Catoe and Charles Cain of the Enforcement Division's FCPA Unit. The SEC acknowledges the assistance of the U.S. Department of Justice's Criminal Division's Fraud Section and the Federal Bureau of Investigation in this matter.

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Related Materials

- SEC Complaint Against Pfizer
- SEC Complaint Against Wyeth
- More SEC FCPA Cases

THE UNITED STATES DEPARTMENT of JUSTICE
JUSTICE NEWS

Department of Justice

Office of Public Affairs

FOR IMMEDIATE RELEASE Friday, October 21, 2011

Pfizer to Pay $14.5 Million for Illegal Marketing of Drug Detrol

Settlement Involves False Claims Act Lawsuit Not Resolved at the Time of the Government's $2.3 Billion Dollar Settlement with Pfizer in 2009

WASHINGTON – American pharmaceutical company Pfizer Inc. has agreed to pay $14.5 million to resolve False Claims Act allegations related to its marketing of the drug Detrol, the Justice Department announced today. The settlement resolves the last of a group of 10 *qui tam*, or whistleblower, suits that were filed in the District of Massachusetts and two other districts, beginning in 2003. The other nine suits were settled or dismissed in 2009 as part of the government's global resolution with Pfizer, under which the company agreed to pay $2.3 billion dollars to resolve civil claims and criminal charges regarding multiple drugs.

The current settlement addresses allegations that Pfizer illegally marketed Detrol, a drug for the treatment of overactive bladder, for use in male patients suffering from benign prostatic hypertrophy and several allied conditions, notably lower urinary tract symptoms and bladder outlet obstruction – all uses for which the Food and Drug Administration (FDA) had not approved the drug as safe and effective. Under the terms of the settlement, the $14.5 million recovery will be divided between the United States and participating state Medicaid programs, with $11,878,846 going to the federal government and $2,621,154 going to state Medicaid programs. Under the *qui tam* provisions of the False Claims Act, whistleblowers will receive a $3,282,019 share of the federal recovery.

"Whistleblowers play an important role in protecting taxpayer funds from fraud and abuse," said Tony West, Assistant Attorney General of the Justice Department's Civil Division. "Settlements like this one help maintain the integrity of FDA's drug approval process and support important federal and state health care programs."

"The United States is pleased that Pfizer has agreed to resolve the last of the pending cases that were not settled as part of the 2009 resolution and plea," said Carmen Ortiz, U.S. Attorney for the District of Massachusetts. "We hope and expect that this is indicative of a commitment to move forward in compliance with the law, and we will continue to watch vigilantly to ensure that Pfizer complies with the law in its sales and marketing of drugs sold to the public."

The case is *U.S. ex rel. Wetherholt and Drimer v. Pfizer*, which the United States declined to intervene in and was independently litigated by the relators. The United States subsequently participated closely in efforts to resolve the case.

This settlement is part of the government's emphasis on combating health care fraud and another step for the Health Care Fraud Prevention and Enforcement Action Team (HEAT) initiative, which was announced by Attorney General Eric Holder and Kathleen Sebelius, Secretary of the Department of Health and Human Services in May 2009. The partnership between the two departments has focused efforts to reduce and prevent Medicare and Medicaid financial fraud through enhanced cooperation. One of the most powerful tools in that effort is the False Claims Act, which the Justice Department has used to recover more than $6.3 billion since January 2009 in cases involving fraud against federal health care programs. The Justice Department's total recoveries in False Claims Act cases since January 2009 exceed $8.1 billion.

Component(s):
Civil Division

Press Release Number:
11-1389

Updated September 15, 2014

PHARMACEUTICALS - DIVERSIFIED

MARCH 25, 2010 / 5:07 PM / UPDATED 12 YEARS AGO

US jury's Neurontin ruling to cost Pfizer $141 mln

By Reuters Staff

* Pfizer ordered to pay $47 million in Neurontin case

* Penalty triples under RICO law

* Pfizer to appeal decision

NEW YORK, March 25 (Reuters) - Pfizer Inc PFE.N violated federal racketeering law by improperly promoting the epilepsy drug Neurontin, a Boston jury found on Thursday, and the world's largest drugmaker was ordered to pay $47 million in damages.

Under federal RICO law (Racketeer Influenced and Corrupt Organizations act) the penalty is automatically tripled, so the finding will cost Pfizer $141 million.

Pfizer said it would appeal the decision.

The jury agreed with the plaintiffs, Kaiser Foundation Hospitals and Kaiser Foundation Health Plan, that Pfizer had illegally promoted the drug for unapproved uses, such as for migraine headaches, pain and bipolar disorder, for which plaintiffs attorneys argued the drug does not work.

promote them for uses approved by the U.S. Food and Drug Administration.

Kaiser was seeking about $100 million in damages and was awarded just under half of that, Pfizer said.

"We are disappointed with the verdict and will pursue post-trial motions and an appeal," Pfizer spokesman Chris Loder said in a statement. "The verdict and the judge's rulings are not consistent with the facts and the law."

In 2004, Pfizer agreed to pay $430 million to federal and state governments and pleaded guilty to criminal charges of illegally marketing Neurontin, a drug the company obtained with its 2000 acquisition of Warner Lambert Corp.

Pfizer contends that the judge improperly allowed details of that case and settlement to be considered by the Boston jury.

The drugmaker also said Kaiser doctors continue to prescribe Neurontin for the so-called off-label uses despite Kaiser attorney contentions that the medicine does not work for those unapproved indications.

"Kaiser itself continues to recommend Neurontin for the same uses they sought recovery for in this case. Kaiser's own physicians and several of their expert witnesses prescribed Neurontin for their patients based on their sound medical judgment," Loder said. (Reporting by Bill Berkrot)

Our Standards: The Thomson Reuters Trust Principles.

Pfizer to Pay $75 Million to Settle Nigerian Trovan Drug-Testing Suit

By Joe Stephens
Washington Post Staff Writer
Friday, July 31, 2009

Pfizer signed a $75 million agreement Thursday with Nigerian authorities to settle criminal and civil charges that the pharmaceutical company illegally tested an experimental drug on children during a 1996 meningitis epidemic.

Nigerian authorities say Pfizer's test of the antibiotic Trovan killed 11 children and disabled scores more. Pfizer says the deaths and injuries were the result of meningitis.

An attorney for the state of Kano, where the charges were lodged, said the settlement was a long time in coming but welcome because it set the record straight about Pfizer's culpability. "People and entities can and must be held accountable for the consequences of their conduct," the attorney, Babatunde Irukera, said. "People around the world are no different and must be accorded the same levels of protections, always."

Charges filed against Pfizer by Nigeria's federal government, which is seeking about $6 billion in damages, are unaffected by the settlement, Irukera said. Two lawsuits related to the Trovan experiment also remain pending in New York.

In a news release, Pfizer said that it "specifically denies" any wrongdoing or liability. The company said its researchers conducted the clinical trial of the antibiotic Trovan legally, with the approval of the Nigerian government and the consent of guardians of the children. The company said the settlement was the best way to "allow Pfizer and the Nigerian governments to focus on what matters -- improving healthcare for all Nigerians."

Under the agreement, the world's largest drug company agreed to pay $30 million over two years toward health-care initiatives chosen by the Kano state government. It will reimburse the state for $10 million in legal costs. And Pfizer agreed to create a fund that will pay up to $35 million toward "valid claims" for financial support submitted by patients who took part in the clinical trial. A panel appointed by Pfizer and Kano state will determine eligibility and levels of support.

In return, Kano officials agreed to drop civil and criminal actions against the company. Kano and the Nigerian federal government originally filed legal actions naming as defendants Pfizer and 10 individuals, including former Pfizer chief executive William C. Steere Jr. The actions sought $9 billion in restitution and damages and included 31 criminal counts, including homicide.

Details of the drug trial were first made public in December 2000 in a Washington Post investigative series. The articles reported that the trial did not conform to U.S. patient-protection standards and that the oral form of the drug used in the trial had not been previously tested in children. Pfizer had no signed consent forms for the children, the articles said, and the company relied on a falsified ethics approval letter.

Five years later, in May 2006, The Post obtained and published a confidential report that concluded that Pfizer violated Nigerian and international law in the experiment. That set in motion the criminal charges.

Trovan was never approved for use by children in the United States. The Food and Drug Administration approved it for adults in 1998 but later severely restricted its use after reports of liver failure. The European Union banned it in 1999.

THE UNITED STATES DEPARTMENT of JUSTICE
JUSTICE NEWS

Department of Justice

Office of Public Affairs

FOR IMMEDIATE RELEASE Monday, November 4, 2013

Johnson & Johnson to Pay More Than $2.2 Billion to Resolve Criminal and Civil Investigations

Allegations Include Off-label Marketing and Kickbacks to Doctors and Pharmacists

WASHINGTON - Global health care giant Johnson & Johnson (J&J) and its subsidiaries will pay more than $2.2 billion to resolve criminal and civil liability arising from allegations relating to the prescription drugs Risperdal, Invega and Natrecor, including promotion for uses not approved as safe and effective by the Food and Drug Administration (FDA) and payment of kickbacks to physicians and to the nation's largest long-term care pharmacy provider. The global resolution is one of the largest health care fraud settlements in U.S. history, including criminal fines and forfeiture totaling $485 million and civil settlements with the federal government and states totaling $1.72 billion.

"The conduct at issue in this case jeopardized the health and safety of patients and damaged the public trust," said Attorney General Eric Holder. "This multibillion-dollar resolution demonstrates the Justice Department's firm commitment to preventing and combating all forms of health care fraud. And it proves our determination to hold accountable any corporation that breaks the law and enriches its bottom line at the expense of the American people."

The resolution includes criminal fines and forfeiture for violations of the law and civil settlements based on the False Claims Act arising out of multiple investigations of the company and its subsidiaries.

"When companies put profit over patients' health and misuse taxpayer dollars, we demand accountability," said Associate Attorney General Tony West. "In addition to significant monetary sanctions, we will ensure that non-monetary measures are in place to facilitate change in corporate behavior and help ensure the playing field is level for all market participants."

In addition to imposing substantial monetary sanctions, the resolution will subject J&J to stringent requirements under a Corporate Integrity Agreement (CIA) with the Department of Health and Human Services Office of Inspector General (HHS-OIG). This agreement is designed to increase accountability and transparency and prevent future fraud and abuse.

"As patients and consumers, we have a right to rely upon the claims drug companies make about their products," said Assistant Attorney General for the Justice Department's Civil Division Stuart F. Delery. "And, as taxpayers, we have a right to ensure that federal health care dollars are spent appropriately. That is why this Administration has continued to pursue aggressively – with all of our available law enforcement tools -- those companies that corrupt our health care system."

J&J Subsidiary Janssen Pleads Guilty to Misbranding Antipsychotic Drug

In a criminal information filed today in the Eastern District of Pennsylvania, the government charged that, from March 3, 2002, through Dec. 31, 2003, Janssen Pharmaceuticals Inc., a J&J subsidiary, introduced the antipsychotic drug Risperdal into interstate commerce for an unapproved use, rendering the product misbranded. For most of this time period, Risperdal was approved only to treat schizophrenia. The information alleges that Janssen's sales representatives promoted Risperdal to physicians and other prescribers who treated elderly dementia patients by urging the prescribers to use Risperdal to treat symptoms such as anxiety, agitation, depression, hostility and confusion. The information alleges that the company created written sales aids for use by Janssen's ElderCare sales force that emphasized symptoms and minimized any mention of the FDA-approved use, treatment of schizophrenia. The company also provided incentives for off-label promotion and intended use by basing sales representatives' bonuses on total sales of Risperdal in their sales areas, not just sales for FDA-approved uses.

In a plea agreement resolving these charges, Janssen admitted that it promoted Risperdal to health care providers for treatment of psychotic symptoms and associated behavioral disturbances exhibited by elderly, non-schizophrenic dementia patients. Under the terms of the plea agreement, Janssen will pay a total of $400 million, including a criminal fine of $334 million and forfeiture of $66 million. Janssen's guilty plea will not be final until accepted by the U.S. District Court.

The Federal Food, Drug, and Cosmetic Act (FDCA) protects the health and safety of the public by ensuring, among other things, that drugs intended for use in humans are safe and effective for their intended uses and that the labeling of such drugs bear true, complete and accurate information. Under the FDCA, a pharmaceutical company must specify the intended uses of a drug in its new drug application to the FDA. Before approval, the FDA must determine that the drug is safe and effective for those specified uses. Once the drug is approved, if the company intends a different use and then introduces the drug into interstate commerce for that new, unapproved use, the drug becomes misbranded. The unapproved use is also known as an "off-label" use because it is not included in the drug's FDA-approved labeling.

"When pharmaceutical companies interfere with the FDA's mission of ensuring that drugs are safe and effective for the American public, they undermine the doctor-patient relationship and put the health and safety of patients at risk," said Director of the FDA's Office of Criminal Investigations John Roth. "Today's settlement demonstrates the government's continued focus on pharmaceutical companies that put profits ahead of the public's health. The FDA will continue to devote resources to criminal investigations targeting pharmaceutical companies that disregard the drug approval process and recklessly promote drugs for uses that have not been proven to be safe and effective."

J&J and Janssen Settle Civil Allegations of Targeting Vulnerable Patients with the Drugs Risperdal and Invega for Off-Label Uses

In a related civil complaint filed today in the Eastern District of Pennsylvania, the United States alleges that Janssen marketed Risperdal to control the behaviors and conduct of the nation's most vulnerable patients: elderly nursing home residents, children and individuals with mental disabilities. The government alleges that J&J and Janssen caused false claims to be submitted to federal health care programs by promoting Risperdal for off-label uses that federal health care programs did not cover, making false and misleading statements about the safety and efficacy of Risperdal and paying kickbacks to physicians to prescribe Risperdal.

"J&J's promotion of Risperdal for unapproved uses threatened the most vulnerable populations of our society – children, the elderly and those with developmental disabilities," said U.S. Attorney for the Eastern District of Pennsylvania Zane Memeger. "This historic settlement sends the message that drug manufacturers who place profits over patient care will face severe criminal and civil penalties."

In its complaint, the government alleges that the FDA repeatedly advised Janssen that marketing Risperdal as safe and effective for the elderly would be "misleading." The FDA cautioned Janssen that behavioral disturbances in elderly dementia patients were not necessarily manifestations of psychotic disorders and might even be "appropriate

responses to the deplorable conditions under which some demented patients are housed, thus raising an ethical question regarding the use of an antipsychotic medication for inappropriate behavioral control."

The complaint further alleges that J&J and Janssen were aware that Risperdal posed serious health risks for the elderly, including an increased risk of strokes, but that the companies downplayed these risks. For example, when a J&J study of Risperdal showed a significant risk of strokes and other adverse events in elderly dementia patients, the complaint alleges that Janssen combined the study data with other studies to make it appear that there was a lower overall risk of adverse events. A year after J&J had received the results of a second study confirming the increased safety risk for elderly patients taking Risperdal, but had not published the data, one physician who worked on the study cautioned Janssen that "[a]t this point, so long after [the study] has been completed … we must be concerned that this gives the strong appearance that Janssen is purposely withholding the findings."

The complaint also alleges that Janssen knew that patients taking Risperdal had an increased risk of developing diabetes, but nonetheless promoted Risperdal as "uncompromised by safety concerns (does not cause diabetes)." When Janssen received the initial results of studies indicating that Risperdal posed the same diabetes risk as other antipsychotics, the complaint alleges that the company retained outside consultants to re-analyze the study results and ultimately published articles stating that Risperdal was actually associated with a lower risk of developing diabetes.

The complaint alleges that, despite the FDA warnings and increased health risks, from 1999 through 2005, Janssen aggressively marketed Risperdal to control behavioral disturbances in dementia patients through an "ElderCare sales force" designed to target nursing homes and doctors who treated the elderly. In business plans, Janssen's goal was to "[m]aximize and grow RISPERDAL's market leadership in geriatrics and long term care." The company touted Risperdal as having "proven efficacy" and "an excellent safety and tolerability profile" in geriatric patients.

In addition to promoting Risperdal for elderly dementia patients, from 1999 through 2005, Janssen allegedly promoted the antipsychotic drug for use in children and individuals with mental disabilities. The complaint alleges that J&J and Janssen knew that Risperdal posed certain health risks to children, including the risk of elevated levels of prolactin, a hormone that can stimulate breast development and milk production. Nonetheless, one of Janssen's Key Base Business Goals was to grow and protect the drug's market share with child/adolescent patients. Janssen instructed its sales representatives to call on child psychiatrists, as well as mental health facilities that primarily treated children, and to market Risperdal as safe and effective for symptoms of various childhood disorders, such as attention deficit hyperactivity disorder, oppositional defiant disorder, obsessive-compulsive disorder and autism. Until late 2006, Risperdal was not approved for use in children for any purpose, and the FDA repeatedly warned the company against promoting it for use in children.

The government's complaint also contains allegations that Janssen paid speaker fees to doctors to influence them to write prescriptions for Risperdal. Sales representatives allegedly told these doctors that if they wanted to receive payments for speaking, they needed to increase their Risperdal prescriptions.

In addition to allegations relating to Risperdal, today's settlement also resolves allegations relating to Invega, a newer antipsychotic drug also sold by Janssen. Although Invega was approved only for the treatment of schizophrenia and schizoaffective disorder, the government alleges that, from 2006 through 2009, J&J and Janssen marketed the drug for off-label indications and made false and misleading statements about its safety and efficacy.

As part of the global resolution, J&J and Janssen have agreed to pay a total of $1.391 billion to resolve the false claims allegedly resulting from their off-label marketing and kickbacks for Risperdal and Invega. This total includes $1.273 billion to be paid as part of the resolution announced today, as well as $118 million that J&J and Janssen paid to the state of Texas in March 2012 to resolve similar allegations relating to Risperdal. Because Medicaid is a joint federal-state program, J&J's conduct caused losses to both the federal and state governments. The additional payment made by J&J as part of today's settlement will be shared between the federal and state governments, with the federal government recovering $749 million, and the states recovering $524 million. The federal government and Texas each received $59 million from the Texas settlement.

Kickbacks to Nursing Home Pharmacies

The civil settlement also resolves allegations that, in furtherance of their efforts to target elderly dementia patients in nursing homes, J&J and Janssen paid kickbacks to Omnicare Inc., the nation's largest pharmacy specializing in dispensing drugs to nursing home patients. In a complaint filed in the District of Massachusetts in January 2010, the United States alleged that J&J paid millions of dollars in kickbacks to Omnicare under the guise of market share rebate payments, data-purchase agreements, "grants" and "educational funding." These kickbacks were intended to induce Omnicare and its hundreds of consultant pharmacists to engage in "active intervention programs" to promote the use of Risperdal and other J&J drugs in nursing homes. Omnicare's consultant pharmacists regularly reviewed nursing home patients' medical charts and made recommendations to physicians on what drugs should be prescribed for those patients. Although consultant pharmacists purported to provide "independent" recommendations based on their clinical judgment, J&J viewed the pharmacists as an "extension of [J&J's] sales force."

J&J and Janssen have agreed to pay $149 million to resolve the government's contention that these kickbacks caused Omnicare to submit false claims to federal health care programs. The federal share of this settlement is $132 million, and the five participating states' total share is $17 million. In 2009, Omnicare paid $98 million to resolve its civil liability for claims that it accepted kickbacks from J&J and Janssen, along with certain other conduct.

"Consultant pharmacists can play an important role in protecting nursing home residents from the use of antipsychotic drugs as chemical restraints," said U.S. Attorney for the District of Massachusetts Carmen Ortiz. "This settlement is a reminder that the recommendations of consultant pharmacists should be based on their independent clinical judgment and should not be the product of money paid by drug companies."

Off-Label Promotion of the Heart Failure Drug Natrecor

The civil settlement announced today also resolves allegations that J&J and another of its subsidiaries, Scios Inc., caused false and fraudulent claims to be submitted to federal health care programs for the heart failure drug Natrecor. In August 2001, the FDA approved Natrecor to treat patients with acutely decompensated congestive heart failure who have shortness of breath at rest or with minimal activity. This approval was based on a study involving hospitalized patients experiencing severe heart failure who received infusions of Natrecor over an average 36-hour period.

In a civil complaint filed in 2009 in the Northern District of California, the government alleged that, shortly after Natrecor was approved, Scios launched an aggressive campaign to market the drug for scheduled, serial outpatient infusions for patients with less severe heart failure – a use not included in the FDA-approved label and not covered by federal health care programs. These infusions generally involved visits to an outpatient clinic or doctor's office for four- to six-hour infusions one or two times per week for several weeks or months.

The government's complaint alleged that Scios had no sound scientific evidence supporting the medical necessity of these outpatient infusions and misleadingly used a small pilot study to encourage the serial outpatient use of the drug. Among other things, Scios sponsored an extensive speaker program through which doctors were paid to tout the purported benefits of serial outpatient use of Natrecor. Scios also urged doctors and hospitals to set up outpatient clinics specifically to administer the serial outpatient infusions, in some cases providing funds to defray the costs of setting up the clinics, and supplied providers with extensive resources and support for billing Medicare for the outpatient infusions.

As part of today's resolution, J&J and Scios have agreed to pay the federal government $184 million to resolve their civil liability for the alleged false claims to federal health care programs resulting from their off-label marketing of Natrecor. In October 2011, Scios pleaded guilty to a misdemeanor FDCA violation and paid a criminal fine of $85 million for introducing Natrecor into interstate commerce for an off-label use.

"This case is an example of a drug company encouraging doctors to use a drug in a way that was unsupported by valid scientific evidence," said First Assistant U.S. Attorney for the Northern District of California Brian Stretch. "We are committed to ensuring that federal health care programs do not pay for such inappropriate uses, and that pharmaceutical companies market their drugs only for uses that have been proven safe and effective."

Non-Monetary Provisions of the Global Resolution and Corporate Integrity Agreement

In addition to the criminal and civil resolutions, J&J has executed a five-year Corporate Integrity Agreement (CIA) with the Department of Health and Human Services Office of Inspector General (HHS-OIG). The CIA includes provisions

requiring J&J to implement major changes to the way its pharmaceutical affiliates do business. Among other things, the CIA requires J&J to change its executive compensation program to permit the company to recoup annual bonuses and other long-term incentives from covered executives if they, or their subordinates, engage in significant misconduct. J&J may recoup monies from executives who are current employees and from those who have left the company. The CIA also requires J&J's pharmaceutical businesses to implement and maintain transparency regarding their research practices, publication policies and payments to physicians. On an annual basis, management employees, including senior executives and certain members of J&J's independent board of directors, must certify compliance with provisions of the CIA. J&J must submit detailed annual reports to HHS-OIG about its compliance program and its business operations.

"OIG will work aggressively with our law enforcement partners to hold companies accountable for marketing and promotion that violate laws intended to protect the public," said Inspector General of the U.S. Department of Health and Human Services Daniel R. Levinson. "Our compliance agreement with Johnson & Johnson increases individual accountability for board members, sales representatives, company executives and management. The agreement also contains strong monitoring and reporting provisions to help ensure that the public is protected from future unlawful and potentially harmful off-label marketing."

Coordinated Investigative Effort Spans Federal and State Law Enforcement

This resolution marks the culmination of an extensive, coordinated investigation by federal and state law enforcement partners that is the hallmark of the Health Care Fraud Prevention and Enforcement Action Team (HEAT) initiative, which fosters government collaborations to fight fraud. Announced in May 2009 by Attorney General Eric Holder and Health and Human Services Secretary Kathleen Sebelius, the HEAT initiative has focused efforts to reduce and prevent Medicare and Medicaid financial fraud through enhanced cooperation.

The criminal cases against Janssen and Scios were handled by the U.S. Attorney's Offices for the Eastern District of Pennsylvania and the Northern District of California and the Civil Division's Consumer Protection Branch. The civil settlements were handled by the U.S. Attorney's Offices for the Eastern District of Pennsylvania, the Northern District of California and the District of Massachusetts and the Civil Division's Commercial Litigation Branch. Assistance was provided by the HHS Office of Counsel to the Inspector General, Office of the General Counsel-CMS Division, the FDA's Office of Chief Counsel and the National Association of Medicaid Fraud Control Units.

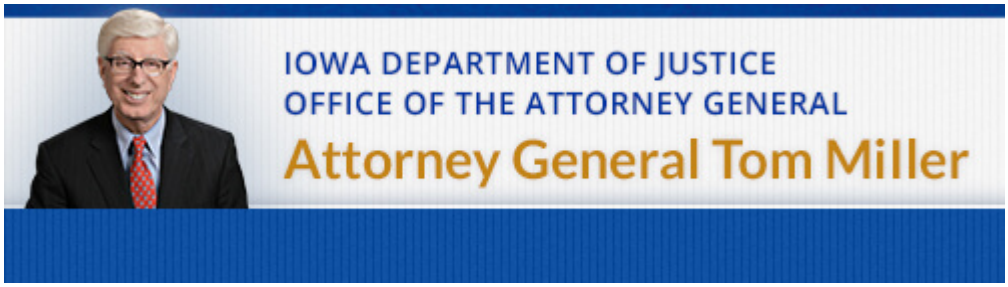
This matter was investigated by HHS-OIG, the Department of Defense's Defense Criminal Investigative Service, the FDA's Office of Criminal Investigations, the Office of Personnel Management's Office of Inspector General, the Department of Veterans Affairs, the Department of Labor, TRICARE Program Integrity, the U.S. Postal Inspection Service's Office of the Inspector General and the FBI.

One of the most powerful tools in the fight against Medicare and Medicaid financial fraud is the False Claims Act. Since January 2009, the Justice Department has recovered a total of more than $16.7 billion through False Claims Act cases, with more than $11.9 billion of that amount recovered in cases involving fraud against federal health care programs.

The department enforces the FDCA by prosecuting those who illegally distribute unapproved, misbranded and adulterated drugs and medical devices in violation of the Act. Since 2009, fines, penalties and forfeitures that have been imposed in connection with such FDCA violations have totaled more than $6 billion.

The civil settlements described above resolve multiple lawsuits filed under the qui tam, or whistleblower, provisions of the False Claims Act, which allow private citizens to bring civil actions on behalf of the government and to share in any recovery. From the federal government's share of the civil settlements announced today, the whistleblowers in the Eastern District of Pennsylvania will receive $112 million, the whistleblowers in the District of Massachusetts will receive $27.7 million and the whistleblower in the Northern District of California will receive $28 million. Except to the extent that J&J subsidiaries have pleaded guilty or agreed to plead guilty to the criminal charges discussed above, the claims settled by the civil settlements are allegations only, and there has been no determination of liability.
Court documents related to today's settlement can be viewed online at www.justice.gov/opa/jj-pc-docs.html.

Topic(s):
Consumer Protection



October 17, 2019

AGs reach $116.9 million settlement with Johnson & Johnson, Ethicon

Surgical mesh devices caused serious complications for women

DES MOINES — Iowa Attorney General Tom Miller announced a multistate settlement along with 40 states and the District of Columbia requiring Johnson & Johnson and its subsidiary Ethicon, Inc. to pay nearly $116.9 million for their deceptive marketing of transvaginal surgical mesh devices.

A multistate investigation found the companies violated state consumer protection laws by misrepresenting the safety and effectiveness of the devices and failing to sufficiently disclose risks associated with their use, according to a petition filed in Polk County District Court. Iowa will receive $1,884,129.41 under the settlement.

“For years, women have suffered debilitating symptoms and other serious problems after surgeons implanted these devices. The companies failed to adequately disclose the possible complications and risks,” Miller said.

Transvaginal surgical mesh is a synthetic material that is surgically implanted through the vagina to support the pelvic organs of women who suffer from stress urinary incontinence or pelvic organ prolapse.

The multistate investigation found the companies misrepresented or failed to adequately disclose the products’ possible adverse effects, including the risk of chronic pain and inflammation, mesh erosion through the vagina, incontinence developing after surgery, painful sexual relations, and vaginal scarring. Evidence shows the companies were aware of the possibility for serious medical complications but did not provide sufficient warnings to consumers or surgeons who implanted the devices.

Patients around the country have filed thousands of private lawsuits against Johnson & Johnson and other makers of transvaginal mesh. Many of the lawsuits have been consolidated into a multi-district litigation in the U.S. District Court in the Southern District of West Virginia.

Under the settlement, Johnson & Johnson has agreed to pay $116.86 million to the 41 participating states and District of Columbia. The settlement also provides injunctive relief, requiring full disclosure of the device's risks and accurate information on promotional material, in addition to the product's "information for use" package inserts.

According to the consent judgment, the companies must:

- Refrain from referring to the mesh as "FDA approved" when that is not the case;
- Refrain from representing in promotions that risks associated with mesh can be eliminated with surgical experience or technique alone;
- Ensure that product training provided to medical professionals covers the risks associated with the mesh;
- Omit claims that surgical mesh stretches after implantation, that it remains soft after implantation, that foreign body reactions are transient and that foreign body reactions "may" occur (when in fact they will occur);
- Disclose that mesh risks include: fistula formation, inflammation, as well as mesh extrusion, exposure and erosion into the vagina and other organs;
- Disclose risks of tissue contraction, pain with intercourse, loss of sexual function, urge incontinence, de novo incontinence, infection following transvaginal implantation and vaginal scarring;
- Disclose that risks include that revision surgeries may be necessary to treat complications, that revision surgeries may not resolve complications and that revision surgeries are also associated with a risk of adverse reactions.

Joining Iowa in this multistate settlement are Alabama, Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, and Wisconsin.

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THE UNITED STATES DEPARTMENT of JUSTICE
JUSTICE NEWS

Department of Justice

Office of Public Affairs

FOR IMMEDIATE RELEASE Friday, April 8, 2011

Johnson & Johnson Agrees to Pay $21.4 Million Criminal Penalty to Resolve Foreign Corrupt Practices Act and Oil for Food Investigations

Company to Pay Total Penalties of $70 Million in Resolutions with Justice Department and U.S. Securities and Exchange Commission (SEC)

WASHINGTON – Johnson & Johnson (J&J) has agreed to pay a $21.4 million criminal penalty as part of a deferred prosecution agreement with the Department of Justice to resolve improper payments by J&J subsidiaries to government officials in Greece, Poland and Romania in violation of the Foreign Corrupt Practices Act (FCPA), the Justice Department's Criminal Division announced today. The agreement also resolves kickbacks paid to the former government of Iraq under the United Nations Oil for Food Program.

J&J is headquartered in New Brunswick, N.J., and is listed on the New York Stock Exchange. The company manufactures and sells medical devices, pharmaceuticals and consumer health care products.

"Today, Johnson & Johnson has admitted that its subsidiaries, employees and agents paid bribes to publicly-employed health care providers in Greece, Poland and Romania, and that kickbacks were paid on behalf of Johnson & Johnson subsidiary companies to the former government of Iraq under the United Nations Oil for Food program," said Principal Deputy Assistant Attorney General Mythili Raman of the Justice Department's Criminal Division." "Johnson & Johnson, however, has also cooperated extensively with the government and, as a result, has played an important role in identifying improper practices in the life sciences industry. As today's agreement reflects, we are committed to holding corporations accountable for bribing foreign officials while, at the same time, giving meaningful credit to companies that self-report and cooperate with our investigations."

According to the agreement, J&J has acknowledged responsibility for the actions of its subsidiaries, employees and agents who made various improper payments to publicly-employed health care providers in Greece, Poland and Romania in order to induce the purchase of medical devices and pharmaceuticals manufactured by J&J subsidiaries. J&J also acknowledged that kickbacks were paid on behalf of J&J subsidiary companies to the former government of Iraq under the United Nations Oil for Food Program in order to secure contracts to provide humanitarian supplies. A criminal information, filed in U.S. District Court in the District of Columbia in connection with the deferred prosecution agreement, charges J&J subsidiary DePuy Inc. with conspiracy and violations of the FCPA in connection with the payments to public physicians in Greece.

The agreement recognizes J&J's timely voluntary disclosure, and thorough and wide-reaching self-investigation of the underlying conduct; the extraordinary cooperation provided by the company to the department, the SEC and multiple foreign enforcement authorities, including significant assistance in the industry-wide investigation; and the extensive remedial efforts and compliance improvements undertaken by the company. In addition, J&J received a reduction in its criminal fine as a result of its cooperation in the ongoing investigation of other companies and individuals, as outlined in the U.S. Sentencing Guidelines. J&J's fine was also reduced in light of its anticipated resolution in the United Kingdom. Due to J&J's pre-existing compliance and ethics programs, extensive remediation, and improvement of its compliance systems and internal controls, as well as the enhanced compliance undertakings included in the agreement, J&J was not required to retain a corporate monitor, but it must report to the department on implementation of its remediation and enhanced compliance efforts every six months for the duration of the agreement.

In a related matter, J&J reached a settlement today with the SEC under which it agreed to pay more than $48.6 million in disgorgement of profits, including pre-judgment interest.

This case is being prosecuted by Trial Attorney Kathleen M Hamann of the Criminal Division's Fraud Section with assistance from the FBI's Washington Field Office's dedicated FCPA squad. The Criminal Division's Office of International Affairs provided assistance in this matter.

The Justice Department acknowledges and expresses its appreciation for the significant assistance provided by the authorities of the 8th Ordinary Interrogation Department of the Athens Court of First Instance and the Athens Economic Crime Squad in Greece; the 5th Investigation Department of the Regional Prosecutor's Office in Radom, Poland; the Fraud Squad of the West Yorkshire Police Department in the United Kingdom; and the SEC's Division of Enforcement, as well as the coordination and cooperation with the authorities of the United Kingdom's Serious Fraud Office.

Component(s):
Criminal Division

Press Release Number:
11-446

Updated September 15, 2014

THE UNITED STATES DEPARTMENT of JUSTICE
JUSTICE NEWS

Department of Justice

Office of Public Affairs

FOR IMMEDIATE RELEASE Tuesday, March 10, 2015

McNeil-PPC Inc. Pleads Guilty in Connection with Adulterated Infants' and Children's Over-the-Counter Liquid Drugs

McNeil-PPC Inc. entered a guilty plea in Federal District Court in Philadelphia today to one count of an information charging the company with delivering for introduction into interstate commerce adulterated infants' and children's over-the-counter (OTC) liquid medicines, the Department of Justice announced today. As part of the criminal resolution, McNeil, a wholly owned subsidiary of Johnson & Johnson, agreed to pay a criminal fine of $20 million and forfeit $5 million.

Acting Assistant Attorney General Benjamin C. Mizer of the Justice Department's Civil Division and First Assistant U.S. Attorney Louis D. Lappen of the Eastern District of Pennsylvania today announced the filing of a criminal Information against McNeil for delivering for introduction into interstate commerce infants' and children's liquid OTC drugs that were adulterated. According to the criminal charge, the infants' and children's liquid medicines were adulterated because they were not manufactured, processed, packed or held in conformance with current Good Manufacturing Practices (cGMP), in violation of the federal Food, Drug and Cosmetic Act (FDCA).

The U.S. District Court for the Eastern District of Pennsylvania accepted McNeil's guilty plea.

In addition to McNeil's guilty plea, McNeil remains subject to a permanent injunction entered by the U.S. District Court in 2011, requiring the company, among other things, to make remedial measures before reopening its manufacturing facility in Fort Washington, Pennsylvania.

"McNeil's failure to comply with current good manufacturing practices is seriously troubling," said Acting Assistant Attorney General Mizer. "The Department of Justice will continue to be aggressive in pursuing and punishing companies such as McNeil that disregard a process designed to assure quality medicines, especially OTC drugs for infants and children."

"The law requires that drugs be produced under the most rigorous of quality standards," said First Assistant U.S. Attorney Lappen. "When companies fail to exercise the vigilance that the law demands, they will held be accountable. Drug companies should be aware that failing to adhere to good manufacturing practices subjects them to penalties and prosecution."

According to the information, the OTC liquid drugs manufactured by McNeil at its Fort Washington facility, including Infants' and Children's Tylenol and Infants' and Children's Motrin, were bottled on four lines of machinery dedicated to liquid formulations. As alleged in the information, on or about May 1, 2009, McNeil received a complaint from a consumer regarding the presence of "black specks in the liquid on the bottom of the bottle" of Infants' Tylenol. According to the information, the foreign material was later identified as including nickel/chromium-rich inclusions, which were not intended ingredients in this OTC liquid drug. In connection with receiving this consumer complaint, McNeil did not initiate or complete a Corrective Action Preventive Action (CAPA) plan, as alleged in the charging document.

The information alleges numerous other instances in which McNeil found metal particles in bottles of Infants' Tylenol at its Fort Washington facility but failed to initiate or complete a CAPA. According to the information, during a 2010

Inspection of McNeil's Fort Washington facility, the U.S. Food and Drug Administration (FDA) asked McNeil for a list with all non-conformances for particles and the associated OTC drug batches that had occurred since an FDA inspection in 2009. As noted in the information, this document revealed 30 batches of OTC liquid drugs, including Infants' Tylenol, Children's Tylenol, and Children's Motrin. During the 2010 inspection, the FDA asked McNeil for the CAPA plan covering the particles and foreign material found in the Infants' and Children's OTC drugs, and a McNeil employee confirmed that McNeil did not have such a CAPA plan.

On or about April 30, 2010, McNeil Consumer Health Care, a division of McNeil, in consultation with the FDA, announced that the company was recalling all lots of certain unexpired Infants' and Children's OTC drugs manufactured at McNeil's Fort Washington facility and distributed in the United States and other countries around the world. McNeil's recall included, but was not limited to, Infants' and Children's Tylenol and Infants' and Children's Motrin. According to a press release issued by McNeil on April 30, 2010, some of the recalled OTC drugs "may contain tiny particles."

The FDCA prohibits causing the introduction or delivery for introduction into interstate commerce of any adulterated drug. Under the law, a drug is adulterated if the methods used in, or the facilities and controls used for, the manufacture, processing, packing, labeling, holding and distribution of drugs and components were not in conformance with cGMP requirements for drugs. Drugs not manufactured, processed, packed, labeled, held and distributed in conformance with cGMP requirements are adulterated as a matter of federal law, without any showing of actual defect.

"Drug quality – and especially with the medicines we give our children – is of paramount concern to the FDA," said Commissioner Margaret A. Hamburg M.D. of the FDA. "The FDA expects manufacturers to have systems in place that will quickly discover and correct problems with medical products before they enter the U.S. marketplace. Today's guilty plea holds accountable those corporations who risk jeopardizing the public health by not adhering to the high standards set for drug manufacturers."

Acting Assistant Attorney General Mizer and First Assistant U.S. Attorney Lappen commended the investigative efforts of the FDA's Office of Criminal Investigations. The government is represented in this case by Assistant Director Jeffrey Steger and Trial Attorney Kathryn Drenning of the Civil Division's Consumer Protection Branch and Assistant U.S. Attorney Mary Beth Leahy of the Eastern District of Pennsylvania, with the assistance of Associate Chief Counsel for Enforcement Laura Pawloski of the Department of Health and Human Services' Office of General Counsel's Food and Drug Division.

Attachment(s):
Download mcneil_information.pdf
Download united_states_plea_and_sentencing_memorandum_with_plea_agreement.pdf

Topic(s):
Consumer Protection

Component(s):
Civil Division

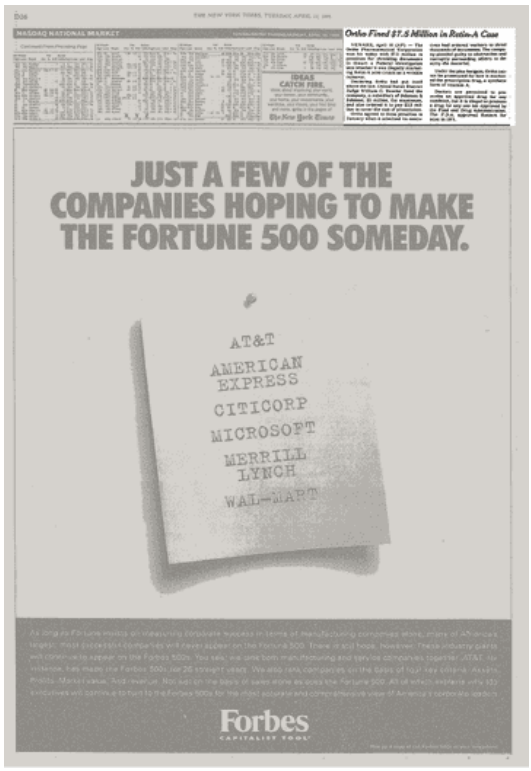
Press Release Number:
15-289

Updated March 10, 2015

The New York Times
https://www.nytimes.com/1995/04/11/business/ortho-fined-7.5-million-in-retin-a-case.html

Ortho Fined $7.5 Million in Retin-A Case

By The Associated Press
April 11, 1995



About the Archive

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Occasionally the digitization process introduces transcription errors or other problems; we are continuing to work to improve these archived versions.

The Ortho Pharmaceutical Corporation was hit today with $7.5 million in penalties for shredding documents to thwart a Federal investigation into whether it was illegally marketing Retin-A acne cream as a wrinkle remover.

Declaring Ortho had put itself above the law, United States District Judge William G. Bassler fined the company, a subsidiary of Johnson & Johnson, $5 million, the maximum, and also ordered it to pay $2.5 million to cover the cost of prosecution.

Ortho agreed to those penalties in January when it admitted its executives had ordered workers to shred thousands of documents. The company pleaded guilty to obstruction and corruptly persuading others to destroy the material.

Under the plea bargain, Ortho cannot be prosecuted for how it marketed the prescription drug, a synthetic form of vitamin A.

Doctors are permitted to prescribe an approved drug for any condition, but it is illegal to promote a drug for any use not approved by the Food and Drug Administration. The F.D.A. approved Retin-A for acne in 1971.

A version of this article appears in print on , Section D, Page 26 of the National edition with the headline: Ortho Fined $7.5 Million in Retin-A Case

United States Senate
Committee on Finance

Sen. Chuck Grassley · Iowa
Ranking Member

http://finance.senate.gov
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Statement of U.S. Senator Chuck Grassley of Iowa
The Adequacy of FDA Efforts to Assure the Safety of the Drug Supply
Subcommittee on Oversight and Investigations
House of Representatives Committee on Energy and Commerce
Tuesday, February 13, 2007

Chairman Dingell, Chairman Stupak, Ranking Members Barton and Whitfield and distinguished colleagues, thank you for holding this important hearing on drug safety and the Food and Drug Administration. Thank you also for inviting me to speak today on this important subject.

During the last three years, I conducted extensive oversight of the Food and Drug Administration while I was Chairman of the Senate Finance Committee, which is responsible for Medicare and Medicaid. I view my role as working to ensure the safety and well-being of the more than 80 million Americans who are beneficiaries of these programs. The Medicare and Medicaid programs spend a lot of money on prescription drugs and medical devices, and that money should be spent on drugs and devices that are safe and effective.

In the course of my oversight of the federal bureaucracy, I have developed many good relationships with whistleblowers. And it was FDA whistleblowers and concerned FDA scientists who first drew my attention to problems at the Food and Drug Administration.

It started in early 2004 with an FDA psychiatrist named Dr. Andrew Mosholder, who realized through his work that there was a serious suicide risk for teenagers taking certain antidepressants. He wanted to make a presentation about his findings to an FDA advisory committee. But for some reason, FDA supervisors didn't want this information to get out. They canceled Dr. Mosholder's presentation and instructed him to write a script approved by his supervisors that he would use if anybody asked him why he was no longer presenting.

That fall, I held a hearing on drug safety in the aftermath of Vioxx - the blockbuster pain medication - being pulled from the market by its manufacturer, rather than the Food and Drug Administration. The testimony at my hearing turned a bright spotlight on problems with the FDA's postmarket surveillance effort. The FDA works tirelessly, as it should, to approve new life-saving and life-enhancing drugs. But it could do a lot better job of keeping track of

developments with these drugs after they're on the market. Reviewing what happened inside the FDA with Vioxx, and in working with a number of whistleblowers who bravely stuck their necks out and came to me after that landmark hearing, I've identified problems at the FDA that consistently fit into a few themes.

First, scientific dissent is discouraged, quashed, and sometimes muzzled inside the Food and Drug Administration. Second, the FDA's relationship with drug makers is too cozy. The FDA worries about smoothing things over with industry much more than it should with its regulatory responsibilities. Third, inside the FDA there's widespread fear of retaliation for speaking up about problems. And fourth, the public safety would be better served if the agency was more transparent and forthcoming about drug safety and drug risks.

These problems involve the culture of the Food and Drug Administration. They're not isolated but systemic. And they can be partly attributed to the organizational structure of the FDA.

My concerns are not isolated either. During the last year, they've been validated by the highly regarded Institute of Medicine, as well as the independent Government Accountability Office and respected medical journals. What's at stake is public safety and public confidence in our nation's world-renowned Food and Drug Administration.

My investigations of FDA issues have also revealed a deeply troubling disregard for Congress' responsibility to conduct oversight of the executive branch of government. The FDA and the Department of Health and Human Services have put up so much resistance to my effort to find out what happened inside the FDA with a relatively new antibiotic called Ketek that I can only wonder what there is to cover up.

Every excuse under the sun has been used to create roadblocks, even in the face of Congressional subpoenas requesting information and access to FDA employees.

In denying access to documents responsive to the subpoenas, the Department and FDA have claimed "prosecutorial deliberative process," "confidential communications," and "agency prerogative to determine who will be interviewed or testify before a jurisdictional committee." Yet, during my years in the Senate, my investigators have obtained access to every single one of these categories of so-called confidential information from HHS as well as other executive branch agencies.

Furthermore, I asked the Congressional Research Service to look into the Department's policies regarding this matter and CRS told me that there is "no legal basis" for the Department's executive branch assertions.

Nevertheless, the Department and FDA not only withheld documents that do not appear to be privileged, but they also won't say what has been withheld and why. The subpoenas compel a privilege log, but the Department and FDA will not provide one.

The Department and FDA say that they have been responsive to the Finance Committee's Ketek investigation because they made available millions of pages of documents to the Committee. But what they provided is quantity, not quality.

They delivered hundreds of pages simply marked, for example, "57 pages removed," or "43 pages removed." (see attachments 1-5) Other documents have whole pages, paragraphs or sentences redacted with no explanation for what has been withheld or redacted and why. In fact, the FDA redacted some of the same documents differently and even redacted one of my own letters to them on a different matter (see attachment 6)

When I point out the absurdities in the Department's responses to my requests for documents and interviews related to Ketek, the Department argues it could not provide access to information and individuals related to open criminal investigations. But I didn't ask for access to open criminal investigations; I don't want to jeopardize a criminal matter. The Department and the FDA know that, yet they keep using that excuse anyway.

Even so, what I've learned about what happened with Ketek troubles me. I've learned that:

- FDA gave its advisory committee questionable data on Ketek and did not tell them about problems with that data. I sent a letter to the FDA in December regarding my findings on this matter and am awaiting a response from the agency.
- FDA approved Ketek without much safety data from the U.S.; the agency relied almost exclusively on foreign, post-marketing safety data; and
- Ketek's sponsor in all likelihood was aware of the fact that it submitted some questionable data to the FDA regarding its large safety study; the sponsor was informed of problems with one of the study sites prior to data submission to the FDA. However, according to FDA reviewers, the sponsor never raised these problems to the FDA. FDA learned about them after its own investigators inspected the site.

I plan to continue my investigation of Ketek and issue more reports. But I am heartened to hear that FDA came to a decision yesterday that mirrors the recommendations of its internal scientists as well as its advisory committees.

During the last three years, I've also tried to work in a productive way with the Commissioners and Acting Commissioners of the FDA. It will take bold leadership to get on top of the FDA's troubles and turn the agency around. So far, the lip service has been fine. The reality a lot less so.

Last month, Senator Chris Dodd and I reintroduced two reform bills that we first proposed in 2005 to get at the safety shortcomings of the FDA. Our first bill would elevate and empower the office with the FDA that is responsible for monitoring FDA-approved drugs after they're on the market. It would make the "postmarket drug safety" function independent within the FDA, instead of under the thumb of the office and center that puts the drugs on the market in the first place, the way it is today.

Chairman Dingell, the Wall Street Journal has reported that you're intrigued by the idea of a drug safety center within the FDA. I appreciate that view. It doesn't make any sense that the FDA officials who are supposed to monitor the safety of a drug on the market serve only as consultants to the FDA officials who approved the drug in the first place. The officials who approved the drug would obviously be conflicted in making a judgment that approval is no longer appropriate or was a mistake in the first place. A separate center for drug safety within the FDA is a vital lynchpin when it comes to meaningful reform and improvement of the agency's postmarket surveillance work.

The second bill that Senator Dodd and I introduced would expand an existing public database by mandating the registry of all clinical trials and the results of those trials. This reform is key to establishing greater transparency regarding clinical trials, the good ones and the bad ones, and to holding drug makers and drug regulators accountable.

Both of these legislative initiatives would make drug information used by doctors and patients more complete and more accessible. American consumers should not have to second guess the safety of the pills in their medicine cabinets.

I appreciate the attention all of you are giving to this important national issue with this hearing. You will hear from some of the heroic whistleblowers who have helped my work, without whom my work wouldn't have been possible. Two of the whistleblowers have left the FDA. It's a tremendous loss for our country when an agency like the Food and Drug Administration gets so dysfunctional that specialists like these whistleblowers are forced to leave the agency to avoid retaliation. I want to work closely with you to make sure FDA whistleblowers can communicate to Congress without fear.

In addition, the existing agreement between the Inspector General for the Department of Health and Human Services and the Food and Drug Administration gives too much power to the FDA when it comes to how allegations of criminal misconduct by FDA employees are investigated. That agreement should be revisited by reform minded leaders in Congress. (see attachment 7)

I look forward to reform opportunities in the year ahead. There's no doubt that the FDA needs additional tools and resources to do its work. The FDA also needs an overhaul to make the agency more transparent, more forthcoming, and more independent-minded.

I look forward to working with this Committee and in particular with you, Chairmen Dingell and Stupak and Ranking Members Barton and Whitfield, as well as my colleagues in the Senate to enact reforms at the FDA. Thank you.

EDMOND J. SAFRA
Center for Ethics

Donald Light

Light received a BA in history from Stanford, an MA in sociology from the University of Chicago, and a PhD in sociology from Brandeis. His research at the Center concerned the historical roots of institutional corruption in the development of prescription drugs and its consequences.

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EDMOND J. SAFRA Center for Ethics

Risky Drugs: Why The FDA Cannot Be Trusted

July 17, 2013

*by **Donald W. Light***

A **forthcoming article** for the special issue of the *Journal of Law, Medicine and Ethics* (JLME), edited by Marc Rodwin and supported by the Edmond J. Safra Center for Ethics, presents evidence that about 90 percent of all new drugs approved by the FDA over the past 30 years are little or no more effective *for patients* than existing drugs.

All of them may be better than indirect measures or placebos, but most are no better for patients than previous drugs approved as better against these measures. The few superior drugs make important contributions to the growing medicine chest of effective drugs.

The bar for "safe" is equally low, and over the past 30 years, approved drugs have caused an epidemic of harmful side effects, even when properly prescribed. Every week, about 53,000 excess hospitalizations and about 2400 excess deaths occur in the United States among people taking properly prescribed drugs to be healthier. One in every five drugs approved ends up causing serious harm,[1] while one in ten provide substantial benefit compared to existing, established drugs. This is the opposite of what people want or expect from the FDA. Prescription drugs are the 4th leading cause of death. Deaths and hospitalizations from over-dosing, errors, or recreational drug use would increase this total. American patients also suffer from about 80 million mild side effects a year, such as aches and pains, digestive discomforts, sleepiness or mild dizziness.

The forthcoming article in JLME also presents systematic, quantitative evidence that since the industry started making large contributions to the FDA for reviewing its drugs, as it makes large contributions to Congressmen who have promoted this substitution for publicly funded regulation, the FDA has sped up the review process with the result that drugs approved are significantly more likely to cause serious harm, hospitalizations, and deaths. New FDA policies are likely to increase the epidemic of harms. This will increase costs for insurers but increase revenues for providers.

This evidence indicates why we can no longer trust the FDA to carry out its historic mission to protect the public from harmful and ineffective drugs. Strong public demand that government "do something" about periodic drug disasters has played a central role in developing the FDA.[2] Yet close, constant contact by companies with FDA staff and officials has contributed to vague, minimal criteria of what "safe" and "effective" mean. The FDA routinely approves scores of new minor variations each year, with minimal evidence about

risks of harm. Then very effective mass marketing takes over, and the FDA devotes only a small percent of its budget to protect physicians or patients from receiving biased or untruthful information.[3,4] The further corruption of medical knowledge through company-funded teams that craft the published literature to overstate benefits and understate harms, unmonitored by the FDA, leaves good physicians with corrupted knowledge.[5,6] Patients are the innocent victims.

Although it now embraces the industry rhetoric about “breakthrough” and “life-saving” innovation, the FDA in effect serves as the re-generator of patent-protected high prices for minor drugs in each disease group, as their therapeutic equivalents lose patent protection. The billions spent on promoting them results in the **Inverse Benefit Law**: the more widely most drugs are marketed, the more diluted become their benefits but more widespread become their risks of harm.

The FDA also legitimates industry efforts to lower and widen criteria prescribing drugs, known by critics as “**the selling of sickness.**” Regulations conveniently prohibit the FDA from comparing the effectiveness of new drugs or from assessing their cost-effectiveness. Only the United States allows companies to charge what they like and raise prices annually on last year’s drugs, without regard to their added value.[7]

A New Era?

Now the FDA is going even further. The New England Journal of Medicine has published, without comment, proposals by two senior figures from the FDA to loosen criteria drugs that allege to prevent Alzheimer’s disease by treating it at an early stage.[8] The authors seem unaware of how their views about Alzheimer’s and the role of the FDA incorporate the language and rationale of marketing executives for the industry. First, they use the word “disease” to refer to a hypothetical “early-stage Alzheimer’s disease” that supposedly exists “before the earliest symptoms of Alzheimer’s disease are apparent.” Notice that phrasing assumes that the earliest symptoms will become apparent, when in fact it’s only a hypothetical model for claiming that cognitive lapses like not remembering where you put something or what you were going to say are signs of incipient Altzheimer’s disease. The proposed looser criteria would legitimate drugs as “safe and effective” that have little or no evidence of being effective and expose millions to risks of harmful side effects.

No proven biomarkers or clinical symptoms exist, the FDA officials note, but nevertheless they advocate accelerated approval to allow “drugs that address an unmet medical need.” What “unmet need"? None exists. This market-making language by officials who are charged with protecting the public from unsafe drugs moves us towards the 19-century hucksterism of peddling cures of questionable benefits and hidden risks of harm, only now fully certified by the modern FDA.[9]

The main reason for advocating approvals of drugs for an unproven need with unproven benefits, these FDA officials explain, is that companies cannot find effective drugs for overt Alzheimer’s. Their drug-candidates have failed again and again in trials. The core rationale of the proposed loosening of criteria is that “the focus of drug development has sifted to earlier stages of Alzheimer’s disease…and the regulatory framework under which such therapies are evaluated should evolve accordingly.” Yet they admit there are no “therapies” in this much larger market where (with the help of the industry-funded FDA) companies will not have to

prove their drugs are effective. In fact, these FDA officers propose to approve the drugs without ever knowing if they are therapeutic or not. Their commercialized language presumes the outcome before starting. The job of the FDA, it seems, is to help drug companies open up new markets to increase profits for the FDA's corporate paymasters.

These two FDA officials maintain that "the range of focus must extend to healthy people who are merely at risk for the disease but could benefit from preventive therapies." Yet they admit we do not know who is "at risk," nor whether there is a "disease," nor whether anyone "could benefit," nor whether the drugs constitute "preventive therapies." Similar FDA-encouraged shifts have been made for drugs treating pre-diabetes, pre-psychosis, and pre-bone density loss, with few or no benefits to offset risks of harm. This week, based on policy research at the Edmond J. Safra Center for Ethics, **a letter of concern** was published in the New England Journal of Medicine. The authors write that approval for drugs to treat "early stage Altzheimer's disease" must meet "a much higher bar – evidence of slowed disease progression." But without clinical manifestations or biomarkers for an alleged disease, how will such progression be measured?

Advice to readers: Experienced, independent physicians recommend not to take a new drug approved by the FDA until it is out for 7 years, unless you have to, so that evidence can accumulate about its real harms and benefits.[10]

Disclaimer: The assessment and views expressed here are solely the author's and do not necessarily reflect those of persons or institutions to which he is associated. The comments and suggestions of Gordon Schiff, an expert in prescribing at Brigham and Women's Hospital, and Robert Whitaker are gratefully acknowledged.

References

1. Lexchin J. New drugs and safety: what happened to new active substances approved in Canada between 1995 and 2010? Archives of Internal Medicine 2012 (Nov 26);172:1680-81.
2. Hilts PJ. Protecting America's Health: The FDA, Business and One Hundred Years of Regulation. New York: Alfred A. Knopf; 2003.
3. Rodwin M. Conflicts of interest, institutional corruption, and Pharma: an agenda for reform. Journal of Law, Medicine & Ethics 2012;40:511-22.
4. Rodwin M. Reforming pharmaceutical industry-physician financial relationships: lessons from the United States, France, and Japan. Journal of Law, Medicine & Ethics 2011(Winter):2-10.
5. Sismondo S. Ghost management. PLoS Medicine 2007;4:1429-33.
6. Sismondo S, Doucet M. Publication ethics and the ghost management of medical publication. Bioethics 2010;24:273-83.
7. Schondelmeyer S, Purvis L. Rx Price Watch Report. Washington DC: American Association of Retired Persons 2012.
8. Kozauer N, Katz R. Regulatory innovation and drug development for early-stage Alzheimer's disease. New England Journal of Medicine 2013 (Mar 13);DOI: 10.1056/NEJMp1302513
9. Young JH. The Toadstool Millionaires: a social history of patent medicines in America before federal regulation. Princeton, NJ: Princeton University Press; 1961.

COVID-19

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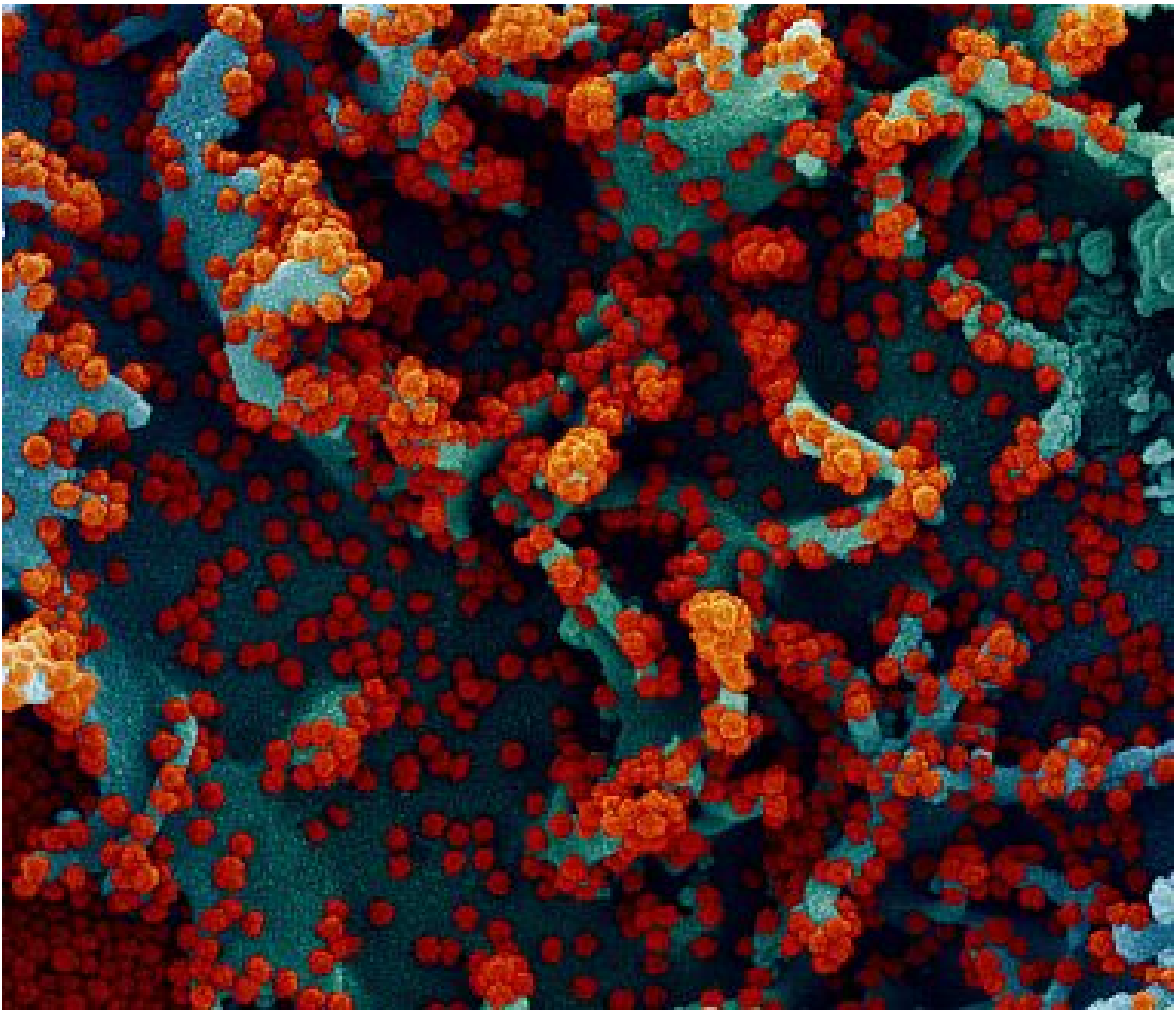
NIH RESEARCH MATTERS

January 26, 2021

Lasting immunity found after recovery from COVID-19

At a Glance

- The immune systems of more than 95% of people who recovered from COVID-19 had durable memories of the virus up to eight months after infection.
- The results provide hope that people receiving SARS-CoV-2 vaccines will develop similar lasting immune memories after vaccination.



Colorized scanning electron micrograph of a cell, isolated from a patient sample, that is heavily infected with SARS-CoV-2 virus particles (red). *NIAID Integrated Research Facility, Fort Detrick, Maryland*

After people recover from infection with a virus, the immune system retains a memory of it. Immune cells and proteins that circulate in the body can recognize and kill the pathogen if it's encountered again, protecting against disease and reducing illness severity.

This long-term immune protection involves several components. Antibodies—proteins that circulate in the blood—recognize foreign substances like viruses and neutralize them. Different types of T cells help recognize and kill pathogens. B cells make new antibodies when the body needs them.

All of these immune-system components have been found in people who recover from SARS-CoV-2, the virus that causes COVID-19. But the details of this immune response and how long it lasts after infection have been unclear. Scattered reports of reinfection with SARS-CoV-2 have raised concerns that the immune response to the virus might not be durable.

To better understand immune memory of SARS-CoV-2, researchers led by Drs. Daniela Weiskopf, Alessandro Sette, and Shane Crotty from the La Jolla Institute for Immunology analyzed immune cells and antibodies from almost 200 people who had been exposed to SARS-CoV-2

and recovered.

Time since infection ranged from six days after symptom onset to eight months later. More than 40 participants had been recovered for more than six months before the study began. About 50 people provided blood samples at more than one time after infection.

The research was funded in part by NIH's National Institute of Allergy and Infectious Diseases (NIAID) and National Cancer Institute (NCI). Results were published on January 6, 2021, in *Science*.

The researchers found durable immune responses in the majority of people studied. Antibodies against the spike protein of SARS-CoV-2, which the virus uses to get inside cells, were found in 98% of participants one month after symptom onset. As seen in previous studies, the number of antibodies ranged widely between individuals. But, promisingly, their levels remained fairly stable over time, declining only modestly at 6 to 8 months after infection.

Virus-specific B cells increased over time. People had more memory B cells six months after symptom onset than at one month afterwards. Although the number of these cells appeared to reach a plateau after a few months, levels didn't decline over the period studied.

Levels of T cells for the virus also remained high after infection. Six months after symptom onset, 92% of participants had CD4+ T cells that recognized the virus. These cells help coordinate the immune response. About half the participants had CD8+ T cells, which kill cells that are infected by the virus.

As with antibodies, the numbers of different immune cell types varied substantially between individuals. Neither gender nor differences in disease severity could account for this variability. However, 95% of the people had at least 3 out of 5 immune-system components that could recognize SARS-CoV-2 up to 8 months after infection.

"Several months ago, our studies showed that natural infection induced a strong response, and this study now shows that the responses last," Weiskopf says. "We are hopeful that a similar pattern of responses lasting over time will also emerge for the vaccine-induced responses."

—by Sharon Reynolds

Related Links

- Experimental Coronavirus Vaccine Highly Effective (https://www.nih.gov/news-events/nih-research-matters/experimental-coronavirus-vaccine-highly-effective)
- Antibodies and T Cells Protect Against SARS-CoV-2 (https://www.nih.gov/news-events/nih-research-matters/antibodies-t-cells-protect-against-sars-cov-2)
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- Coronavirus (COVID-19) (https://covid19.nih.gov/)
- Coronavirus Prevention Network (https://www.coronaviruspreventionnetwork.org/)

- Coronavirus (COVID-19) (https://www.coronavirus.gov/)

References: Immunological memory to SARS-CoV-2 assessed for up to 8 months after infection. Dan JM, Mateus J, Kato Y, Hastie KM, Yu ED, Faliti CE, Grifoni A, Ramirez SI, Haupt S, Frazier A, Nakao C, Rayaprolu V, Rawlings SA, Peters B, Krammer F, Simon V, Saphire EO, Smith DM, Weiskopf D, Sette A, Crotty S. *Science*. 2021 Jan 6:eabf4063. doi: 10.1126/science.abf4063. Online ahead of print. PMID: 33408181.

Funding: NIH's National Institute of Allergy and Infectious Diseases (NIAID) and National Cancer Institute (NCI); La Jolla Institute for Immunology; John and Mary Tu Foundation; Bill and Melinda Gates Foundation; Mastercard; Wellcome; Emergent Ventures; Collaborative Influenza Vaccine Innovation Centers; JPB Foundation; Cohen Foundation; Open Philanthropy Project.

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Infection fatality rate of COVID-19 inferred from seroprevalence data

John P A Ioannidis[a]

Objective To estimate the infection fatality rate of coronavirus disease 2019 (COVID-19) from seroprevalence data.
Methods I searched PubMed and preprint servers for COVID-19 seroprevalence studies with a sample size ≥ 500 as of 9 September 2020. I also retrieved additional results of national studies from preliminary press releases and reports. I assessed the studies for design features and seroprevalence estimates. I estimated the infection fatality rate for each study by dividing the cumulative number of COVID-19 deaths by the number of people estimated to be infected in each region. I corrected for the number of immunoglobin (Ig) types tested (IgG, IgM, IgA).
Findings I included 61 studies (74 estimates) and eight preliminary national estimates. Seroprevalence estimates ranged from 0.02% to 53.40%. Infection fatality rates ranged from 0.00% to 1.63%, corrected values from 0.00% to 1.54%. Across 51 locations, the median COVID-19 infection fatality rate was 0.27% (corrected 0.23%): the rate was 0.09% in locations with COVID-19 population mortality rates less than the global average (< 118 deaths/million), 0.20% in locations with 118–500 COVID-19 deaths/million people and 0.57% in locations with > 500 COVID-19 deaths/million people. In people younger than 70 years, infection fatality rates ranged from 0.00% to 0.31% with crude and corrected medians of 0.05%.
Conclusion The infection fatality rate of COVID-19 can vary substantially across different locations and this may reflect differences in population age structure and case-mix of infected and deceased patients and other factors. The inferred infection fatality rates tended to be much lower than estimates made earlier in the pandemic.

Abstracts in عربي, 中文, Français, Русский and Español at the end of each article.

Introduction

The infection fatality rate, the probability of dying for a person who is infected, is one of the most important features of the coronavirus disease 2019 (COVID-19) pandemic. The expected total mortality burden of COVID-19 is directly related to the infection fatality rate. Moreover, justification for various non-pharmacological public health interventions depends on the infection fatality rate. Some stringent interventions that potentially also result in more noticeable collateral harms[1] may be considered appropriate, if the infection fatality rate is high. Conversely, the same measures may fall short of acceptable risk–benefit thresholds, if the infection fatality rate is low.

Early data from China suggested a 3.4% case fatality rate[2] and that asymptomatic infections were uncommon,[3] thus the case fatality rate and infection fatality rate would be about the same. Mathematical models have suggested that 40–81% of the world population could be infected,[4,5] and have lowered the infection fatality rate to 1.0% or 0.9%.[5,6] Since March 2020, many studies have estimated the spread of the virus causing COVID-19 – severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) – in various locations by evaluating seroprevalence. I used the prevalence data from these studies to infer estimates of the COVID-19 infection fatality rate.

Methods

Seroprevalence studies

The input data for calculations of infection fatality rate were studies on the seroprevalence of COVID-19 done in the general population, or in samples that might approximately represent the general population (e.g. with proper reweighting), that had been published in peer-reviewed journals or as preprints (irrespective of language) as of 9 September 2020. I considered only studies with at least 500 assessed samples because smaller data sets would result in large uncertainty for any calculations based on these data. I included studies that made seroprevalence assessments at different time intervals if at least one time interval assessment had a sample size of at least 500 participants. If there were different eligible time intervals, I selected the one with the highest seroprevalence, since seroprevalence may decrease over time as antibody titres decrease. I excluded studies with data collected for more than a month that could not be broken into at least one eligible time interval less than one month duration because it would not be possible to estimate a point seroprevalence reliably. Studies were eligible regardless of the exact age range of participants included, but I excluded studies with only children.

I also examined results from national studies from preliminary press releases and reports whenever a country had no other data presented in published papers or preprints. This inclusion allowed these countries to be represented, but information was less complete than information in published papers or preprints and thus requires caution.

I included studies on blood donors, although they may underestimate seroprevalence and overestimate infection fatality rate because of the healthy volunteer effect. I excluded studies on health-care workers, since this group is at a potentially high exposure risk, which may result in seroprevalence estimates much higher than the general population and thus an improbably low infection fatality rate. Similarly, I also excluded studies on communities (e.g. shelters or religious or other shared-living communities). Studies were eligible regardless of whether they aimed to evaluate seroprevalence in large or small regions, provided that the population of reference in the region was at least 5000 people.

I searched PubMed® (LitCOVID), and medRxiv, bioRxiv and Research Square using the terms "seroprevalence" OR "antibodies" with continuous updates. I made the first search in early May and did monthly updates, with the last update

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(*Submitted: 13 May 2020 – Revised version received: 13 September 2020 – Accepted: 15 September 2020 – Published online: 14 October 2020*)

on 9 September 2020. I contacted field experts to retrieve any important studies that may have been missed.

From each study, I extracted information on location, recruitment and sampling strategy, dates of sample collection, sample size, types of antibody measured (immunoglobulin G (IgG), IgM and IgA), the estimated crude seroprevalence (positive samples divided by all samples tested), adjusted seroprevalence and the factors that the authors considered for adjustment.

Inferred infection fatality rate

If a study did not cover an entire country, I collected information on the population of the relevant location from the paper or recent census data so as to approximate as much as possible the relevant catchment area (e.g. region(s) or county(ies)). Some studies targeted specific age groups (e.g. excluding elderly people and/or excluding children) and some estimated numbers of people infected in the population based on specific age groups. For consistency, I used the entire population (all ages) and, separately, the population 0–70 years to estimate numbers of infected people. I assumed that the seroprevalence would be similar in different age groups, but I also recorded any significant differences in seroprevalence across age strata so as to examine the validity of this assumption.

I calculated the number of infected people by multiplying the relevant population size and the adjusted estimate of seroprevalence. If a study did not give an adjusted seroprevalence estimate, I used the unadjusted seroprevalence instead. When seroprevalence estimates with different adjustments were available, I selected the analysis with largest adjustment. The factors adjusted for included COVID-19 test performance, sampling design, and other factors such as age, sex, clustering effects or socioeconomic factors. I did not adjust for specificity in test performance when positive antibody results were already validated by a different method.

For the number of COVID-19 deaths, I chose the number of deaths accumulated until the date 1 week after the midpoint of the study period (or the date closest to this that had available data) – unless the authors of the study had strong arguments to choose some other time point or approach. The 1-week lag accounts for different delays in developing antibodies versus dying from infection. The number of deaths is an approximation because it is not known when exactly each patient who died was infected. The 1-week cut-off after the study midpoint may underestimate deaths in places where patients are in hospital for a long time before death, and may overestimate deaths in places where patients die soon because of poor or even inappropriate care. Whether or not the health system became overloaded may also affect the number of deaths. Moreover, because of imperfect diagnostic documentation, COVID-19 deaths may have been both overcounted and undercounted in different locations and at different time points.

I calculated the inferred infection fatality rate by dividing the number of deaths by the number of infected people for the entire population, and separately for people younger than 70 years. I took the proportion of COVID-19 deaths that occurred in people younger than 70 years from situational reports for the respective locations that I retrieved at the time I identified the seroprevalence studies. I also calculated a corrected infection fatality rate to try and account for the fact that only one or two types of antibodies (among IgG, IgM, IgA) might have been used. I corrected seroprevalence upwards (and inferred infection fatality rate downwards) by one tenth of its value if a study did not measure IgM and similarly if IgA was not measured. This correction is reasonable based on some early evidence,[7] although there is uncertainty about the exact correction factor.

Data synthesis

The estimates of the infection fatality rate across all locations showed great heterogeneity with I^2 exceeding 99.9%; thus, a meta-analysis would be inappropriate to report across all locations. Quantitative synthesis with meta-analysis across all locations would also be misleading since locations with high COVID-19 seroprevalence would tend to carry more weight than locations with low seroprevalence. Furthermore, locations with more studies (typically those that have attracted more attention because of high death tolls and thus high infection fatality rates) would be represented multiple times in the calculations. In addition, poorly conducted studies with fewer adjustments would get more weight because of spuriously narrower confidence intervals than more rigorous studies with more careful adjustments which allow for more uncertainty. Finally, with a highly skewed distribution of the infection fatality rate and with large between-study heterogeneity, typical random effects models would produce an incorrectly high summary infection fatality rate that approximates the mean of the study-specific estimates (also strongly influenced by high-mortality locations where more studies have been done); for such a skewed distribution, the median is more appropriate.

Therefore, in a first step, I grouped estimates of the infection fatality rate from studies in the same country (or for the United States of America, the same state) together and calculated a single infection fatality rate for that location, weighting the study-specific infection fatality rates by the sample size of each study. This approach avoided inappropriately giving more weight to studies with higher seroprevalence estimates and those with seemingly narrower confidence intervals because of poor or no adjustments, while still giving more weight to larger studies. Then, I used the single summary estimate for each location to calculate the median of the distribution of location-specific infection fatality rate estimates. Finally, I explored whether the location-specific infection fatality rates were associated with the COVID-19 mortality rate in the population (COVID-19 deaths per million people) in each location as of 12 September 2020; this analysis allowed me to assess whether estimates of the infection fatality rate tended to be higher in locations with a higher burden of death from COVID-19.

Results

Seroprevalence studies

I retrieved 61 studies with 74 eligible estimates published either in the peer-reviewed literature or as preprints as of 9 September 2020.[8–68] Furthermore, I considered another eight preliminary national estimates.[69–76] This search yielded a total of 82 eligible estimates (Fig. 1).

The studies varied substantially in sampling and recruitment designs (Table 1; available at: http://www.who.int/bulletin/volumes/99/1/20-265892). Of the 61 studies, 24 studies[8,10,16,17,20,22,25,33,34,36,37,42,46–49,52–54,57,61,63,65,68]

explicitly aimed for random sampling from the general population. In principle, random sampling is a stronger design. However, even then, people who cannot be reached (e.g. by email or telephone or even by visiting them at a house location) will not be recruited, and these vulnerable populations are likely to be missed. Moreover, several such studies[8,10,16,37,42] focused on geographical locations with high numbers of deaths, higher than other locations in the same city or country, and this emphasis would tend to select eventually for a higher infection fatality rate on average.

Eleven studies assessed blood donors,[12,15,18,24,28,31,41,44,45,55,60] which might underestimate COVID-19 seroprevalence in the general population. For example, 200 blood donors in Oise, France showed 3.00% seroprevalence, while the seroprevalence was 25.87% (171/661) in pupils, siblings, parents, teachers and staff at a high school with a cluster of cases in the same area; the true population seroprevalence may be between these two values.[13]

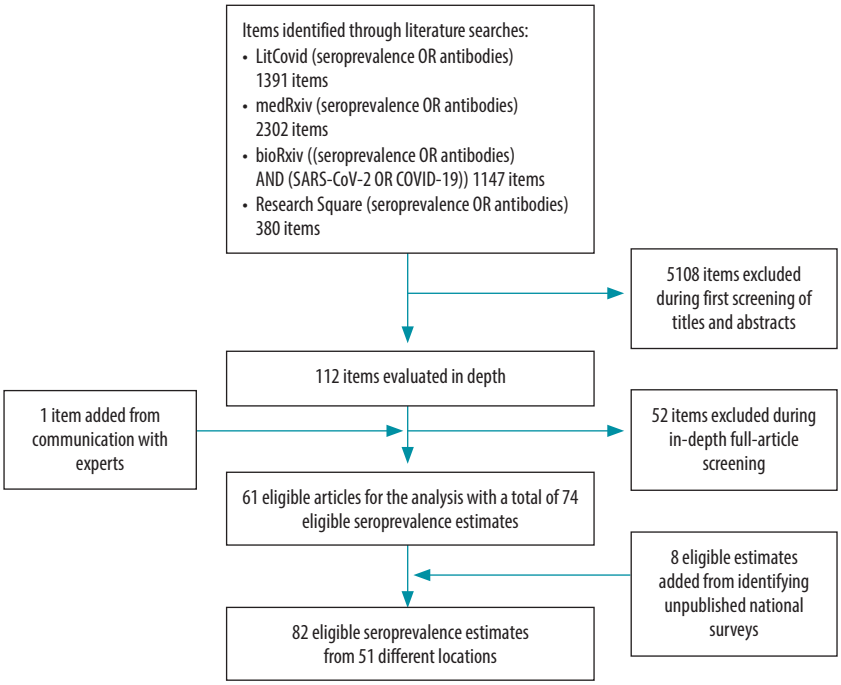
For other studies, healthy volunteer bias[19] may underestimate seroprevalence, attracting people with symptoms[26] may overestimate seroprevalence, and studies of employees,[14,21,25,32,66] grocery store clients[23] or patient cohorts[11,14,27–30,36,38,40,50,51,56,59,62,64,67] risk sampling bias in an unpredictable direction.

All the studies tested for IgG antibodies but only about half also assessed IgM and few assessed IgA. Only seven studies assessed all three types of antibodies and/or used pan-Ig antibodies. The ratio of people sampled versus the total population of the region was more than 1:1000 in 20 studies (Table 2; available at: http://www.who.int/bulletin/volumes/99/1/20-265892).

Seroprevalence estimates

Seroprevalence for the infection ranged from 0.02% to 53.40% (58.40% in the slum sub-population in Mumbai; Table 3). Studies varied considerably depending on whether or not they tried to adjust their estimates for test performance, sampling (to get closer to a more representative sample), clustering (e.g. when including household members) and other factors. The adjusted seroprevalence occasionally differed substantially from the unadjusted value. In studies that used samples from multiple locations, between-location heterogeneity was seen (e.g. 0.00–25.00% across 133 Brazilian cities).[25]

Fig. 1. **Flowchart for selection of seroprevalence studies on severe acute respiratory syndrome coronavirus 2, 2020**



COVID-19: coronavirus disease 2019; SARS-CoV-2: severe acute respiratory syndrome coronavirus 2.

Inferred infection fatality rate

Inferred infection fatality rate estimates varied from 0.00% to 1.63% (Table 4). Corrected values also varied considerably (0.00–1.54%).

For 15 locations, more than one estimate of the infection fatality rate was available and thus I could compare the infection fatality rate from different studies evaluating the same location. The estimates of infection fatality rate tended to be more homogeneous within each location, while they differed markedly across locations (Fig. 2). Within the same location, infection fatality rate estimates tend to have only small differences, even though it is possible that different areas within the same location may also have real differences in infection fatality rate. France is one exception where differences are large, but both estimates come from population studies of outbreaks from schools and thus may not provide good estimates of population seroprevalence and may lead to an underestimated infection fatality rate.

I used summary estimates weighted for sample size to generate a single estimate for each location. Data were available for 51 different locations (including the inferred infection fatality rates from the eight preliminary additional national estimates in Table 5).

The median infection fatality rate across all 51 locations was 0.27% (corrected 0.23%). Most data came from locations with high death tolls from COVID-19 and 32 of the locations had a population mortality rate (COVID-19 deaths per million population) higher than the global average (118 deaths from COVID-19 per million as of 12 September 2020;[79] Fig. 3). Uncorrected estimates of the infection fatality rate of COVID-19 ranged from 0.01% to 0.67% (median 0.10%) across the 19 locations with a population mortality rate for COVID-19 lower than the global average, from 0.07% to 0.73% (median 0.20%) across 17 locations with population mortality rate higher than the global average but lower than 500 COVID-19 deaths per million, and from 0.20% to 1.63% (median 0.71%) across 15 locations with more than 500 COVID-19 deaths per million. The corrected estimates of the median infection fatality rate were

Table 3. **Estimated prevalence of COVID-19 and estimated number of people infected, 2020**

Country (location)	Seroprevalence, %			Estimated no. of people infected
	Crude	Adjusted		
		Value	Adjustments	
Argentina (Barrio Padre Mugica)[47]	ND	53.4	Age, sex, household, non-response	26 691
Belgium[38]	5.7	6.0	Sampling, age, sex, province	695 377
Brazil (133 cities)[25]	1.39	1.62 overall (0–25.0 across the 133 cities)	Test, design	1 209 435[a]
Brazil (Espirito Santo)[34]	2.1	ND	NA	84 391
Brazil (Maranhao)[68]	37	40.4	Clustering, stratification, non-response	2 877 454
Brazil (Rio de Janeiro), blood donors[41]	6	4.7	Age, sex, test	811 452
Brazil (Rio Grande do Sul)[17]	0.222	0.222[b]	Sampling	25 283
Brazil (Sao Paulo)[42]	5.2	4.7	Sampling design	14 017
Canada (British Columbia)[50]	0.45	0.55	Age	27 890
Chile (Vitacura)[43]	11.2	ND	NA	9 500
China, blood donors[55]				
Wuhan	3.87	ND	NA	433 827
Shenzhen	0.06	ND	NA	7 818
Shijiazhuang	0.02	ND	NA	2 206
China (Wuhan)[14]	10	ND	NA	1 108 000
China (Wuhan)[32]	8.36	ND	NA	926 288
Entire period	3.53	2.80	Age, sex, test	–
China (Guangzhou), blood donors[60]	0.09	ND	NA	104 783
China (several regions)[40]				
Hubei (not Wuhan)	3.6	ND	NA	1 718 110
Chongqing	3.8	ND	NA	11 956 109
Sichuan	0.6	ND	NA	487 847
Guangdong	2.2	ND	NA	2 522 010
Croatia[26]	1.27[c]	ND	NA	51 765
Denmark, blood donors[12]	2	1.9	Test	109 665
Denmark (Faroe Islands)[52]	0.6	0.7	Test	365
France (Crepy-en-Valois)[39]	10.4	ND	NA	620 105
France (Oise)[13]	25.9	ND	NA	1 548 000
Germany (Gangelt)[16]	15	20.0	Test, cluster, symptoms	2 519
Germany (Frankfurt)[21]	0.6	ND	NA	16 086
Greece[62]	0.42 (April)	0.49[d]	Age, sex, region	51 023
Hungary[57]	0.67	0.68	Design, age, sex, district	65 671
Iceland[58]	2.3 (quarantined), 0.3 (unknown exposure)	0.9	Including those positive by RT-PCR	3 177
India (Mumbai)[61]				534 750
Slum areas	54.1	58.4	Test, age, sex	–
Non-slum areas	16.1	17.3	Test, age, sex	–
India (Srinagar)[67]	3.8	3.6	Age, sex	54 000
Islamic Republic of Iran (Guilan)[8]	22	33.0	Test, sampling	770 000
Italy (Apulia), blood donors[31]	0.99	ND	NA	39 887
Japan (Kobe)[11]	3.3	2.7	Age, sex	40 999
Japan (Tokyo)[29]	3.83	ND	NA	532 450
Japan (Utsunomiya City)[48]	0.4	1.23	Age, sex, distance to clinic, district, cohabitants	6 378
Kenya, blood donors[44]	5.6	5.2	Age, sex, region, test	2 783 453
Luxembourg[20]	1.9	2.1	Age, sex, district	12 684
Netherlands, blood donors[15]	2.7	ND	NA	461 622
Netherlands (Rotterdam)[64]	3	ND	NA	512 910
Pakistan (Karachi)[49]	16.3	11.9	Age, sex	1 987 300
East	20.0	15.1	Age, sex	–
Malir	12.7	8.7	Age, sex	–
Pakistan (urban)[66]	17.5	ND	NA	13 825 000
Qatar[51]	30.4	ND	NA	851 200

(*continues. . .*)

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Country (location)	Seroprevalence, %			Estimated no. of people infected
	Crude	Adjusted		
		Value	Adjustments	
Entire period	24.0	ND	NA	–
Republic of Korea[59]	0.07	ND	NA	1 867
Spain[36]	ND	5.0[e]	Sampling, age, sex, income	2 347 000
Spain (Barcelona)[30]	14.3	ND	NA	1 081 938
Switzerland (Geneva)[10]	10.6	10.9	Test, age, sex	54 500
Switzerland[28]				
Zurich[f]	Unclear	1.3	Multivariate Gaussian conditioning	19 773
Zurich and Lucerne[g]	Unclear	1.6	Multivariate Gaussian conditioning	30 888
United Kingdom (England)[65]	5.6	6.0	Test, sampling	3 360 000
United Kingdom (Scotland) blood donors[18]	1.2	ND	NA	64 800
USA (10 states)[35]				
Washington, Puget Sound	1.3	1.1	Age, sex, test	48 291
Utah	2.4	2.2	Age, sex, test	71 550
New York, New York City	5.7	6.9	Age, sex, test	641 778
Missouri	2.9	2.7	Age, sex, test	161 936
Florida, south	2.2	1.9	Age, sex, test	117 389
Connecticut	4.9	4.9	Age, sex, test	176 012
Louisiana	ND	5.8	Age, sex, test	267 033
California, San Francisco Bay	ND	1	Age, sex, test	64 626
Pennsylvania, Philadelphia	ND	3.2	Age, sex, test	156 633
Minnesota, Minneapolis	ND	2.4	Age, sex, test	90 651
USA (California, Bay Area) blood donors[24]	0.4	0.1	Test and confirmation	7 753
USA (California, Los Angeles)[22]	4.06	4.65	Test, sex, race and ethnicity, income	367 000
USA (California, San Francisco), in census tract 022 901[33]	4.3	6.1	Age, sex, race and ethnicity, test	316
USA (California, Santa Clara)[19]	1.5	2.6	Test, sampling, cluster	51 000
USA (Idaho, Boise)[9]	1.79	ND	NA	8620
USA (Georgia, DeKalb and Fulton counties)[53]	2.7	2.5	Age, sex, race and ethnicity	45 167
USA (Idaho, Blaine County)[46]	22.4	23.4	Test, age, sex, household	5 403
USA (Indiana)[54]	2.3 (IgG and RT-PCR)[h]	2.8	Age, race, Hispanic ethnicity	187 802
USA (Louisiana, Baton Rouge)[63]	6	6.6	Census, race, parish, including RT-PCR positives	46 147
USA (Louisiana, Orleans and Jefferson Parish)[37]	6.9 (IgG and RT-PCR)[h]	6.9 for IgG	Census weighting, demographics	56 578
USA (New York)[23]	12.5	14.0	Test, sex, age race and ethnicity, region	2 723 000
USA, New York[66]				
Columbia University Medical Center, New York City	5	ND	NA	463 044
CareMount central laboratory, five New York state counties	1.8	ND	NA	183 404
USA (New York, Brooklyn)[27]	47	ND	NA	1 203 154
USA (Rhode Island), blood donors[45]	3.9	ND	NA	41 384

COVID-19: coronavirus disease 2019; NA: not applicable; ND: no data available; RT-PCR: real-time polymerase chain reaction; test: test performance.

[a] The authors calculated 760 000 to be infected in the 90 cities that had 200–250 samples tested, but many of the other 43 cities with < 200 samples may be equally or even better represented since they tended to be smaller than the 90 cities (mean population 356 213 versus 659 326).

[b] An estimate is also provided adjusting for test performance, but the assumed specificity of 99.0% seems inappropriately low, since as part of the validation process the authors found that several of the test-positive individuals had household members who were also infected, thus the estimated specificity was deemed by the authors to be at least 99.95%.

[c] 1.20% in workers in Split without mobility restrictions, 3.37% in workers in Knin without mobility restrictions, 1.57% for all workers without mobility restrictions; Split and Knin tended to have somewhat higher death rates than nationwide Croatia, but residence of workers is not given, so the entire population of the country is used in the calculations.

[d] An estimate is also provided adjusting for test performance resulting in adjusted seroprevalence of 0.23%, but this seems inappropriately low, since the authors report that all positive results were further validated by ELISA (enzyme-linked immunosorbent assay).

[e] 5.0% with point of care test, 4.6% with immunoassay, 3.7% with both tests positive, 6.2% with at least one test positive.

[f] Patients during 1–15 April.

[g] Blood donors in May.

[h] The study counts in prevalence also those who were currently/recently infected as determined by a positive RT-PCR.

Notes: Of the studies where seroprevalence was evaluated at multiple consecutive time points, the seroprevalence estimate was the highest in the most recent time interval with few exceptions, for example: in the Switzerland (Geneva) study,[10] the highest value was seen 2 weeks before the last time interval; in the Switzerland (Zurich) study,[28] the highest value was seen in the period 1–15 April for patients at the university hospital and in May for blood donors; and in the China (Wuhan) study,[32] the highest value was seen about 3 weeks before the last time interval.

Table 4. **Deaths from COVID-19 and inferred infection fatality rates, overall and in people younger than 70 years, by location, 2020**

Location	No. of site-specific cumulative deaths from COVID-19 (to date)[a]	Inferred infection fatality rate, % (corrected)	% of site-specific cumulative deaths from COVID-19 in people < 70 years[a]	Infection fatality rate in people < 70 years, % (corrected)
Argentina (Barrio Padre Mugica)[47]	44 (1 July)	0.16 (0.13)	~70	0.11 (0.09)
Belgium[38]	7594 (30 April)	1.09 (0.87)	10	0.13 (0.10)
Brazil (133 cities)[25]	–[b]	Median 0.30 (0.27)	31 (< 60 years)	0.10 (0.09)
Brazil (Espirito Santo)[34]	363 (21 May)	0.43 (0.39)	31 (Brazil, < 60 years)	0.14 (0.13)
Brazil (Maranhao)[68]	4272 (8 August)	0.15 (0.14)	23	0.04 (0.03)
Brazil (Rio de Janeiro), blood donors[41]	1019 (3 May)	0.12 (0.11)	31 (Brazil, < 60 years)	0.04 (0.04)
Brazil (Rio Grande do Sul)[17]	124 (14 May)	0.49 (0.39)	31 (Brazil, < 60 years)	0.19 (0.15)
Brazil (Sao Paulo)[42]	NA[c] (15 May)	Unknown, but likely > 0.4	31 (Brazil, < 60 years)	Unknown, but likely > 0.1
Canada (British Columbia)[50]	164 (28 May)	0.59 (0.59)	13	0.08 (0.08)
Chile (Vitacura)[43]	NA[c] (18 May)	Unknown, but likely < 0.2	36 (Chile)	Unknown, but likely < 0.1
China, blood donors[55]				
Wuhan	1935 (20 February)	0.45 (0.41)	50	0.24 (0.22)
Shenzhen	1 (5 March)	0.01 (0.01)	About 50 (if similar to Wuhan)	0.01 (0.01)
Shijiazhuang	1 (27 February)	0.05 (0.04)	About 50 (if similar to Wuhan)	0.03 (0.02)
China (Wuhan)[14]	3869 (2 May)	0.35 (0.31)	50	0.19 (0.15)
China (Wuhan)[32]	3869 (13 April)	0.42 (0.38)	50	0.23 (0.21)
China (Guangzhou), blood donors[60]	8 (5 April)	0.00 (0.00)	About 50 (if similar to Wuhan)	0.00 (0.00)
China (several regions)[40]				
Hubei (not Wuhan)	643 (12 April)	0.04 (0.03)	About 50 (if similar to Wuhan)	0.02 (0.02)
Chongqing	6 (12 April)	0.00 (0.00)	About 50 (if similar to Wuhan)	0.00 (0.00)
Guangdong	8 (12 April)	0.00 (0.00)	About 50 (if similar to Wuhan)	0.00 (0.00)
Sichuan	3 (12 April)	0.00 (0.00)	About 50 (if similar to Wuhan)	0.00 (0.00)
Croatia[26]	79 (3 May)	0.15 (0.14)	13	0.02 (0.02)
Denmark, blood donors[12]	370 (21 April)	0.34 (0.27)	12	0.05 (0.04)
Faroe Islands[52]	0 (5 May)	0.00 (0.00)	0	0.00 (0.00)
France (Crepy-en-Valois)[39]	2325 (5 May)[d]	0.37 (0.30)	7 (France, < 65 years)	0.04 (0.03)
France (Oise)[13]	932 (7 April)[d]	0.06 (0.05)	7 (France, < 65 years)	0.01 (0.01)
Germany (Gangelt)[16]	7 (15 April)	0.28 (0.25)	0	0.00 (0.00)
Germany (Frankfurt)[21]	42[e] (17 April)	0.26 (0.21)	14 (Germany)	0.04 (0.03)
Greece[62]	121 (22 April)	0.24 (0.19)	30	0.09 (0.07)
Hungary[57]	442 (15 May)	0.67 (0.54)	No data	No data
Iceland[58]	10 (1 June)	0.30 (0.30)	30	0.10 (0.10)
India (Mumbai)[61]	495 (13–20 July)	0.09 (0.07)	50 (< 60 years, India)	0.04 (0.03)
India (Srinagar)[67]	35 (15 July)[f]	0.06 (0.05)	50 (< 60 years, India)	0.03 (0.03)
Islamic Republic of Iran (Guilan)[8]	617 (23 April)	0.08 (0.07)	No data	No data
Italy (Apulia), blood donors[31]	530 (22 May)	1.33 (1.20)	15 (Italy)	0.24 (0.22)
Japan (Kobe)[11]	10 (mid-April)	0.02 (0.02)	21 (Japan)	0.01 (0.01)
Japan (Tokyo)[29]	189 (11 May)	0.04 (0.03)	21 (Japan)	0.01 (0.01)
Japan (Utsunomiya City)[48]	0 (14 June)	0.00 (0.00)	0	0.00 (0.00)
Kenya, blood donors[44]	64 (31 May)	0.00 (0.00)	58 (< 60 years)	0.00 (0.00)
Luxembourg[20]	92 (2 May)	0.73 (0.58)	9	0.07 (0.06)
Netherlands, blood donors[15]	3134 (15 April)	0.68 (0.68)	11	0.09 (0.09)
Netherlands (Rotterdam)[64]	3134 (15 April)	0.65 (0.52)	11	0.08 (0.06)
Pakistan (Karachi)[49]	~1500 (9 July)[g]	0.08 (0.07)	~70	0.06 (0.05)
Pakistan (urban)[66]	5266 (13 July)[h]	0.04 (0.04)	~70	0.03 (0.03)
Qatar[51]	93 (19 June)	0.01 (0.01)	74	0.01 (0.01)
Republic of Korea[59]	2 (3 June)[i]	0.10 (0.09)	0	0.00 (0.00)
Spain[36]	26 920 (11 May)	1.15 (0.92)	13	0.18 (0.14)
Spain (Barcelona)[30]	5137 (2 May)	0.48 (0.48)	13 (Spain)	0.07 (0.07)
Switzerland (Geneva)[10]	243 (30 April)	0.45 (0.36)	8	0.04 (0.03)

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Location	No. of site-specific cumulative deaths from COVID-19 (to date)[a]	Inferred infection fatality rate, % (corrected)	% of site-specific cumulative deaths from COVID-19 in people < 70 years[a]	Infection fatality rate in people < 70 years, % (corrected)
Switzerland (Zurich)[28]	107 (15 April, Zurich), 147 (22 May, Zurich and Lucerne)	0.51 (0.41)	8 (Switzerland)	0.05 (0.04)
England[65]	38 854 (9 July)	1.16 (0.93)	20	0.27 (0.22)
Scotland, blood donors[18]	47 (1 April)	0.07 (0.06)	9 (< 65 years)	0.01 (0.01)
USA (10 states)[35]				
Washington, Puget Sound	207 (4 April)	0.43 (0.43)	10 (state, < 60 years)	0.05 (0.05)
Utah	58 (4 May)	0.08 (0.08)	28 (< 65 years)	0.03 (0.03)
New York	4146 (4 April)	0.65 (0.65)	34 (state)	0.25 (0.25)
Missouri	329 (30 April)	0.20 (0.20)	23	0.05 (0.05)
Florida, south	295 (15 April)	0.25 (0.25)	28 (state)	0.08 (0.08)
Connecticut	2718 (6 May)	1.54 (1.54)	18	0.31 (0.31)
Louisiana	806 (11 April)	0.30 (0.30)	32	0.10 (0.10)
California, San Francisco Bay	321 (1 May)	0.50 (0.50)	25	0.14 (0.14)
Pennsylvania, Philadelphia	697 (26 April)	0.45 (0.45)	21 (state)	0.10 (0.10)
Minnesota, Minneapolis	436 (13 May)	0.48 (0.48)	20 (state)	0.10 (0.10)
USA (California, Bay Area)[24]	12 (22 March)	0.15 (0.12)	25	0.04 (0.03)
USA (California, Los Angeles)[22]	724 (19 April)	0.20 (0.18)	24 (< 65 years)	0.06 (0.05)
USA (California, San Francisco)[33]	0 (4 May)	0.00 (0.00)	0	0.00 (0.00)
USA (California, Santa Clara)[19]	94 (22 April)	0.18 (0.17)	35	0.07 (0.06)
USA (Idaho, Boise)[9]	14 (24 April)	0.16 (0.13)	14 (Idaho)	0.02 (0.02)
USA (Georgia)[53]	198 (7 May)	0.44 (0.44)	30	0.15 (0.15)
USA (Idaho, Blaine County)[46]	5 (19 May)	0.10 (0.08)	14 (Idaho)	0.02 (0.01)
USA (Indiana)[54]	1099 (30 April)	0.58 (0.46)	24	0.16 (0.13)
USA (Louisiana, Baton Rouge)[63]	420 (30 July)	0.91 (0.73)	32 (Louisiana)	0.32 (0.25)
USA (Louisiana, Orleans and Jefferson Parish)[37]	925 (16 May)	1.63 (1.31)	32	0.57 (0.46)
USA (New York)[23]	18 610 (30 April)[j]	0.68 (0.54)[j]	34	0.26 (0.23)
USA (New York Columbia University Medical Center, New York City and CareMount central laboratory, five New York state counties)[56]	965 (28 March, New York state)	0.15 (0.14)	34	0.06 (0.05)
USA (New York, Brooklyn)[27]	4894 (19 May)[j]	0.41 (0.33)[j]	34 (New York state)	0.15 (0.14)
USA (Rhode Island), blood donors[45]	430 (11 May)	1.04 (0.83)	17	0.20 (0.16)

COVID-19: coronavirus disease 2019; NA: not available.

[a] Whenever the number or proportion of COVID-19 deaths at age < 70 years was not provided in the paper, I retrieved the proportion of these deaths from situation reports of the relevant location. If I could not find this information for the specific location, I used a larger geographic area. For Brazil, the closest information that I found was from a news report.[77] For Croatia, I retrieved data on age for 45/103 deaths through Wikipedia.[78] Geographical location in parentheses specifies the population

[b] Data are provided by the authors for deaths per 100 000 population in each city along with inferred infection fatality rate in each city, with wide differences across cities; the infection fatality rate shown here is the median across the 36 cities with 200–250 samples and at least one positive sample (the interquartile range for the uncorrected infection fatality rate is 0.20–0.60% and across all cities is 0–2.4%, but with very wide uncertainty in each city). A higher infection fatality rate is alluded to in the preprint, but the preprint also shows a scatter diagram for survey-based seroprevalence versus reported deaths per population with a regression slope that agrees with an infection fatality rate of 0.3%.

[c] Information on deaths was not available for the specific locations. In the Sao Paulo study, the authors selected six districts of Sao Paulo most affected by COVID-19; they do not name the districts and the number of deaths as of mid-May is not available, but using data for death rates across all Sao Paulo would give an infection fatality rate of > 0.4% overall. In the Vitacura study, similarly one can infer from the wider Santiago metropolitan area that the infection fatality rate in the Vitacura area would probably be < 0.2% overall.

[d] For France, government situation reports provide the number of deaths per region only for in-hospital deaths; therefore, I multiplied the number of in-hospital deaths by a factor equal to: total number of deaths/in-hospital deaths for all of France.

[e] Estimated from number of deaths in Hesse province on 17 April × proportion of deaths in the nine districts with key enrolment (enrolment ratio > 1:10 000) in the study among all deaths in Hesse province.

[f] I calculated the approximate number of deaths assuming the same case fatality ratio in the Srinagar district as in the Jammu and Kashmir state where it is located.

[g] For Karachi, it is assumed that about 30% of COVID-19 deaths in Pakistan are in Karachi (since about 30% of the cases are there).

[h] The number of deaths across all Pakistan; I assumed that this number is a good approximation of deaths in urban areas (most deaths occur in urban areas and there is some potential underreporting).

[i] I calculated the approximate number of deaths from the number of cases in the study areas in south-western Seoul, assuming a similar case fatality as in Seoul overall.

[j] Confirmed COVID-19 deaths; inclusion of probable COVID-19 deaths would increase the infection fatality rate estimates by about a quarter.

Note: Cumulative deaths are sourced from the specific study or from situation report on the same location unless otherwise stated.

0.09%, 0.20% and 0.57%, respectively, for the three location groups.

For people younger than 70 years old, the infection fatality rate of COVID-19 across 40 locations with available data ranged from 0.00% to 0.31% (median 0.05%); the corrected values were similar.

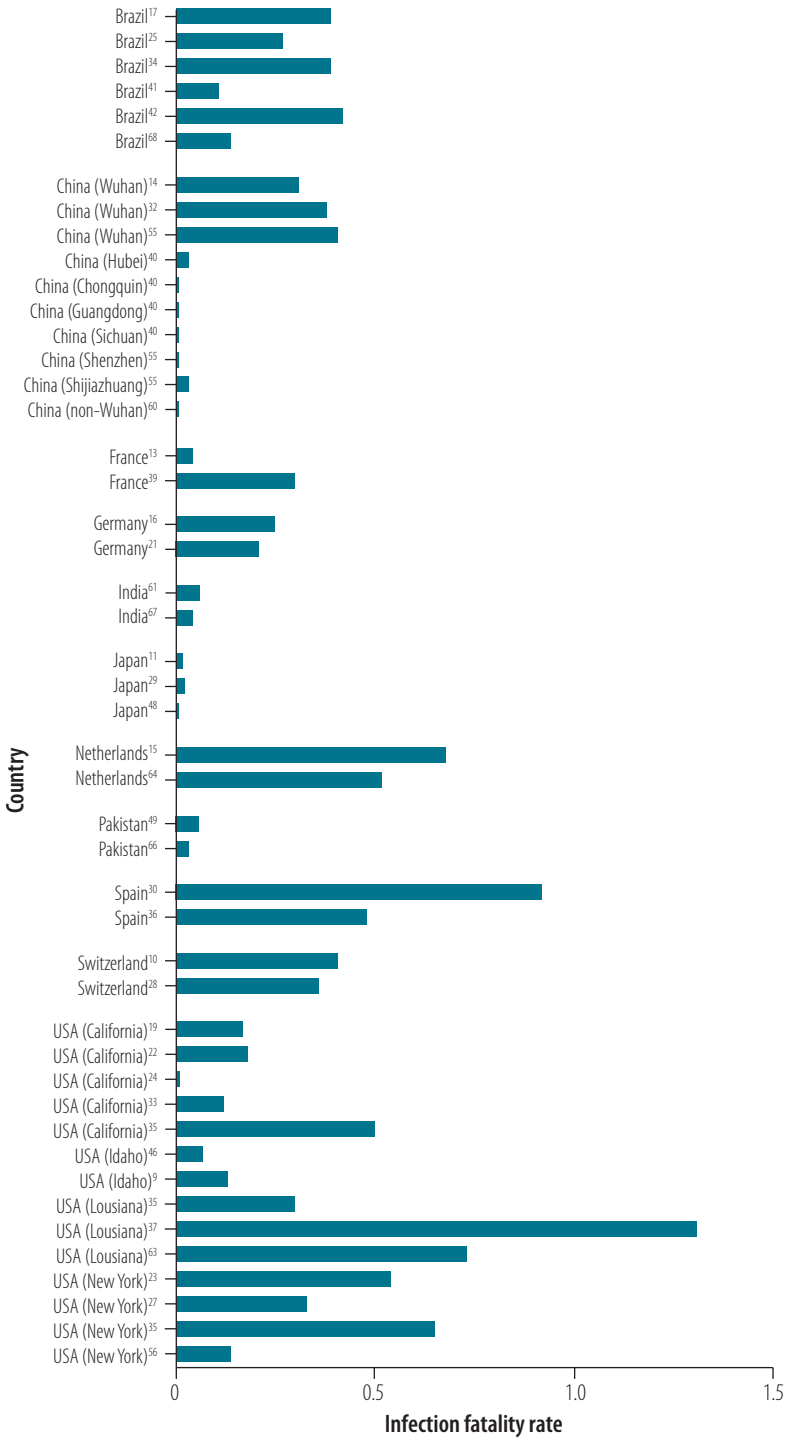
Discussion

The infection fatality rate is not a fixed physical constant and it can vary substantially across locations, depending on the population structure, the case-mix of infected and deceased individuals and other, local factors. The studies analysed here represent 82 different estimates of the infection fatality rate of COVID-19, but they are not fully representative of all countries and locations around the world. Most of the studies are from locations with overall COVID-19 mortality rates that are higher than the global average. The inferred median infection fatality rate in locations with a COVID-19 mortality rate lower than the global average is low (0.09%). If one could sample equally from all locations globally, the median infection fatality rate might even be substantially lower than the 0.23% observed in my analysis.

COVID-19 has a very steep age gradient for risk of death.[80] Moreover, in European countries that have had large numbers of cases and deaths[81], and in the USA[82], many, and in some cases most, deaths occurred in nursing homes. Locations with many nursing home deaths may have high estimates of the infection fatality rate, but the infection fatality rate would still be low among non-elderly, non-debilitated people.

Within China, the much higher infection fatality rate estimates in Wuhan compared with other areas of the country may reflect widespread nosocomial infections,[83] as well as unfamiliarity with how to manage the infection as the first location that had to deal with COVID-19. The very many deaths in nursing homes, nosocomial infections and overwhelmed hospitals may also explain the high number of fatalities in specific locations in Italy[84] and New York and neighbouring states.[23,27,35,56] Poor decisions (e.g. sending COVID-19 patients to nursing homes), poor management (e.g. unnecessary mechanical ventilation and hydroxychloroquine) may also have contributed to worse outcomes.

Fig. 2. **Estimates of infection fatality rates for COVID-19 in locations that had two or more estimates, 2020**



COVID-19: coronavirus disease 2019.
Notes: Locations are defined at the level of countries, except for the United States of America where they are defined at the level of states and China is separated into Wuhan and non-Wuhan areas. Corrected infection fatality rate estimates are shown (correcting for what types of antibodies were assayed).

High levels of congestion (e.g. in busy public transport systems) may also have exposed many people to high infectious loads and, thus, perhaps more severe disease. A more aggressive viral clade has also been speculated.[85] The infection fatality rate may be very high among disadvantaged populations and in settings with a combination of factors predisposing to higher fatalities.[37]

Very low infection fatality rates seem common in Asian coun-

Table 5. **Infection fatality rates for COVID-19 inferred from preliminary nationwide seroprevalence data, 2020**

Country	Sample size	Date	Reported seroprevalence (%)	Population, no.	Deaths, no. (date)	Inferred infection fatality rate (corrected), %
Afghanistan[75]	9 500 (NR)	NR	31.5	39 021 453	1 300 (8 May)	0.01 (0.01)
Czechia[71]	26 549 (IgG)	23 April–1 May	0.4	10 710 000	252 (4 May)	0.59 (0.47)
Finland[69]	674 (IgG)	20–26 April[a]	2.52	5 541 000	211 (30 April)	0.15 (0.12)
Georgia[76]	1 068 (NR)	18–27 May	1	3 988 264	12 (30 May)	0.03 (0.03)[b]
Israel[72]	1 709 (NR)	May	2–3	9 198 000	299 (10 June)	0.13 (0.10)[c]
Russian Federation[74]	650 000 (NR)	NR	14	145 941 776	5 859 (7 June)	0.03 (0.03)
Slovenia[73]	1 368 (NR)	April	3.1	2 079 000	92 (1 May)	0.14 (0.11)
Sweden[70]	1 200 (IgG)	18–24 May	6.3	10 101 000	4 501 (28 May)	0.71 (0.57)

COVID-19: coronavirus disease 2019; Ig: immunoglobin; NR: not reported.

[a] The seroprevalence was slightly lower in subsequent weeks.

[b] The survey was done in Tbilisi, the capital city with a population 1.1 million. I could not retrieve the count of deaths in Tbilisi, but if more deaths happened in Tbilisi, then the infection fatality rate may be higher, but still < 0.1%.

[c] Assuming a seroprevalence of 2.5%.

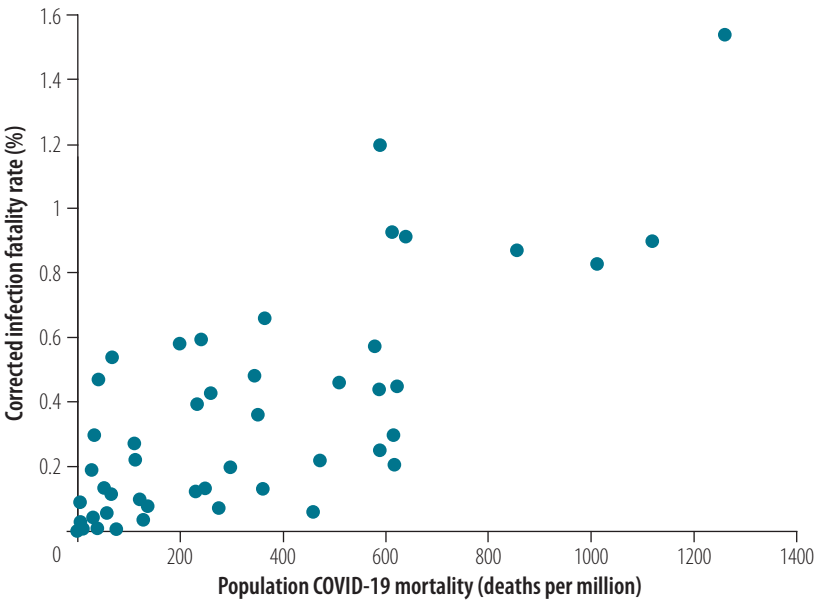
Notes: These are countries for which no eligible studies were retrieved in the literature search. The results of these studies have been announced to the press and/or in preliminary reports, but are not yet peer reviewed and published.

tries.[8,11,29,48,49,51,59,61,67] A younger population in these countries (excluding Japan), previous immunity from exposure to other coronaviruses, genetic differences, hygiene etiquette, lower infectious load and other unknown factors may explain these low rates. The infection fatality rate is low also in low-income countries in both Asia and Africa,[44,49,66,67] perhaps reflecting the young age structure. However, comorbidities, poverty, frailty (e.g. malnutrition) and congested urban living circumstances may have an adverse effect on risk and thus increase infection fatality rate.

Antibody titres may decline with time[10,28,32,86,87] and this would give falsely low prevalence estimates. I considered the maximum seroprevalence estimate when multiple repeated measurements at different time points were available, but even then some of this decline cannot be fully accounted for. With four exceptions,[10,28,32,51] the maximum seroprevalence value was at the latest time point.

Positive controls for the antibody assays used were typically symptomatic patients with positive polymerase chain reaction tests. Symptomatic patients may be more likely to develop antibodies.[87–91] Since seroprevalence studies specifically try to reveal undiagnosed asymptomatic and mildly symptomatic infections, a lower sensitivity for these mild infections could lead to substantial underestimates of the number of

Fig. 3. **Corrected estimates of COVID-19 infection fatality rate in each location plotted against COVID-19 cumulative deaths per million as of September 12 2020 in that location**



COVID-19: coronavirus disease 2019.

Notes: Locations are defined at the level of countries, except for the United Kingdom of Great Britain and Northern Ireland where they are defined by jurisdiction, United States of America (USA) are defined at the level of states and China is separated into Wuhan and non-Wuhan areas. Included locations are: Afghanistan; Argentina; Belgium; Brazil; Canada; Chile; China (non-Wuhan and Wuhan); Croatia; Czechia; Denmark; Faroe Islands; Finland; France; Georgia; Germany; Greece; Hungary; Iceland; India; Iran (Islamic Republic of); Israel; Italy; Japan; Kenya; Luxembourg; Netherlands; Pakistan; Qatar; Republic of Korea; Russian Federation; Slovenia; Spain; Sweden; Switzerland; United Kingdom (England, Scotland); and USA (California, Connecticut, Florida, Georgia, Idaho, Indiana, Louisiana, Minnesota, Missouri, New York, Pennsylvania, Rhode Island, Utah, Washington). When several infection fatality rate estimates were available from multiple studies for a location, the sample size-weighted mean is used. One outlier location with very high deaths per million population (1702 for New York) is not shown.

infected people and overestimates of the inferred infection fatality rate.

A main issue with seroprevalence studies is whether they offer a representative picture of the population in the assessed region. A generic problem is that vulnerable people at high risk of infection and/or death may be more difficult to recruit in survey-type studies. COVID-19 infection is particularly widespread and/or lethal in nursing homes, in homeless people, in prisons and in disadvantaged minorities.[92] Most of these populations are very difficult, or even impossible, to reach and sample and they are probably under-represented to various degrees (or even entirely missed) in surveys. This sampling obstacle would result in underestimating the seroprevalence and overestimating infection fatality rate.

In principle, adjusted seroprevalence values may be closer to the true estimate, but the adjustments show that each study alone may have unavoidable uncertainty and fluctuation, depending on the type of analysis chosen. Furthermore, my corrected infection fatality rate estimates try to account for undercounting of infected people when not all three antibodies (IgG, IgM and IgA) were assessed. However, the magnitude of the correction is uncertain and may vary in different circumstances. An unknown proportion of people may have responded to the virus using immune mechanisms (mucosal, innate, cellular) without generating any detectable serum antibodies.[93–97]

A limitation of this analysis is that several studies included have not yet been fully peer-reviewed and some are still ongoing. Moreover, despite efforts made by seroprevalence studies to generate estimates applicable to the general population, representativeness is difficult to ensure, even for the most rigorous studies and despite adjustments made. Estimating a single infection fatality rate value for a whole country or state can be misleading, when there is often huge variation in the population mixing patterns and pockets of high or low mortality. Furthermore, many studies have evaluated people within restricted age ranges, and the age groups that are not included may differ in seroprevalence. Statistically significant, modest differences in seroprevalence across some age groups have been observed in several studies.[10,13,15,23,27,36,38] Lower values have been seen in young children and higher values in adolescents and young adults, but these patterns are inconsistent and not strong enough to suggest that major differences are incurred by extrapolating across age groups.

Acknowledging these limitations, based on the currently available data, one may project that over half a billion people have been infected as of 12 September 2020, far more than the approximately 29 million documented laboratory-confirmed cases. Most locations probably have an infection fatality rate less than 0.20% and with appropriate, precise non-pharmacological measures that selectively try to protect high-risk vulnerable populations and settings, the infection fatality rate may be brought even lower. ■

Funding: METRICS has been supported by a grant from the Laura and John Arnold Foundation.

Competing interests: I am a co-author (not principal investigator) of one of the seroprevalence studies.

ملخص

معدل وفيات عدوى كوفيد 19 المستدل عليه من بيانات الانتشار المصلي

الغرض تقدير معدل الوفيات الناجمة عن الإصابة بمرض فيروس كورونا 2019 (كوفيد 19) من بيانات الانتشار المصلي.

الطريقة قمت بالبحث في خوادم PubMed وخوادم ما قبل الطباعة عن دراسات الانتشار المصلي لكوفيد 19، بحجم عينة أكبر من أو تساوي 500 بدءاً من 9 سبتمبر/أيلول 2020. كما أنني استرجعت النتائج الإضافية للدراسات الوطنية من البيانات الصحفية والتقارير الأولية. قمت بتقييم دراسات ميزات التصميم وتقديرات الانتشار المصلي. لقد قمت بتقدير معدل الوفيات الناجمة عن الإصابة لكل دراسة عن طريق قسمة العدد الإجمالي للوفيات الناتجة عن جائحة كوفيد 19، على عدد الأشخاص المقدر إصابتهم في كل منطقة. وقمت بتصحيح عدد أنواع الأجسام المضادة التي تم اختبارها (الغلوبين المناعي، IgA ، IgM ، IgG).

النتائج قمت بتضمين 61 دراسة (74 تقديرًا) وثمانية تقديرات وطنية أولية. تراوحت تقديرات الانتشار المصلي من 0.02% إلى 53.40%. تراوحت معدلات وفيات العدوى من 0.00% إلى 1.63%، وتم تصحيح القيم من 0.00% إلى 1.54%. عبر 51 موقعًا، كان متوسط معدل وفيات عدوى كوفيد 19 هو 0.27% (تصحيح بنسبة 0.23%): كان المعدل 0.09% في المواقع التي تقل فيها معدلات وفيات السكان المصابين بكوفيد 19 عن المتوسط العالمي (أكثر من 118 حالة وفاة/مليون نسمة)، و0.20% في المواقع التي يوجد بها من 118 إلى 500 حالة وفاة/مليون نسمة مصابين بكوفيد 19، و0.57% في مواقع بها أكثر من 500 حالة وفاة/مليون نسمة بسبب كوفيد 19. في الأشخاص الذين تقل أعمارهم عن 70 عامًا، تراوحت معدلات وفيات الإصابة بالعدوى من 0.00% إلى 0.31% بمتوسطات مبدئية ومصححة قدرها 0.05%.

الاستنتاج يمكن أن يختلف معدل وفيات الإصابة بفيروس كوفيد 19 بشكل كبير عبر المواقع المختلفة، وقد يعكس هذا الاختلافات في التركيب العمري للسكان، ومزيج الحالات من المرضى المصابين والمتوفين، وعوامل أخرى. تميل معدلات الوفيات المستدل عنها من العدوى إلى أن تكون أقل بكثير من التقديرات التي تم إجراؤها في وقت سابق في الجائحة.

摘要

根据血清阳性率数据推断新型冠状病毒肺炎的感染死亡率

目的 根据血清阳性率数据估计 2019 年冠状病毒病（新型冠状病毒肺炎）的感染死亡率。

方法 在 PubMed 和预印本服务器上查找截至 2020 年 9 月 9 日新型冠状病毒肺炎相关的血清阳性率研究，样本量为 500 个。另外根据初步新闻稿和报告检索了其他全国性研究结果。并评估了与设计特征和血清阳性率估计值相关的研究。通过将新型冠状病毒肺炎累计死亡人数除以每个地区估计感染人数，估算出了每项研究的感染死亡率。然后校正了测试的抗体类型（免疫球蛋白、免疫球蛋白 G、免疫球蛋白 M、免疫球蛋白 A）的数量。

结果 我汇总了 61 项研究（74 个估计值）和 8 个全国性初步估计值。血清阳性率估计值介于 0.02% 至 53.40% 之间。感染死亡率介于 0.00% 至 1.63% 之间，校正值则介于 0.00% 至 1.54% 之间。在 51 个地区中，新型冠状病毒肺炎感染死亡率的中位数为 0.27%（校正值为 0.23%）：在新型冠状病毒肺炎导致的人口死亡率低于全球平均水平（每一百万人口中死亡病例小于 118 例）的地区中，该比率为 0.09%；在每一百万人口中新型冠状病毒肺炎死亡病例介于 118 – 500 例之间的地区，该比率为 0.20%；而在每一百万人口中新型冠状病毒肺炎死亡病例大于 500 例的地区，该比率则为 0.57%。70 岁以下人群的感染死亡率介于 0.00% 至 0.31% 之间，经粗略校正后该比率的中位数为 0.05%。

结论 不同地区的新型冠状病毒肺炎感染死亡率可能存在很大的差异，据此可反映出在人口年龄结构、感染和死亡病例组合以及其他因素方面存在差异。推断的感染死亡率往往比全球性流行病爆发初期的估计值要低得多。

Résumé

Ratio de létalité réel de la COVID-19 déduit à partir des données de séroprévalence

Objectif Estimer le ratio de létalité réel de la maladie à coronavirus 2019 (COVID-19) à partir des données de séroprévalence.

Méthodes J'ai effectué des recherches sur PubMed et sur les serveurs de prépublication afin de trouver des études consacrées à la séroprévalence de la COVID-19, avec des échantillons ≥ 500, au 9 septembre 2020. J'ai également prélevé des résultats supplémentaires dérivés d'études nationales qui figurent dans les versions préliminaires de divers rapports et communiqués de presse. J'ai analysé les études pour y déceler des caractéristiques de conception et des estimations de séroprévalence. Ensuite, j'ai calculé le ratio de létalité réel pour chaque étude en divisant le nombre cumulé de décès dus à la COVID-19 par le nombre d'individus qui auraient été infectés dans chaque région. Enfin, j'ai apporté des corrections en fonction des types d'anticorps testés (immunoglobulines, IgG, IgM, IgA).

Résultats J'ai pris 61 études en compte (74 estimations) et huit estimations nationales préliminaires. Les estimations en matière de séroprévalence étaient comprises entre 0,02% et 53,40%. Les ratios de létalité réels allaient de 0,00% à 1,63%, les valeurs corrigées de 0,00% à 1,54%. Dans les 51 lieux étudiés, la médiane du ratio de létalité réel pour la COVID-19 s'élevait à 0,27% (0,23% après correction): le ratio était de 0,09% dans les endroits où le taux de mortalité dû à la COVID-19 était inférieur à la moyenne mondiale (< 118 décès/million d'habitants), de 0,20% dans les endroits dénombrant 118–500 décès COVID-19/million d'habitants, et de 0,57% là où la COVID-19 était responsable de > 500 décès/million d'habitants. Chez les personnes de moins de 70 ans, les ratios de létalité réels se situaient entre 0,00% et 0,31% avec des médianes brutes et corrigées de 0,05%.

Conclusion Le ratio de létalité réel de la COVID-19 peut considérablement varier d'un endroit à l'autre, ce qui pourrait correspondre aux différences de structure de pyramide des âges au sein de la population, au case-mix entre patients infectés et décédés, ainsi qu'à d'autres facteurs. Les ratios de létalité réels que j'ai pu déduire avaient tendance à être nettement inférieurs aux estimations formulées précédemment durant la pandémie.

Резюме

Показатель летальности при инфицировании COVID-19, определенный на основании данных о сераспространенности

Цель Оценить показатель летальности при инфицировании коронавирусным заболеванием 2019 г. (COVID-19) на основании данных о сераспространенности.

Методы Автор провел поиск на серверах PubMed и серверах предварительной публикации на предмет исследований сераспространенности COVID-19 с размером выборки ≥500 по состоянию на 9 сентября 2020 года. Были также получены дополнительные результаты национальных исследований из предварительных пресс-релизов и отчетов. Автор оценил исследования по элементам дизайна и оценкам сераспространенности. Автор оценил показатель летальности при инфицировании для каждого исследования, разделив общее количество смертей от COVID-19 на количество людей, предположительно инфицированных в каждом регионе. При этом была сделана поправка на количество протестированных типов антител (иммуноглобины, IgG, IgM, IgA).

Результаты В работу вошло 61 исследование (74 прогноза) и восемь предварительных национальных прогнозов. Прогнозы сераспространенности варьировались в диапазоне от 0,02 до 53,40%. Показатели летальности при инфицировании варьировались в диапазоне от 0,00 до 1,63%, скорректированные значения — от 0,00 до 1,54%. В 51 регионе средний показатель летальности при инфицировании COVID-19 составил 0,27% (скорректированный показатель 0,23%): этот показатель составил 0,09% в регионах с уровнем летальности населения от COVID-19 ниже, чем в среднем по миру (<118 смертей на миллион), 0,20% в регионах, в которых зарегистрировано 118–500 случаев смерти от COVID-19 на миллион человек, и 0,57% в регионах, где зарегистрировано более 500 случаев смерти от COVID-19 на миллион человек. У людей младше 70 лет показатель летальности при инфицировании колебался в пределах от 0,00 до

0,31% с приблизительными и скорректированными медианными значениями 0,05%.

Вывод Показатель летальности при инфицировании COVID-19 может существенно различаться в разных регионах, и это может отражать различия в возрастной структуре населения, структуре случаев инфицирования и смерти пациентов, а также в других факторах. Предполагаемые показатели летальности при инфицировании, как правило, были намного ниже, чем прогнозы, сделанные ранее во время пандемии.

Resumen

Tasa de letalidad por la infección de la COVID-19 calculada a partir de los datos de seroprevalencia

Objetivo Estimar la tasa de letalidad por la infección de la enfermedad por coronavirus de 2019 (COVID-19) a partir de los datos de seroprevalencia.

Métodos Se buscaron los estudios de seroprevalencia de la COVID-19 con un tamaño de muestra mayor o igual a 500 a partir del 9 de septiembre de 2020 en PubMed y en los servidores de preimpresión. Además, se recuperaron los resultados adicionales de los estudios nacionales a partir de los comunicados de prensa y de los informes preliminares. Se evaluaron los estudios para determinar las características de diseño y las estimaciones de seroprevalencia. Para calcular la tasa de letalidad por la infección de cada estudio, se dividió la cantidad acumulada de muertes por la COVID-19 por la cantidad de personas que se estima que están infectadas en cada región. Asimismo, se corrigió la cantidad de tipos de anticuerpos probados (inmunoglobulinas, IgG, IgM, IgA).

Resultados Se incluyeron 61 estudios (74 estimaciones) y 8 estimaciones nacionales preliminares. Las estimaciones de seroprevalencia oscilaban entre el 0,02 % y el 53,40 %. Las tasas de letalidad por la infección oscilaron entre el 0,00 % y el 1,63 %, los valores corregidos entre el 0,00 % y el 1,54 %. En 51 lugares, la mediana de la tasa de letalidad por la infección de la COVID-19 fue del 0,27 % (corregida en un 0,23 %): la tasa fue del 0,09 % en lugares donde las tasas de letalidad de la población con la COVID-19 eran inferiores al promedio mundial (menos de 118 muertes/millón), del 0,20 % en lugares con 118-500 muertes a causa de la COVID-19/millón de personas y del 0,57 % en lugares con más de 500 muertes a causa de la COVID-19/millón de personas. En personas menores de 70 años, las tasas de letalidad por la infección oscilaron entre el 0,00 % y el 0,31 % con medianas brutas y corregidas del 0,05 %.

Conclusión La tasa de letalidad por infección de la COVID-19 puede variar de manera sustancial en diferentes lugares y esto puede reflejar diferencias en la estructura de edad de la población y en la variedad de casos de los pacientes infectados y fallecidos, así como en otros factores. Las tasas de letalidad por infección que se calculan tienden a ser mucho más bajas que las estimaciones realizadas a principios de la pandemia.

References

1. Melnick ER, Ioannidis JPA. Should governments continue lockdown to slow the spread of covid-19? BMJ. 2020 Jun 3;369:m1924. doi: http://dx.doi.org/10.1136/bmj.m1924 PMID: 32493767
2. WHO Director-General's opening remarks at the media briefing on COVID-19 – 3 March 2020. Geneva: World Health Organization; 2020. Available from: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---3-march-2020 [cited 2020 May 10].
3. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) 16–24 February 2020. Geneva: World Health Organization; 2020. Available from: https://www.who.int/publications-detail/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-(covid-19) [cited 2020 May 10].
4. McGinty JC. How many people might one person with coronavirus infect? Wall Street Journal. February 14, 2020. Available from: https://www.wsj.com/articles/how-many-people-might-one-person-with-coronavirus-infect-11581676200 [cited 2020 Feb 27].
5. Ferguson NM, Laydon D, Nedjati-Gilani G, Imai N, Ainslie K, Baguelin M, et al. Report 9: Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. London: Imperial College; 2020. Available from: https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/gida-fellowships/Imperial-College-COVID19-NPI-modelling-16-03-2020.pdf [cited 2020 May 10].
6. Meyerowitz-Katz G, Merone L. A systematic review and meta-analysis of published research data on COVID-19 infection-fatality rates [online ahead of print]. Int J Infect Dis. 2020 Sep 29;S1201(20):32180–9. PMID: 33007452
7. Garcia-Basteiro AL, Moncunill G, Tortajada M, Vidal M, Guinovart C, Jiménez A, et al. Seroprevalence of antibodies against SARS-CoV-2 among health care workers in a large Spanish reference hospital. Nat Commun. 2020 Jul 8;11(1):3500. doi: http://dx.doi.org/10.1038/s41467-020-17318-x PMID: 32641730
8. Shakiba M, Nazari S, Mehrabian F, Rezvani SM, Ghasempour Z, Heidarzadeh A. Seroprevalence of COVID-19 virus infection in Guilan province, Iran [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.04.26.20079244doi: http://dx.doi.org/10.1101/2020.04.26.20079244
9. Bryan A, Pepper G, Wener MH, Fink SL, Morishima C, Chaudhary A, et al. Performance characteristics of the Abbott Architect SARS-CoV-2 IgG assay and seroprevalence in Boise, Idaho. J Clin Microbiol. 2020 Jul 23;58(8):e00941-20. doi: http://dx.doi.org/10.1128/JCM.00941-20 PMID: 32381641
10. Stringhini S, Wisniak A, Piumatti G, Azman AS, Lauer SA, Baysson H, et al. Seroprevalence of anti-SARS-CoV-2 IgG antibodies in Geneva, Switzerland (SEROCoV-POP): a population-based study. Lancet. 2020 Aug 1;396(10247):313–19. doi: http://dx.doi.org/10.1016/S0140-6736(20)31304-0 PMID: 32534626
11. Doi A, Iwata K, Kuroda H, Hasuike T, Nasu S, Kanda A, et al. Estimation of seroprevalence of novel coronavirus disease (COVID-19) using preserved serum at an outpatient setting in Kobe, Japan: a cross-sectional study [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.04.26.20079822doi: http://dx.doi.org/10.1101/2020.04.26.20079822
12. Erikstrup C, Hother CE, Pedersen OBV, Mølbak K, Skov RL, Holm DK, et al. Estimation of SARS-CoV-2 infection fatality rate by real-time antibody screening of blood donors. Clin Infect Dis. 2020 Jun 25; ciaa849. doi: http://dx.doi.org/10.1093/cid/ciaa849 PMID: 32584966
13. Fontanet A, Tondeur L, Madec Y, Grant R, Besombes C, Jolly N, et al. Cluster of COVID-19 in northern France: a retrospective closed cohort study [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.04.18.20071134doi: http://dx.doi.org/10.1101/2020.04.18.20071134
14. Wu X, Fu B, Chen L, Feng Y. Serological tests facilitate identification of asymptomatic SARS-CoV-2 infection in Wuhan, China. J Med Virol. 2020 Apr 20;92(10):1795–6. doi: http://dx.doi.org/10.1002/jmv.25904 PMID: 32311142
15. Slot E, Hogema BM, Reusken CBEM, Reimerink JH, Molier M, Karregat HM, et al. Herd immunity is not a realistic exit strategy during a COVID-19 outbreak [preprint]. Durham: Research Square; 2020. doi: http://dx.doi.org/https://doi.org/10.21203/rs.3.rs-25862/v1doi: http://dx.doi.org/10.21203/rs.3.rs-25862/v1
16. Streeck H, Schulte B, Kümmerer BM, Richter E, Höller T, Fuhrmann C, et al. Infection fatality rate of SARS-CoV-2 infection in a German community with a super-spreading event [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.04.20090076doi: http://dx.doi.org/10.1101/2020.05.04.20090076

17. Silveira MF, Barros AJD, Horta BL, Pellanda LC, Victora GD, Dellagostin OA, et al. Population-based surveys of antibodies against SARS-CoV-2 in Southern Brazil. Nat Med. 2020 Aug;26(8):1196–9. doi: http://dx.doi.org/10.1038/s41591-020-0992-3 PMID: 32641783
18. Thompson C, Grayson N, Paton RS, Lourenco J, Penman BS, Lee L. Neutralising antibodies to SARS coronavirus 2 in Scottish blood donors – a pilot study of the value of serology to determine population exposure [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.04.13.20060467doi: http://dx.doi.org/10.1101/2020.04.13.20060467
19. Bendavid E, Mulaney B, Sood N, Shah S, Ling E, Bromley-Dulfano R, et al. COVID-19 Antibody Seroprevalence in Santa Clara County, California [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.04.14.20062463doi: http://dx.doi.org/10.1101/2020.04.14.20062463
20. Snoeck CJ, Vaillant M, Abdelrahman T, Satagopam VP, Turner JD, Beaumont K, et al. Prevalence of SARS-CoV-2 infection in the Luxembourgish population: the CON-VINCE study [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.11.20092916doi: http://dx.doi.org/10.1101/2020.05.11.20092916
21. Kraehling V, Kern M, Halwe S, Mueller H, Rohde C, Savini M, et al. Epidemiological study to detect active SARS-CoV-2 infections and seropositive persons in a selected cohort of employees in the Frankfurt am Main metropolitan area [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.20.20107730doi: http://dx.doi.org/10.1101/2020.05.20.20107730
22. Sood N, Simon P, Ebner P, Eichner D, Reynolds J, Bendavid E, et al. Seroprevalence of SARS-CoV-2-specific antibodies among adults in Los Angeles County, California, on April 10–11, 2020. JAMA. 2020 06 16;323(23):2425–7. doi: http://dx.doi.org/10.1001/jama.2020.8279 PMID: 32421144
23. Rosenberg ES, Tesoriero JM, Rosenthal EM, Chung R, Barranco MA, Styer LM, et al. Cumulative incidence and diagnosis of SARS-CoV-2 infection in New York. Ann Epidemiol. 2020 Aug;48:23–29.e4. doi: http://dx.doi.org/10.1016/j.annepidem.2020.06.004 PMID: 32648546
24. Ng D, Goldgof G, Shy B, Levine A, Balcerek J, Bapat SP, et al. SARS-CoV-2 seroprevalence and neutralizing activity in donor and patient blood from the San Francisco Bay Area [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.19.20107482doi: http://dx.doi.org/10.1101/2020.05.19.20107482
25. Hallal PC, Hartwig FP, Horta BL, Victora GD, Silveira MF, Struchiner CJ, et al. Remarkable variability in SARS-CoV-2 antibodies across Brazilian regions: nationwide serological household survey in 27 states [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.30.20117531doi: http://dx.doi.org/10.1101/2020.05.30.20117531
26. Jerkovic I, Ljubic T, Basic Z, Kruzic I, Kunac N, Bezic J, et al. SARS-CoV-2 antibody seroprevalence in industry workers in Split-Dalmatia and Sibenik-Knin County, Croatia [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.11.20095158doi: http://dx.doi.org/10.1101/2020.05.11.20095158
27. Reifer J, Hayum N, Heszkel B, Klagsbald I, Streva VA. SARS-CoV-2 IgG antibody responses in New York City [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.23.20111427doi: http://dx.doi.org/10.1101/2020.05.23.20111427
28. Emmenegger M, De Cecco E, Lamparter D, Jacquat RPB, Ebner D, Schneider MM, et al. Early plateau of SARS-CoV-2 seroprevalence identified by tripartite immunoassay in a large population [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.31.20118554doi: http://dx.doi.org/10.1101/2020.05.31.20118554
29. Takita M, Matsumura T, Yamamoto K, Yamashita E, Hosoda K, Hamaki T, et al. Geographical profiles of COVID-19 outbreak in Tokyo: an analysis of the primary care clinic-based point-of-care antibody testing. J Prim Care Community Health. 2020 Jan-Dec;11:2150132720942695. doi: http://dx.doi.org/10.1177/2150132720942695 PMID: 32674696
30. Crovetto F, Crispi F, Llurba E, Figueras F, Gomez-Roig MD, Gratacos E. Seroprevalence and clinical spectrum of SARS-CoV-2 infection in the first versus third trimester of pregnancy [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.06.17doi: http://dx.doi.org/10.1101/2020.06.17
31. Fiore JR, Centra M, De Carlo A, Granato T, Rosa A, Sarno M, et al. Results from a survey in healthy blood donors in South Eastern Italy indicate that we are far away from herd immunity to SARS-CoV-2. J Med Virol. 2020 Aug 13;jmv.26425. doi: http://dx.doi.org/10.1002/jmv.26425 PMID: 32790086
32. Ling R, Yu Y, He J, Zhang J, Xu S, Sun R, et al. Seroprevalence and epidemiological characteristics of immunoglobulin M and G antibodies against SARS-CoV-2 in asymptomatic people in Wuhan, China [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.06.16.20132423doi: http://dx.doi.org/10.1101/2020.06.16.20132423
33. Chamie G, Marquez C, Crawford E, Peng J, Petersen M, Schwab D, et al. SARS-CoV-2 community transmission during shelter-in-place in San Francisco [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.06.15.20132233doi: http://dx.doi.org/10.1101/2020.06.15.20132233
34. Gomes CC, Cerutti C, Zandonade E, Maciel EKN, Carvalho de Alencar FE, Almada GL, et al. A population-based study of the prevalence of COVID-19 infection in Espírito Santo, Brazil: methodology and results of the first stage [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.06.13.20130559doi: http://dx.doi.org/10.1101/2020.06.13.20130559
35. Havers FP, Reed C, Lim T, Montgomery JM, Klena JD, Hall AJ, et al. Seroprevalence of antibodies to SARS-CoV-2 in 10 sites in the United States, March 23-May 12, 2020. JAMA Intern Med. 2020 Jul 21. doi: http://dx.doi.org/10.1001/jamainternmed.2020.4130 PMID: 32692365
36. Pollán M, Pérez-Gómez B, Pastor-Barriuso R, Oteo J, Hernán MA, Pérez-Olmeda M, et al.; ENE-COVID Study Group. Prevalence of SARS-CoV-2 in Spain (ENE-COVID): a nationwide, population-based seroepidemiological study. Lancet. 2020 08 22;396(10250):535–44. doi: http://dx.doi.org/10.1016/S0140-6736(20)31483-5 PMID: 32645347
37. Feehan AK, Fort D, Garcia-Diaz J, Price-Haywood E, Velasco C, Sapp E, et al. Seroprevalence of SARS-CoV-2 and infection fatality ratio, Orleans and Jefferson Parishes, Louisiana, USA, May 2020. Emerg Infect Dis. 2020 Jul 30;26(11). doi: http://dx.doi.org/10.3201/eid2611.203029 PMID: 32731911
38. Herzog S, De Bie J, Abrams S, Wouters I, Ekinci E, Patteet L, et al. Seroprevalence of IgG antibodies against SARS coronavirus 2 in Belgium – a prospective cross sectional study of residual samples [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.06.08.20125179doi: http://dx.doi.org/10.1101/2020.06.08.20125179
39. Fontanet A, Grant R, Tondeur L, Madec Y, Grzelak L, Cailleau I, et al. SARS-CoV-2 infection in primary schools in northern France: A retrospective cohort study in an area of high transmission [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.06.25.20140178doi: http://dx.doi.org/10.1101/2020.06.25.20140178
40. Xu X, Sun J, Nie S, Li H, Kong Y, Liang M, et al. Seroprevalence of immunoglobulin M and G antibodies against SARS-CoV-2 in China. Nat Med. 2020 08;26(8):1193–5. doi: http://dx.doi.org/10.1038/s41591-020-0949-6 PMID: 32504052
41. Amorim Filho L, Szwarcwald CL, Mateos SOG, Leon ACMP, Medronho RA, Veloso VG, et al.; Grupo Hemorio de Pesquisa em Covid-19. Seroprevalence of anti-SARS-CoV-2 among blood donors in Rio de Janeiro, Brazil. Rev Saude Publica. 2020;54:69. PMID: 32638883
42. Tess BH, Granato CFH, Alves MC, Pintao MC, Rizzatti E, Nunes MC, et al. SARS-CoV-2 seroprevalence in the municipality of São Paulo, Brazil, ten weeks after the first reported case [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/10.1101/2020.06.29.20142331doi: http://dx.doi.org/10.1101/2020.06.29.20142331
43. Torres JP, Piñera C, De La Maza V, Lagomarcino AJ, Simian D, Torres B, et al. SARS-CoV-2 antibody prevalence in blood in a large school community subject to a Covid-19 outbreak: a cross-sectional study. Clin Infect Dis. 2020 Jul 10;ciaa955. doi: http://dx.doi.org/10.1093/cid/ciaa955 PMID: 32649743
44. Uyoga S, Adetifa IMO, Karanja HK, Nyagwange J, Tuju J, Wankiku P, et al. Seroprevalence of anti-SARS-CoV-2 IgG antibodies in Kenyan blood donors [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.27.20162693doi: http://dx.doi.org/10.1101/2020.07.27.20162693
45. Nesbitt DJ, Jin D, Hogan JW, Chan PA, Simon MJ, Vargas M, et al. Low seroprevalence of SARS-CoV-2 in Rhode Island blood donors determined using multiple serological assay formats [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.20.20157743doi: http://dx.doi.org/10.1101/2020.07.20.20157743
46. McLaughlin CC, Doll MK, Morrison KT, McLaughlin WL, O'Connor T, Sholukh AM, et al. High community SARS-CoV-2 antibody seroprevalence in a ski resort community, Blaine County, Idaho, US. preliminary results [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.19.20157198doi: http://dx.doi.org/10.1101/2020.07.19.20157198

47. Figar S, Pagotto V, Luna L, Salto J, Manslau MW, Mistchenko AS, et al. Community-level SARS-CoV-2 seroprevalence survey in urban slum dwellers of Buenos Aires City, Argentina: a participatory research [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.14.20153858doi: http://dx.doi.org/10.1101/2020.07.14.20153858
48. Nawa N, Kuramochi J, Sonoda S, Yamaoka Y, Nukui Y, Miyazaki Y, et al. Seroprevalence of SARS-CoV-2 IgG antibodies in Utsunomiya City, Greater Tokyo, after first pandemic in 2020 (U-CORONA): a household- and population-based study [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.20.20155945doi: http://dx.doi.org/10.1101/2020.07.20.20155945
49. Nisar I, Ansari N, Amin M, Khalid F, Hotwani A, Rehman N, et al. Serial population based serosurvey of antibodies to SARS-CoV-2 in a low and high transmission area of Karachi, Pakistan [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.28.20163451doi: http://dx.doi.org/10.1101/2020.07.28.20163451
50. Skowronski DM, Sekirov I, Sabaiduc S, Zou M, Morshed M, Lawrence D, et al. Low SARS-CoV-2 sero-prevalence based on anonymized residual sero-survey before and after first wave measures in British Columbia, Canada, March–May 2020 [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.13.20153148doi: http://dx.doi.org/10.1101/2020.07.13.20153148
51. Abu Raddad LJ, Chemaitelly H, Ayoub HH, Al Kanaani Z, Al Khal A, Al Kuwari E, et al. Characterizing the Qatar advanced-phase SARS-CoV-2 epidemic [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.16.20155317doi: http://dx.doi.org/10.1101/2020.07.16.20155317
52. Petersen MS, Strøm M, Christiansen DH, Fjallsbak JP, Eliasen EH, Johansen M, et al. Seroprevalence of SARS-CoV-2-specific antibodies, Faroe Islands. Emerg Infect Dis. 2020 Jul 29;26(11). doi: http://dx.doi.org/10.3201/eid2611.202736 PMID: 32726200
53. Biggs HM, Harris JB, Breakwell L, Dahlgren FS, Abedi GR, Szablewski CM, et al.; CDC Field Surveyor Team. Estimated community seroprevalence of SARS-CoV-2 antibodies - two Georgia counties, April 28–May 3, 2020. MMWR Morb Mortal Wkly Rep. 2020 Jul 24;69(29):965–70. doi: http://dx.doi.org/10.15585/mmwr.mm6929e2 PMID: 32701941
54. Menachemi N, Yiannoutsos CT, Dixon BE, Duszynski TJ, Fadel WF, Wools-Kaloustian KK, et al. Population point prevalence of SARS-CoV-2 infection based on a statewide random sample – Indiana, April 25–29, 2020. MMWR Morb Mortal Wkly Rep. 2020 Jul 24;69(29):960–4. doi: http://dx.doi.org/10.15585/mmwr.mm6929e1 PMID: 32701938
55. Chang L, Hou W, Zhao L, Zhang Y, Wang Y, Wu L, et al. The prevalence of antibodies to SARS-CoV-2 among blood donors in China [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.13.20153106doi: http://dx.doi.org/10.1101/2020.07.13.20153106
56. Meyers K, Liu L, Lin W-H, Luo Y, Yin M, Wu Y, et al. Antibody testing documents the silent spread of SARS-CoV-2 in New York prior to the first reported case [preprint]. Durham: Research Square; 2020. doi: http://dx.doi.org/10.21203/rs.3.rs-39880/v1
57. Merkely B, Szabó AJ, Kosztin A, Berényi E, Sebestyén A, Lengyel C, et al.; HUNgarian COronaVirus-19 Epidemiological Research (H-UNCOVER) investigators. Novel coronavirus epidemic in the Hungarian population, a cross-sectional nationwide survey to support the exit policy in Hungary. Geroscience. 2020 Aug;42(4):1063–74. doi: http://dx.doi.org/10.1007/s11357-020-00226-9 PMID: 32677025
58. Gudbjartsson DF, Norddahl GL, Melsted P, Gunnarsdottir K, Holm H, Eythorsson E, et al. Humoral immune response to SARS-CoV-2 in Iceland. N Engl J Med. 2020 Sep 1.NEJMoa2026116 [online ahead of print]. doi: http://dx.doi.org/10.1056/NEJMoa2026116 PMID: 32871063
59. Noh JY, Seo YB, Yoon JG, Seong H, Hyun H, Lee J, et al. Seroprevalence of anti-SARS-CoV-2 antibodies among outpatients in southwestern Seoul, Korea. J Korean Med Sci. 2020 Aug 24;35(33):e311. doi: http://dx.doi.org/10.3346/jkms.2020.35.e311 PMID: 32830472
60. Xu R, Huang J, Duan C, Liao Q, Shan Z, Wang M, et al. Low prevalence of antibodies against SARS-CoV-2 among voluntary blood donors in Guangzhou, China. J Med Virol. 2020 Aug 19.jmv.26445. [online ahead of print]. doi: http://dx.doi.org/10.1002/jmv.26445 PMID: 32813273
61. Malani A, Shah D, Kang G, Lobo GN, Shastri J, Mohanan M, et al. Seroprevalence of SARS-CoV-2 in slums and non-slums of Mumbai, India, during June 29–July 19, 2020 [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.08.27.20182741doi: http://dx.doi.org/10.1101/2020.08.27.20182741
62. Bogogiannidou Z, Vontas A, Dadouli K, Kyritsi MA, Soteriades S, Nikoulis DJ, et al. Repeated leftover serosurvey of SARS-CoV-2 IgG antibodies, Greece, March and April 2020. Euro Surveill. 2020 Aug;25(31):2001369. doi: http://dx.doi.org/10.2807/1560-7917.ES.2020.25.31.2001369 PMID: 32762796
63. Feehan AK, Velasco C, Fort D, Burton JH, Price-Haywood E, Katzmarzyk PT, et al. Racial and workplace disparities in seroprevalence of SARS-CoV-2 in Baton Rouge, Louisiana, 4 July 15–31, 2020 [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.08.26.20180968doi: http://dx.doi.org/10.1101/2020.08.26.20180968
64. Westerhuis BM, de Bruin E, Chandler FD, Ramakers CRB, Okba NMA, Li W, et al. Homologous and he 1 terologous antibodies to coronavirus 229E, NL63, OC43, HKU1, SARS, MERS and SARS-CoV-2 antigens in an age stratified cross-sectional serosurvey in a large tertiary hospital in The Netherlands [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.08.21.20177857doi: http://dx.doi.org/10.1101/2020.08.21.20177857
65. Ward H, Atchinson C, Whitaker M, Ainslie KED, Elliott J, Okell L, et al. Antibody prevalence for SARS-CoV-2 following the peak of the pandemic in England: REACT2 study in 100,000 adults [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.08.12.20173690doi: http://dx.doi.org/10.1101/2020.08.12.20173690
66. Javed W, Baqar J, Abidi SHB, Farooq W. Sero-prevalence findings from metropoles in Pakistan: implications for assessing COVID-19 prevalence and case-fatality within a dense, urban working population [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/10.1101/2020.08.13.20173914doi: http://dx.doi.org/10.1101/2020.08.13.20173914
67. Khan MS, Qurieshi MA, Haq I, Majid S, Akbar A. Seroprevalence of SARS-CoV-2 specific IgG antibodies in District Srinagar, northern India – a cross-sectional study [preprint].Cold Spring Harbor: bioRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.09.04.282640doi: http://dx.doi.org/10.1101/2020.09.04.282640
68. Da Silva A, Lima-Neto L, de Azevedo C, da Costa L, Braganca M, Filho A, et al. Population-based seroprevalence of SARS-CoV-2 is more than halfway through the herd immunity threshold in the State of Maranhão, Brazil [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/10.1101/2020.08.28.20180463doi: http://dx.doi.org/ doi: http://dx.doi.org/10.1101/2020.08.28.20180463
69. [Weekly report of the population serology survey of the corona epidemic.] Helsinki: Finland Department of Health and Welfare; 2020. [Finnish]. Available from: https://www.thl.fi/roko/cov-vaestoserologia/sero_report_weekly.html [cited 2020 Jul 12].
70. [First results on antibodies after review of covid-19 in blood donors.] Solna: Swedish Public Health Agency; 2020. [Swedish]. Available from: https://www.folkhalsomyndigheten.se/nyheter-och-press/nyhetsarkiv/2020/juni/forsta-resultaten-om-antikroppar-efter-genomgangen-covid-19-hos-blodgivare/ [cited 2020 Jul 12].
71. [Studie SARS-CoV-2-CZ-Preval.] Prague: Institute of Health Information and Statistics of the Czech Republic; 2020. [Czech]. Available from: https://covid-imunita.uzis.cz/res/file/prezentace/20200506-dusek.pdf [cited 2020 Jul 12].
72. Jaffe-Hoffman M. Coronavirus herd immunity? Not in Israel, according to a serological study. Jerusalem Post. 2020 Jun 2. Available from: https://www.jpost.com/israel-news/coronavirus-herd-immunity-not-in-israel-according-to-a-serological-study-630059 [cited 2020 Jul 12].
73. First study carried out on herd immunity of the population in the whole territory of Slovenia. Ljubljana: Republic of Slovenia; 2020. Available from: https://www.gov.si/en/news/2020-05-06-first-study-carried-out-on-herd-immunity-of-the-population-in-the-whole-territory-of-slovenia/ [cited 2020 Jul 12].
74. [Popova declared immunity to coronavirus in 14% of those tested]. Interfax. 2020 Jun 10. [Russian]. Available from: https://www.interfax.ru/russia/712617 [cited 2020 Aug 12].
75. Gul A. Ten million Afghans likely infected and recovered: COVID-19 survey. VOA. 2020 Aug 5. Available from: https://www.voanews.com/south-central-asia/10-million-afghans-likely-infected-and-recovered-covid-19-survey [cited 2020 Aug 12].
76. Preliminary results of seroprevalence study in Tbilisi: 10 out of 1068 residents have coronavirus antibodies. Agenda.ge. 2020 Jun 29. Available from: https://agenda.ge/en/news/2020/2055 [cited 2020 Aug 12].
77. Genot L. In Brazil, COVID-19 hitting young people harder. The Jakarta Post. 2020 May 22. Available from: https://www.thejakartapost.com/news/2020/05/22/in-brazil-covid-19-hitting-young-people-harder.html [cited 2020 Jul 12].
78. COVID-19 pandemic in Croatia [internet]. Wikipedia; 2020. Available from https://en.wikipedia.org/wiki/COVID-19_pandemic_in_Croatia [cited 2020 Jul 12].

79. COVID-19 coronavirus pandemic [internet]. Dover: Worldometer; 2020. Available from: https://www.worldometers.info/coronavirus/ [cited 2020 Sep 12].
80. Ioannidis JPA, Axfors C, Contopoulos-Ioannidis DG. Population-level COVID-19 mortality risk for non-elderly individuals overall and for non-elderly individuals without underlying diseases in pandemic epicenters. Environ Res. 2020 Sep;188:109890. doi: http://dx.doi.org/10.1016/j.envres.2020.109890 PMID: 32846654
81. Booth R. Half of coronavirus deaths happen in care homes, data from EU suggests. The Guardian. 2020 Apr 13. Available from: https://www.theguardian.com/world/2020/apr/13/half-of-coronavirus-deaths-happen-in-care-homes-data-from-eu-suggests [cited 2020 Apr 27].
82. American Geriatrics Society. American Geriatrics Society Policy Brief: COVID-19 and nursing homes. J Am Geriatr Soc. 2020 May;68(5):908–11. doi: http://dx.doi.org/10.1111/jgs.16477 PMID: 32267538
83. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA. 2020 Mar 17;323(11):1061–9. doi: http://dx.doi.org/10.1001/jama.2020.1585 PMID: 32031570
84. Boccia S, Ricciardi W, Ioannidis JPA. What other countries can learn from Italy during the COVID-19 pandemic. JAMA Intern Med. 2020 Jul 1;180(7):927–8. doi: http://dx.doi.org/10.1001/jamainternmed.2020.1447 PMID: 32259190
85. Brufsky A. Distinct viral clades of SARS-CoV-2: implications for modeling of viral spread. J Med Virol. 2020 Apr 20;92(9):1386–90. doi: http://dx.doi.org/10.1002/jmv.25902 PMID: 32311094
86. Rosado J, Cockram C, Merkling SH, Demeret C, Meola A, Kerneis S, et al. Serological signatures of SARS-CoV-2 infection: implications for antibody-based diagnostics [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.07.20093963doi: http://dx.doi.org/10.1101/2020.05.07.20093963
87. Long QX, Tang XJ, Shi QL, Li Q, Deng HJ, Yuan J, et al. Clinical and immunological assessment of asymptomatic SARS-CoV-2 infections. Nat Med. 2020 Aug;26(8):1200–4. doi: http://dx.doi.org/10.1038/s41591-020-0965-6 PMID: 32555424
88. Wu F, Wang A, Liu M, Wang Q, Chen J, Xia S, et al. Neutralizing antibody responses to SARS-CoV-2 in a COVID-19 recovered patient cohort and their implications [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.03.30.20047365doi: http://dx.doi.org/10.1101/2020.03.30.20047365
89. Seow J, Graham C, Merrick B, Acors S, Steel KJA, Hemmings O, et al. Longitudinal evaluation and decline of antibody responses in SARS-CoV-2 infection [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.07.09.20148429doi: http://dx.doi.org/10.1101/2020.07.09.20148429
90. Edouard S, Colson P, Melenotte C, De Pinto F, Thomas L, La Scola B, et al. Evaluating the serological status of COVID-19 patients using an indirect immunofluorescent assay, France [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.05.20092064doi: http://dx.doi.org/10.1101/2020.05.05.20092064
91. Solbach W, Schiffner J, Backhaus I, Burger D, Staiger R, Tiemer B, et al. Antibody profiling of COVID-19 patients in an urban low-incidence region in northern Germany [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.30.20111393doi: http://dx.doi.org/10.1101/2020.05.30.20111393
92. Ioannidis JPA. Global perspective of COVID-19 epidemiology for a full-cycle pandemic. Eur J Clin Invest. 2020 Oct 7;e13421. doi: http://dx.doi.org/10.1111/eci.13423 PMID: 33026101
93. Kikkert M. Innate immune evasion by human respiratory RNA viruses. J Innate Immun. 2020;12(1):4–20. doi: http://dx.doi.org/10.1159/000503030 PMID: 31610541
94. Krammer F. The human antibody response to influenza A virus infection and vaccination. Nat Rev Immunol. 2019 Jun;19(6):383–97. doi: http://dx.doi.org/10.1038/s41577-019-0143-6 PMID: 30837674
95. Cervia C, Nilsson J, Zurbuchen Y, Valaperti A, Schreiner J, Wolfensberger A, et al. Systemic and mucosal antibody secretion specific to SARS-CoV-2 during mild versus severe COVID-19 [preprint]. Cold Spring Harbor: bioRxiv. 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.05.21.108308doi: http://dx.doi.org/10.1101/2020.05.21.108308
96. Gallais F, Velay A, Wendling M-J, Nazon C, Partisani M, Sibilia J, et al. Intrafamilial exposure to SARS-CoV-2 induces cellular immune response without seroconversion [preprint]. Cold Spring Harbor: medRxiv; 2020. doi: http://dx.doi.org/https://doi.org/10.1101/2020.06.21.20132449doi: http://dx.doi.org/10.1101/2020.06.21.20132449
97. Sekine T, Perez-Potti A, Rivera-Ballesteros O, Strålin K, Gorin J-B, Olsson A, et al.; Karolinska COVID-19 Study Group. Robust T cell immunity in convalescent individuals with asymptomatic or mild COVID-19. Cell. 2020 10 1;183(1):158–168.e14. doi: http://dx.doi.org/10.1016/j.cell.2020.08.017 PMID: 32979941

Table 1. **Eligible seroprevalence studies on COVID-19 published or deposited as preprints as of 9 September 2020: dates, sampling and recruitment**

Author	Country (location)	Dates	Sampling and recruitment
Figar et al.[47]	Argentina (Barrio Padre Mugica)	10–26 June	Probabilistic sampling of a slum neighbourhood, sampling from people 14 years or older across households
Herzog et al.[38]	Belgium	30 March–5 April and 20–26 April	Residual sera from 10 private diagnostic laboratories in Belgium, with fixed numbers per age group, region and periodical sampling, and stratified by sex
Hallal et al.[25]	Brazil	15–22 May	Sampling from 133 cities (the main city in each region), selecting 25 census tracts with probability proportionate to size in each sentinel city, and 10 households at random in each tract. Aiming for 250 participants per city
Gomes et al.[34]	Brazil (Espirito Santo)	13–15 May	Cross-section of major municipalities with houses as the sampling units
Da Silva et al.[68]	Brazil (Maranhao)	27 July–8 August	Three-stage cluster sampling stratified by four state regions in the state of Maranhao; the estimates took clustering, stratification and non-response into account
Amorim Filho et al.[41]	Brazil (Rio de Janeiro)	14–27 April (eligible: 24–27 April)	Blood donors without flulike symptoms within 30 days of donation; had close contact with suspected or confirmed COVID-19 cases in the 30 days before donation; or had travelled abroad in the past 30 days
Silveira et al.[17]	Brazil (Rio Grande do Sul)	9–11 May (third round, after 11–13 April, and 25–27 April)	Multistage probability sampling in each of nine cities to select 500 households, from which one member was randomly chosen for testing
Tess et al.[42]	Brazil (Sao Paulo)	4–12 May	Randomly selected adults and their cohabitants sampled from six districts of Sao Paulo City with high numbers of cases
Skowronski et al.[50]	Canada (British Columbia)	15–27 May (after baseline in 5–13 March)	Specimens from patients attending one of about 80 diagnostic service centres of the only outpatient laboratory network in the Lower Mainland
Torres et al.[43]	Chile (Vitacura)	4–19 May	Classroom stratified sample of children and all staff in a community placed on quarantine after school outbreak
Chang et al.[55]	China	January–April weekly: 3–23 February (Wuhan); 24 February–15 March (Shenzhen); 10 February–1 March (Shijiazhuang)	38 144 healthy blood donors in Wuhan, Shenzhen and Shijiazhuang who met the criteria for blood donation during the COVID-19 pandemic in China
Wu et al.[14]	China (Wuhan)	3–15 April	People applying for permission to resume work ($n = 1021$) and hospitalized patients ($n = 381$)
Ling et al.[32]	China (Wuhan)	26 March–28 April	Age 16–64 years, going back to work, with no fever, headache or other symptoms of COVID-19
Xu et al.[60]	China (Guangzhou)	23 March–2 April	Healthy blood donors in Guangzhou
Xu et al.[40]	China (several regions)	30 March–10 April	Voluntary participation by public call for haemodialysis patients ($n = 979$ in Jingzhou, Hubei and $n = 563$ in Guangzhou/Foshan, Guangdong) and outpatients in Chongqing ($n = 993$), and community residents in Chengdu, Sichuan ($n = 9442$), and required testing for factory workers in Guangzhou, Guandong ($n = 442$)
Jerkovic et al.[26]	Croatia	23–28 April	DIV Group factory workers in Split and Sibenik-Knin invited for voluntary testing
Erikstrup et al.[12]	Denmark	6 April–3 May	All Danish blood donors aged 17–69 years giving blood. Blood donors are healthy and must comply with strict eligibility criteria; they must self-defer for two weeks if they develop fever with upper respiratory symptoms
Petersen et al.[52]	Denmark (Faroe Islands)	27 April–1 May	1 500 randomly selected residents invited to participate, samples collected from 1075
Fontanet et al.[39]	France (Crepy-en-Valois)	28–30 April	Pupils, their parents and relatives, and staff of primary schools exposed to SARS-CoV-2 in February and March 2020 in a city north of Paris
Fontanet et al.[13]	France (Oise)	30 March–4 April	Pupils, their parents and siblings, as well as teachers and non-teaching staff of a high-school
Streeck et al.[16]	Germany (Gangelt)	30 March–6 April	600 adults with different surnames in Gangelt were randomly selected; all household members were asked to participate in the study

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Author	Country (location)	Dates	Sampling and recruitment
Kraehling et al.[21]	Germany (Frankfurt)	6–14 April	Employees of Infraserv Höchst, a large industrial site operator in Frankfurt am Main. No exclusion criteria
Bogogiannidou et al.[62]	Greece	March and April (April data used)	Leftover blood samples collected from a nationwide laboratory network, including both private and public hospital laboratories (27 laboratories in total)
Merkely et al.[57]	Hungary	1–16 May	Representative sample (n = 17 787) of the Hungarian population ≥ 14 years living in private households (8 283 810)
Gudbjartsson et al.[58]	Iceland	Several cohorts between April and June[a]	30 576 people in Iceland, including those documented to be infected, those quarantined and people not known to have been exposed
Malani et al.[61]	India (Mumbai)	29 June–19 July	Geographically-spaced community sampling of households, one individual per household was tested in slum and non-slum communities in three wards, one each from the three main zones of Mumbai
Khan et al.[67]	India (Srinagar)	1–15 July	Adults (> 18 years) who visited selected hospitals across the Srinagar District
Shakiba et al.[8]	Islamic Republic of Iran (Guilan)	April (until 21 April)	Population-based cluster random sampling design through telephone call invitation, household-based
Fiore et al.[31]	Italy (Apulia)	1–31 May	Blood donors 18–65 years old free of recent symptoms possibly related to COVID-19, no close contact with confirmed cases, symptom-free in the preceding 14 days, no contact with suspected cases
Doi et al.[11]	Japan (Kobe)	31 March–7 April	Randomly selected patients who visited outpatient clinics and received blood testing for any reason. Patients who visited the emergency department or the designated fever consultation service were excluded
Takita et al.[29]	Japan (Tokyo)	21 April–20 May	Two community clinics in the main railway stations in Tokyo (Navitas Clinic Shinjuku and Tachikawa)
Nawa et al.[48]	Japan (Utsunomiya City)	14 June–5 July	Invitations enclosed with a questionnaire were sent to 2290 people in 1 000 households randomly selected from Utsunomiya City's basic resident registry; 742 completed the study
Uyoga et al.[44]	Kenya	30 April–16 June (~90% of samples in last 30 days)	Residual blood donor serum samples from donors 16–65 years in four sites (Mombasa, Nairobi, Eldoret and Kisumu)
Snoeck et al.[20]	Luxembourg	16 April–5 May	Representative sample (no details how ensured), 1807 of 2000 contacted provided data, were < 79 years and had serology results
Slot et al.[15]	Netherlands	1–15 April	Blood donors. Donors must be completely healthy, but they may have been ill in the past, provided that they recovered at least 2 weeks before
Westerhuis et al.[64]	Netherlands (Rotterdam)	Early March and early April	Left-over plasma samples from patients of nine age categories in Erasmus Medical Center in Rotterdam: 879 samples in early March and 729 in early April)
Nisar et al.[49]	Pakistan (Karachi)	25 June–11 July (after baseline on 15–25 April)	Cross-sectional household surveys in a low- (district Malir) and high-transmission (district East) area of Karachi with households selected using simple random sampling (Malir) and systematic random sampling (East)
Javed et al.[66]	Pakistan (urban Karachi, Lahore, Multan, Peshawar and Quetta)	Up to 6 July	Adult, working population aged 18–65 years, recruited from dense, urban workplaces including factories, businesses, restaurants, media houses, schools, banks, hospitals (health-care providers), and from families of positive cases in cities in Pakistan
Abu Raddad et al.[51]	Qatar	12 May–12 July (highest seroprevalence on 12–31 May)	Convenience sample of residual blood specimens collected for routine clinical screening or clinical management from 32 970 outpatient and inpatient departments for a variety of health conditions (n = 937 in 12–31 May)
Noh et al.[59]	Republic of Korea	25–29 May	Outpatients who visited two hospitals in south-west Seoul which serve six administrative areas
Pollán et al.[36]	Spain	27 April–11 May	35 883 households selected from municipal rolls using two-stage random sampling stratified by province and municipality size, with all residents invited to participate (75.1% of all contacted individuals participated)

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Author	Country (location)	Dates	Sampling and recruitment
Crovetto et al.[30]	Spain (Barcelona)	14 April–5 May	Consecutive pregnant women for first trimester screening or delivery in two hospitals
Stringhini et al.[10]	Switzerland (Geneva)	6 April–9 May (5 consecutive weeks)	Randomly selected previous participants of the Bus Santé study with an email (or telephone contact, if email unavailable); participants were invited to bring all members of their household aged 5 years and older
Emmenegger et al.[28]	Switzerland (Zurich)	Prepandemic until June (patients) and May (blood donors)	Patients at the University Hospital of Zurich and blood donors in Zurich and Lucerne
Ward et al.[65]	United Kingdom (England)	20 June–13 July	Random population sample of 100 000 adults over 18 years
Thompson et al.[18]	United Kingdom (Scotland)	21–23 March	Blood donors. Donors should not have felt unwell in the past 14 days; some other deferrals also applied regarding travel and COVID-19 symptoms
Havers et al.[35]	USA (10 states)	23 March–1 April (Washington, Puget Sound and New York, New York City), 1–8 April (Louisiana), 5–10 April (Florida, south), 13–25 April (Pennsylvania, Philadelphia, metropolitan area), 20–26 April (Missouri), 23–27 April (California, San Francisco Bay Area), 20 April–3 May (Utah), 26 April–3 May (Connecticut), 30 April–12 May (Minnesota, Minneapolis)	Convenience samples using residual sera obtained for routine clinical testing (screening or management) by two commercial laboratory companies
Ng et al.[24]	USA (California, Bay Area)	March	1000 blood donors in diverse Bay Area locations (excluding those with self-reported symptoms or abnormal vital signs)
Sood[22]	USA (California, Los Angeles)	10–14 April	Proprietary database representative of the county. A random sample of these residents was invited, with quotas for enrolment for subgroups based on age, sex, race and ethnicity distribution
Chamie et al.[33]	USA (California, San Francisco)	25–28 April	United States census tract 022 901 population-dense area (58% Latin American) in San Francisco Mission district, expanded to neighbouring blocks on 28 April
Bendavid et al.[19]	USA (California, Santa Clara)	2–3 April	Facebook advertisement with additional targeting by zip code
Biggs et al.[53]	USA (Georgia, DeKalb and Fulton)	28 April–3 May	Two-stage cluster sampling design used to randomly select 30 census blocks in DeKalb County and 30 census blocks in Fulton County, with a target of seven participating households per census block
McLaughlin et al.[46]	USA (Idaho, Blaine County)	4–19 May	Volunteers who registered via a secure web link, using prestratification weighting to the population distribution by age and sex within each zip code
Bryan et al.[9]	USA (Idaho, Boise)	Late April	People from the Boise, Idaho metropolitan area, part of the Crush the Curve initiative
Menachemi et al.[54]	USA (Indiana)	25–29 April	Stratified random sampling among all persons aged ≥ 12 years using Indiana's 10 public health preparedness districts as sampling strata
Feehan et al.[63]	USA (Louisiana, Baton Rouge)	15–31 July	Representative sample in a method developed by Public Democracy
Feehan et al.[37]	USA (Louisiana, Orleans and Jefferson Parish)	9–15 May	Pool of potential participants reflecting the demographics of the parishes was based on 50 characteristics, then a randomized subset of 150 000 people was selected, and 25 000 were approached with digital apps, and 2640 were recruited

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Author	Country (location)	Dates	Sampling and recruitment
Rosenberg et al.[23]	USA (New York)	19–28 April	Convenience sample of people ≥ 18 years living in New York State, recruited consecutively on entering 99 grocery stores and through an in-store flyer
Meyers et al.[56]	USA (New York)	2–30 March (Columbia University Medical Center, New York City); 13–28 March (CareMount central laboratory)	Discarded clinical samples in Columbia Medical Center, New York City ($n = 814$ in 24 February–30 March, 742 of those in the period 2–30 March) and samples from CareMount central laboratory (960 samples on 13/14 March, 505 samples on 20/21 March, and 376 samples on 27/28 March) from its network of clinics in five counties north of New York City
Reifer et al.[27]	USA (New York, Brooklyn)	Early May	Patients seen in an urgent care facility in Brooklyn
Nesbitt et al.[45]	USA (Rhode Island)	27 April–11 May	Consecutive blood donors

COVID-19: coronavirus disease 19; SARS-CoV-2: severe acute respiratory syndrome coronavirus 2.
[a] Sample collection time for some sub-cohorts may have exceeded 1 month, but more than half of the cases were already documented by polymerase chain reaction testing before any antibody testing and the last death occurred on 20 April.
Note: Some studies included additional data sets that did not fulfil the eligibility criteria (e.g. had sample size < 500 or were health-care workers) and they are not presented here.

Table 2. **Sample size, types of antibodies assessed and population size in the studies included to assess COVID-19 infection fatality rate, 2020**

Country (location)	Sample size[a], no.	Antibody	Population,[b,c,d] no.	% of population < 70 years[c]
Argentina (Barrio Padre Mugica)[47]	873	IgG	49 983	99
Belgium[38]	3 391 (20–26 April)	IgG	11 589 623	86
Brazil (133 cities)[25]	24 995	IgG and IgM	74 656 499	94 (Brazil)
Brazil (Espirito Santo)[34]	4 608	IgG and IgM	4 018 650	94 (Brazil)
Brazil (Maranhao)[68]	3 156	IgG and IgM	7 114 598	92
Brazil (Rio de Janeiro), blood donors[41]	669 (24–27 April)	IgG and IgM	17 264 943	94 (Brazil)
Brazil (Rio Grande do Sul)[17]	4 500	IgG	11 377 239	91
Brazil (Sao Paulo)[42]	517	IgG and IgM	298 240 (6 districts)	94 (Brazil)
Canada (British Columbia)[50]	885	IgG, IgM and IgA	5 071 000	94
Chile (Vitacura)[43]	1 244	IgG and IgM	85 000	92 (Chile)
China, blood donors[55]				
Wuhan	930 (3–23 February)	IgG and IgM	11 210 000	93 (China)
Shenzhen	3 507 (24 February–15 March)	IgG and IgM	13 030 000	93 (China)
Shijiazhuang	6 455 (10 February–1 March)	IgG and IgM	11 030 000	93 (China)
China (Wuhan)[14]	1 401	IgG and IgM	11 080 000	93 (China)
China (Wuhan)[32]	1 196 (4–8 April)	IgG and IgM	11 080 000	93 (China)
China (Guangzhou), blood donors[60]	2 199	IgG, IgM and IgA	115 210 000 (Guangdong)	93 (China)
China (several regions)[40]				
Hubei (not Wuhan)	979	IgG and IgM	48 058 000	93 (China)
Chongqing	993	IgG and IgM	31 243 200	93 (China)
Sichuan	9 442	IgG and IgM	83 750 000	93 (China)
Guangdong	1 005	IgG and IgM	115 210 000	93 (China)
Croatia[26]	1 494	IgG and IgM	4 076 000	86
Denmark blood donors[12]	20 640	IgG and IgM	5 771 876	86
Denmark (Faroe Islands)[52]	1 075	IgG and IgM	52 428	88
France (Crepy-en-Valois)[39]	1 340	IgG	5 978 000 (Hauts-de-France)	89
France (Oise)[13]	661	IgG	5 978 000 (Hauts-de-France)	89
Germany (Gangelt)[16]	919	IgG and IgA	12 597	86
Germany (Frankfurt)[21]	1 000	IgG	2 681 000[e]	84 (Germany)
Greece[62]	6 586 (4 511 in April)	IgG	10 412 967	84
Hungary[57]	10 504	IgG (also had RT-PCR)	9 657 451	88
Iceland[58]	30 576	Pan-Ig	366 854	90
India (Mumbai)[61]	6 904 (4 202 in slums, 2 702 not in slums)	IgG	1 414 917 (705 523 in slums, 709 394 in non-slums) in the 3 ward areas	98
India (Srinagar)[67]	2 906	IgG	1 500 000	97
Islamic Republic of Iran (Guilan)[8]	551	IgG and IgM	2 354 848	95
Italy (Apulia), blood donors[31]	909	IgG and IgM	4 029 000	84
Japan (Kobe)[11]	1 000	IgG	1 518 870	79 (Japan)
Japan (Tokyo)[29]	1 071	IgG	13 902 077	79 (Japan)
Japan (Utsunomiya City)[48]	742	IgG	518 610	79 (Japan)
Kenya, blood donors[44]	3 098	IgG	47 564 296	99
Luxembourg[20]	1 807	IgG and IgA[f]	615 729	90
Netherlands blood donors[15]	7 361	IgG, IgM and IgA	17 097 123	86
Netherlands (Rotterdam)[64]	729 (early April)	IgG	17 097 123 (Netherlands)	86
Pakistan (Karachi)[49]	1 004	IgG and IgM	16 700 000	98 (Pakistan)
Pakistan (urban)[66]	24 210	IgG and IgM	79 000 000 (urban)	98
Qatar[51]	937	IgG	2 800 000	99
Republic of Korea[59]	1 500	IgG	2 667 341	90 (Republic of Korea)
Spain[36]	61 075	IgG	46 940 000	85
Spain (Barcelona)[30]	874	IgG, IgM and IgA	7 566 000 (Catalonia)	86
Switzerland (Geneva)[10]	577 (20–27 April)	IgG	500 000	88

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Country (location)	Sample size[a], no.	Antibody	Population,[b,c,d] no.	% of population < 70 years[c]
Switzerland (Zurich)[28]	1 644 patients (1–15 April)	IgG	1 520 968 (Zurich canton)	88
Switzerland (Zurich and Lucerne)[28]	1 640 blood donors (May)	IgG	1 930 525 (Zurich and Lucerne)	88
United Kingdom (England)[65]	109 076	IgG	56 287 000	86
United Kingdom (Scotland), blood donors[18]	500	IgG	5 400 000	88
USA (10 states)[35]				
Washington, Puget Sound	3 264	Pan-Ig	4 273 548	90 (Washington)
Utah	1 132	Pan-Ig	3 282 120	92
New York, New York City	2 482	Pan-Ig	9 260 870	89
Missouri	1 882	Pan-Ig	6 110 800	88
Florida, south	1 742	Pan-Ig	6 345 345	86 (Florida)
Connecticut	1 431	Pan-Ig	3 562 989	88
Louisiana	1 184	Pan-Ig	4 644 049	92
California, San Francisco Bay	1 224	Pan-Ig	2 173 082	90
Pennsylvania, Philadelphia	824	Pan-Ig	4 910 139	90
Minnesota, Minneapolis	860	Pan-Ig	3 857 479	90
USA (California, Bay Area)[24]	1 000	IgG	7 753 000	90
USA (California, Los Angeles)[22]	863	IgG and IgM	7 892 000	92
USA (California, San Francisco)[33]	3 953	IgG and RT-PCR	5 174 (in census tract 022 901)	95
USA (California, Santa Clara)[19]	3 300	IgG and IgM	1 928 000	90
USA (Idaho, Boise)[9]	4 856	IgG	481 587 (Ada County)	92
USA (Georgia, DeKalb and Fulton Counties)[53]	696	Total Ig	1 806 672	88 (Georgia)
USA (Idaho, Blaine County)[46]	917	IgG	23 089	92
USA (Indiana)[54]	3 629	IgG and RT-PCR	6 730 000	89
USA (Louisiana, Baton Rouge)[63]	138	IgG	699 200 (East Baton Rouge, West Baton Rouge, Ascension, Livingston)	92 (Louisiana)
USA (Louisiana, Orleans and Jefferson Parish)[37]	2 640	IgG	825 057	92 (Louisiana)
USA (New York)[23]	15 101	IgG	19 450 000	90
USA, New York[56]				
Columbia University Medical Center, New York City	742 (2–30 March)	IgG and IgM	9 260 870	89
CareMount central laboratory, five New York state counties	1 841	IgG and IgM	10 189 130 (New York state excluding New York City)	89
USA (New York, Brooklyn)[27]	11 092	IgG	2 559 903	91
USA (Rhode Island), blood donors[45]	1 996	IgG and IgM	1 059 000	88

COVID-19: coronavirus disease 19; Ig: immunoglobin; RT-PCR: real-time polymerase chain reaction.

[a] Dates in brackets are the specific dates used when seroprevalence was evaluated at multiple consecutive time points or settings.

[b] Some studies focused on age-restricted populations of the specific location under study, for example: people 17–70 years in the Denmark blood donor study ($n = 3\,800\,000$); people 18–79 years in the Luxembourg study ($n = 483\,000$); people < 70 years in the Netherlands blood donor study ($n = 13\,745\,768$); people ≥ 18 years in the New York state study ($n = 15\,280\,000$); people > 19 years in the Utah population of the 10-state United States of America study ($n = 2\,173\,082$); people ≥ 18 years in Blaine County, Idaho ($n = 17\,611$); people 15–64 years in the Kenya blood donor study ($n = 27\,150\,165$); people > 14 years living in private premises in Hungary ($n = 8{,}283{,}810$); people > 18 years ($n = 551\,185$) in Baton Rouge, Louisiana; people 18–65 years working in urban locations in Pakistan ($n = 22\,100\,000$); and people > 18 years in Srinagar District, India ($n = 1\,020\,000$). In this table and subsequent analyses, the entire population in the location is considered for consistency across studies.

[c] Information in parentheses specifies the population.

[d] When the population of the relevant location was not given in a specific study, information on recent estimates of the pertinent population was obtained by standard online sources such as: populationpyramid.net, worldpopulationreview.com, worldometers.info/coronavirus, and Wikipedia.

[e] Participants were recruited from a large number of districts, but most districts had very few participants; here I included the population of the nine districts with > 1:10 000 sampling ratio (846/1000 participants came from these nine districts).

[f] Considered positive if both IgG and IgA were positive; in the other studies, detection of any antibody was considered positive.