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Bakalářská práce

# Neologisms related to the Covid-19 pandemics

Neologismy vzniklé v souvislosti s pandemií Covid-19

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V Českých Budějovicích dne 8. července 2021

Adéla Friedelová

## **Poděkování**

Mé poděkování patří vedoucímu této práce Mgr. Jaroslavu Emmerovi za vřelost, ochotu, a bleskovou komunikaci, bez které by tato práce nevznikla.

## **Anotace**

Cílem této bakalářské práce je zjistit, zda v anglickém jazyce vznikly neologismy v souvislosti s pandemií Covid-19, jak jsou časté a zda jsou to opravdu nové výrazy. Práce nejprve popisuje globální situaci týkající se této pandemie mezi březnem 2020 a červnem 2021. Poté se věnuje jazykovým změnám a vlivu internetu na jazyk. Dále také představuje hlavní slovtvorné procesy v anglickém jazyce, vymezuje pojem neologismy, uvádí některé příklady nově vzniklých slov/sousloví a určuje u nich slovtvorný proces. V praktické části je zanalyzován výsledek korpusového výzkumu. Ten zahrnuje deset vybraných článků z britských a amerických online novin, blogů apod. Pomocí programu #Lancsbox je vytvořen vlastní korpus. Z *Oxford English Dictionary* jsou vybrána slova, která vznikla v dubnu 2020 a týkají se pandemie Covid-19. Nejen tato slova jsou poté hledána v rámci korpusu. Poté práce analyzuje, jak často jsou nově vzniklá covid-slova užívána a jaká je míra jejich novosti. Práce je psaná v angličtině.

Klíčová slova: Covid-19, pandemie, internet, slovtvorba, neologismy

## **Abstract**

The main goal of this Bachelor's thesis is to find out if there are any new words coined in relation to the Covid-19 pandemic, what is their frequency and level of novelty. First the work describes the global situation of Covid-19 pandemic between March 2020 and June 2021. Then it introduces the main word formation processes, explains what neologisms are, lists some of the examples of newly coined words/phrases and determines their word-formation process. In the Practical part it contains an analysis of the results of the corpus research. The research contains ten chosen articles from British and American online news platforms, blogs etc. and with the help of the programme #Lancsbox, own corpus is created. Then the work analyses the frequency of the newly coined covid-words and what is the level of their novelty. The work is written in English language.

Key words: Covid-19, pandemic, Internet, word-formation, neologisms

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## 1. Introduction

English language is continuously evolving and adapting to new conditions. It immediately reacts to changes in our lives. As a result of changes in the extralinguistic reality, some words become obsolete and less frequent (or vanish altogether), but at the same time new words are coined or recycled to keep up with the development.

A relevant example of such a situation is the Coronavirus pandemic, which has directly influenced our lives and the language as well. New words were (and still are) created to describe new circumstances that we must deal with on daily basis. These words are used for they help us understand and depict the current scene.

In the theoretical part of my thesis, I will first approach the background of the Covid-19 pandemic. I will touch the topic of language change and the influence of Internet. In next chapter I will introduce main word-formation processes in English and define neologisms. Then I will explain two ways of understanding neologism – a) as new word and b) as new meaning of an existing word. I will have a closer look at some of the internet neologisms that have been coined recently and I will determine the word-formation process of these words. Then I will list some recently coined covid-19 neologisms and determine their word formation process as well. The last chapter of the Theoretical part will be dealing with the question of novelty of Covid-19 neologisms.

In the practical part of my thesis, I will create my own corpus with the help of the programme #LancsBox. First, I will describe the methodology of my thesis and briefly introduce the programme. I will choose ten online articles from newspapers, blogs etc. and I will use the corpus for collecting data and analysing neologisms related to the pandemic according to Oxford English Dictionary's list of new words from April 2020. I will

also try to find covid-words that are not on the OED list. The goal of the work is to find out if there are any new words being used in connection to covid-19 and comment on the level of their novelty and frequency.

## 2. Theoretical part

### 2.1. Covid-19 pandemic

'Covid-19' stands for Coronavirus disease 2019, which is caused by severe acute respiratory syndrome coronavirus (SARS-CoV-2). It is a new virus, first detected at the end of 2019 in China, specifically in the city of Wuhan, and from there it has spread throughout our planet. (1)

The symptoms of the disease are individual. Some people do not even know they contracted the virus, but for some it is even fatal, especially if they already suffer from another respiratory illness like asthma, or if they deal with other health issues such as hypertension, obesity, or heart diseases. As for the symptoms, the most common are fever, fatigue, cough, shortness of breath, loss of appetite, loss of smell and others. (2)

Covid-19 is spread through droplets, and it is very resistant. That is why countries had to intervene by introducing certain measures to prevent the disease from spreading. These include covering one's mouth and nose in public places, keeping only essential businesses open, e.g., grocery shops, drugstore, pharmacy, etc., and closing most of the places where people can meet with others and unknowingly spread the virus.

With viruses like coronavirus, it is very common there are multiple mutations/variants of this virus that are even more resistant and aggressive, e.g., the *British variant*, *South African Variant*, *Brazilian variant*. Although medical companies have already made vaccines and countries have arranged vaccination plans for their citizens, these vaccines are not one hundred percent successful in fighting those mutations. Most



recent mutation, detected in June 2021, is called 'Delta Mutation' and it is more harmful for young people. (3)

Not meeting with other people, travelling only if necessary, washing hands properly, covering airways, not touching face, keeping at least one metre distance from other people, these all are recommendations of the World Health Organization and accordingly countries declare measures.

These measures, unfortunately, made it very difficult for the culture, sports, small businesses, and many other spheres. Entrepreneurs are in a huge profit loss. Czech schools have been closed for almost a whole year, and pupils and students were studying from home. Plenty of activities are, or were at least for some time, forbidden, such as going to gyms, cinemas, concerts, parties, restaurants; eating out; going to a different district; visiting a cosmetic salon or a hairdresser, and many more. This has, of course, a huge impact on our mental health as well and mental problems go hand in hand with the prevalence of suicides. (4) It is called a 'pandemic' not only for it affects our health, but it also changes our society, our economy sector, our politics, social relationships, etc.

## 2.2. Language change and the Internet

Language immediately reacts to changes in our lives, and so language change is something unavoidable, natural. (Bybee 2015, 10) "Changes in words are the most obvious sorts of changes." Most languages demand new words, whether they borrow words from other languages or create own language units through word-formation processes (see next chapter). Borrowing most typically happens when there is a new entity created in another culture (e.g., the word *karaoke*, which originated in Japan in 1970s). (Bybee, 2015, 1-2)

English vocabulary has been influenced by many nations that came to the British Isles in the past, such as Vikings or Normans. They all brought new, different cultural concepts and they also left behind linguistic legacy. (Peprník, 1992, 124-127)

*Table 1: Examples of loanwords and their origin*

<b>Origin</b>	<b>Word</b>
<b>Latin</b>	cook
	money
	kettle
	dish
<b>Scandinavian languages</b>	husband
	anger
	call
	happy
	knife
<b>Norman</b>	government
	enemy
	assault
	people
	beauty

Thanks to the Internet, language change is even more rapid nowadays, as it is the quickest information spreader and offers unlimited social interaction. (Smyk-Bhattacharjee, 2009, 75-80) Despite the fact that the Internet is multilingual, English is the most popular and most common language used on this online platform. (Smyk-Bhattacharjee, 2009, 103) That could be having even bigger impact on the changes of English language.

Linguists argue whether the Internet benefits language or the opposite. In 2000s, when texting grew into being popular, “many people saw it as a linguistic disaster” because of the invention of abbreviations, e.g., *h8* (hate), or omission of letters, e.g., *msg* (message). They believed this ‘textism’ is degrading children’s literacy. However, it turned out children who used abbreviations the most had higher scores in grammar and spelling exams. Crystal sees the Internet as a beneficial sphere for language, among other things for it “introduced many new varieties”, such as blogging, tweeting, social networking. (Crystal, 2011, 5-7)

Due to the constant development of science and technology, expansion of Internet usage, mass media and social media, the vocabulary simply requires more and more words and terms. (Peprník, 1992, 122a-124)

### 2.3. English and Word Formation

Present day English, unlike Czech or German, no longer uses systematical flection, although there are still remnants of the old system (adjectives, pronouns, verbs). (5) It has however, the largest vocabulary of all world languages. (6) Among borrowing words from other languages, English can form words itself.

Word-formation is most easily defined by Plag: “As the term of ‘word-formation’ suggests, we are dealing with the formation of words.” (Plag, 2003, 12)

There are multiple word-formation methods. The most common methods are:

- *Derivation*, i.e., adding suffixes (adding before the base) and/or prefixes (adding after the base) (Peprník, 1992, 8)
- *Compounding*, also called composition, combining two word-stems into one compound word. (Peprník, 1992, 19)

Other methods include:

- *Blending*, which is basically a fusion of two (rarely three) words, when we omit some part(s) of one or another, or both. (Plag, 2003, 155)
- *Clipping*, i.e., shortening of a word by cutting a part of it off. However, it keeps its meaning and word class. (Bauer, 1983, 233)
- *Abbreviations* – shortening of a denomination to initial letters, initial syllables, acronyms, etc. (Peprník, 1992, 33-34)
- *Conversion*, which is a transition of a word to a different part of speech. Plag defines it as the “derivation of a new word without any overt making”. (Plag, 2003, 134)
- *Backformation* – omitting (sometimes hypothetical) affixes from a word. (Peprník, 1992, 19-39) Most of the words that are backformed are verbs. (Bauer, 1983, 230)
- As for neologisms, the word-formation process is called *coinage*, but they can be formed by any of the word-formation processes mentioned above. (Peprník, 1992, 76)

For a better picture I created an illustrative table with examples.

Table 2: Word formation methods and examples

Word-formation method	Example	Newly formed word
Derivation	<i>love + -ly</i> (verb + adv. suffix)	lovely (adv.)
	<i>un + predictable</i> (neg. prefix + adj.)	unpredictable (adj.)
Compounding	<i>bed + room</i> (noun + noun)	bedroom (noun)
	<i>swimming + pool</i> (verb + noun)	swimming pool
Blending	<i>breakfast + lunch</i>	brunch
	<i>smoke + fog</i>	smog
Clipping	<i>influenza</i>	flu
	<i>telephone</i>	phone
Abbreviations	<i>in my opinion</i>	IMO
	<i>Member of Parliament</i>	MP
Conversion	<i>bottle</i> (noun)	to bottle (verb)
	<i>empty</i> (adj.)	to empty (verb)
Backformation	<i>vaccination</i> (noun)	to vaccinate (verb)
	<i>decadence</i> (noun)	decadent (adj.)

#### 2.4. Neologisms and nonce formations

“Neologism is a new word, which was created out of the need to name a new entity and has not become generally used yet. (...) Neologism is a new naming unit, semantic neologism is a new meaning of an already existing word”. (Peprník, 1992, 122a, own translation)

It may be coined by a single author (Peprník, 1992, 122a), for example the well-known word ‘robot’, first used in 1921. Until then the word ‘robota’ was known just as the slave labour. In the sense of ‘a machine’, it first appeared in Karel Čapek’s drama

*R.U.R.*, after his brother Josef Čapek suggested it to him. (7) At first the new word is used by only a small number of people, then it may spread and eventually become a well-known term.

Newmark defines neologisms in more detail as “new words naming newly invented or imported objects or processes, or new expressions that suddenly fill one of the innumerable gaps in a language's resources for handling human thought and feeling at some level of formality.” (Newmark, 1998, 122)

Štekauer in his work describes neologisms as “a naming unit which was coined to satisfy a linguistic demand” either of an individual speaker or of a disposable demand which has only one-time appearance. (Štekauer, 2008, 101)

Neologism which appeared only once is usually called *a nonce word* or *an occasionalism*. (Peprník, 1992, 123) Štekauer in his article *An Article on the Theory of Neologisms and Nonce-formations*, published in *Australian Journal of Linguistics* in 2002, defines nonce formations as the first stage of a newly coined lexeme. Bauer defines it as “a new complex word coined by a speaker/writer on the spur of the moment to cover some immediate need.” (Bauer, 1983, 45)

Neologisms, on the other hand, are not immediately created items. They started as nonce words but began to spread and became used by a group of speakers (regardless of the size of the group). Therefore, according to Štekauer, it is the second stage of the lexeme's life.

As for the language system, we distinguish units belonging to the centre, units belonging to the periphery and units in the transition between the centre and the periphery.

The central elements have the highest frequency and are the most stable because they are not dependent on the external reality, i.e., denominations which do not develop or change. The peripheral elements are limited in frequency, time, and place, i.e., special terms, slang words, neologisms. (Peprník, 1992, 109) Neologism however may become lexicalized and then move into the centre of the vocabulary. If it does not become lexicalized, it simply does not stay in the central vocabulary any longer. (Bauer, 1983, 42-48)

The issue with neologisms is that the period of considering something as *new* is relative. (Levchenko, 2010, 11) The point when it stops being new could be either when the word, as Crystal argues, “falls out of fashion” or when we begin to use it regularly, “without thinking”, but we cannot tell in advance which neologisms will become established expressions and which will disappear. (Crystal, 2003, 132)

Neologisms do not necessarily have to be just completely new words. Neologism may thus refer to a novel meaning of an existing word, which is frequently a result of a metaphoric or metonymic extension. In that case, neologism can either completely replace the meaning of the old word or it may just add another meaning to it. (Levchenko, 2010, 14-15)

Neology (or coinage) most often appears in the sphere of science and technology, mass media, music, and art, but also our everyday life sometimes requires new terminology, such as in sport, food, clothing, entertainment, etc. An abundant supply of neologisms also arises during an exceptional period, new era or during difficult times, such as global pandemic, when we need to name new entities or situations that are the core of our discussion. (Peprník, 1992, 122a-124)

As I have mentioned in the previous chapter, neologisms can be coined by any type of word-formation processes. To prove this fact, I have picked out some examples of recently coined denominations from the OED online blog and I will analyze their word-formation process.

**List of recently coined words from the Internet and their word-formation analysis: (8)**

▪ **profee**

A drink made by adding protein powder/shake to an iced coffee.

Blending: protein + coffee

▪ **sleepcast**

A podcast containing sounds that are supposed to make one fall asleep easier and deeper.

Blending: sleep + podcast

▪ **HILIT**

A form of training that consists of short periods of intense exercise with short periods of rest in between but does not include any exercise that puts high pressure on joints (e.g. jumping).

Abbreviation: high intensity low-impact training

▪ **hurry sickness**

A way of behaviour when someone does everything in a hurry because they are always stressed about not having enough time.

Compounding: hurry + sickness

▪ **BookTokker**

A person who creates content about books on a social media platform TikTok.

Compounding: Book + Tokker



- **Regenuary**

A movement organized in January 2021 that encourages people to buy and eat food that is local and seasonal.

Blending: region + January

- **dunchfast**

A meal eaten once a day that combines breakfast, lunch, and dinner.

Blending: dinner + lunch + breakfast

- **15-minute city**

A city designed so that its citizens can reach everything they need in 15min walk/bike ride.

Compounding: 15 + minute + city

- **NFT**

An entry in a digital database that shows who owns a piece of content on the internet (video, song, sound).

Abbreviation: non-fungible token

- **Dub-Lit**

A genre of books written by Irish authors and set in present-day Dublin.

Complex clipping: Dublin literature

- **extractive tourism**

The situation when too many people visit a holiday place so that it makes it difficult for people who live there to exist and function.

Compounding: extractive + tourism

## 2.5. Neologisms and Covid-19

Whether we appreciate it or not, the covid-19 slang is inevitable. We hear new information about the pandemic every day and everywhere, not to mention the number of myths and hoax. In fact, there is so much information that it confuses most of our lay public and that can lead to misinformation spread, especially through social media. The World Health Organization created an 'infodemic' management, which is supposed to fight with the "information pandemic" and "reduce its impact on health behaviours". (9) It may be overwhelming to hear about Covid-19 all the time and not being able to escape from it but being well informed is essential in a crisis like this.

The term 'Covid-19' was coined in February 2020, when the official name of the disease was announced by WHO. It is using letters from the official name Coronavirus Disease. Since then, people created their slang, e.g., in the United Kingdom, they use the word 'covidiot' as a label for someone who does not respect social distancing rules. These words cannot be found in dictionaries, but they are a proof for linguistic creativity, which can be used as an amusement and to help us as a coping mechanism.

It is not only English that covers newly coined terms. In German they use e.g., *coronaspeck*, which refers to stress eating in home quarantine. Spanish use for example *coronaburro* (burro is a word for donkey) to make fun of people disrespecting public

health recommendations. In Australia, they have coined multiple clippings or abbreviations, e.g., *quaz* for quarantine or *sanny* for sanitizer.

Fiona McPherson, an editor of the Oxford English Dictionary (OED) comments: "Social change brings about linguistic change." She also says that many of the newly coined words are not actually new. (10) This topic is more developed in the following chapter.

**Examples of recently coined neologisms related to the covid-19 pandemic, found on the Internet and their word-formation analysis: (8)**

- **covidivorce**

When a married couple gets divorced because of the huge amount of time they spend with each other during covid-19 lockdown.

Blending: covid + divorce

- **quaranteen**

A teenager in times of covid-19 quarantine.

Blending: quarantine + teenager

- **anti-masker**

A person who rejects wearing a mask for protection from the covid-19, even when it is a state rule.

Derivation: prefix anti + masker

- **maskne**

Acne that was created or worsen by wearing a mask.

Blending: mask + acne

- **blursday**

A funny term to use for any day in the week during the covid-19 times, when people spend most of their time at home working, studying, and do not ever go out.

Compounding: blurs + day

- **Above-the-mask**

A cosmetic treatment or product that is used specifically on the eyes, eyebrows or forehead, which are visible face parts when wearing a mask.

Compounding: above + the + mask

- **V-day**

The day when the covid-19 vaccination programme started in the UK.

Abbreviation: Vaccination Day

- **coronasomnia**

A condition of being unable to sleep because of anxiety related to the covid-19 pandemic.

Blending: coronavirus + insomnia

- **boffice**

A bed used as a working space by someone who works from home during the pandemic.

Blending: bed + office

- **panpanic**

A feeling of fear experienced by many during the covid-19 pandemic, which often leads to irrational thoughts and actions.

Blending: pandemic + panic

- **vaccine hunter**

Someone who uses the internet to organise covid-19 vaccine appointments for people who cannot do that themselves.

Compounding: vaccine + hunter

- **scariant**

Any new variant of covid-19 that people are very worried about because of the way it is presented in media, even when there is no scientific evidence about its dangerousness.

Blending: scary + variant

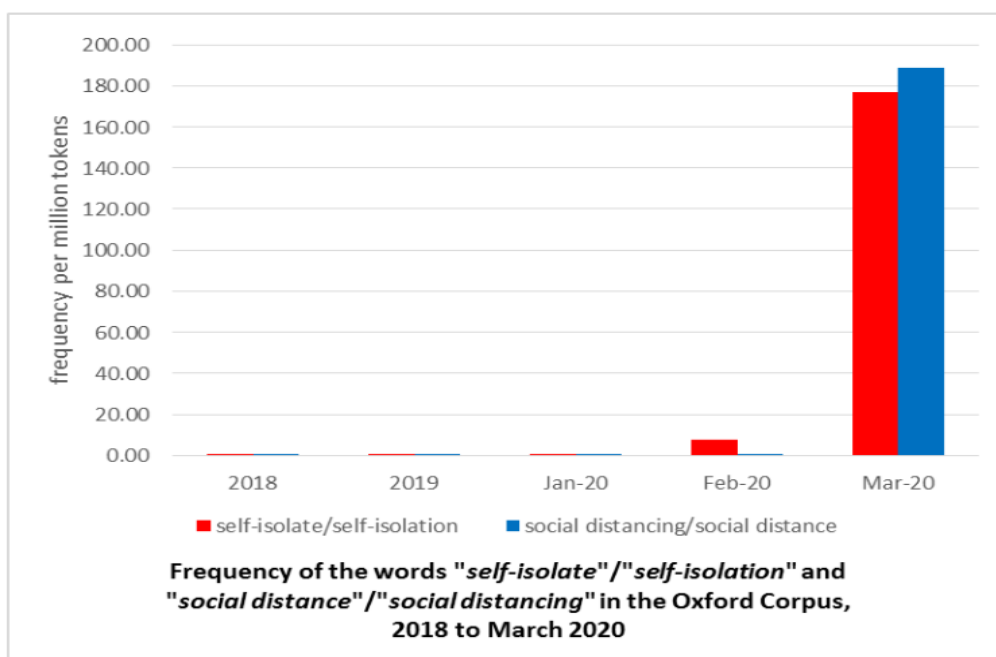
## 2.6. [New or newly popular?](#)

The problem with 'new' is that it is relative, so the question is: Are covid-19 related words new or simply newly popular? Fiona McPherson in an article *Why we've created new language for coronavirus* (10) from May 2020 commented: "I find it fascinating that words which we (probably) weren't using 3 months ago are suddenly completely normal and natural and are probably featured in the majority of

conversations that we are having.” This statement suggests that the words we are using when talking about the Covid-19 pandemic are not new, they just “hadn’t crossed our collective radar until this pandemic.”

Some of the “new entries” in our daily vocabulary include *self-isolation*, dated back to 1834, *social distancing*, first detected in 1957, or *WFH* standing for ‘work from home’ used as a noun since 1994 and as a verb since 2001. The word ‘coronavirus’ itself has existed for even hundreds of years. They became more frequently used or they gained new meanings to fit the context of the pandemic. According to McPherson, the only truly new term is ‘Covid-19’. (10)

“Many of the words used in the context of the current crisis are not completely new but were relatively uncommon before this year (2020). The chart below shows the increase in frequency of two particularly salient sets of terms: *social distancing/social distance* and *self-isolation/self-isolate*.” (11)



Source: <https://public.oed.com/blog/corpus-analysis-of-the-language-of-covid-19/>

The chart above shows us that even though terms as ‘self-isolation’ and ‘social distancing’ existed before, the frequency of their usage was insignificant. They simply were not necessary or common in conversations. That has changed since the global Covid-19 pandemic began, and we had to take certain measures to protect ourselves and our close ones by staying away from other people. We started using these words in daily conversation because they became essential for describing our reality, our lives. In one month, their frequency climbed up from 0 per million tokens to almost 180,000 and 200,000 per million tokens.

### 3. Practical part

#### 3.1. Methodology of my work

For my analysis I have chosen ten articles from online news platforms covering or at least touching the topic of the Covid-19 pandemic. I then created ten files where I copied the articles to and uploaded the files into the #Lancsbox programme, creating my own corpora.

I searched for words that are on the OED list of new words from April 2020, when all the new entries were somehow related to Covid-19. These include ‘new words’ “appearing in OED for the first time” and ‘new sub-entries’ as “compounds or phrases integrated into the body of newly or recently updated entries”.

As for new words, OED lists these:

- **Covid-19** (n.): “An acute respiratory illness in humans caused by a coronavirus, which is capable of producing severe symptoms and death, esp. in the elderly and...”
- **infodemic** (n.): “A proliferation of diverse, often unsubstantiated information relating to a crisis, controversy, or event, which disseminates rapidly and...”
- **RO** (n.): “The average number of cases of an infectious disease arising by transmission from a single infected individual, in a population that has not...”
- **self-isolate** (v., -ed adj., -tion n., -ing adj.): To isolate oneself from others deliberately; (now) esp. to undertake self-imposed isolation for a period of...”
- **self-quarantine** (n., v., -ed adj.): “Self-imposed isolation undertaken in order to avoid catching or transmitting an infectious disease, or as part of a community initiative to inhibit...”
- **shelter in place** (n., v.): “A public safety protocol invoked during an emergency in which there is an imminent threat to life or health, instructing people to find a place of...”
- **social distancing** (n.): “The action of practice of maintaining a specified physical distance from other people, or of limiting access to and contact between people (esp...”
- **social isolation** (n.): “The state of having little or no contact with other people; (now) esp. a condition in which an individual lacks social connections or has no access...”



As for new sub-entries, OED lists:

- **flatten the curve** (v.): “To take measures designed to reduce the rate at which infection spreads during an epidemic, with the aim of lowering the peak daily number of new cases and extending the period over which new cases occur.”

(12)

The following table displays top 25 keywords in the Oxford Corpus, April to June 2020. “Each month we run searches to identify words which are markedly more frequent in that month than in the corpus as a whole (‘keywords’ for those months). As described in our April blog post, keywords in January, February, and March (2020) included those describing and naming the virus and the disease (*coronavirus, Covid-19, respiratory*, etc.), and those referring to the social consequences and medical response (*social distancing, self-isolation, self-quarantine, lockdown, PPE, ventilator*, etc.). The keywords in April, May, and June show further shifts and changes.”

April	May	June
PPE	reopen	defund
lockdown	lockdown	Juneteenth
pandemic	Covid-19	brutality
ventilator	pandemic	anti-racism
stay-at-home	Covid	racism
Covid-19	distancing	Covid
furlough	hydroxychloroquine	Confederate
distancing	covering	looting
coronavirus	furlough	covering
N95	stay-at-home	kneel
Zoom	SARS-CoV-2	chokehold
hydroxychloroquine	PPE	statue
quarantine	phased	reopen
asymptomatic	quarantine	two-metre
Covid	reopening	systemic
frontline	tracer	pandemic
virus	easing	looter
self-isolation	remdesivir	Covid-19
disinfectant	asymptomatic	distancing
shelter-in-place	mail-in	lockdown
mask	hornet	dexamethasone
SARS-CoV-2	coronavirus	racial
non-essential	antibody	injustice
ICU	mask	asymptomatic
corona	in-person	distanced

Source: <https://public.oed.com/blog/using-corpora-to-track-the-language-of-covid-19-update-2/>

Not all of these items are related to Covid-19 pandemic, so I created a table of those that are directly connected with this topic.

*Table 3: Most frequent words directly connected to Covid-19 pandemic (OED)*

PPE	coronavirus	shelter-in-place
lockdown	quarantine	mask
pandemic	asymptomatic	SARS-CoV-2
ventilator	Covid	corona
stay-at-home	virus	Remdesivir
Covid-19	self-isolation	two-metre
distancing	disinfectant	distanced

In my research I looked for the words listed above and for the new words listed by OED in April 2020 in my chosen texts with the help of #Lancsbox tool ‘Words’. I also searched for other Covid-19 related items that I discovered in the text, because the situation is still evolving, and the terminology changed since last year. As I have already mentioned, there are multiple variants of the virus, multiple vaccines and some countries are already moderating their restrictions for many people are already vaccinated and the spread is slowing down.

In the Analysis chapter, I analyse the frequency of the found words and comment on their meaning.

### 3.2. #Lancsbox

#Lancsbox or Lancaster University corpus toolbox is a “new-generation software package for the analysis of language data and corpora” founded at Lancaster University by Vaclav Brezina and his team of developers. As the official #Lancsbox website says, it:

- Works with your own data or existing corpora.
- Can be used by linguists, language teachers, historians, sociologists, educators and anyone interested in language.
- Visualizes language data.
- Analyses data in any language.
- Automatically annotates data for part-of-speech.

It has seven main tools, but I mainly used the tool 'Words', which provides a list of all the words sorted according to their frequency and it also illustrated the distribution of these words among the texts, and the tool 'KWIC' for it allows the user to see the context before and after a searched word, which helped me to recognize the meaning easier. (13)

### 3.3. Analysis

#### 3.3.1. Vaccine

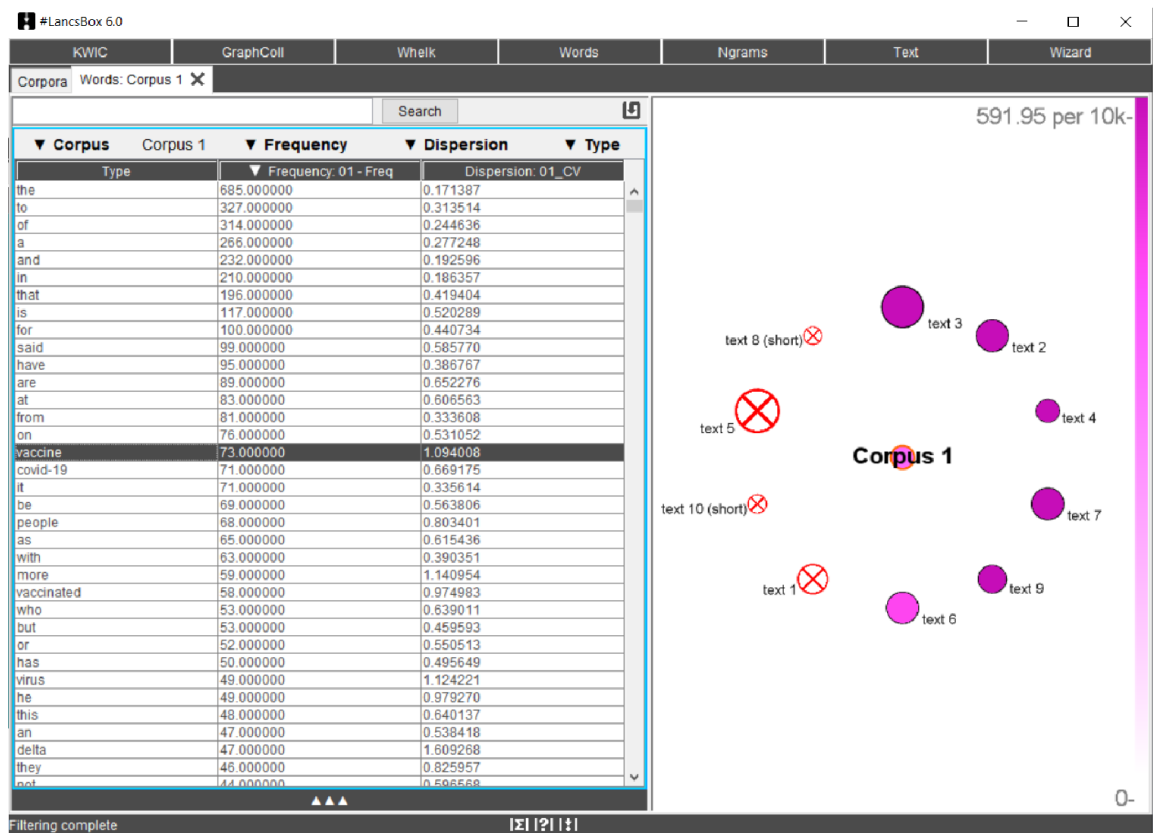
The most frequent word in the texts was the noun 'vaccine'. In the *Figure 1* we can see that it appeared in the texts 2, 3, 4, 6, 7 and 9 with the frequency of 73. The lighter coloured circle suggests that this word did appear less in the text number 6. The size of the circles displays the size of the texts. Texts 8 and 10 are short reports (around 400 words), whereas texts 3 and 5 are longer articles with more than 2000 words.

This word was not in OED corpus listed as most frequent word because there simply was no vaccine yet by the time the corpus was made. This word became frequently used after medical companies made their vaccines and countries started with their vaccination plans. Today however, it is a daily used term. We discuss the topic of vaccination every day and there has also arisen an 'Anti-vax' group, which refuses to get

vaccinated. The main reason for it may be the side effects that many people have after getting the dose, as well as trust issues towards science.

In the text I have detected also other manifestations of the word vaccine: *vaccines* (n.) – frequency 43, *vaccination* (n.) – freq. 25, *vaccinations* (n.) – freq. 6, *vaccinated* (adj.) – freq. 58 and *unvaccinated* (adj.) – freq. 15.

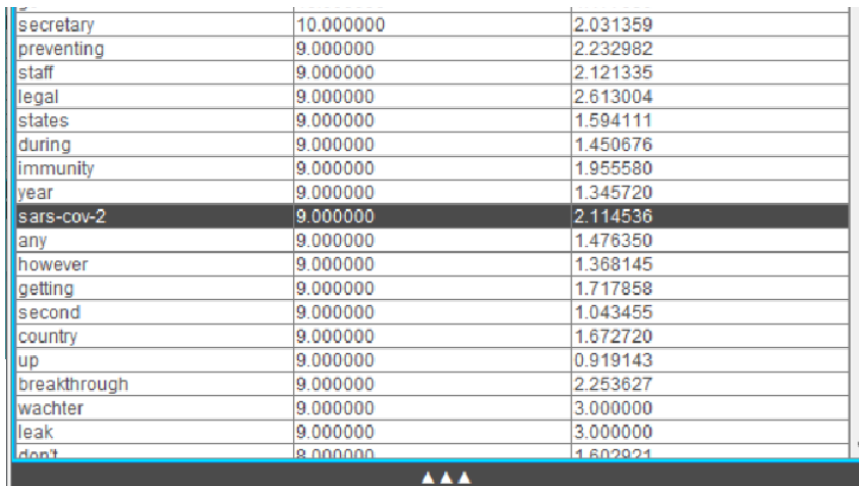
Figure 1: Vaccine



### 3.3.2. SARS-CoV-2

The official name of the virus, 'SARS-CoV-2', appeared only 9 times. I believe it is because the name is difficult and technical, so it is not likely to appear often.

Figure 2: SARS-CoV-2



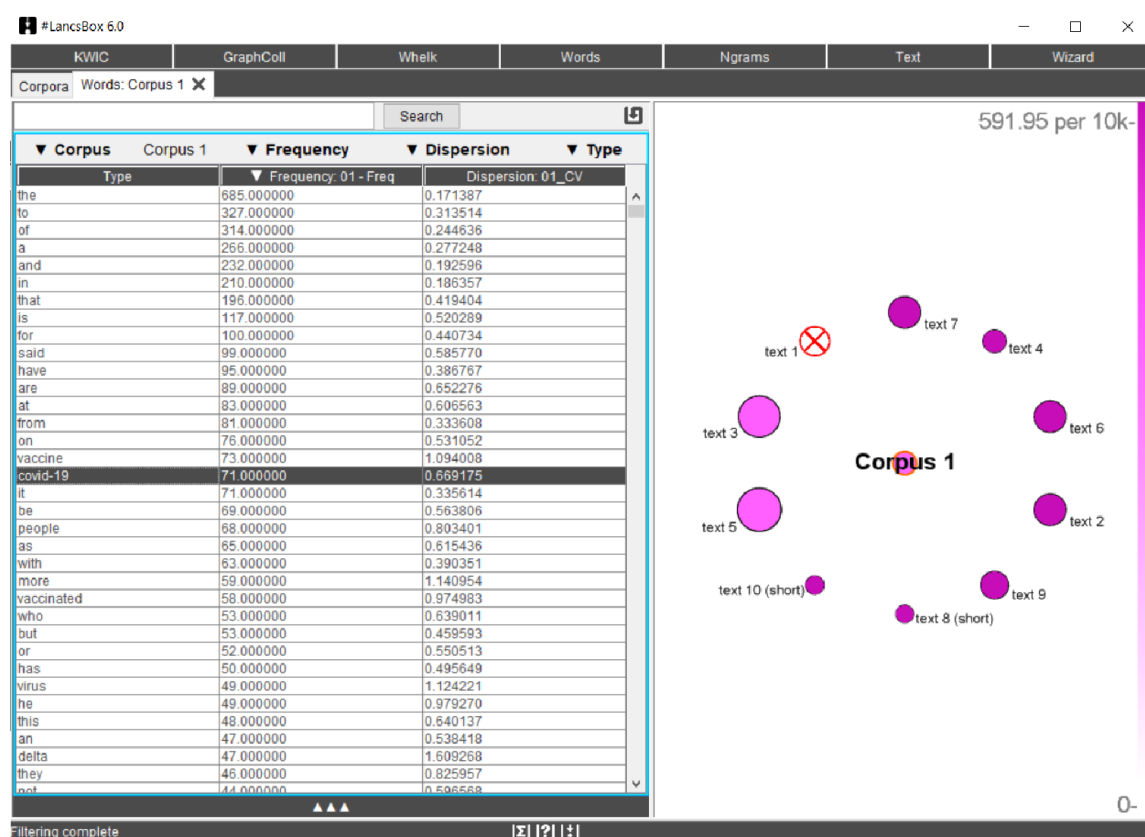
secretary	10.000000	2.031359
preventing	9.000000	2.232982
staff	9.000000	2.121335
legal	9.000000	2.613004
states	9.000000	1.594111
during	9.000000	1.450676
immunity	9.000000	1.955580
year	9.000000	1.345720
sars-cov-2	9.000000	2.114536
any	9.000000	1.476350
however	9.000000	1.368145
getting	9.000000	1.717858
second	9.000000	1.043455
country	9.000000	1.672720
up	9.000000	0.919143
breakthrough	9.000000	2.253627
wachter	9.000000	3.000000
leak	9.000000	3.000000
don't	8.000000	1.602921

### 3.3.3. Covid-19

The second most frequent Covid-related word was 'Covid-19'. As we can see, it appeared in 9 out of 10 texts with the frequency of 71. Even though it has less frequency units than 'vaccine', I would say it is more frequently used for it appeared in each but one texts.

This term has other alternatives that are not literally accurate, but they gained the same meaning by metonymical shift. These include *coronavirus*, which is a name of a whole group of viruses, not only this specific Covid-19 disease. However, when somebody says "coronavirus" we automatically associate it with this specific SARS-CoV-2. Same for e.g. *Covid*, which is short for 'Covid-19' or *corona*, short for 'coronavirus'.

Figure 3: Covid-19



### 3.3.4. Alternatives to Covid-19

The articles included alternatives to Covid-19 such as ‘coronavirus’ – frequency 23 and ‘Covid’ with the frequency 11. Here I also used the tool KWIC to quickly find out the context of these alternatives so that I can recognize their meaning.

As for coronavirus, it was mostly used in the sense of the Covid-19. It was also accompanying nouns creating compounds, e.g., *coronavirus rules*, *coronavirus vaccine*, *coronavirus strain*, *coronavirus variant*, *coronavirus infections*. In the context of these compounds, it also carried the meaning of this specific Covid-19 pandemic. Its plural form ‘coronaviruses’ was, however, used in the original meaning, as a group of viruses.

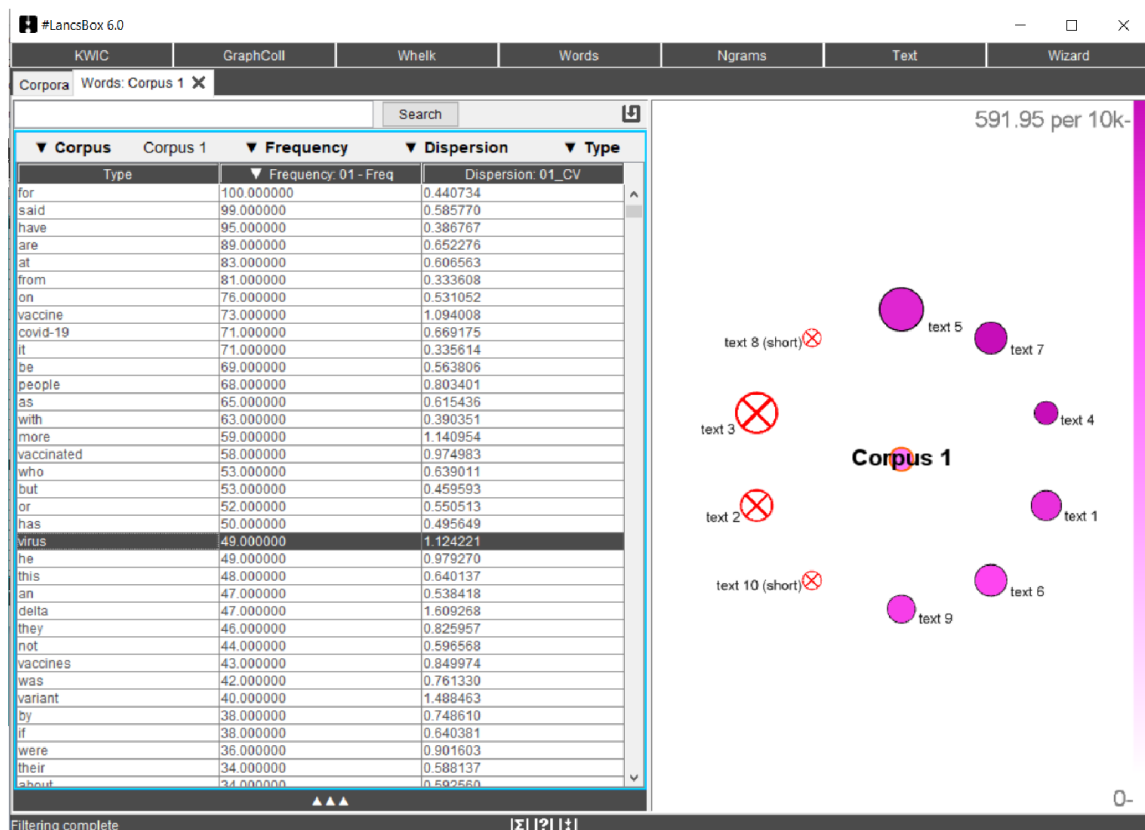
As for the short variation, 'Covid', the usage was mostly for the specific Covid-19 and there were also some cases of compounds, e.g. *Covid case*, *Covid restrictions*, *Covid contact*.

### 3.3.5. Virus

The third most used word in the texts was 'virus'. In most cases this noun referred to the specific SARS-CoV-2 virus and the meaning was metonymically shifted. Its frequency was 49 and it was used in 6 out of 10 texts.

With this word and its plural form, I also used the KWIC tool. I found out that only its plural modification 'viruses' in the text number 10 kept its literal and general meaning as microscopic infectious agents.

Figure 4: Virus



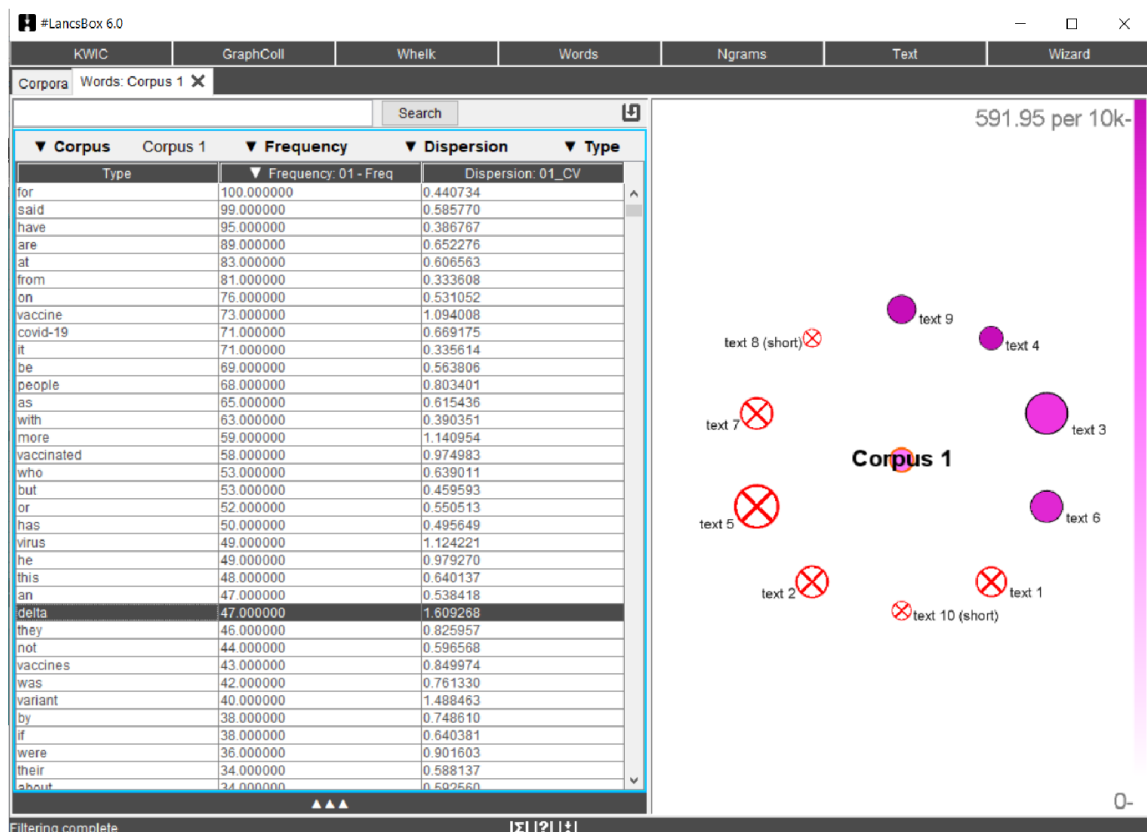
### 3.3.6. Delta

Next, we have 'Delta' as for the newest variant of Covid-19, with its frequency 47.

Here I also used the tool KWIC to see the context. It appeared in texts 3, 4, 6 and 9 and in most cases, it was accompanied with 'variant', creating a compound phrase 'delta variant'. In many cases though, it stood by itself but with the same meaning as Delta variant of Covid-19. Therefore 'variant' was right behind with the frequency of 40.

It is more than obvious why this term was not in the OED list – it is a very recently detected and named mutation. Therefore, I consider it a neologism.

Figure 5: Delta





### 3.3.7. Self-isolate, mask, pandemic

‘Mask’ (n.), ‘pandemic’ (n.) and ‘self-isolate’ (v.) were all in the OED corpus and they also appeared in my research, all with the same frequency value - 6.

The meaning of ‘mask’ depends on the context, from a protective face covering for sports such as fencing or ice-hockey; face covering to amuse others (e.g., on carnival, Halloween...); to cosmetic treatment for facial skin; ... In the sense of a sheet, covering one’s nose and mouth in order to prevent spreading illnesses or viruses, it existed for ages in the medical environment. However, since March 2020 it became our daily accessory and necessity.

‘Pandemic’ was used especially in relation to Covid-19 for there is currently no other global pandemic. ‘Self-isolate’ or other variants of this term also became rapidly common in our day-to-day lives. As OED commented, the term also existed before, but it was not needed in daily vocabulary.

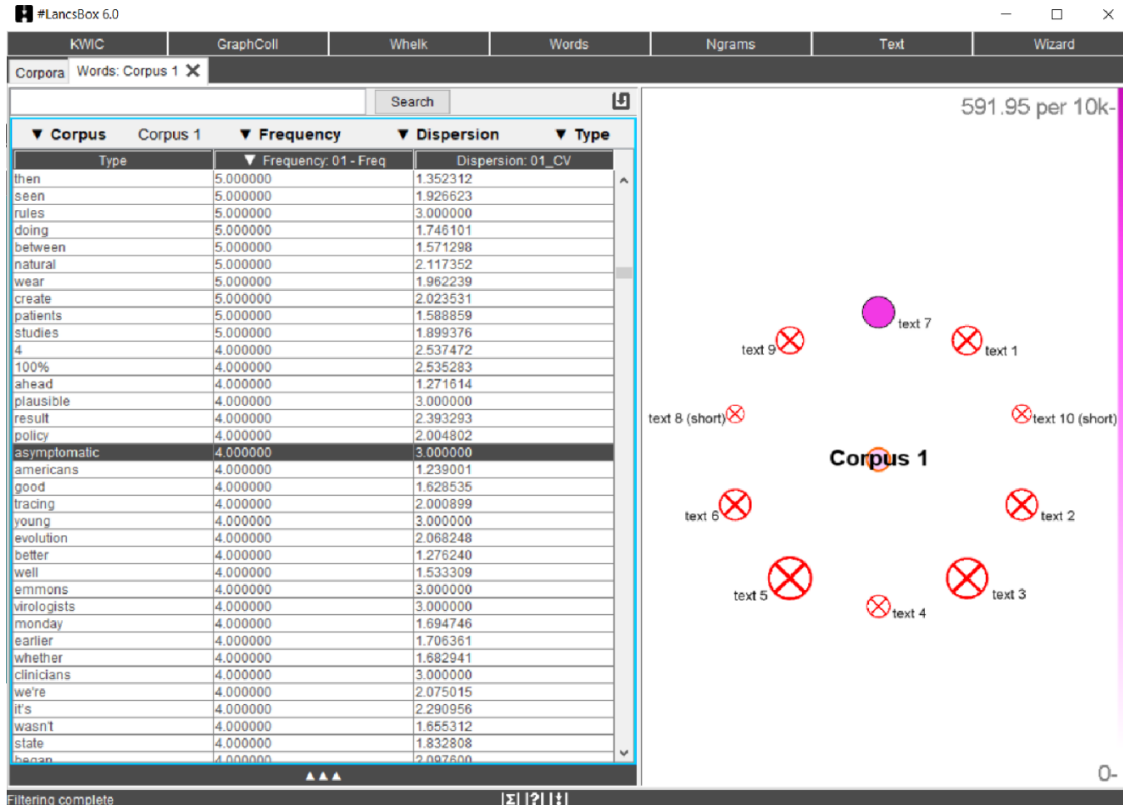
Figure 6: Self-isolate, mask, pandemic

▼ Corpus	Corpus 1	▼ Frequency	▼ Dispersion	▼ Type
Type		▼ Frequency: 01 - Freq	Dispersion: 01_CV	
possibility		6.000000	2.247273	
chief		6.000000	2.525576	
early		6.000000	2.171148	
time		6.000000	2.261599	
identified		6.000000	1.521031	
coats		6.000000	3.000000	
clear		6.000000	1.996478	
<b>self-isolate</b>		<b>6.000000</b>	<b>2.029047</b>	
take		6.000000	0.988332	
concerns		6.000000	2.284375	
home		6.000000	1.282802	
vaccinations		6.000000	1.581149	
made		6.000000	1.314010	
illness		6.000000	1.923570	
within		6.000000	1.151204	
something		6.000000	1.493105	
though		6.000000	1.145209	
five		6.000000	1.387501	
<b>mask</b>		<b>6.000000</b>	<b>1.638329</b>	
texas		6.000000	2.663869	
severe		6.000000	1.738321	
<b>pandemic</b>		<b>6.000000</b>	<b>1.427297</b>	
number		6.000000	1.425762	
outbreak		6.000000	1.337107	
similar		6.000000	1.778808	
system		6.000000	1.321090	
saying		6.000000	2.100624	
worry		6.000000	2.268281	
officials		6.000000	1.733803	
why		6.000000	1.457381	
rate		6.000000	2.078997	

### 3.3.8. Asymptomatic

This adjective was not so common, it appeared four times and only in text n. 7.

Figure 7: Asymptomatic



### 3.3.9. Distancing

'Distancing' was used four times. In all four cases it was a head of a compound: *social distancing* or *physical distancing*, referring to limiting the contact with other people to not unconsciously spread the virus and to protect ourselves from getting infected.

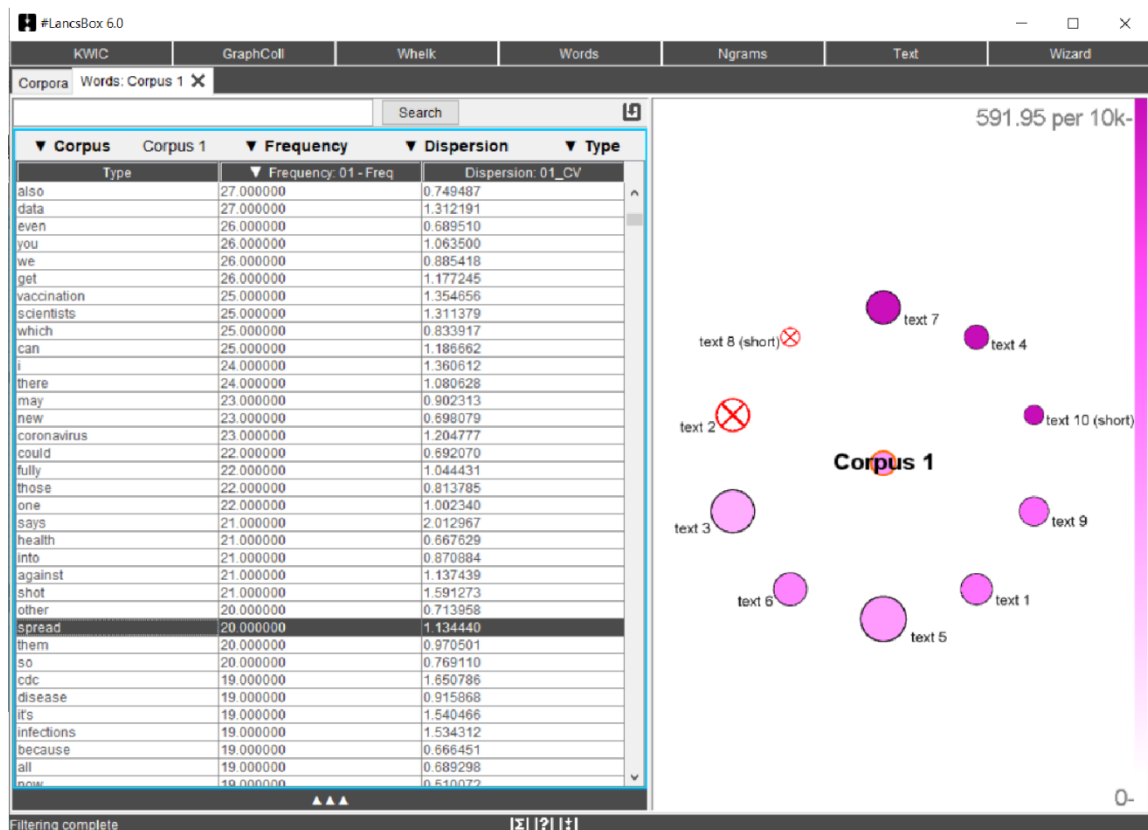
### 3.3.10. Quarantine

'Quarantine' appeared only once and as a verb form (*having to quarantine*). The one-time occurrence may be caused by the fact that I have chosen random articles from the Internet. People still need to stay in quarantine, e.g., when they got into contact with an infected person and do not want to be tested, so I do not think the word 'quarantine' has left our daily used vocabulary yet.

### 3.3.11. Spread

This word was mainly used as a verb, but it appeared also as a part of a compound *covid spread*. It was used twenty times in the texts. It did not appear only in texts 2 and 8.

Figure 8: Spread



### 3.4. Results

I have analysed fifteen words related to the Covid-19 pandemic. Some of these words corresponded with the OED corpus from April 2020, but some were not included in their corpus because they were not relevant at that time.

The table below displays the results of my findings. The most frequent word was vaccine. Considering the current Covid-scene, when there are 24.6% people already

vaccinated with at least one dose and more than 30 million vaccines are administered daily (14), there is no doubt that most of the news online deal with this topic.

Covid-19 and its metonymic modifications are, of course, also very high on the frequency level, as well as the new Delta variant.

What I find quite surprising, is the occurrence of the word quarantine. It appeared only once in the whole corpus. As I have mentioned before, I believe it is due to the random choosing of the texts into my corpora.

*Table 4: Results*

	<b>Word</b>	<b>Frequency</b>
1.	vaccine	73
2.	Covid-19	71
3.	virus	49
4.	Delta	47
5.	variant	40
6.	coronavirus	23
7.	spread	20
8.	Covid	11
9.	SARS-CoV-2	9
10.	mask	6
11.	pandemic	6
12.	self-isolate	6
13.	distancing	4
14.	asymptomatic	4
15.	quarantine	1

The aim of my work was to find out if there are any new words that were created in the context of the Covid-19 pandemic. According to Oxford English Dictionary Blog, there are plenty of new entries being coined every day (as I listed some of them in chapter 2.5.). I, however, believe they did not cross the boundary of public's regular vocabulary for almost none of those neologisms did occur in my findings.

My findings correspond with the theory of nonce formations, defined by Štekauer as the first stage of a newly coined lexeme or with Bauer's definition: "a new complex word coined by a speaker/writer on the spur of the moment to cover some immediate need." (See chapter 2.4.) There is, of course, the possibility that some of them will become lexicalized and used more frequently.

I detected only two true neologisms – Covid-19 and Delta variant. These terms were coined when something new emerged - a completely new coronavirus 'Covid-19' and a new mutation of this virus 'Delta variant', and they are completely new denominations.

As Peprník claims, there are also semantic neologisms, which are not new entries but new meanings of already existing words. According to Levchenko, this is frequently a result of a metaphoric or metonymic extension. In my research, this often appeared with the word 'coronavirus', 'Covid' or just 'virus' where the meaning has shifted from a general sense to a concrete sense of one specific virus causing the Coronavirus Disease 2019. As for 'Covid' and 'coronavirus', it worked often as a modifier to a compound head, e.g., *Covid restrictions, Covid cases, coronavirus vaccine, coronavirus variant*.

## 4. Conclusion

As my favourite internet linguist Gretchen McCulloch wrote in an article published in the Wired magazine, “Covid is, for the moment, a lifestyle illness.” That means we are covered in coroninformation all the time and there are, of course, plenty of new words or novel meanings coined in relation to this worldwide covid-situation. Our vocabulary had to evolve and change, at least to a certain extent.

Even though I discovered only two true neologisms in my chosen articles, there is a big number of other coinages. In my opinion, majority of the new words are terms that emerge only once or a few times to fill the void in language. They appear mostly on the internet in discussion forums and articles covering some social or lifestyle issue that is new and needs to be described. Authors of these articles play with the language and create new compounds, blends, clips, or abbreviations, often to attract attention and/or entertain a reader and satisfy a linguistic demand. Therefore, these singletons do not manage to stay in the central vocabulary.

On the other hand, some already existing words fought their way from the periphery into the centre of communication and became essential for describing the daily circumstances. Until Covid-19, it was not necessary to keep them in our central word supply but after Covid-19 intervened, their frequency rose rapidly, and their meaning gained new nuances. Nevertheless, I do not consider them neologisms.

I believe living languages are still in a transformation process, so some of the newly coined English neologisms might start occurring more in the future. After (or if) we oust the pandemic, units as *Covid-19*, *self-isolation*, *quarantine*, *coronavirus*, *Delta mutation* and others will most probably stop occurring that often or they will acquire new

meanings. One way or another, one cannot clearly predict these kinds of language changes.

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## 6. Appendix

### Text 1

Covid: Self-isolation to be scrapped for double-jabbed and children in England

Fully vaccinated people in England won't have to self-isolate if a close contact tests positive for Covid from 16 August, the health secretary says.

Sajid Javid told MPs the same policy would also apply to anyone under the age of 18 from that date.

The government would give more details this week on self-isolation rules for international travel, he added.

"This new approach means we can manage the virus in a way that is proportionate," Mr Javid said.

Education Secretary Gavin Williamson has also announced the end of the "bubble" system in schools, which has led to large numbers of pupils being sent home if a single child has a positive test, from 19 July.

Covid-related pupil absence in England has hit a new high since all students returned to school in March.

On Monday, the prime minister confirmed he intended to scrap most of the remaining restrictions in England on 19 July, including the laws on mask wearing and rules on social distancing.

Earlier, Mr Javid said daily cases "could go as high as 100,000" when restrictions were fully lifted.

In a statement to the House of Commons, Mr Javid said: "From 16 August when even more people will have the protection of both doses, and when modelling suggests the risks from the virus will be even lower, anyone who is a close contact of a positive case will no longer have to self-isolate if they have been fully vaccinated.

"If someone gets their second dose just before or just after 16 August, they'll need to wait two weeks, after which their second jab can take effect and give them these new freedoms."

As under-18s are not routinely jabbed, he said a similar exemption from self-isolation rules would be extended to them.

He said adults who had been in close contact with a positive case would be "advised" to get a PCR as soon as possible to make sure they hadn't been infected, while for children it would be dependent on their age.

People identified as close contacts of a confirmed Covid case are currently required to self-isolate for up to 10 full days when contacted by NHS Test and Trace.

He added that "of course" anyone that tests positive would have to self-isolate whether they have had the jab or not.

Mr Javid added that Transport Secretary Grant Shapps will update MPs this week on how to "remove the need for fully-vaccinated arrivals to isolate when they return from an amber list country".

Earlier, the health secretary told BBC Radio 4's Today programme he would expect cases numbers by 19 July to be "at least double" what they were now "so around 50,000 new cases a day".

"As we ease and go into the summer we expect them to rise significantly and they could go as high as 100,000 case numbers," he added.

Prof Neil Ferguson, from Imperial College - whose modelling helped lead to the first nationwide restrictions - said as restrictions eased there was the potential for the UK to have a very large numbers of cases - 150,000 to 200,000 a day - which could "still cause some pressure to the health system".

However he told BBC Radio 4's Today programme that although it was a "slight gamble" he thought it was "justifiable", adding "I'm reasonably optimistic."

He said the vaccines would keep deaths far lower than in previous waves. "The ratio which we saw in the past between case numbers and deaths has been reduced by more like eight to 10-fold."

He said that in the worst-case scenario there "may need to be a course correction later".

The planned relaxation of restrictions on 19 July is essentially an acknowledgement the government is now happy to let Covid spread, in the knowledge the most vulnerable have a good level of protection.

But it is also being done with the expectation that, at some point, cases will begin to plateau as the virus hits the wall of immunity built up by the vaccination programme and natural infection.

That may not happen before we hit 50,000 cases a day, perhaps even 100,000, which of course would mean lots of people having to quarantine because they come into close contact with someone who is infected.

There are already reports of hospitals being short of staff because doctors and nurses are self-isolating because they are classed as a close contact.

And this is being mirrored in workplaces and other settings across the country. If allowed to continue, the country is at risk of grinding to a halt this summer.

For people who have been double-jabbed, the chances are they will not become infected - the vaccines offer about 80% protection against symptomatic infection.

As always with Covid, it comes down to what is proportionate.

Labour politicians, as well as some doctors and trade unions, have expressed concern that the lifting of the restrictions may be premature.

Shadow health secretary Jonathan Ashworth said although he was "in favour of reopening our economy", he felt there was a need to maintain a legal requirement to continue wearing masks in shops and on public transport.

He said it was "peculiar" to have a situation where more people would be getting on trains and buses while telling them they didn't have to wear a mask anymore.

Businesses have given mixed reactions to the prime minister's latest announcement.

Melvin Benn, chief executive of Festival Republic, which runs the Reading and Leeds festivals, said the government had "got this right", adding that "the country wants to reopen, we are tired of this, we want to reopen".

He also said he was not inclined to encourage festival guests to wear masks - even indoors.

However, Jacinta Rowsell, manager of the Westfield shopping centre in London, said staff would still "encourage guests" to wear masks as they wanted people visiting to feel safe.

She added that each retailer in the centre "may implement their own policy" on mask wearing inside their stores.

Scotland, Wales and Northern Ireland are in charge of their own coronavirus rules.

The Scottish government has said it may continue to require masks in certain settings even after 9 August, when it is hoped the final curbs will end.

Ahead of a review on 15 July in Wales, ministers said people would need to learn to live with Covid. Rules in Northern Ireland have just eased, with another review due on 8 July.

On Monday, a further 27,334 cases were reported across the UK - and another nine deaths within 28 days of a positive test.

## Text 2

Anti-vax group mounts legal blitz to sow disinformation against vaccinations

Texas group the Informed Consent Action Network has capitalized on fear surrounding supposed vaccine mandates

Just as the Covid-19 vaccine rollout began in earnest in the United States, the Informed Consent Action Network (Ican) sent its subscribers a "legal update" on its war against employers and schools planning to require the shots.

An unspecified number of organizations had supposedly dropped their mandates – one just after Ican took them to court – and the Texas-based anti-vaccination nonprofit was prowling for more plaintiffs.

"If you or anyone you know is being required by an employer or school to receive a Covid-19 vaccine, Ican is pleased to offer to support legal action on your behalf to challenge the requirement," read the January email.

Ican was founded in 2016 by one of the loudest voices in the US anti-vaccine movement, Del Bigtree, who produced the widely discredited propaganda movie *Vaxxed: From Cover-Up to Catastrophe*. For the last year, the nonprofit has capitalized on fear surrounding supposed vaccine mandates, going on the offensive months before any lifesaving vaccines became available to the public. Now, as vaccine hesitancy persists, Ican's legal blitz has fueled disinformation, using costly legal threats to deter schools and businesses from implementing vaccination requirements.

"If you have a limited budget to deal with litigation, it doesn't matter if you might win at the supreme court level," said Margaret Foster Riley, a professor at the University of Virginia School of Law. "The costs of that litigation are so existentially threatening that you're not going to take the risk."

Ican did not return the Guardian's request for comment.

The US Equal Employment Opportunity Commission has already given the go-ahead to employers who want to require vaccines for employees in the workplace, according to recent guidance. However, the idea of a "vaccine mandate" is misleading, as students and workers still have the right to refuse a job and won't be involuntarily vaccinated, said Y Tony Yang, a professor of health policy at George Washington University.

Those who forgo a shot may be barred from some opportunities, although there's still the possibility of waivers, exemptions and other work-arounds. Plus, they'll likely have the ability to choose education or employment alternatives that don't require vaccines.

"Sure, that's a different school, might not be the school you want," Yang said. "That's the option."

Vaccine requirements are already commonplace in academic settings and among healthcare workers in the US. But the specter of Covid-19 vaccine mandates nevertheless became a "calling card" for anti-vax groups like Ican – a lightning rod to "rally people" and "sow a lot of contentiousness", said Rekha Lakshmanan, director of advocacy and public policy at the Immunization Partnership.

"There's a theme of being very pre-emptive and opportunistic to sort of lay this foundation and seeds of doubt," Lakshmanan said.

In fact, Ican may have targeted mandates so strongly because the Covid-19 vaccine – which has already reached more than 65% of US adults – represents "an existential threat" to its mission, Riley said.

"The more used to vaccination people are – and this is a population-wide experience – the less traction Ican has as an anti-vax organization," she added.

If the anti-vax movement is a pyramid scheme, Ican sits at the top among the well-funded organizers and creators of misinformation, explained Dorit Reiss, a professor at the University of California, Hastings College of the Law.

Some of the nonprofit's staff may be "true believers", Reiss allowed. But as a whole, the institution is largely "cynical" and "manipulative", far removed from the grassroots activists who act as door-to-door salesmen, spreading misinformation to friends and neighbors.

Since Ican's inception, its leaders have attracted a substantial fan base through its pseudo-talk show hosted by Bigtree, established a strong relationship with the New York-based attorney Aaron Siri and fundraised millions for their mission.

"They are much better at promoting their message comparatively than many of the organizations that are in the public health space," said Ana Santos Rutschman, an assistant professor at the Saint Louis University School of Law.

"They have resources directed at them. They are savvier."

The nonprofit has made a home in Texas, where deeply rooted conservative beliefs around liberty and freedom have sprouted an active, sizable anti-vax community, including a political action committee that advocates for "vaccine choice".

Earlier this month, a federal judge in Texas dismissed a lawsuit brought by employees of Houston Methodist hospital who had challenged the hospital's Covid-19 vaccination requirement, in one of the first rulings of its kind. The hospital suspended 178 staff for refusing the shot, which some have described as "venom".

"The political environment here was unfortunately prime and ripe for individuals and organizations like Ican to kind of set up shop in Texas," Lakshmanan said.

Ican's tactics and reliance on expensive legal services predate the pandemic, but threats of litigation became central to its strategy as it took on Covid-19 vaccine requirements.

In 2019, \$1.26m of the nonprofit's \$3.5m total expenses went to Siri's law firm, Siri and Glimstad, and this year, the nonprofit described Siri as its legal team leader. In February, Siri published a warning that organizations with Covid-19 vaccine requirements would "run afoul of the law", which could land them in court.

"Such potentially costly lawsuits can be avoided by refraining from adopting policies that require vaccination or penalize members for choosing not to be vaccinated," he wrote for Stat, a health-focused outlet produced by Boston Globe Media.

Siri's incendiary op-ed focused on the vaccines' emergency use authorizations (EUAs), which have allowed Americans to access the shots for months even though the US Food and Drug Administration (FDA) has yet to fully approve them.

As with any products approved for emergency use, US code requires that patients be informed of their choice to "accept or refuse administration" of the Covid-19 vaccines, and "of the consequences, if any, of refusing".

In recent months, Siri's firm has leaned on that provision along with other, weaker claims to lodge a barrage of attacks against an eclectic group of organizations requiring Covid-19 vaccinations, including New Jersey universities, a Wisconsin nursing home and a North Carolina sheriff's department, the Washington Post reported.

"It's these subliminal messages that are being issued out to entities," Lakshmanan said. "Hey, if you're going to even consider this, this is what we're going to do, and this is what we already started to put into motion."

But in May, Ican at least pressed pause on actively recruiting plaintiffs and announced it would no longer accept cases fighting vaccine requirements. Although there's still a legal grey area around mandates for EUA-authorized vaccines, experts are increasingly confident that, on balance, the courts would likely uphold them.

Meanwhile, with Pfizer, BioNTech and Moderna already applying to get their vaccines fully approved by the FDA, companies and institutions will likely benefit from over a century of judicial precedent defending mandatory vaccinations in coming months.

And, for employers, the prospect of a Covid-19 outbreak after a year of unexpected closures may now outweigh any hypothetical litigation.

"The risk of losing the lawsuit is probably smaller, even if it means that the mandate will only be in place for six months," Reiss said. "That's already a lot."

Still, Ican isn't going away. During this legislative session, Bigtree testified in front of Texas lawmakers to push for a bill that would have scared and confused patients. More recently, the nonprofit has tried to discredit Dr Anthony Fauci after obtaining a series of his emails through the Freedom of Information Act.

"They attract a lot of traffic," Santos Rutschman said, "wherever they decide to go."

### Text 3

Reports of Some Getting Pfizer, Moderna 'Boosters' After J&J Vaccine Prompts Calls for More Guidance

With the delta variant poised to become the dominant strain in the U.S., some Johnson & Johnson recipients are taking an additional shot from Pfizer or Moderna in the hopes of boosting their protection.

Kacie Coats did exactly what all public health experts were telling her to do: She got the first coronavirus vaccine available to her.

The 30-year-old Texas resident was inoculated against COVID-19 with a single Johnson & Johnson shot on March 31, at the first appointment she could get.

"It was, like, when everybody was in the mad dash trying to get appointments and we were told just to get the first available vaccine. So I kind of trusted that it would be good enough," she says. Then, she began to have doubts. She began reading studies on the effectiveness of the AstraZeneca vaccine, which uses similar technology to J&J's vaccine, on the delta variant.

She began to worry if the J&J vaccine was adequately protecting her against the variant, especially after hearing top infectious disease expert Anthony Fauci warning that the variant will likely become the dominant strain in the U.S. Her worries even prompted her to stop going out sans mask and to stay home more often, despite assurances from federal officials that fully vaccinated people could go back to normal life.

Finally, in June, she decided to receive one dose of the Pfizer vaccine.

"I do feel safer," she says post-dose. "I do feel safer knowing that I have it going through my body now and hopefully building up more immunity."

#### Why Get Two Doses?

As concerns mount over the delta variant first identified in India, Coats is not the only recipient of Johnson & Johnson's single-dose coronavirus vaccine looking for ways to boost protection. A handful of respected infectious disease experts have taken the Pfizer or Moderna booster shot plunge, too.

Jason Gallagher, a clinical professor at Temple University School of Pharmacy, recently received one dose of the Pfizer vaccine after getting the J&J shot in November as part of a clinical trial. He notes several considerations for his decision, including upcoming travel and having an unvaccinated child. He says that anyone who received the J&J vaccine who has concerns should speak to their doctor about the idea.

Angela Rasmussen, a virologist at the University of Saskatchewan's Vaccine and Infectious Disease Organization, documented her decision to get a shot of Pfizer after her J&J dose on Twitter, saying "we shouldn't wait to make recommendations about this."

"In the U.S. and increasingly in Canada, there are ample supplies of mRNA vaccines that will expire before they can be shipped to other countries," she tweeted, referring to messenger RNA. Both the Pfizer and Moderna are mRNA vaccines that were made with a new technology that uses genetic material to teach cells to make a protein that triggers an immune response.

The single-dose J&J vaccine has been plagued with concerns about efficacy since rollout, despite urging from officials not to compare efficacy of the vaccines. While trial data has shown the J&J vaccine to be about 66% effective against the original strain, vaccines from Pfizer and Moderna offer about a 95% efficacy rate. When only considering protection from severe cases of COVID-19 – an important figure for reducing deaths and burdens on health care systems – the efficacy of the single J&J shot jumps to 85%. Pfizer and Moderna have indicated that early data shows the mRNA vaccines are effective against the delta variant, but there is no substantial data yet published showing J&J vaccine's protection against the new strain.

In April, the vaccine was temporarily paused as officials investigated six cases of blood clots in women who had been vaccinated. The vaccine was ultimately continued, but a mid-May Kaiser Family Foundation report found that, in the wake of the pause, less than half of the public expressed confidence in safety of the vaccine and concerns of potential side effects had increased, especially among unvaccinated women.

Concerns about the variant have prompted some people, like Coats, Gallagher and Rasmussen, to receive a dose of an mRNA vaccine. Others, including Claire, a 24-year-old Washington, D.C., resident who received J&J in March, have begun to consider it. Claire, who is being referred to by her first name for privacy reasons, says she wants to see more data or guidance from people who have done it before she decides.

"I don't think I'd be comfortable doing it without knowing from someone with a more solid scientific background that it would be safe to do. And it would also provide me more protection," she says.

#### A Call for CDC, FDA Guidance

There is no authorization by the Food and Drug Administration to mix doses nor has the Centers for Disease Control and Prevention recommended doing so. In an email to U.S. News, a CDC spokesperson said most data available on vaccine effectiveness is related to mRNA vaccines while data on the J&J vaccine is still being collected.

The spokesperson also pointed to CDC guidance on mixing vaccines, which states that the efficacy of mixing doses hasn't been evaluated yet. In limited circumstances, when a second dose of the mRNA vaccine a patient initially received isn't available, that patient could receive another vaccine, the CDC says. But patients who received a single J&J dose are considered fully vaccinated two weeks after their shot.

An FDA spokesperson told U.S. News that there is "no data available on the interchangeability of the vaccine with other COVID-19 vaccines."

"Individuals who have received one dose of the Pfizer/BioNTech or Moderna COVID-19 Vaccine should receive a second dose of the same vaccine to complete the vaccination series," the spokesperson said in a statement.

Experts agreed that guidance from the CDC directed at those who received the J&J vaccine is needed.

"A little bit of guidance from CDC, even if it was to say, 'This is a question that we're working to answer and think we will know the answer in X many weeks or months' or so forth will be a plus, a significant plus," Gallagher says.

When asked about the idea of a shot of an mRNA vaccine to follow J&J's single dose, CDC Director Rochelle Walensky this week defended the vaccine.

"Right now, we have no information to suggest that you need a second shot after J&J even with the delta variant," Walensky said Wednesday on NBC's "Today" show.

She acknowledged that less data is available on J&J vaccine's efficacy related to the delta variant than with the mRNA vaccines but said that more information is forthcoming.

"We have every reason to believe based on how J&J is performing with other variants of concern – and that is quite well – and how its sister vaccine AstraZeneca has performed against the delta variant in other countries ... that the J&J will perform well against the delta variant, as it has so far against other variants circulating in the United States," Walensky said.

She added that if someone is interested in a booster shot, they should enroll in a trial to study the extra dose

But Gallagher calls that guidance "impractical," saying that not everyone has access to a vaccine trial.

Shad Marvasti of the University of Arizona College of Medicine in Phoenix says that the CDC needs to be "proactive about trends like this" and suggests gathering together experts to come up with a consensus statement on the situation.

"I think convening a consensus conference among the experts and being able to come out with some kind of interim recommendation about this as soon as possible should be a top priority for the CDC," Marvasti says.

In a recent podcast episode, Andy Slavitt, former senior White House adviser on the COVID-19 response, said he asked Fauci, Walensky and seven clinicians treating patients for their advice on mixing vaccine doses for people who received the J&J shot and are worried about the delta variant. He said those people have two options: do nothing and wait for the next available data or receive an mRNA shot, like a Pfizer or Moderna. There's a third option to receive another J&J dose, Slavitt said, but that is not recommended by any doctor.

"The current official advice from the CDC, based on the data, is to wait. And I think there's a good reason," he said, adding there isn't much prevalence of delta yet and not enough data to prove the effectiveness of mixing doses.

But Slavitt also said that there are doctors who say mixing a J&J dose with an mRNA vaccine is OK.

"If you feel the need to do something" because you're worried about the effectiveness of the J&J vaccine against the delta variant, Slavitt said, "take the Pfizer or Moderna."

However, in a podcast episode out Wednesday, Slavitt spoke directly with Walensky, who again reiterated that not much data is yet available on mixing the J&J dose with a Pfizer or Moderna shot. She added that doing so was "probably safe because these vaccines are generally safe to begin with, but there aren't enough data to inform this one way or another."

Early Mixing Data Shows Promise

Trials are underway to look at booster shots and mixing and matching vaccines. Early data from a recent British study found that J&J's so-called "sister vaccine," AstraZeneca, generated a strong immune response when mixed with a dose of the Pfizer vaccine. They found that volunteers who got an initial AstraZeneca dose followed by a Pfizer shot produced antibody levels roughly as high as recipients of two Pfizer doses.

Experts agree the results are promising for mixing and matching vaccines but cautioned that AstraZeneca's data does not necessarily apply to the J&J vaccine despite their similarities.

Georges Benjamin, executive director of the American Public Health Association, says that the limited data on mixing doses has largely come from errors when someone accidentally received a Moderna and Pfizer dose, for example. From a safety perspective, however, he says it appears to be safe to mix doses, so far, and mixing a J&J dose with an mRNA shot shows early promise of providing more protection.

But he doesn't recommend that clinicians go ahead and mix doses. Instead, he urges them to continue to follow CDC and FDA guidance, lest a patient get seriously sick or injured, opening clinicians up to liability. Instead, dose mixing should only be performed under clinical trials, he says.

Experts generally agreed that as people wait for trial results on boosting the J&J vaccine, they should practice the mitigation measures that are known to work. Some criticized the CDC for relaxing masking recommendations too soon.

"It's very hard in public health to backtrack and change your guidance as the facts on the ground warrant it," says Stanley Weiss, a professor at the Rutgers New Jersey Medical School. "People don't understand science in that way."

But at least one jurisdiction is trying anyway. Officials in Los Angeles County this week "strongly" recommended everyone wear masks in indoor public places regardless of their vaccination status due to the spread of the delta variant.

Marvasti says that the U.S. should be following recent suggestions from the World Health Organization that even fully vaccinated people should still use masks.

"I think that goes doubly for people who have received just one dose of J&J because it's clear that it is definitely less protective than the mRNA vaccines against the new variants," Marvasti says.

There's also a question as to whether pharmacists and clinicians will agree to offering a J&J recipient an mRNA vaccine. The American Pharmacists Association tells U.S. News it encourages providers to follow CDC guidelines, also pointing to the CDC's guidance on mixing doses and emphasizing that J&J users are considered fully vaccinated.

For Coats, who managed to get a Pfizer dose, that meant lying. She first went to a local Walgreens where she handed the pharmacist her insurance information, which the pharmacist used to see that she had already received a vaccine. Coats says the pharmacy tried to call Pfizer to ask for their guidance but wasn't able to get them on the line. Coats was then told her insurance would not pay for another vaccine and she offered to pay out-of-pocket, which the federal government forbids. Ultimately, she was turned away.

That didn't stop her though.

"I went pretty much across the street to my local grocery store and I just told them that I did not have insurance," she says. "And, yeah, I was able to get it."

#### Text 4

Why some vaccinated people are dying of COVID-19

Vaccines aren't 100% effective, so some people will be vulnerable to the virus even after receiving two shots

As the Delta variant of the coronavirus surges through the U.K., almost half of the country's recent COVID-19 deaths are of people who have been vaccinated. But doctors and scientists aren't sounding the alarm about the apparently high proportion of deaths among the vaccinated population.

On the contrary, they say the figures so far offer reassurance that vaccines offer substantial protection against the variant, particularly after two doses. Delta, first identified in India, has since spread to at least 85 countries, including the U.S., where it is now estimated to be the most common variant.

The U.K. is a testing ground for how vaccines are coping. Delta is racing through the country -- with 146,000 identified cases in the past week, 72% up on the week before. The country is also a world leader in identifying through testing and genetic sequencing which versions of the virus are prevalent: By mid-June, 97% of cases were Delta infections. And Delta is spreading among a population that is among the most highly vaccinated in the world: 85% of adults have had at least one vaccine shot and 63% have had two.

The spread of Delta has led the U.K. government to postpone by a month the ending of COVID restrictions until July 19. But ministers are increasingly confident that the unlocking will take place as planned because vaccinations have broken the lockstep between new cases, later hospitalizations and deaths.

Data from Public Health England show that there were 117 deaths among 92,000 Delta cases logged through June 21. Fifty of those -- 46% -- had received two shots of vaccine.

But rather than suggest Delta is displaying a worrying ability to evade the vaccine and cause severe illness, scientists say those figures support the shots' effectiveness. There are three main reasons why.

First, vaccines aren't 100% effective. Not everyone who is inoculated will respond in the same way. Those who are elderly or whose immune systems are faulty, damaged or stressed by some other illness are less likely to mount a robust response than someone younger and fitter. COVID-19 vaccines are highly effective but some people will still be vulnerable to the virus even after receiving their shots.

Second, the risk of dying from COVID-19 increases steeply with age. If a vaccine reduces an 80-year-old's risk of death from COVID-19 by 95%, for instance, that 80-year-old's risk of death might still be greater than the risk faced by an unvaccinated 20-year-old. Some chronic illnesses such as diabetes, hypertension and lung disease are also associated with a higher risk of severe illness and death.

Third, as more of the population gets vaccinated, there are fewer unvaccinated people for the virus to infect. If the pool of vaccinated people is larger than the pool of unvaccinated people, then it is possible and even likely that breakthrough infections resulting in death in the older, vaccinated group would match or exceed deaths in the younger, unvaccinated group. Consider an imaginary country with 100% of people vaccinated, where the virus can still somehow spread. All COVID-19 deaths would be in vaccinated individuals.

Of those 50 deaths in fully vaccinated people in England, all were in people aged 50 years and over, the data show. There have been no deaths recorded in double-vaccinated under 50s.

The data show that, overall, the fatality rate for confirmed cases of COVID-19 has been lower than it was with the Alpha variant, which was first spotted in the U.K. late last year and has since spread around the world. Public Health England pegged the fatality rate for Alpha at 1.9%. It estimates the fatality rate for Delta is closer to 0.3%, which scientists say reflects both mass vaccination and improved treatment for COVID-19. And the vaccine also reduces the chances of catching the virus at all.

#### Text 5

The science around the lab leak theory hasn't changed. But here's why some scientists have.

Five virologists said few conclusions can be drawn based on the available scientific evidence, but they noted that the context and circumstances of the debate have changed.

Alina Chan isn't saying the coronavirus definitely leaked from a lab in China. What she is saying is what more scientists have grown comfortable discussing publicly: There's no clear evidence either way.

"I know a lot of people want to have a smoking gun," said Chan, a postdoctoral associate at the Broad Institute of MIT and Harvard University who specializes in genetic engineering and has been vocal about the need to investigate the possibility of a lab leak. "It's more like breadcrumbs everywhere, and they're not always leading in one direction. It's like the whole floor is covered in breadcrumbs."

Chan was one of 18 scientists who published a letter in the journal *Science* last month calling for a more in-depth investigation into the virus's origin that takes into account theories about both natural occurrence and laboratory spillovers. The letter helped kick-start a new round of calls to investigate the "lab leak hypothesis," including demands from President Joe Biden and several leading scientists. And while public discussion of a potential lab leak has shifted significantly in recent months, as more people pay attention to a theory that was originally promulgated by former President Donald Trump and his followers, the scientific evidence has remained unchanged, according to interviews with five virologists who have experience in microbiology, infectious disease ecology and viral evolution.

The researchers offered near-uniform summations that few conclusions can be drawn based on the available scientific evidence, but they noted that the context and circumstances of the origin debate have changed, particularly as critics point out that China hasn't been fully transparent about the earliest days of the pandemic.

The shift reflects how some scientists who previously avoided the topic or were quick to dismiss it are grappling with enduring uncertainties about the virus's origin, free from the politicization that clouded such discussions during the Trump administration.

Chan said there had been trepidation among some scientists about publicly discussing the lab leak hypothesis for fear that their words could be misconstrued or used to support racist rhetoric about how the coronavirus emerged. Trump fueled accusations that the

Wuhan Institute of Virology, a research lab in the city where the first Covid-19 cases were reported, was connected to the outbreak, and on numerous occasions he called the pathogen the "Wuhan virus" or "kung flu."

"At the time, it was scarier to be associated with Trump and to become a tool for racists, so people didn't want to publicly call for an investigation into lab origins," she said.

Now, more scientists are comfortable confronting the gamut of plausible theories — particularly given China's opacity about the topic — although many still caution that entertaining the idea of a lab leak requires clear scientific proof, which hasn't materialized.

"There has been no new evidence over the past 16 months that the virus had a lab origin," said Maciej Boni, an associate professor of biology at Penn State University, who specializes in tropical disease epidemiology and viral evolution.

#### The hypotheses in play

A number of theories about how the virus may have emerged have been thrown out. Most that remain fall under three possible scenarios:

The virus evolved naturally before spilling over into humans from an infected animal.

The virus evolved naturally, but an employee at the lab became infected from a sample and accidentally "leaked" it into the community.

Scientists at the lab were manipulating virus samples and accidentally or intentionally released the pathogen.

What makes the virus's origin a complicated matter is that the various threads can be difficult to reconcile. While most of the virologists who spoke to NBC News said the coronavirus probably evolved in nature, they agreed that it's reasonable to look into the possibility that it came from a lab.

At the heart of those suspicions is the Wuhan Institute of Virology, a research facility founded in the 1950s that was the first in China to receive the highest level of biosafety clearance. The institute's lab has a biosafety level of 4 (known as BSL-4, the highest level), meaning it is equipped to study the world's highest-risk infectious agents and toxins, those that require the strictest biocontainment measures. It's that designation, and the lab's location in the city where the outbreak was first reported, that made the institute an early suspect.

"If we had a pandemic that was sourced near to a BSL-4 lab in the U.S., the first thing you would be asking is if they were working with that pathogen in that lab," said an expert on evolutionary genetics of infectious diseases, Andrew Read, a professor of biology at Penn State.

Still, he cautioned that while a lab leak is plausible, that doesn't necessarily mean it's the most probable explanation.

Boni said it's still more likely that the virus passed from an animal, such as a bat, into humans. He said his experiences conducting field epidemiology work on avian influenza in Vietnam from 2008 to 2016 showed how close contact with wildlife, such as in "wet markets" around the world where outdoor stalls sell meat, seafood and live animals for consumption, can create easy opportunities for pathogens to spill into human populations.

"Going back over the past 25 years of emerging viruses that have crossed species boundaries from animals to humans, the most common route is something like a wet market or farm or some other form of human and animal contact," he said. "These are far more common than lab accidents."

#### Animal origins

The first cluster of Covid-19 infections was traced to the Huanan Seafood Market in Wuhan, leading to early speculation that it may have been where the virus jumped from animals into humans. But Chinese researchers have since found that several of the earliest known cases of Covid-19 in the city were unrelated to the market, meaning the virus may already have been spreading in the community.

A joint investigation this year by the World Health Organization and China focused on the possibility of a zoonotic, or animal, origin. The team's report, released in March, found that the virus probably emerged in bats and jumped to an intermediary animal before it spread to humans.

The team also downplayed the theory that the virus leaked from the Wuhan institute, describing the scenario as "extremely unlikely." But the WHO-led investigation was heavily criticized for not doing enough to review all plausible hypotheses. And the validity of the findings was questioned because the investigation hinged on China's cooperation, and the Chinese government didn't give researchers access to full records and raw data.

Chan and 17 other scientists, including Ralph Baric, a virologist at the University of North Carolina, Chapel Hill; David Relman, a microbiologist at Stanford University; and Akiko Iwasaki, an immunologist at Yale University, signed the letter in Science in response to the shortcomings of the WHO report.

Within the scientific community, the letter was seen as something of a turning point, lending credibility to the hypothesis that the virus may have escaped from the lab.

"I think it had a big effect," Chan said. "I think it literally helped all the people who wanted to investigate this by saying: This is not bogus. Top scientists think this is plausible."

#### Illnesses spark suspicion

Calls for a more in-depth investigation into both the natural origin theory and the lab leak hypothesis have been fueled, at least in part, by growing circumstantial evidence uncovered over the last year by a band of anonymous internet sleuths. Last year, a member of the amateur investigative team, which calls itself DRASTIC (short for Decentralized Radical Autonomous Search Team Investigating Covid-19), combed through online records and found a 2013 thesis by a postgraduate student at Kunming Medical University in China that described six workers at a mine in Yunnan province who fell ill with severe pneumonia caused by a "SARS-like" coronavirus.

Three of the mine workers eventually died, but not much else is known about the situation. In research published in November by scientists at the Wuhan institute, serum samples from four of the mine workers were tested and showed no trace of SARS-CoV-2, the virus that causes Covid-19.

Separately, a U.S. intelligence report disclosed that three researchers at the Wuhan institute sought treatment at a hospital after they fell ill in November 2019, as The Wall Street Journal first reported in May.



During the WHO-led investigation this year, officials at the Wuhan institute said all staff members had tested negative for Covid-19 antibodies. Its leaders have been adamant that the virus didn't escape from the facility, but the Chinese government's reluctance to share records and test results has cast suspicion over what the lab's scientists knew — and when.

Although they are far from conclusive, the intelligence report and the mine workers' mysterious illnesses have been presented as circumstantial evidence that scientists at the Wuhan institute were studying risky coronaviruses similar to SARS-CoV-2 and that the virus may have escaped from the lab, perhaps after an employee became infected.

Genetic manipulation?

The mine incident also drew attention to a separate SARS-like virus that Chinese researchers collected from a bat in Yunnan province in 2013. Shi Zhengli, a prominent bat researcher who directs the Center for Emerging Infectious Diseases at the Wuhan Institute of Virology, co-wrote a paper published in February 2020 detailing the virus, known as RaTG13.

The genomes of RaTG13 and SARS-CoV-2 were found to be 96.2 percent alike, prompting some to wonder whether the pandemic had been caused by lab experiments on RaTG13 that had gone awry. The similarities between the two viruses also raised questions about the possibility that Chinese researchers were conducting "gain of function" experiments, which involve manipulating viruses in a lab to make them more dangerous or more transmissible to understand their inner workings.

Gain-of-function research isn't altogether uncommon in virology, but such experiments are controversial because of the risks. A scientist could, for example, unwittingly or by design create a pathogen that is better adapted to invade human cells or cause more severe infections. But there are real benefits to gain-of-function research, said Robert Garry, a virologist at Tulane University in New Orleans. For one, understanding the characteristics of a virus and its transmissibility is critical to developing vaccines and lifesaving drugs, he said.

He said most virologists take the responsibility of such experiments seriously.

"It's not the Wild West," he said. "It's very highly regulated."

In 2014, the U.S. National Institutes of Health imposed a moratorium on gain-of-function research after two lab accidents involving anthrax and a strain of H5N1 bird flu occurred at the Centers for Disease Control and Prevention. Funding for gain-of-function experiments was paused for three years while the government conducted safety assessments. The ban was reversed in January 2017, during the Trump administration, after an independent science advisory panel found that the overall risk to public safety was low.

While it's possible that scientists at the Wuhan institute were making genetic tweaks to samples, a coronavirus like RaTG13 that is 96.2 percent similar still can't easily be altered to create SARS-CoV-2, Garry said.

"Taking a virus that is 96 percent similar and sequencing and converting it to SARS-CoV-2 is impossible," he said. "That kind of evolution takes maybe three to five decades in nature. You just can't force that in a lab."

Dr. Charles Chiu, a virologist at the University of California, San Francisco, added that the differences between RaTG13 and SARS-CoV-2 exceed the capabilities of genetic engineering.

"The differences are scattered throughout the genome," he said. "There's a big difference between 96 percent similar and 100 percent identical. We just don't have the ability to make those kinds of changes."

In other words, the experts say, it's unlikely that scientists could snip and splice bits of a virus or tweak a pathogen's genome in such a way that would create SARS-CoV-2, even if researchers were using closely related coronaviruses.

"We're very good at imitating nature — we have, for instance, been able to synthesize polio virus — but our ability to manipulate or change the sequence of viruses is still limited," Chiu said.

The investigation continues

Chan, of the Broad Institute, wasn't ready to rule out the possibility of genetic engineering, saying that if minor tweaks were being made to virus samples, it could be difficult to detect the fingerprints of such work.

"You can do recombination without leaving a trace," she said. "Basically, it's like you can 3D-print clothing with no seams, so it's difficult to tell if anything has been manipulated or stitched together in a lab."

Chan acknowledged that it's "definitely possible" that the virus evolved in nature but added that all options should be kept on the table because neither the natural origins theory nor the lab leak hypothesis can be ruled out.

"All the evidence right now is circumstantial, and it's consistent with both lab and natural origins," she said. "There's precedents for lab leaks, the genetic data could swing either way, and the epidemiological data, which is how it unfolded in Wuhan, can also swing either way. None of this is pointing in any one direction."

And it may be years, or even decades, before scientists have any clarity on the topic. The Ebola virus, which was discovered in 1976, is thought to have spread to humans from bats or nonhuman primates, but scientists still haven't identified the origin from a specific animal host.

"The key issue here is that we simply don't have the information to make really firm conclusions," said Chiu, of the University of California, San Francisco, referring to Covid-19. "Unless we know exactly what happened, we're simply making guesses."

Text 6

Nearly every new Covid-19 death is now entirely preventable, CDC director says

The dangerous Delta variant poses a risk as the United States works to ease out of the Covid-19 pandemic, but experts say the nation has the tools needed to overcome the threat -- if the public takes advantage of them.

"Covid-19 vaccines are available for everyone ages 12 and up," US Centers for Disease Control and Prevention Director Dr. Rochelle Walensky said Tuesday at a White House briefing. "They are nearly 100% effective against severe disease and death -- meaning nearly every death due to Covid-19 is particularly tragic, because nearly every death, especially among adults, due to Covid-19 is at this point entirely preventable."

Those still dying from Covid-19 in the US are "overwhelmingly" unvaccinated, National Institute of Allergy and Infectious Diseases Director Dr. Anthony Fauci told CNN. As of Wednesday, 65.6% of the adult population in the US have received at least one dose of a Covid-19 vaccine, according to the CDC. While that seems close to President Joe Biden's goal of having 70% of American adults at least

partially vaccinated by July 4, experts are concerned about declining rates of new vaccinations and the difficulty in motivating those still hesitant to get inoculated.

"This virus is an opportunist," Walensky said. "As long as there are those who are not vaccinated, Covid-19 will remain a threat."

The Delta variant, which is believed to be more transmissible and more dangerous, could be the dominant strain in areas of the US that have low vaccination rates in a matter of weeks, Fauci told "CBS This Morning" on Wednesday.

While Fauci thinks a return to the high virus numbers of 2020 is unlikely, communities with low vaccination rates could experience localized surges because of the Delta variant, he said earlier this week. Full vaccination with current vaccines is effective against the variant, he has said.

"For those areas where you have a high vaccination rate, you're not going to see" Delta become dominant, Fauci told CBS. "Again, another powerful reason why we need to get vaccinated."

Even if 75% of eligible Americans were vaccinated, a Delta-like variant could result in Covid-19 bouncing back from summer lows to cause more than 3,000 deaths per week in the US at various points during the fall and winter, a recent research model showed.

That would be about 1,000 more Covid-19 deaths than the US has seen over the past week, though still far below the peak of 24,000 deaths during the second week of January, according to the model from the Covid-19 Scenario Modeling Hub, a project involving researchers from 13 institutions. Wyoming county sees outbreak ahead of famous rodeo event

Some areas of the country are seeing a rise in cases in the past few weeks.

Wyoming's Laramie County is facing a outbreak as it reports a "fairly high number" of Delta variant cases, according to Health Department Executive Director Kathy Emmons.

There were 330 Covid-19 cases in Wyoming during the week of June 14 to June 20, according to Emmons. Of those 330 cases, 181 are from Laramie County, with 28 attributed to the Delta variant.

Emmons said less than a third of the county is fully vaccinated and several large gatherings have contributed to the high number of cases.

She said the virus "just has spread like wildfire through those groups" at the gatherings.

Emmons is concerned because Cheyenne Frontier Days, a rodeo event with nightly shows, that often draws more than 100,000 people, is scheduled for July 23-August 1.

"This year is the 150th anniversary, so we've worked very closely with the CFD (Cheyenne Frontier Days) committee to put into place safety measures," she said.

According to data from Johns Hopkins University, five states, including Missouri, have seen a rise in cases over the past seven days compared to the previous seven-day period.

Steve Edwards, CEO of CoxHealth, a healthcare system in Springfield, Missouri, told CNN this week they have seen a six-fold increase in hospitalizations in his system.

"I think it is the Delta variant and there is a lot of kindling with low vaccination rates, so it's spreading very rapidly," Edwards said. "Almost all of our cases are unvaccinated people that, in my opinion, have put themselves in harm's way during this pandemic."

Using TikTok to reach young adults

Standing in the way of closing the vaccination gap are young people and states with low vaccination rates, Fauci said.

"It's a combination of some states and regions that are below where we need them to be," Fauci told CNN. "Within that context, it's younger people -- particularly 18 to 26 -- where you really want to try and get them to get vaccinated."

Fewer than half of the adults in Alabama, Louisiana, Mississippi and Wyoming have received at least one dose of the Covid-19 vaccine, according to data from the CDC.

And even in high vaccination states, like Vermont, young adults are a "tough nut to crack," Vermont Health Commissioner Dr. Mark Levine told CNN.

As of Monday, 81.3% of eligible Vermonters had started the vaccination process. Levine said he knows that if he can get that younger demographic to get vaccinated, the state numbers would look even better "because there are thousands of thousands of them and we do think they want to be vaccinated."

Levine is confident that the college-going part of this age group will get vaccinated, if they haven't already, because most colleges and universities in the state have required, or will require, the vaccine. He still has some concerns about the 18- to 29-year-olds who are in the work force and not in college.

"Most of them are not a truly vaccine-resistant group," Levine said. "They don't have that strong polarized view. They're mostly in the category where it's just not at the top of their list right now."

Levine said one strategy that might work is to make vaccinations and information so accessible that young people stumble onto it -- and Fauci has taken on the challenge with a TikTok.

"I never would have imagined in my wildest dreams I would be doing TikTok with people today," Fauci told CNN, noting misinformation about the vaccine has been spreading on social media.

"We've got to go out there and push the envelope out in the media -- including the media that's giving misinformation," Fauci said.

A new target date for vaccinations

Officials and experts have been putting extra effort into increasing vaccination rates as the country is on a path to fall short of Biden's goal to have 70% of adults at least partially vaccinated by July 4.

"We've made tremendous progress in our vaccination efforts to date, and the ultimate goal has been to get America back to normal," White House press secretary Jen Psaki said this week.

Fauci said the new time period officials have set their focus on is mid-July.

"If you look at the rate now, it's probably going to be within the first couple of weeks of July," Fauci said. "Maybe the second or third week of July."

Fauci, the nation's top infectious disease specialist, said he does not think it's a "big deal" for the nation to fall slightly short of the July 4 target.

"You set a goal. If you reach it, great. If you don't, you keep going to try and reach it and go beyond it," he said.

## Text 7

Can people vaccinated against COVID-19 still spread the coronavirus? Takeaways:

Vaccines can be great at preventing you from getting sick, while at the same time not necessarily stopping you from getting infected or spreading the germ.

Preliminary evidence seems to suggest the COVID-19 vaccines make it less likely someone who's vaccinated will transmit the coronavirus, but the proof is not yet ironclad.

Unvaccinated people should still be diligent about mask-wearing, physical distancing and other precautions against the coronavirus.

When the U.S. Centers for Disease Control and Prevention changed its guidelines about mask-wearing on May 13, 2021, plenty of Americans were left a little confused. Now anyone who is fully vaccinated can participate in indoor and outdoor activities, large or small, without wearing a mask or physical distancing.

Anthony Fauci, chief medical adviser to President Biden, said the new guideline is "based on the evolution of the science" and "serves as an incentive" for the almost two-thirds of Americans who are not yet fully vaccinated to go ahead and get the shot.

But some people cannot be vaccinated because of underlying conditions. Others with weakened immune systems, from cancer or medical treatments, may not be fully protected by their vaccinations. Children aged 12 to 15 became eligible for the Pfizer-BioNTech vaccine only on May 10, 2021. And no COVID-19 vaccines are yet authorized for the nearly 50 million children in the U.S. younger than 12.

As restrictions are lifted and people start to leave their masks at home, some people worry: Can you catch COVID-19 from someone who's vaccinated?

Vaccines don't always prevent infection

Researchers had hoped to design safe COVID-19 vaccines that would prevent at least half of the people vaccinated from getting COVID-19 symptoms.

Fortunately, the vaccines have vastly outperformed expectations. For example, in 6.5 million residents of Israel, aged 16 years and older, the Pfizer-BioNTech mRNA COVID-19 vaccine was found to be 95.3% effective after both shots. Within two months, among the 4.7 million fully vaccinated, the detectable infections fell by 30-fold. Similarly in California and Texas, only 0.05% of fully vaccinated health care workers tested positive for COVID-19.

Vaccine developers often hope that, in addition to preventing illness, their vaccines will achieve "sterilizing immunity," where the vaccination blocks the germ from even being able to get into the body at all. This sterilizing immunity means someone who's vaccinated will neither catch the virus nor transmit it further. For a vaccine to be effective, though, it doesn't need to prevent the germ from infecting an immunized person.

The Salk inactivated polio vaccine, for instance, does not completely stop polio virus from growing in the human gut. But it is extremely effective at preventing the crippling disease because it triggers antibodies that block the virus from infecting the brain and spinal cord. Good vaccines provide effective and durable training for the body's immune system, so when it actually encounters the disease-causing pathogen, it's ready to mount an optimum response.

When it comes to COVID-19, immunologists are still figuring out what they call the "correlates of protection," factors that predict just how protected someone is against the coronavirus. Researchers believe that an optimum amount of "neutralizing antibodies," the type that not only bind the virus but also prevent it from infecting, are sufficient to fend off repeat infections. Scientists are also still assessing the durability of immunity that the COVID-19 vaccines are providing and where in the body it's working.

### Can a vaccinated person spread coronavirus?

Immunologists expect vaccines that protect against viral illnesses to also reduce transmission of the virus after vaccination. But it's actually tricky to figure out for sure if vaccinated people are not spreading the germ.

COVID-19 poses a particular challenge because people with asymptomatic and pre-symptomatic infections can spread the disease – and insufficient contact tracing and testing mean those without symptoms are rarely detected. Some scientists estimate that the number of asymptomatic COVID-19 infections in the overall population could be 3 to 20 times higher than the number of confirmed cases. Research suggests that undocumented cases of COVID-19 in people who either were asymptomatic or experienced very mild disease could be responsible for up to 86% of all infections, though other studies contradict the high estimates.

In one study, the CDC tested volunteer health care personnel and other front-line workers at eight U.S. locations for SARS-CoV-2 infections weekly for three months, regardless of symptoms or vaccination status. The researchers found that fully immunized participants were 25 times less likely to test positive for COVID-19 than were those who were unvaccinated. Findings like this imply that if vaccinated people are so well protected from getting infected at all, they are also unlikely to spread the virus. But without contact tracing to track transmission in a larger population, it's impossible to know if the assumption is true.

What we know for sure is that if someone does get sick with COVID-19 after vaccination, in what is called a "breakthrough infection," symptoms will be milder. Studies have found that people who tested positive for COVID-19 after getting just their first vaccine dose had lower levels of virus in their bodies than unvaccinated people who tested positive. The researchers believe the decreased viral load hints that vaccinated people who do contract the virus will be less infectious because they will have much less virus that could be spread to others.

A preprint study which has not yet been peer-reviewed suggests that the Moderna mRNA COVID-19 vaccine can produce coronavirus-fighting antibodies in the oral and nasal fluid. Since that's where SARS-CoV-2 makes its entry, antibodies in the mouth and nose should block the virus from getting into the body, effectively providing "sterilizing immunity." This would also mean vaccinated people probably wouldn't spread the virus through respiratory droplets.

These bits of evidence are promising. But without more studies, scientists cannot yet conclude that COVID-19 vaccines really do protect against all transmission. Studies attempting to directly answer this question through contact tracing are just beginning: Researchers will track COVID-19 infections among vaccinated and unvaccinated volunteers and their close contacts.

## Protection and prevention go hand in hand

Vaccines help slow down the spread of an infectious disease by breaking the chain of infection. Those who are infected eventually have fewer and fewer unprotected people to pass the virus on to. This is how a vaccine increases herd immunity – susceptible and not-yet-immunized people are surrounded by a “herd” of people who have become immune, thanks to vaccination or previous infection. But studies suggest that, for a combination of biological and social reasons, vaccination alone is unlikely to achieve herd immunity against COVID-19 and fully contain the coronavirus.

In fact, vaccination alone can take a long time to eradicate any disease. Even diseases that are nearly “eliminated” – such as chickenpox, measles and pertussis – can resurface with waning immunity and declining vaccine rates.

The recent outbreak of infections among the vaccinated New York Yankees shows that vaccinated people not only can still get infected, they might also transmit the coronavirus to close contacts. Highly tested groups, such as professional sports teams, spotlight the fact that mild, asymptomatic infections among the vaccinated in the general population might actually be more frequent than reported. A similar outbreak in airport workers in Singapore shows that, even among the fully vaccinated, new and more infectious variants can spread fast.

The CDC’s relaxed guidelines on masking are meant to reassure vaccinated people that they are safe from serious illness. And they are. But the picture is less clear-cut for the unvaccinated who interact with them. Until near herd immunity against COVID-19 is achieved, and clear evidence accumulates that vaccinated people do not spread the virus, I and many epidemiologists believe it is better to avoid situations where there are chances to get infected. Vaccination coupled with continued masking and social distancing is still an effective way to stay safer.

## Text 8 (short)

### UK defence secretary and military chiefs self-isolate after Covid contact

Defence secretary and heads of Royal Navy and RAF all isolating after Gen Sir Nick Carter’s positive Covid test

The defence secretary and six of the UK’s most senior military commanders have been forced to self-isolate after Gen Sir Nick Carter, the head of the armed forces, tested positive for coronavirus.

The Ministry of Defence confirmed in a statement to the Guardian that Carter, chief of the defence staff, had tested positive for Covid-19.

The MoD also said on Sunday night that colleagues who were in a meeting with Carter last week, including the defence secretary, Ben Wallace, are now self-isolating.

An MoD spokesperson said: “The chief of the defence staff has tested positive during routine Covid-19 checks.

“Colleagues who were in a senior meeting with him last week, including the secretary of state, are self-isolating in line with government guidelines.”

The Telegraph reported that Carter started isolating late last week after testing positive and that NHS Test and Trace had since ordered Wallace and the heads of the Royal Navy, RAF and Strategic Command to remain at home after coming into “close contact” with him. The head of the army and Carter’s deputy, who also attended the same meeting but were at a distance from Carter, spent the weekend isolating while they waited for the results of PCR tests. It is believed that as a precaution they will work remotely on Monday.

Carter, 62, reportedly tested positive after appearing at the Chalke Valley history festival in Wiltshire on Friday and at a meeting at the Defence Academy in Shrivenham in Oxfordshire on Thursday.

Among those also reportedly present at Thursday’s meeting in addition to Wallace were: Adm Sir Tim Fraser, vice-chief of the defence staff; Gen Sir Mark Carleton-Smith, chief of the general staff; Adm Sir Tony Radakin; Air Chief Marshal Sir Mike Wigston; and Gen Sir Patrick Sanders.

MPs had issued a warning last week that Nato partners had expressed concern about British service personnel who had not been double-vaccinated being deployed overseas.

Labour accused the government of falling short of its duty to protect members of the armed forces.

But defence minister James Heappey insisted it was right that troops were vaccinated according to their age cohort as he said that 95% on active overseas operations had been vaccinated and that 61% had received their second dose.

## Text 9

### The Delta variant might pose the biggest threat yet to vaccinated people

The Delta variant appears to be more transmissible than any other coronavirus strain.

Some experts worry the variant could result in more breakthrough cases in vaccinated people, especially those who have had only one dose of vaccine.

Right now, the Delta variant does not seriously threaten anyone who has had two vaccine doses.

Scientists have long worried about a coronavirus variant that’s more dangerous than the original virus in three key ways: It would be more transmissible, result in more serious illness, and evade protection from existing vaccines.

“The nightmare here is a variant that checks off all three boxes,” said Bob Wachter, the chair of the Department of Medicine at the University of California, San Francisco.

No prior variant, he said, has checked more than one or two. But the Delta variant, first identified in India in February, has come closest to checking all three.

Right now, two doses of vaccine are at least greater than 88% effective at preventing serious cases of COVID-19, of the type that might put you in hospital, even from the Delta variant. However, a single shot is only about 33% effective in protecting patients from that level of harm, according to studies of Delta variant.

“The data today says that this variant gets a full checked box for more infectious, probably gets a checked box for more serious, and at least gets a partial checked box for immune evasion. And that’s scary,” Wachter said.

The Centers for Disease Control and Prevention labeled Delta a “variant of concern” on Tuesday.

“Delta is a superspreader variant, the worst version of the virus we’ve seen,” Eric Topol, the director of the Scripps Research Translational Institute, tweeted on Tuesday.

For the most part, however, Delta hasn't drastically challenged vaccines. Public Health England analyses have found that two doses of Pfizer's vaccine are still 96% effective at preventing hospitalizations — and 88% effective at preventing symptomatic COVID-19 — from Delta cases. Two doses of AstraZeneca's vaccine, meanwhile, are around 92% effective at preventing hospitalizations and 60% effective at preventing symptomatic COVID-19 from Delta.

But that efficacy does not come after just one dose: A single shot of either Pfizer's or AstraZeneca's vaccines were just 33% effective at preventing symptomatic COVID-19 from Delta.

"The fact that three weeks after your first dose you're only 30% protected — versus, in the original, you were 80% — says that this thing has figured out how to at least partly evade the immune system," Wachter said.

It's also possible, he added, that vaccine protection could "wear off more quickly."

While Delta undoubtedly poses the biggest threat to unvaccinated people, some experts worry that it may result in more breakthrough infections — cases of COVID-19 diagnosed at least two weeks after someone is fully vaccinated.

"That's the concern — that you're more likely to get COVID from the same exposure than you would have been before," Wachter said.

"And you're more likely, if you have COVID, to have a more serious case."

Other experts are also afraid the strain may further evolve into something more dangerous, since Delta's high transmissibility enables it to spread easily among unvaccinated people, and therefore to keep replicating and mutating.

"The worst-case scenario is if Delta mutates into something completely different, a completely different animal, and then our current vaccines are even less effective or ineffective," said Vivek Cherian, an internal-medicine physician in Baltimore.

Research from Public Health England suggests that the Delta variant is associated with a 60% increased risk of household transmission compared to Alpha — the variant discovered in the UK. Alpha is already around 50% more transmissible than the original strain, the CDC said.

In other words, "Alpha is to the original as Delta is to Alpha," Wachter said.

Researchers in Scotland, meanwhile, found that getting infected with Delta doubles the risk of hospital admission relative to Alpha. Although variants are responsible for the majority of breakthrough infections, it's very rare to get COVID-19 after being fully vaccinated: A May CDC report found that just 0.01% of vaccinated Americans got sick.

Even when it comes to Delta, Cherian said, "my guess is you don't really have to worry about breakthrough infections."

But Wachter worries that Delta could turn a mild breakthrough case into a more serious one.

"It increases the risk that we're going to see more breakthrough infections and maybe more serious breakthrough infections than I would have worried about a few weeks ago," he said.

The biggest risk may be for elderly or immunocompromised people, he added.

"The 80-year-old who's been fully vaccinated — their level of immunity is not the same as a 30-year-old," Wachter said.

At the moment, Delta accounts for 10% of US coronavirus infections, but scientists expect it to become the dominant strain within weeks. Wachter said he would "start acting much more carefully" if Delta came to represent one out of every three or five COVID-19 cases in a given region.

"If I had gotten comfortable with being inside without a mask in a place where I wasn't sure that everybody's vaccinated, I would now be uncomfortable," he added.

Cherian, on the other hand, doesn't think Delta warrants that level of caution yet — though most experts still worry that a more concerning variant could arise out of the fast-mutating strain.

"It is a perfectly human instinct to feel now we have weathered this terrible 18 months, and now we are out of it and over it," Wachter said. "I hope that's true, and it may turn out to be true. But the chances of that not being true, and that we're going to have more in our future to deal with, have gone up considerably in the last few weeks because of Delta."

#### Text 10 (short)

East Asia was hit by another coronavirus epidemic 20,000 years ago, new study shows

Over the past 20 years, people have faced a series of outbreaks caused by coronaviruses, including SARS, MERS, and Covid-19. But humans may have faced the disease millennia ago, new research suggests.

A team of researchers from Australia and the United States has found evidence of a coronavirus epidemic that broke out more than 20,000 years ago in East Asia, according to a study published in the *Current Biology* scientific journal on Thursday.

In the study, the researchers studied the genomes of more than 2,500 people from 26 different populations around the world. They pinpointed the earliest interaction of the human genome with coronaviruses, which left genetic imprints on the DNA of modern-day people in East Asia.

The genomes they studied contain evolutionary information about humans tracing back hundreds of thousands of years, said lead author Yassine Souilmi -- information we've only learned to decode in recent years.

Viruses work by making copies of themselves. However, they don't have their own tools to do the duplication. "So they actually depend on a host, and that's why they invade a host and then they hijack their machinery to create copies of themselves," Souilmi said.

That hijacking of human cells leaves a mark we can now observe -- offering concrete evidence our ancestors were once exposed to and adapted to coronaviruses.

In the genomes, researchers found these genetic signals related to a coronavirus in five different populations located in China, Japan and Vietnam. The epidemic could have spread further beyond these countries, Souilmi added, but data isn't available in other parts of the region, so there's no way of knowing.

From these populations, Souilmi said the researchers found an affected group developed a beneficial mutation which helped to protect them from the coronavirus. Those with the mutation had "an edge" in survival, he said -- meaning over time, the population was made up of more people with the mutation than without.

"Over a long period of time, and along the exposure, this leaves a very, very clear marking in the genomes of their descendants," Souilmi said. "And that's the signature we actually use to detect this ancient epidemic, and also the timing of this ancient epidemic."

The study said the coronavirus plague occurred separately among different regions and spread across East Asia as an epidemic.

However, scientists don't know how ancient people lived through the epidemic, partially because it wasn't clear whether it was something seasonal like a flu, or continuous -- like the Covid-19 pandemic -- that infects people and keeps spreading all the time.