All the Coronavirus Terminology You Need to Know

A simple glossary of complicated and previously obscure words related to the pandemic

Robert Roy Britt

The global pandemic of 2020 has spawned an outbreak of complex and unfamiliar words, including two that are brand new: SARS-CoV-2, the shorthand name given to a new coronavirus that hopped from animals to humans in December 2019; and Covid-19, the human disease caused by SARS-CoV-2. Some other words and terms could use a little defining to improve understanding of the virus, the disease, and the scientific analysis and mainstream reporting of it. Here's a handy glossary.

Aerosols

Small, fine, and light particles that can be emitted by coughing, sneezing, and even talking that can stay suspended in the air for several minutes or longer (unlike heavier droplets, which fall more quickly). "Have you ever used hairspray or aerosolized cooking oil? Many of those droplets remain airborne nearby as you inhale particles and smell hairspray and cooking oil for several minutes," writes Lisa Brosseau, ScD, an expert on respiratory protection and infectious diseases and retired professor from the University of Illinois at Chicago. "The same thing happens when someone coughs or sneezes." Brosseau and other scientists say the coronavirus is almost surely spreading and infecting people via aerosols. "There are many of us in my field that are convinced that the science says airborne transmission is happening" with Covid-19, says Joseph Allen, assistant professor of exposure-assessment science at Harvard T.H. Chan School of Public Health. Other experts are not convinced that the virus remains viable in

aerosols, however.

Antibiotics

Drugs that fight bacterial infections. They do not work on viruses.

Antibodies

Proteins generated by the immune system in response to a threat. Reacting to viruses, antibodies are released into the bloodstream and act as catcher's mitts, says virologist Andrea Amalfitano, DO, dean of the College of Osteopathic Medicine at Michigan State University. Antibodies can be generated by an infection or a vaccine and tend to be uniquely suited to battling a particular virus or other microbial invader, and how robust they are depends on how well the gloves fit the virus, how many gloves you have, and how long they stay in your bloodstream, Amalfitano explains.

Antibody tests

Also called serology tests because they examine blood serum, these can reveal whether a person has antibodies to a particular disease, indicating they've had that disease. They are not used for determining if someone is currently infected (see PCR tests below). In a study reviewing 14 of these serology tests for Covid-19, researchers found only three were consistently reliable, and even those had flaws. Even if these tests are perfected, the presence of antibodies does not by itself indicate the level of immunity, says Yonatan Grad, MD, an assistant professor of immunology and infectious diseases at Harvard T.H. Chan School of Public Health.

Antigens

The proteins on a virus or other germ that our immune system recognizes as an invader, triggering an immune response, including the creation of antibodies. Antigen tests look for these fragments of viral surface proteins

and could be a faster way to diagnose Covid-19 than PCR tests (see below) — but so far, scientists are having difficulties finding a protein target unique to the novel coronavirus.

Asymptomatic

When a person is infected but not feeling or exhibiting symptoms. Asymptomatic carriers of Covid-19 are thought to be among the reasons the disease has spread quickly and easily.

Clinical trials

Tests on actual humans to see whether drugs, vaccines, or other therapies work, with results measured against a control group that is typically given no treatment or a placebo. Clinical trials proceed in highly controlled phases from very small to large groups to determine both effectiveness and safety in stepwise fashion. (By contrast, observational studies typically involve actual observations, questionnaires and/or past medical records to reach less-firm conclusions that sometimes lead to clinical trials.)

Contagious

The state of being infected and able to transmit a disease to another person, directly or indirectly.

Community spread

When people are infected by others within a community, and the source is not known (as opposed to having contracted a disease while traveling, or catching it from a family member at home).

Contact tracing

Finding people who came in contact with an infected person and letting

them know they may have been exposed. Scientists say this will be one of several crucial tasks needed to inform where, when, and how to restart the economy.

Comorbidity

The simultaneous presence of two or more illnesses in a person. With Covid-19, comorbidities like obesity, hypertension, and diabetes increase the risk of worse outcomes.

Confounding factors

Variables not considered in a study or analysis that can create bias or lead to false or incomplete conclusions. Some variables can be too expensive, impractical, unethical, or otherwise impossible to consider, but good research aims to account for likely confounders.

Coronaviruses

A type of virus that, seen in a microscope, has spiky protrusions that give the effect of a crown, or corona. The spikes, as shown in the widely seen illustration of the new coronavirus SARS-CoV-2, are used to latch on to human cells and gain entry. There are many types of coronaviruses, including some that are only in animals (for now, at least) and others that cause the common cold.

Covid-19

Stands for "coronavirus disease 2019." It's an infectious viral disease that causes a range of symptoms in people, from mild cold- or flu-like reactions in some cases to severe respiratory, digestive, and even neurological consequences that can result in death.

Cytokine storm

An over-response by the immune system, producing a storm of proteins called cytokines whose normal function involves affecting interaction and communication between cells. Too many cytokines — a storm of them — can kill human lung cells and cause severe infection, difficulty breathing, and death.

Disinfectants

Chemicals that kill viruses and other microbes, intended for use on inanimate objects (countertops, doorknobs, etc.). Household bleach (technically sodium hypochlorite) and isopropyl alcohol are common disinfectants. The CDC has extensive guidelines for disinfecting your home. Vinegar is not considered a disinfectant. Because they kill things, disinfectants are dangerous if ingested (or injected) and can also be dangerous if inhaled excessively or mixed with other chemicals. Disinfectants caused more calls to poison control centers in the early months of 2020 compared to years prior, likely because more people are disinfecting their homes, and some don't follow safety precautions, the researchers say.

Endemic

A baseline or normal amount of a disease present in a given population.

Epidemic

An increase of disease prevalence, typically sudden, beyond the endemic baseline.

Epidemiology

The science of investigating causes, trends, and outcomes of diseases or other health-related events (not just epidemics), including how many people have a particular disease, whether the numbers are going up or

down, how a disease might be controlled, and how it may affect society in terms of health consequences and economic costs. (Note: Definitions vary. Here's what the CDC says.)

False positive

A conclusion that something is true when it is not, such as results indicating a drug works when in fact it doesn't, or that a person has a disease when they don't. A false negative, naturally, happens when something is not detected when it's in fact there. These errors or oversights can occur due to faulty tests, inadequate data, or bad analysis.

Handshakes

Something humans used to do to express friendship, seal deals, and spread disease.

Herd immunity

If enough people in a population develop immunity to a disease, either by catching it or through vaccines, a collective immunity can slow or stop the spread. If, say, 75% of a population is immune to a disease, then three out of four people won't catch it when exposed. With a new disease like Covid-19, it's not known how high the percentage of infections would have to be to prevent additional serious outbreaks, but in general it's thought somewhere between 70% and 90% of a population has to be immune for herd immunity to be effective. No knowledgeable health experts are suggesting natural herd immunity would be an effective, ethical way to fight this disease — the death toll would be unacceptable. Natalie Dean, PhD, who studies emerging infectious diseases at University of Florida, calls a strategy invoking herd immunity "dangerous." From a practical standpoint: "I don't think anybody believes there will be herd immunity in May, or June, or July, unless there's a massive outbreak again and we don't social distance," Michael Mina,

assistant professor of epidemiology at Harvard T.H. Chan School of Public Health, said April 24 on a conference call with reporters.

Hydroxychloroquine and chloroquine

Drugs that treat or prevent malaria and lupus and which have been touted by President Donald Trump as possible treatments for Covid-19 and "one of the biggest game changers in the history of medicine." The drugs have not been proven to work on Covid-19. The Food & Drug Administration on April 24 formally cautioned against their use for Covid-19 outside of hospital settings and clinical trials, warning of side effects, including "serious heart rhythm problems in patients with Covid-19" who were treated with the drugs. One study of chloroquine for Covid-19 treatment was shut down because the primary outcome was death.

Immunity

Protection from a disease caused by having contracted it previously or a vaccine against it, such that if you're exposed to it again, you do not get infected. Immunity, generated as the immune system creates antibodies to battle a germ, can exist in varying degrees of robustness and for varying lengths of time, depending both on the person, the severity of a first experience with a disease, and the particular disease and the potential for its carrier (the virus or other germ) to change. The level of immunity people develop against Covid-19, and whether it varies based on severity of symptoms, is not yet known. Based on knowledge of other coronaviruses, scientists at Johns Hopkins University speculate that people infected with this coronavirus might have some level of immunity for months or possibly years. But any level of immunity is so far unproven with Covid-19 and in general, immunity tends to wane with any disease, which is why experts worry about the potential for additional waves of Covid-19 this fall or even next year.

Immunity certificates (or passports)

These "Covid passports" or "risk-free certificates," as they've also been called, would indicate a person has had the disease, is immune, and could therefore return to work and life as we know it. But there are scientific problems with the idea. Namely, we don't know what level of immunity a person might have after surviving Covid-19, nor how long it might last. There are also possible legal issues, and ethical concerns, too. "It creates the potential for people to be stigmatized, that if you don't have it, you can't go back to work, and [this] might create conditions where people will intentionally expose themselves to the virus, thinking that that's the ticket back to work," Joseph Allen, assistant professor of exposure-assessment science at Harvard T.H. Chan School of Public Health, said on an April 23 conference call with reporters.

Incubation period

Like a bird in an egg, a virus incubates for some time after it enters a human but before it causes symptoms. The incubation period for the new coronavirus SARS-CoV-2 typically ranges from two to 14 days, with the median being four or five days. During some of the incubation period, a person can be infectious.

Infectious disease

Any disease that can spread directly or indirectly from person to person via bacteria, viruses, parasites, or other microorganisms that are pathogenetic, which means "capable of producing disease." That's distinct from, say, heart disease or diabetes, which are not contagious. (Also note that there are many life-sustaining "good" microorganisms on and in the human body that do not transmit disease.)

Mortality

As used in medicine, a fancy word for "death rate." It is often used without very important qualifiers, however. With a new disease, early reports tend to involve "case fatality rates," meaning deaths as a percentage of known cases. The more important figure is "infection fatality rate," measuring deaths as a percentage of all infections. The Covid-19 infection fatality rate is not yet known, given limited testing and the unknown number of people who have had the disease without symptoms. It is thought by many epidemiologists to probably be higher than for the flu, which is estimated to kill around 0.1% of the people who are infected.

Mutation

Minor changes to a living thing's genetic code. Some have little practical effect; others can lead to distinct differences that cause plants or animals to evolve, perhaps ultimately into new species. Viruses can mutate, too, evolving into new strains that our immune defenses no longer recognize. Lesser mutations can affect just the parts of a virus we're immune to, rendering our immunity less effective or useless, without creating a whole new strain of the virus. These are called antigenic changes, or antigenic drift, and explain why the flu vaccine has to be re-engineered every year.

Outbreak

A significant spike in cases of a disease above the baseline, or endemic number. It is sometimes used interchangeably with "epidemic," though an outbreak typically refers to a smaller geographic area.

Pandemic

Often described as "an epidemic that has spread over several countries or continents, usually affecting a large number of people." The World Health Organization declared Covid-19 a pandemic March 11, even though some experts were using the term a full month sooner. That reflects the fact that

the term really has no agreed-upon, specific definition.

PCR tests

To determine if someone currently has Covid-19, genetic material is obtained (typically using a swab stuffed way up your nose) and run through a process called polymerase chain reaction (PCR) to identify the coronavirus SARS-CoV-2. These tests initially took several days to analyze in a lab and return results, but several companies are working on faster test processes that can offer results in hours, and also mail-in tests with samples collected at home. PCR tests differ from an antibody/serology test (above) used to determine if someone had the disease at some point in the past and whether they might have immunity.

PPE (personal protective equipment)

Face masks, eye protection, gowns, and other gear used to protect against contagious disease, especially as it pertains to health care settings.

Peer review

Before reputable journals formally publish results of a scientific study, they have other scientists who were not involved in the work vet the paper, and editors may request changes, all to help check that the methods, data, and conclusions are sound. This peer-review process is never perfect, but it helps ensure validity and accuracy. However, it can mean some findings are not made public for weeks, months, or even years.

Preprint papers

Scientists will sometimes post a draft of a scientific paper online, before it's formally peer-reviewed. This allows the paper's authors to stake a claim on their apparent findings and to solicit feedback or even collaboration. Preprints were once rare but their prevalence has grown in recent years.

And in the rush to make Covid-19 findings available quickly, preprints have been getting more attention than ever. "In an epidemic scenario, every day counts," Richard Sever, a cofounder of two preprint web sites tells the online publication *Undark*. But some Covid-19 preprints have fueled ill-advised articles in the mainstream media, only to have scientists heavily criticize the study methods and conclusions, creating what some scientists see as the potential for dangerously false or misleading information among the public and policymakers.

Quarantine

Keeping a sick person away from other people. "Someone in self-quarantine stays separated from others, and they limit movement outside of their home or current place," the CDC states. (Isolation is similar to quarantine; the main difference is the more formal sound of the word quarantine, and the fact that it's sometimes formally enforced, as at ports of entry and in cases where people are not allowed to go home.)

R0

Pronounced "R naught," the R0 is a "reproduction number" for a disease, signifying the average number of cases each infected person will cause. It's one factor in determining the potential spreadability of a disease. An R0 above 1 indicates the number of cases is rising, and below 1 suggests falling numbers. However, R0 is always just an estimate given certain circumstances, and can change based on many things, from mutations in the infecting germ to social measures taken to prevent spread. As one example, measles is highly infectious, with an R0 often said to be between 12 and 18, but a 2017 study found the range might be much wider. The R0 for flu is thought to be around 0.9 to 2.1. Early studies suggest Covid-19 has an R0 of around 2 or 3, but it may turn out to be higher once a clearer picture of total cases emerges. "The reproduction number depends on the contact rate between susceptible & infectious people," says Caroline

Buckee, PhD, associate professor of epidemiology at Harvard T.H. Chan School of Public Health. "We have lowered that rate with social distancing, but it will rise again if we relax interventions."

Remdesivir

An antiviral drug that once seemed promising as a treatment for Ebola (that didn't work out) and had some effect against other coronaviruses, including SARS (below). It has now shown early promise in clinical trials for treating Covid-19 but will undergo further testing prior to any possible widespread use.

Respiratory droplets

Drops of fluid that emanate when a person coughs, sneezes or even talks, and which tend to fall to the ground or other surfaces quickly without travel more than a few feet. Droplets are known to carry Covid-19 from the mouths and noses of infected people, hence the advice to wear masks and stay 6 feet apart. (Smaller particles that travel farther, aerosols, are described above.)

SARS

An acronym for "severe acute respiratory syndrome," which was an outbreak caused by a different coronavirus back in 2003. It infected 8,098 people globally and killed 774 before it was contained and eradicated. The big difference between that coronavirus (also called SARS-CoV) and the current one: "People who got SARS in 2003 got very sick very fast, so it was easy to identify them and isolate and treat them," explains Mark Cameron, PhD, an immunologist and medical researcher at Case Western Reserve University in Ohio. A much lower percentage had mild symptoms or no symptoms with the 2003 disease, so it did not spread as easily as...

SARS-CoV-2

This stands for "severe acute respiratory syndrome coronavirus 2." It's the new coronavirus, thought to have originated in bats, then hopping to humans in Wuhan, China, in December 2019 and now spreading from human to human and causing the disease Covid-19.

Social distancing

Perhaps more accurately called "physical distancing," this is, in the Covid-19 parlance, the safety precaution of staying at least 6 feet away from other people and avoiding large gatherings to help prevent the spread. It's meant not just to save lives but to "flatten the curve," meaning to avoid a huge and sudden spike in cases that would overwhelm hospitals, and to give scientists time to understand the disease and develop treatments and potentially a vaccine.

Super spreaders (or silent spreaders)

People who have few or no symptoms of a disease but are carrying it and are contagious, able to unknowingly spread it to tens or even hundreds of others. This is thought to be one reason Covid-19 has spread so quickly and widely.

Vaccine

A product developed to stimulate the immune system to generate antibodies and therefore some level of immunity — rarely fully effect or everlasting — to a specific disease, without actually making the person sick. Vaccines have reduced and in some cases largely eradicated many crippling and deadly diseases, from mumps and measles to polio. A vaccine causes the body to develop antibodies and other immune cells that fight the disease when needed. While many scientists are working on it, there's no

guarantee a vaccine will be developed for Covid-19, nor how effective one might be. The process to develop, test, and produce a vaccine for a new disease normally takes years, and historically most efforts fail. About one-third to one-half of the most promising candidates fail in the final stages of human testing.

Ventilator

A device that pumps oxygen-rich air into lungs that are struggling to breathe on their own. There are many varieties, from emergency ventilators operated by manually squeezing a bag to complex computerized devices that monitor all aspects of the process.

Virus

Collectively, viruses would be the most abundant life-forms on the planet if they were considered alive. But they require the cells of a host, such as a human or other animal, to replicate. Outside a host cell, a virus doesn't really do anything. Except wait. When they enter a human cell, they hijack it and use it to reproduce. A virus will often weaken a host cell and leave it for dead. Or, it can make so many progenies that they actually bust through the host cell membrane and destroy it outright, explains virologist Jan Carette, PhD, of Stanford University. Coronavirus and rhinoviruses, which can both cause the common cold, tend to lodge in the upper respiratory tract. But the new coronavirus, SARS-CoV-2, gets deep into the lungs and also can infect the digestive system and apparently even the nervous system, including the brain.

Viral dose

The number of viral particles that get inside a person. Whether a person catches a particular disease, and how severe it becomes, can depend on the viral dose, also called infectious dose. It can be as few as 10 viral

particles for some diseases, or thousands for others. An infectious dose can be increased by such things as taking a direct sneeze to the face from an infected person vs. passing through a cloud of infected particles left by someone who walked by moments ago. The dose can also be increased by duration of exposure, as when health care workers are exposed to sick people all day, day after day. It's not yet known what the thresholds might be for Covid-19.

Viral load

This is the amount of virus found in a test sample from a person, reflecting how well a virus is replicating in that person.

Viral shedding

This just means viruses are getting out of an infected person, whether through coughing, sneezing, pooping, or even talking (all thought to be methods of escape for the Covid-19 coronavirus) and potentially infecting someone else. An infected person can be shedding the coronavirus before their symptoms appear.

ADDITIONAL SOURCES: World Health Organization, U.S. Centers for Disease Control and Prevention, National Institute on Aging, and the Food & Drug Administration; Yale Medicine's Covid-19 glossary; Kaiser Family Foundation's Covid-19 glossary