



Rotman School of Management
UNIVERSITY OF TORONTO

Exploring the Public Response to COVID-19 Challenges in the First Year of the Pandemic: *Addressing the deployment of the mRNA vaccination, and care delivery through telemedicine*

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Agenda

- Fighting COVID-19 pandemic and technological challenges
- The COVID-19 pandemic and Social Media
- But... mRNA drug technologies are not new!
- Telemedicine has a long history !
- Reasons for Taking the COVID-19 Vaccine by US Social Media Users
- Reasons for Utilizing Telemedicine during and after the COVID-19 Pandemic: An Internet-Based International Study
- Public Health policies implications: Take home message





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The 2 Leading Technologies for Fighting COVID-19



- The introduction of novel **mRNA-based vaccines**
 - Vaccination rates vary dramatically across states, due largely to concerns around trust and perceived risk with this 'unproven' tech
 - Yet, such vaccine hesitancy is a major barrier in achieving herd immunity across different populations
- Rapid deployment of **Online Care and of Telemedicine**
 - Several studies in 2020/21 revealed telehealth caution among patients, citing mostly quality and security concerns
 - Yet, by deploying telehealth solutions and programs, people can receive care from home, without entering medical facilities, minimizing their risk of contracting the COVID virus

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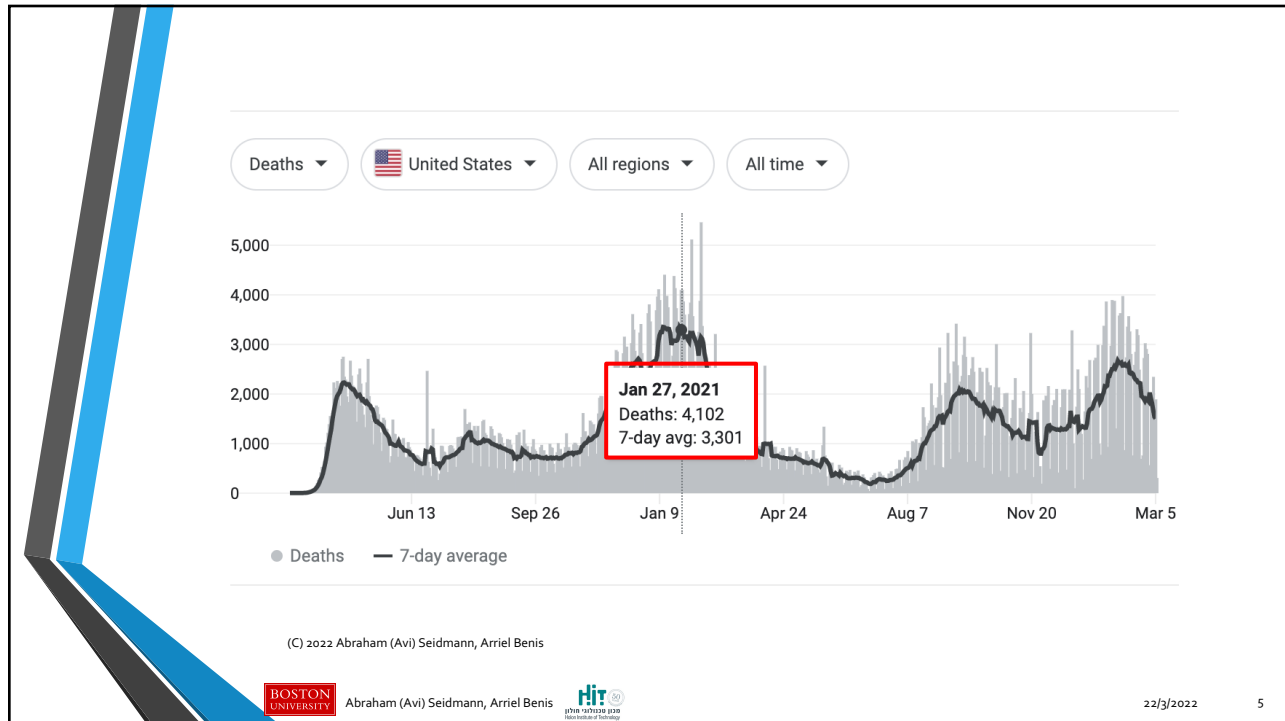
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Fighting COVID-19 pandemic and technological challenges

- The **COVID-19 pandemic challenges** almost all of our **healthcare services**.
- The pandemic had a **stimulating effect** on **"innovative" technologies**.
 - Rapid introduction of novel **mRNA-based vaccines**,
 - Rapid deployment of **Online Care and of Telemedicine**.
- Policy makers and **public health officials looking for the right ways** to encourage:
 - Broad-based **vaccinations**,
 - **Telemedicine** services use.

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How can We Help in that Effort?

Time is of the essence
Daily Mortality rates >3,500 at the USA
Balancing Speed of Research Publication VS
Conventional OR/OM/IS Outlets



The slide features a large, bold title at the top. Below it, the text 'Time is of the essence' is followed by 'Daily Mortality rates >3,500 at the USA' and 'Balancing Speed of Research Publication VS Conventional OR/OM/IS Outlets'. On the right side, there is a photograph of a hand holding a silver stopwatch. At the bottom, there is a copyright notice '(C) 2022 Abraham (Avi) Seidmann, Arriel Benis', logos for Boston University and Hit, and the date '22/3/2022' with a page number '5'.

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The COVID-19 pandemic and Social Media

- Dramatic increase in the use of mass media and social media communication
 - In trying to swing public support for vaccinations and telemedicine
 - But also, by hesitant and anti-vax/anti-tech people
- We sought to elucidate the socio-demographic characteristics and the principal reasons of the public intent
 - to take the newly introduced mRNA vaccine(s) against COVID-19,
 - to use telemedicine during the COVID-19 pandemic, and the overall propensity to try and use it thereafter.

Distribution of the number of tweets by month comprising at least one of the terms "flu," "vaccination," "vaccine," "vaxx," and "covid" between December 30, 2019, and April 30, 2021. Benis A, Chatsubi A, Levner E, Ashkenazi S. Change in Threads on Twitter Regarding Influenza, Vaccines, and Vaccination During the COVID-19 Pandemic: Artificial Intelligence-Based Infodemiology Study, JMIR Infodemiology 2021;1(1):e31983, doi: [10.2196/31983](https://doi.org/10.2196/31983)

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November 18, 2021
4:31 PM EST
Last Updated 4 months ago

COVID-19 Health Litigation

Wait what? FDA v years to process F request over vacc

By Jenna Greene

4 minute read

Photographer: Sarah Silbiger/Getty Images

U.S. Department of Health and Human Services
Food and Drug Administration

Why a Judge Ordered FDA to Release Covid-19 Vaccine Data Pronto

Jan. 18, 2022, 4:00 AM

A group of scientists and medical researchers sued the FDA under FOIA to force release of hundreds of thousands of documents related to licensing of the Pfizer-BioNTech Covid-19 vaccine. Plaintiff's attorney Aaron Siri, who is representing the group, explains the fight that led a federal court to order expedited release of documents the agency claimed it would take decades to process.

Aaron Siri
Siri & Glimstad

Topics

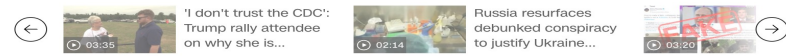
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Anti-vaxxers are using the same tactics as cults do to attract followers on social media

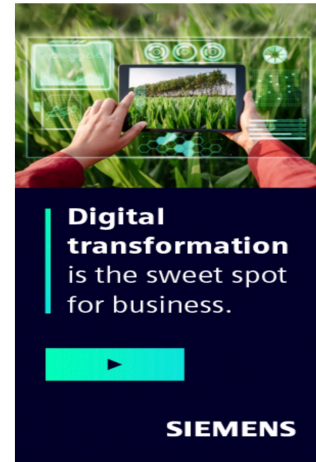
Opinion by Steven Hassan for CNN Business Perspectives
Published 9:10 AM EDT, Wed September 29, 2021



Video Ad Feedback



Editor's Note: Steven Hassan, PhD, is a licensed mental health professional and one of the leading experts on cults and undue influence in the world. A former member of the Moonie cult, Hassan left the group 45 years ago and has dedicated his life to helping people out of cults and destructive situations. He has written four books, including *Combating Cult Mind Control* and *The Cult of Trump*. The opinions expressed in this commentary are his own.

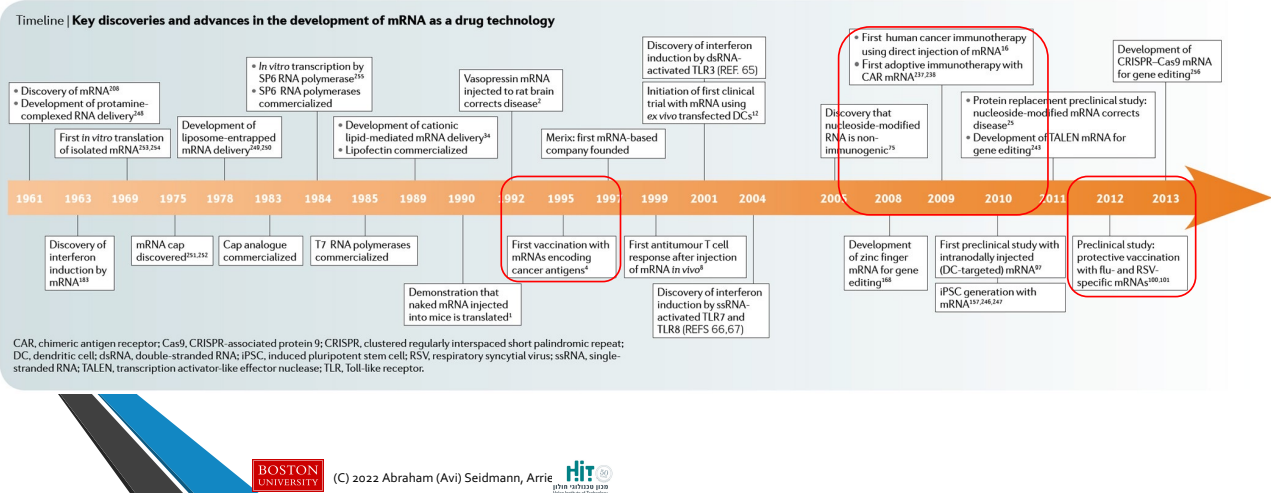


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Amazingly... mRNA drug technologies are not so new!

Sahin, U., Karikó, K. & Türeci, Ö. mRNA-based therapeutics — developing a new class of drugs. *Nat Rev Drug Discov* 13, 759–780 (2014). <https://doi.org/10.1038/nrd4278>



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And, Telemedicine has a long history !

The History of Telehealth and Telemedicine

500 B.C.E. Historical recordings show the Greek and Romans used fires and light signals to send messages about the spread of plagues.

1946 The first radiological images are sent via telephone. The telephone was shown to not only be useful for connecting households across the country, but also allowed doctors to use this new technology to send radiological images to other specialists, which helped to speed up data transfer.

1948 University and local services partner to provide emergency medical assistance. The University of Miami School of Medicine teamed up with the local fire department to transmit electrocardiographic rhythms over radio to Jackson Memorial Hospital in rescue situations.

1959 U.S. space programs conduct flight tests with animals that have remote medical monitoring devices. Space testing with animals was conducted before sending people into space, but this time the animals were all used to monitor their health and well-being while leaving Earth. This led to many of the techniques and systems that are in place today.

1961 NASA becomes a major pioneer in moving forward the research and development of telehealth in the 60s and 70s. NASA became a major pioneer in moving forward the research and development of telehealth in the 60s and 70s.

1967 The University of Miami School of Medicine teamed up with the local fire department to transmit electrocardiographic rhythms over radio to Jackson Memorial Hospital in rescue situations.

1970s Space Technology Applied to Rural Paepago Advanced Health Care (STARPAHC). Indian Health Services, with NASA, developed the STARPAHC project, which aimed to provide better medical care access to local Native Americans in Alaska on the Peapago Reservation, and the astronaut NASA sends to space various forms of medical information including electrocardiograms and X-rays were sent back and forth with the Public Health Service hospital by way of microwaves. This project and many others similar in nature, designed by NASA, generated interest and sparked more research in the area of health care communication and medical engineering. This began the foundation for telehealth that would be expanded upon by numerous articles over the next several decades.

1973 The Internet is Born: Computer networks establish a universal communication standard.

1983 Dr. Jay Sanders received a doctorate from Harvard and in 1970 went on to form the first division of general medicine in the country at the University of Miami. Served as Chief of Medicine at Jackson Memorial Hospital. In 1991 he developed the first statewide telemedicine system in the state of Georgia. Also created the first correctional telemedicine program and the first tele-homecare technology that was named "The Electronic House Call". Founder of the American Telemedicine Association and served as president for three years. He worked as a consultant for NASA and the CDC and is currently the CEO of the Global Telemedicine Group.

1993 American Recovery and Reinvestment Act promotes and leads to greater connection online across medical technologies. Following the recession in 2008, the government, aimed to stimulate growth and economic stability with the American Recovery and Reinvestment Act. This act allocated an unclear amount of funds into healthcare with the bill directing over \$2.1 billion for advances in digital healthcare and technology for improving health. Telehealth faced the challenge of inter-technology communication between health systems and providers. The bill also helped to establish more universal and easier connectivity.

1993 American Telemedicine Association is founded. The internet up and running, potential begins to be realized by those in the healthcare field. The focus was on how to use technology to promote and increase the usage of telehealth to improve the reach of healthcare to more patients and those who struggle to access it. They aim to educate both patients and providers by staying up on advances in technology and care.

1999 Centers for Medicare and Medicaid Services determines what meaningful uses of electronic health records are. After the AHCA was passed, the CMS issued a ruling on what could be considered proper and meaningful ways to use electronic health records (EHRs) or electronic medical records (EMRs). The ruling was to increase and maintain the privacy of patient records in the modern era of technology. Meaningful uses were defined as "the use of certified EHR technology in a meaningful manner such as gathering information and improving the quality of care."

2010 HHS received and distributed \$16 million to expand rural access to healthcare through the use of telehealth. It has been shown that one of the populations that benefit the most from telehealth is the rural community. Finding ways to serve the rural community and underserved communities is a pillar of health care, and telehealth looks to fill these voids.

2016 The Health Resources and Services Administration Receives Funding to Expand the Use of Telehealth in Rural Areas. HHS received and distributed \$16 million to expand rural access to healthcare through the use of telehealth. It has been shown that one of the populations that benefit the most from telehealth is the rural community. Finding ways to serve the rural community and underserved communities is a pillar of health care, and telehealth looks to fill these voids.

2020 Global outbreak COVID-19 spreading easily across borders leads to increased utilization of telehealth. Thrust to the forefront, telehealth quickly entered high demand and was forced into handling massive amounts of patients. Thankfully, decades of research helped with preparedness. The president signs multiple executive orders into effect that increased telehealth coverage by reducing barriers and restrictions to better provide care virtually to patients during the public health emergency. Bills are currently being introduced by Congress to extend and make many of these changes for telehealth permanent going forward.

UMTRC umtrc.org

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Reasons for Taking the COVID-19 Vaccine by US Social Media Users

Benis, Arriel, Abraham Seidmann, and Shai Ashkenazi. 2021. "Reasons for Taking the COVID-19 Vaccine by US Social Media Users" *Vaccines* 9, no. 4: 315. <https://doi.org/10.3390/vaccines9040315>


40% **8%** **18%** **12%** **22%**

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Reasons for Taking the COVID-19 Vaccine by US Social Media Users

- Between 10 and 24 December 2020 (first FDA approval for the COVID-19 vaccines)
- Online, focusing on US (over the Internet)
- Built in and performed over Microsoft Forms (*Free*).
- Invitations to take the survey (*Free*):
 - posted by the research team on social media platforms (Facebook, Twitter, LinkedIn, Reedit, Instagram)
 - sent via email to personal and professional contact lists (*without any paid recruitment or advertising*)
 - Some participants shared the survey address broadly as well (*Free*).
- Each of these communication channels has its characteristics and population target influencing the recruitment approach.
- The response rate was estimated to be 0.50% (1728 answers, 1644 included).

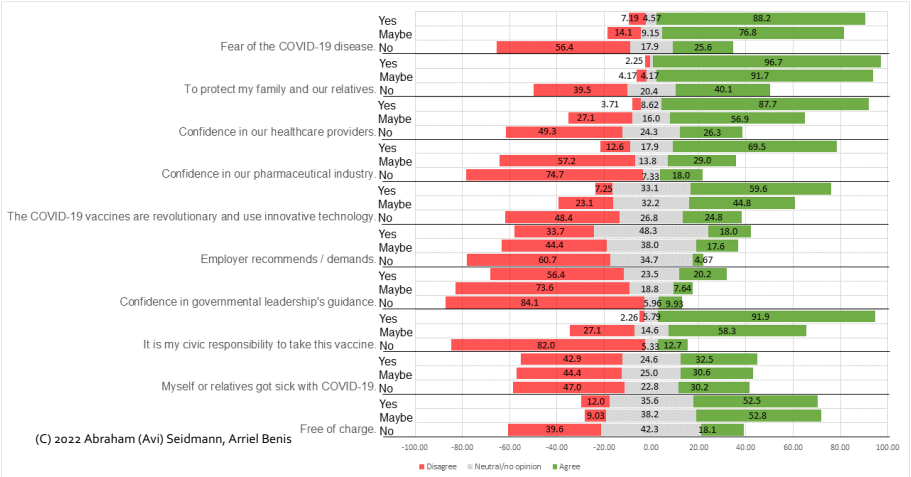


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Reasons for Taking the COVID-19 Vaccine by US Social Media Users as a Likert scale



Statement	Response	Percentage
Fear of the COVID-19 disease:	Yes	7.19
	Maybe	14.1
	No	56.4
To protect my family and our relatives:	Yes	2.25
	Maybe	4.17
	No	39.5
Confidence in our healthcare providers:	Yes	3.71
	Maybe	27.1
	No	49.3
Confidence in our pharmaceutical industry:	Yes	7.25
	Maybe	23.1
	No	48.4
The COVID-19 vaccines are revolutionary and use innovative technology:	Yes	33.1
	Maybe	48.4
	No	44.4
Employer recommends / demands:	Yes	38.0
	Maybe	60.7
	No	60.7
Confidence in governmental leadership's guidance:	Yes	18.8
	Maybe	73.6
	No	56.4
It is my civic responsibility to take this vaccine:	Yes	2.26
	Maybe	27.1
	No	82.0
Myself or relatives got sick with COVID-19:	Yes	24.6
	Maybe	44.4
	No	44.4
Free of charge:	Yes	35.6
	Maybe	12.0
	No	39.6

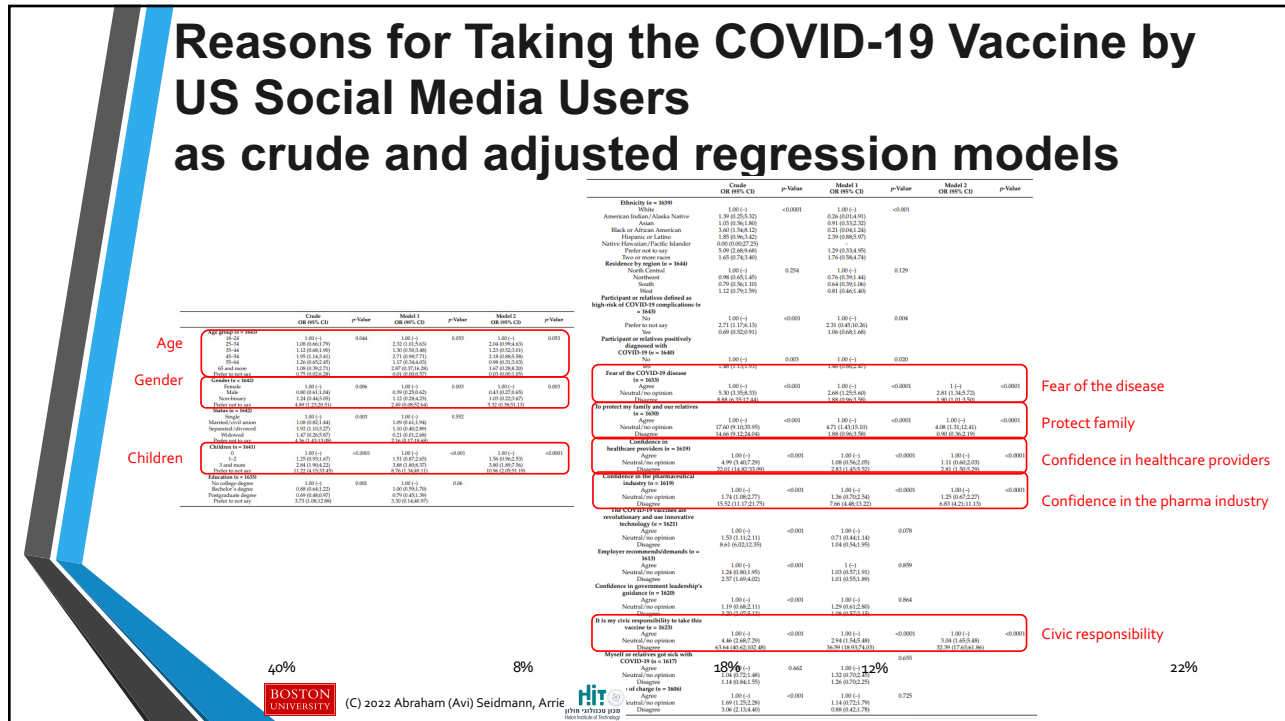


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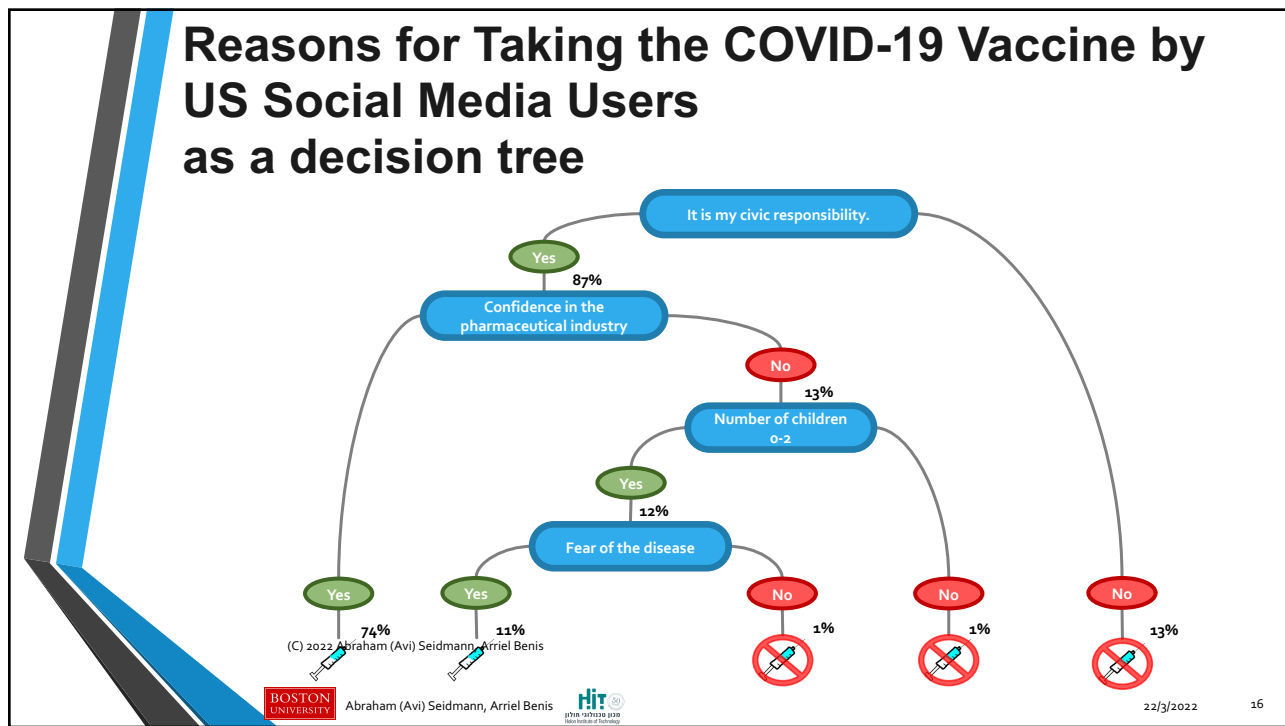


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Reasons for Utilizing Telemedicine during and after the COVID-19 Pandemic: An Internet-Based International Study

Benis, Arriel, Maxim Banker, David Pinkasovich, Mark Kirin, Bat-elYoshai, Raquel Benchoam-Ravid, Shai Ashkenazi, and Abraham Seidmann. 2021. "Reasons for Utilizing Telemedicine during and after the COVID-19 Pandemic: An Internet-Based International Study" *Journal of Clinical Medicine* 10, no. 23: 5519. <https://doi.org/10.3390/jcm10235519>



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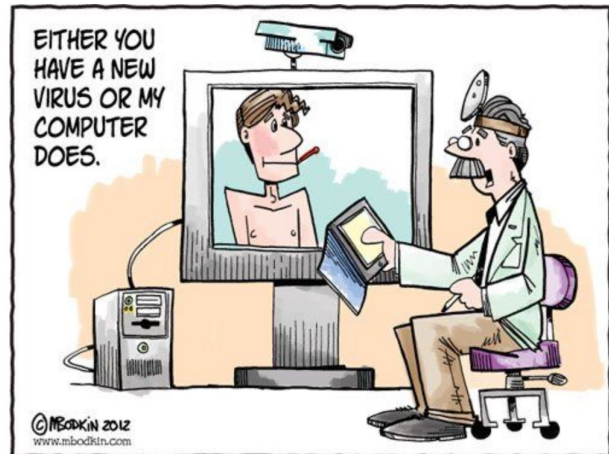
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Some Telemed "Fears"

IN ORDER TO MAKE AN APPOINTMENT, HE FIRST HAD TO UPDATE HIS OPERATING SYSTEM, DOWNLOAD AN APP, GET A USERNAME, CHOOSE A PASSWORD, LOG IN TO A HEALTH PORTAL, NAVIGATE TO MESSAGES AND WRITE HIS DOCTOR...BY THEN IT WAS TOO LATE.



Patients Concerns




Doctors Concerns

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Reasons for Utilizing Telemedicine during and after the COVID-19 Pandemic

- Between 23 March to 6 April 2021 (between the 2nd and 3rd COVID-19 pandemic waves)
- Online, multi-center (over the Internet), multi-lingual (English, Hebrew, Spanish, Russian, French, and Arabic), cross-sectional survey about the perception and use of telemedicine by customers
- Built in and performed over Microsoft Forms (*Free*).
- Invitations to take the survey (*Free*):
 - posted by the research team on social media platforms (Facebook, Twitter, and LinkedIn)
 - sent via email to personal and professional contact lists (*without any paid recruitment or advertising*)
 - Some participants shared the survey address broadly as well (*Free*).
- Each of these communication channels has its characteristics and population target influencing the recruitment approach.
- The response rate was estimated to be 1.96% (*473 answers*).

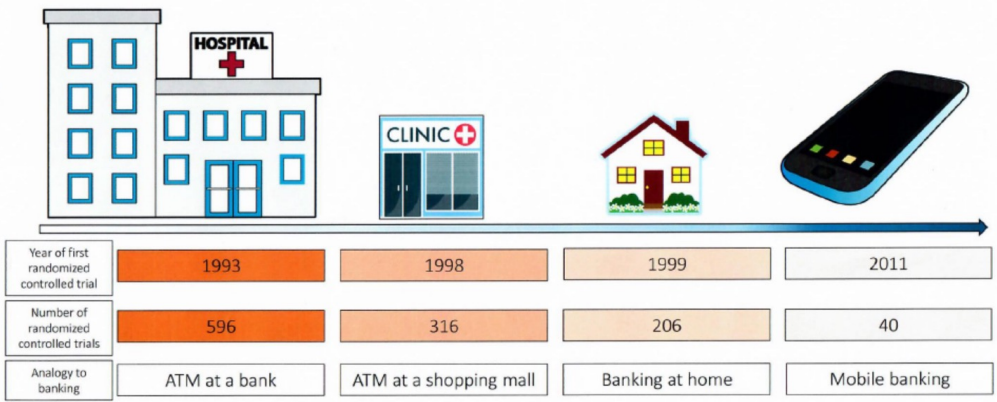


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Telehealth allows care to be provided where it is most needed ...




	1993	1998	1999	2011
Year of first randomized controlled trial	1993	1998	1999	2011
Number of randomized controlled trials	596	316	206	40
Analogy to banking	ATM at a bank	ATM at a shopping mall	Banking at home	Mobile banking

Source: PubMed searches of telehealth and care delivery in various locations, filtered for randomized controlled trials and excluding home monitoring, on 9/15/2017

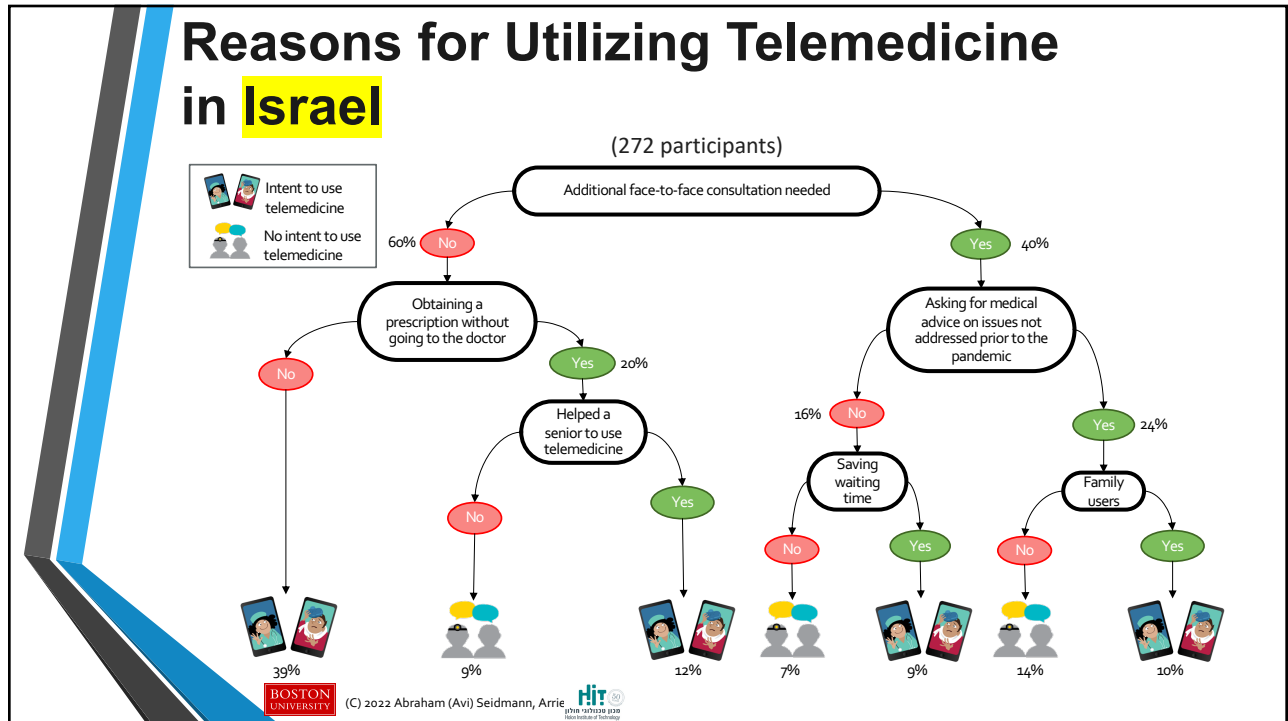


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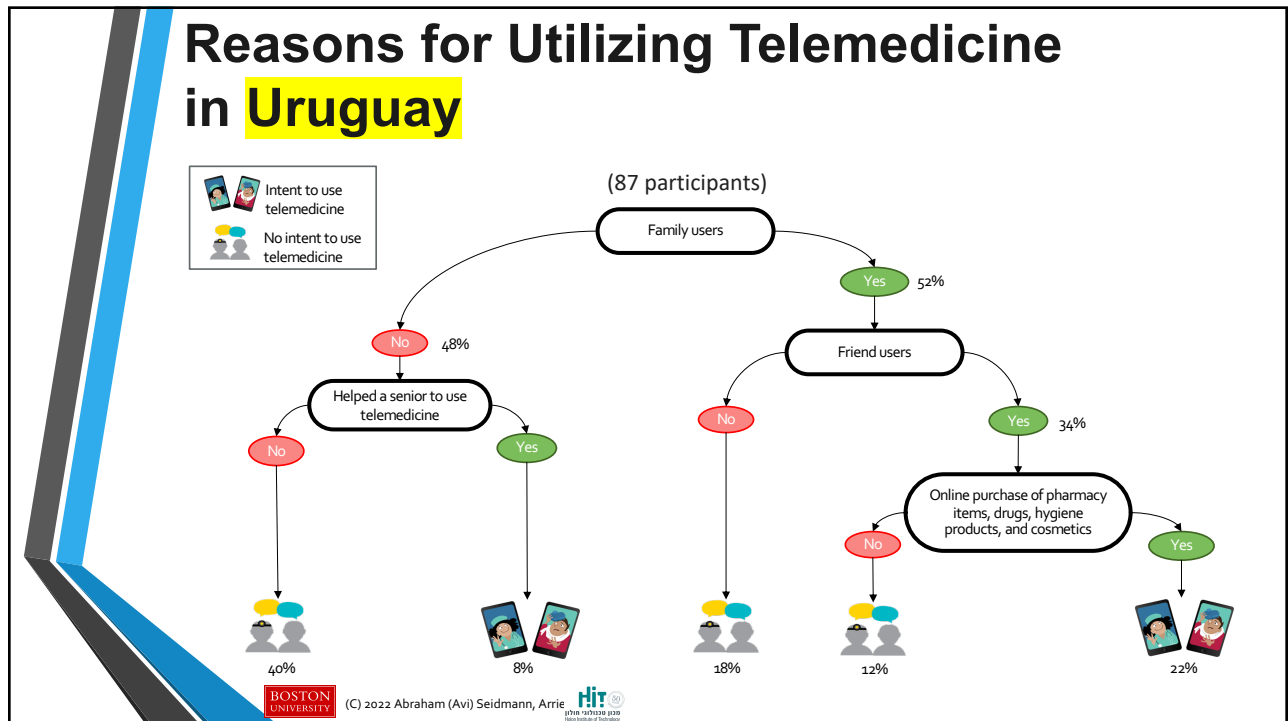


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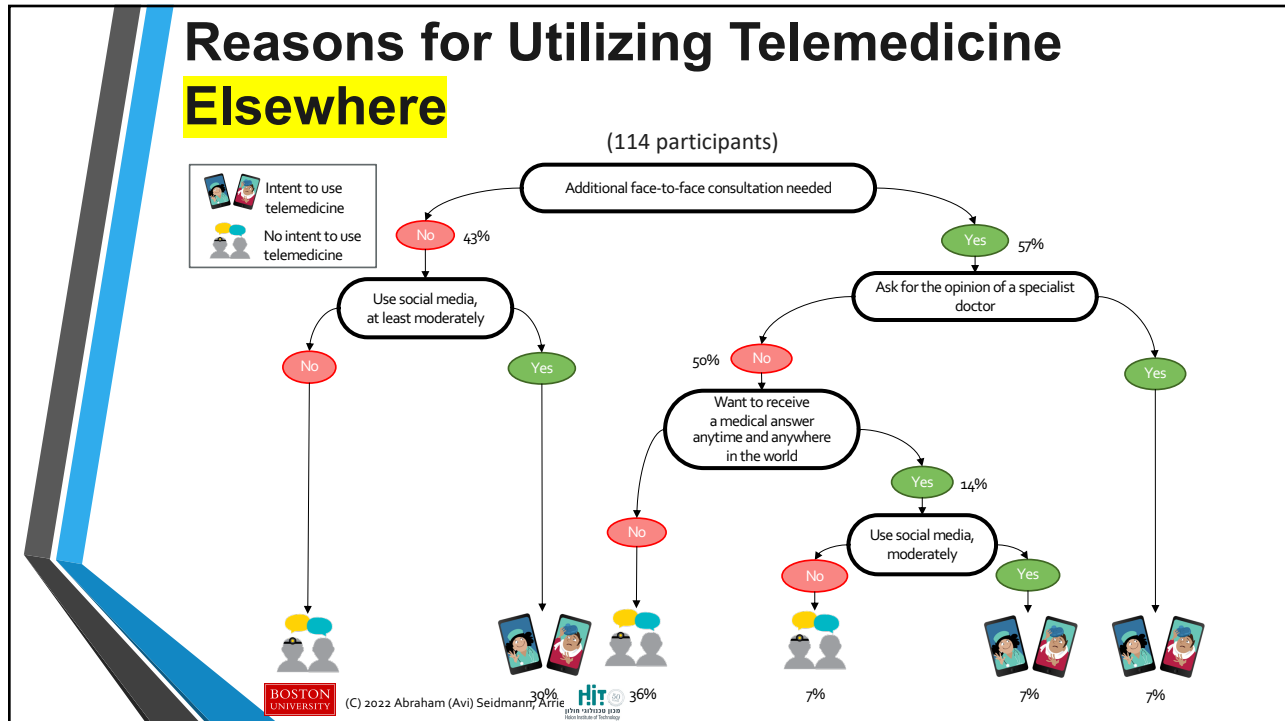
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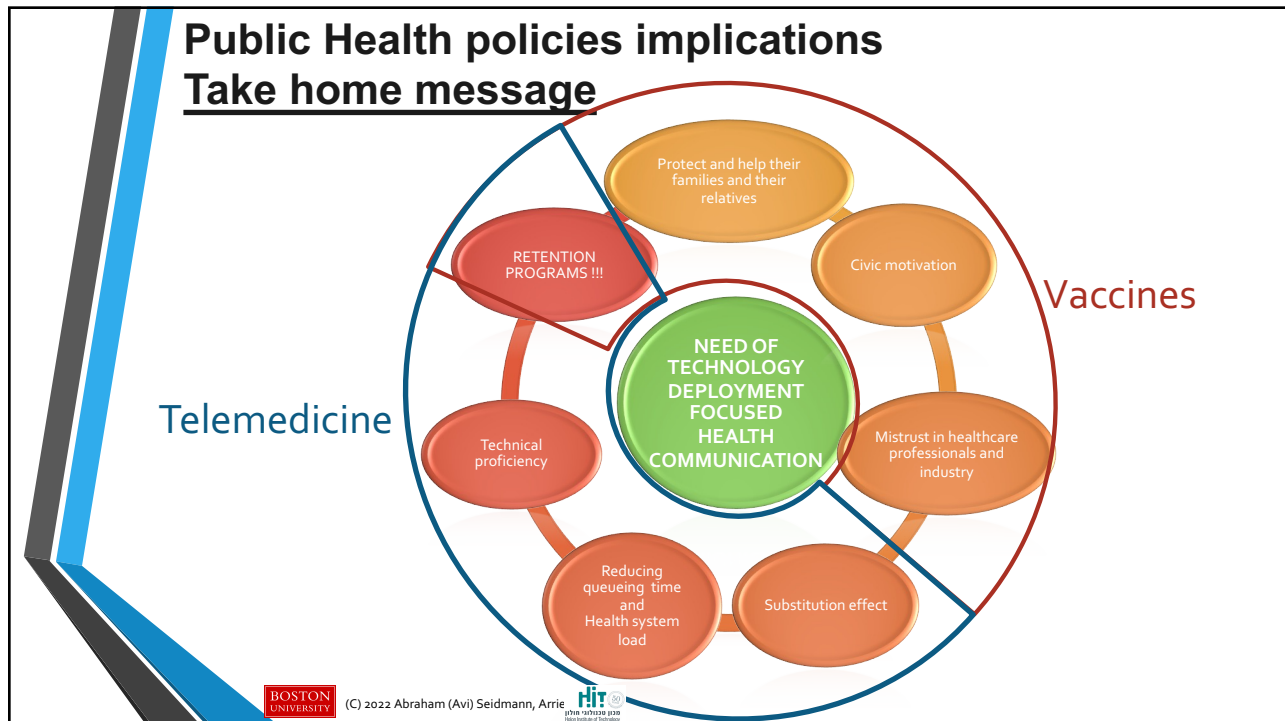
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Our International Telemed Study

- Major Insights: (Israelis VS Uruguayans)
 - Forcing TM on PTs will not be appreciated by the public unless it is well designed to meet (at least) the four major service parameters as stated below:
 - I. TM visits be (*almost*) a **full substitution**
 - II. Having an **overall technical proficiency**
 - III. TM will **reduce physical travel & queuing times**
 - IV. Need to observe satisfactory **trusted peer experience**



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Policy Implications

Currently the whole area of Telemed is a dangerous '**Wild West**':

- I. No clear **regulations**
- II. Uncertain **clinical value** in most applications
- III. Unestablished **SLA's, charges, coverage, liability,...**
- IV. Severe implications for **MD's productivity and availability**
- V. The '**online banking**' lessons are far from comforting for the public
- VI. Serious concerns for our **weaker citizens** (elderly, limited, poorer, ZIP..)




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Thank You



- **Benis, Arriel, Abraham Seidmann,** and Shai Ashkenazi. 2021. "Reasons for Taking the COVID-19 Vaccine by US Social Media Users" *Vaccines* 9, no. 4: 315. <https://doi.org/10.3390/vaccines9040315>


- **Benis, Arriel,** Maxim Banker, David Pinkasovich, Mark Kirin, Bat-el Yoshai, Raquel Benchoam-Ravid, Shai Ashkenazi, and **Abraham Seidmann.** 2021. "Reasons for Utilizing Telemedicine during and after the COVID-19 Pandemic: An Internet-Based International Study" *Journal of Clinical Medicine* 10, no. 23: 5519. <https://doi.org/10.3390/jcm10235519>





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