
ENGLISH LEARNING
FOR CURIOUS MINDS

Episode #117

A Short History of Vaccines

22nd Dec, 2020

[00:00:00] Hello, hello hello, and welcome to English Learning for Curious Minds, by Leonardo English.

[00:00:11] The show where you can listen to fascinating stories, and learn weird and wonderful things about the world at the same time as improving your English.

[00:00:21] I'm Alastair Budge and today we are going to be talking about vaccines.

[00:00:28] You no doubt know what vaccines are, you have probably been vaccinated, and the word 'vaccine' has never been in the news more than it has been in the past few weeks.

[00:00:40] But you might not know the history of vaccines, where they come from, how they have developed, how cheap they actually are, and what has caused the rise of the anti-vax movement.

[00:00:53] We have a lot to cover in today's episode, so let's **get cracking**[1].

[00:00:59] Vaccines have completely changed the way we deal with **disease**[2].

[00:01:04] It's almost always easier and cheaper to prevent something from happening in the first place than to cure it when it does happen, and of course our health is no **exception**[3].

[00:01:18] In 2020, when there are vaccines for the majority of the **diseases**[4] that used to cause most **premature**[5] deaths, it's easy to **take this for granted**[6].

[00:01:30] But stepping back one minute and thinking about the fact that we don't have to worry about things like **smallpox**[7], **mumps**[8], **polio**[9] and **tetanus**[10], **diseases** that used to kill millions of people every single year is a pretty amazing achievement.

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[1] get started

[2] an illness

[3] something that is is not included in a rule, group, or list

[4] illnesses

[5] happening too soon

[6] to not properly appreciate something because it has always been there

[7] an extremely infectious disease that causes a fever, spots on the skin, and often death

[8] an infectious disease that causes painful swelling in the neck and slight fever

[9] a serious disease that can paralyse your arms and legs

[10] a serious disease caused by bacteria entering the body

[00:01:49] So, firstly, how do vaccines work?

[00:01:53] The principle is pretty similar, whatever **disease** the vaccine is trying to prevent.

[00:01:59] A small amount of the **germ**[11], often in a killed or weakened state, is put into your body.

[00:02:09] Most are **injections**[12], but occasionally there are some that you take orally, that you **swallow**[13].

[00:02:15] And then your body does the rest.

[00:02:18] Your **immune system**[14] recognises the **germ**, it recognises the **virus**[15] or **bacteria**[16], and produces **antibodies**[17] to fight it.

[00:02:28] It then remembers how to produce these antibodies so that if it **encounters**[18] this **germ** in the future, it will be able to fight it naturally before it develops into a

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[11] a small organism that causes disease

[12] the act of putting something into someone's body using a small needle

[13] to make something go down your throat and towards your stomach

[14] your body's system that makes it able to protect itself

[15] a very small piece of material that causes disease

[16] very small living things that cause disease

[17] proteins produced in the blood that fight disease

[18] meets

disease, and you don't have to worry about getting that disease again because your body has developed immunity[19] to it.

[00:02:48] As you will know, vaccines differ - some need to be done again after a certain number of years, while others are just done once and are good for life.

[00:02:58] So, this is the general principle - it's relatively simple.

[00:03:03] But of course, behind everything that appears simple is a huge amount of work and experimentation, and vaccines are no exception.

[00:03:15] Indeed, the first vaccine, or attempted vaccine, is believed to have been developed around 500 years ago, a long time before 'modern medicine' was invented.

[00:03:29] Smallpox, otherwise known as variola, was a devastating[20] disease that had existed since the Ancient Egyptians.

[00:03:39] By the 15th century it had spread[21] to large parts of the globe, and was killing 300,000 people a year in Europe alone.

[00:03:51] It was highly contagious[22].

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[19] the state of being protected against a disease

[20] causing a lot of damage

[21] move quickly

[22] a contagious disease is easy to catch from other people

[00:03:52] You could catch it either by breathing the same air as someone who was infected, or from direct contact.

[00:04:02] You've probably seen pictures of what happens to someone when they get **smallpox**.

[00:04:07] They are normally covered in horrible **scabs**[23], and suffer from fever and **vomiting**[24].

[00:04:14] And if you got **smallpox** you had a 30% chance of dying.

[00:04:21] So, not good news at all.

[00:04:25] The first records of attempted vaccination, or technically it was called **variolation**[25], but they are very similar things - the first record comes from China, in the 15th century.

[00:04:40] It was discovered that by taking some of the dried **scabs**, the dried skin of someone who had **smallpox** and **rubbing**[26] that on the skin of someone without

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[23] a rough surface made of dried bloody

[24] emptying your stomach through your mouth

[25] a primitive way of protecting against smallpox

[26] pressing something against a surface and moving it

smallpox, that person would normally develop only a **mild**[27] infection, and they would recover after a few weeks.

[00:05:02] If they had this small infection then they were unlikely to get a **full blown**[28], dangerous and deadly one.

[00:05:11] The process was still quite dangerous, and between 0.5% and and of people who had this **primitive**[29] vaccine died from it, because they did develop the full, bad, deadly **smallpox**.

[00:05:27] But still, 2% is a lot better than 30%, and I certainly think I'd like those **odds**[30].

[00:05:35] Knowledge of this method of preventing **smallpox** **spread**, and it was popularised in Britain by an **aristocratic**[31] lady named Lady Mary Wortley Montagu.

[00:05:48] She had not only lost her brother to **smallpox**, but she had also got it, recovered, and was left with terrible **scars**[32] on her face. She heard about this process of **variolation**, she had it done on her children, and started promoting it in Britain.

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[27] not violent

[28] completely developed

[29] not developed

[30] probability

[31] relating to the highest class in society

[32] marks left on the body after an injury has healed

[00:06:09] Early experiments with this process proved **encouraging**[33], and the Royal Family was impressed, trusting it with their own children.

[00:06:19] It hit a major **roadblock**[34] though when a son of King George III, a boy called Prince Octavius, the eighth son, as you might be able to guess from the name, died after being given this treatment.

[00:06:35] Despite the loss of the prince, this **primitive** version of vaccination **went from strength to strength**[35].

[00:06:43] It was quite easy to do, and doctors developed new and **innovative**[36] ways of doing it.

[00:06:51] The key thing they were trying to achieve was to reduce the strength of the **smallpox** **virus** that was given to the person, which they did through things like drying it and burying it in the ground before giving it to the patient.

[00:07:08] By the 18th century, the practice was **widespread**[37] throughout Europe, as well as the United States, although there was still a non-zero chance of you actually getting **smallpox** from it and dying.

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[33] promising, giving you hope

[34] something that stops the progress of a plan

[35] improved consistently

[36] using new methods

[37] happening in many places

[00:07:23] So, it was better than nothing, but still imperfect.

[00:07:28] Towards the end of the 18th century British doctors had noticed something strange about dairy farmers, about cow farmers. They rarely got **smallpox**, but they did get something called cowpox, which was similar but significantly less **lethal**[38].

[00:07:50] A man named Edward Jenner **hypothesised**[39] that if someone was given a small amount of the cowpox **virus**, instead of **smallpox**, this might have the effect of **immunising**[40] them against **smallpox**.

[00:08:08] On 14 May 1796 he tried out this theory on an eight year old boy, the son of Jenner's gardener.

[00:08:18] The boy developed some very **mild** **symptoms**[41], but then recovered. And when they tried to infect him with **smallpox** a few weeks later, he didn't get it.

[00:08:31] He was **immune**[42].

[00:08:33] Jenner had done it, he had found a way to safely vaccinate against **smallpox**.

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[38] able to cause death

[39] thought was possible

[40] protecting a person by putting a small substance into their body

[41] feelings or changes typical of a disease

[42] protected against a disease

[00:08:40] Of course, more tests needed to be done, but this was the basis of vaccination. Indeed the term 'vaccination' comes from Jenner's invention - vacca is cow in Latin.

[00:08:54] Jenner has been called the father of **immunology**[43], and this discovery is thought to have saved more lives than the work of any other human.

[00:09:05] By the year 1840 the previous process of **immunisation**[44], **variolation**, which used the real **smallpox** **virus**, was **banned**[45], and Jenner's method was the approved one promoted by the British government.

[00:09:21] There were **philanthropic**[46] **missions**[47] that travelled throughout the Americas and East Asia giving people this vaccine, **inoculating**[48] them and saving them from the **disease**.

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[43] the scientific study of disease prevention

[44] the process of being made immune

[45] not allowed

[46] relating to helping the poorest in society

[47] important jobs, especially that involve going to another place

[48] treat with a vaccine

[00:09:34] And even Napoleon, in the middle of a war with Britain, gave every one of his soldiers Jenner's **smallpox** vaccine and **awarded**[49] Jenner a **medal**[50].

[00:09:46] By the start of the 20th century, **smallpox** had been virtually **eradicated**[51] in the developed world, however it was **spiralling out of control**[52] in the developing world.

[00:09:59] It's estimated that it killed 300 million people in the 20th century.

[00:10:06] There was a huge, global effort to **eradicate**[53] the **disease**, using a vaccine that was based on the one Jenner had discovered 150 years earlier, and on May 8, 1980 it was declared to be **eradicated** by the World Health Assembly, the decision making **body**[54] of the World Health Organisation.

[00:10:29] After Jenner's **smallpox** vaccine, vaccines for other **diseases** continued to be discovered.

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[49] given as a reward

[50] a small metal disc, given as a reward

[51] got rid of completely

[52] becoming less and less easy to control

[53] get rid of completely

[54] a group of people within an organisation

[00:10:35] Louis Pasteur developed the first vaccines for **rabies**[55] and **anthrax**[56], and we now have vaccines for dozens of **diseases** that used to kill millions of people every year.

[00:10:50] Vaccination is promoted by pretty much every government, and often **subsidised**[57] to encourage people to get vaccinated.

[00:10:59] It's much cheaper to vaccinate someone than to care for them if they get sick, and so governments don't just do it for moral reasons - there are some very good economic reasons for them to encourage it as well.

[00:11:16] But, for as long as vaccines have been around, there have been people who have been **opposed**[58] to them, who do not want to take them for all sorts of reasons, from religious to moral to scientific to health to people just believing that they don't work.

[00:11:33] And despite the billions of people around the world who have been vaccinated safely, and the hundreds of millions of deaths that have been prevented, as you'll no doubt know, the proportion of people who are **sceptical**[59] about vaccinations has never been higher.

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[55] a serious disease of the nervous system

[56] a disease that causes fever and death

[57] made cheaper

[58] if you are opposed to something, you disagree with it

[59] doubting

[00:11:52] Indeed, even in 2019, before COVID-19, vaccine **scepticism**[60], or anti vax, was listed as one of the top 10 global health threats by the WHO, by the World Health Organisation.

[00:12:10] The reason is that for a **disease** to be completely **eradicated** and for it to not have a chance to be **transmitted** [61]again, as many people as possible need to be **immune** to it.

[00:12:23] The more people who aren't **immune** to a particular **disease**, the more bodies, the more homes, that **disease** has, and the greater the probability is that it can return.

[00:12:36] You've probably heard a lot about this in the past few months, and have heard the term '**herd immunity**[62]'.

[00:12:44] To **recap**[63], **herd immunity** is the idea that if enough people in the population are **immune** to a **disease** or **virus** this means it can't spread as fast as it would if nobody was **immune**, and this protects the population.

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[60] the state of doubting something

[61] passed (to someone else)

[62] the state of enough people in a group being immune to a disease, so that others are protected

[63] to repeat

[00:13:03] Modern anti vax ideas typically include anything from doubts about the effectiveness of vaccines through to a belief that they actively cause you harm, and other, more wild and dangerous conspiracy theories.

[00:13:19] We're not going to give these the benefit of any real consideration here today, as they have all been **debunked**[64], proved wrong by pretty much every serious health professional, but there is one famous case that it is worth mentioning.

[00:13:36] And that is the belief that there is a link between the MMR vaccine, the **Mumps**[65], **Measles**[66] and **Rubella**[67] vaccine, and **autism**[68].

[00:13:47] Now, this theory has been completely **debunked**, it has been proved to not be true.

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[64] proved to not be true

[65] a disease that produces small, red spots

[66] a contagious disease often called German measles

[67] a contagious disease often called German measles

[68] a mental disorder making it hard to communicate properly

[00:13:54] The man who proposed it has been **struck off**[69] **the medical register**[70], he is no longer allowed to practice medicine, and the **journal**[71] in which the theory was originally published has removed it.

[00:14:08] So there is absolutely no proof that it's true, but it has remained the most famous and dangerous conspiracy theory about vaccines.

[00:14:18] In 1998 Andrew Wakefield, **then**[72] a doctor and academic, published a paper in a **reputable**[73] medical **journal** called The Lancet suggesting that there was a link between this vaccine and **autism**.

[00:14:36] Evidently, that would be a terrible thing, and it's every parent's worst nightmare that by trying to protect their child, they are actually harming them.

[00:14:47] The news of Wakefield's discovery or proposal soon **spread**, he called a press conference and called for this vaccine to be stopped until more research was done.

[00:15:01] But, it turned out that these claims were completely false.

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[69] removed from an official list

[70] the list of people who are allowed to practise medicine

[71] a serious magazine

[72] at that time

[73] having a good reputation

[00:15:07] The laboratory in which the tests had been conducted, had made several mistakes, and there was absolutely no evidence that this vaccine caused **autism**.

[00:15:19] Whatsmore, Wakefield hadn't revealed that he had a financial interest in attacking this particular vaccine, as he was developing a different one.

[00:15:30] So the entire thing was a **fraud**[74], but the damage was done.

[00:15:35] Just the mention of the possibility that this vaccine could cause **autism** was enough, even if it has proved to be a complete lie.

[00:15:46] Wakefield didn't start the anti vax movement, but he was the **highest profile**[75] person to be involved with it, and is now a frequent campaigner at antivax protests and is a sort of **figurehead**[76] for the anti vax movement.

[00:16:06] And as you know, this movement is growing.

[00:16:09] There was a survey in 2019 that suggested that 40% of Americans doubt vaccine safety, and parents who have the **means**[77], who either live in countries where vaccines are free, or who have the financial ability to pay for them are increasingly refusing to vaccinate their children.

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[74] if something is a fraud, it is not what it claims to be

[75] most well known

[76] someone who seems to be the leader of a movement or country, but has no real power

[77] ability (to do something)

[00:16:33] The effect of this is, as expected, a return of some of the **diseases** that these vaccines were created to prevent.

[00:16:43] In the year 2000 the Centre for **Disease** Control and Prevention, the main **body** for infectious **diseases** in the US declared that '**measles**' had been eliminated throughout the United States.

[00:16:57] Eliminated in this case means that there had been no **transmission**[78] for 12 **consequent**[79] months.

[00:17:05] But with the rise of the anti vax movement, and more and more parents refusing to give their children vaccinations, **measles** came back.

[00:17:17] In 2010 there were 60 cases, then 220 the next year, and in 2019 there were 1282 cases. In 2020 the cases will drop dramatically, but that's only due to COVID and people being inside - if there had been no COVID, no doubt it would have increased.

[00:17:42] And it's not just in the US.

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[78] passing from person to person

[79] happening one after the other

[00:17:44] It's growing the world over, as there is growing **distrust**[80] in government institutions and information, or rather **misinformation**[81], **spreads**[82] more easily and faster than ever, thanks to the internet, social networks and messaging apps.

[00:18:01] This has got governments **scratching their heads**[83], with no country really sure what to do about it.

[00:18:10] In some countries, especially less developed countries, it's thought to be a question of education and providing the right information about the effectiveness of vaccines.

[00:18:24] The theory goes that if people just understand that vaccines are safe, cheap or free, and an effective way of preventing deadly **disease**, then they would be more likely to have their children vaccinated.

[00:18:41] But in developed countries the problem isn't information, it's trust.

[00:18:47] In a world where people have been **conditioned**[84] to not believe anything that an official institution tells them, no amount of the World Health Organisation

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[80] not believe

[81] false information

[82] moves quickly

[83] not sure about what to do

[84] if you are conditioned to do something, you have been taught to do it

telling you that vaccines are effective is going to work, because you simply don't trust them.

[00:19:04] Indeed, often this has the opposite effect.

[00:19:09] If you believe that there is some global conspiracy forcing children to have vaccines, then adverts from government **bodies**[85] telling you that vaccines are safe are probably going to **reinforce**[86] your **pre-existing**[87] beliefs.

[00:19:25] And of course, social media has made **amplifying**[88] and **spreading**[89] these kinds of theories easier than ever, and anti-vax has become an **ideological**[90] war ground.

[00:19:39] There was a report that found that the Internet Research Agency, a Russian **troll farm**[91], a group that systematically uses social media to interfere in political

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[85] departments, groups

[86] make something stronger

[87] current

[88] making louder

[89] causing to reach more people

[90] relating to ideas and beliefs

[91] an organisation employing people to make deliberately offensive or provocative online posts in order to cause conflict or manipulate public opinion.

opinions, this organisation had used Twitter **bots**[92] to **amplify**[93] **prominent**[94] anti vax tweets.

[00:19:59] And there are thousands of very active anti vax groups on Facebook, which help **fan the flames**[95] of the anti vax movement.

[00:20:08] And this brings us on to the one **elephant in the room**[96], the one thing that we haven't yet talked about.

[00:20:16] A vaccine for COVID-19.

[00:20:19] Now, this episode will be released in December 2020, so obviously this subject is very much **ongoing**[97].

[00:20:28] Perhaps by the time you listen to it there will be a widely available vaccine, and this pandemic will be **declared**[98] over.

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[92] computer programmes that work automatically

[93] make louder

[94] well known

[95] make feelings stronger

[96] an important subject that is not talked about

[97] continuing to exist or develop

[98] officially said to be

[00:20:36] For that to happen though, a large enough percentage of people need to take it, and recent surveys suggest that this might not be that simple.

[00:20:47] The number of Americans who say that they'll be happy to take a vaccine for COVID-19 **at the last count**[99] was 58%, and the numbers for most European countries are broadly similar.

[00:21:02] Evidently, the more people are vaccinated the less opportunity there is for the **virus** to **spread**, so the next challenge will be to actually develop ways to encourage people to do this.

[00:21:16] A challenge that is, perhaps, a lot harder than developing the vaccine itself.

[00:21:24] OK then, that is it for today's short history of vaccines.

[00:21:29] I hope it's been an interesting one, and that you've learnt something new.

[00:21:33] As always, I would love to know what you thought of this episode.

[00:21:37] Did you know about how vaccines were first invented?

[00:21:40] Have you had much experience with the anti-vax movement?

[00:21:44] I know it's a bit of a **hot potato**[100] of a topic, but I would love to know what you think.

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[99] according to the latest information

[100] a problem that divides opinion

[00:21:49] You can head right into our community forum, which is at community.leonardoenglish.com and get chatting away to other curious minds.

[00:21:59] You've been listening to English Learning for Curious Minds, by Leonardo English

[00:22:04] I'm Alastair Budge, you stay safe, and I'll catch you in the next episode.

[END OF PODCAST]

Key vocabulary

Word	Definition
Get cracking	get started
Disease	an illness
Exception	something that is is not included in a rule, group, or list
Diseases	illnesses
Premature	happening too soon
Take this for granted	to not properly appreciate something because it has always been there
Smallpox	an extremely infectious disease that causes a fever, spots on the skin, and often death
Mumps	an infectious disease that causes painful swelling in the neck and slight fever
Polio	a serious disease that can paralyse your arms and legs
Tetanus	a serious disease caused by bacteria entering the body
Germ	a small organism that causes disease
Injections	the act of putting something into someone's body using a small needle
Swallow	to make something go down your throat and towards your stomach

Immune system	your body's system that makes it able to protect itself
Virus	a very small piece of material that causes disease
Bacteria	very small living things that cause disease
Antibodies	proteins produced in the blood that fight disease
Encounters	meets
Immunity	the state of being protected against a disease
Devastating	causing a lot of damage
Spread	move quickly
Contagious	a contagious disease is easy to catch from other people
Scabs	a rough surface made of dried bloody
Vomiting	emptying your stomach through your mouth
Variolation	a primitive way of protecting against smallpox
Rubbing	pressing something against a surface and moving it
Mild	not violent
Full blown	completely developed

Primitive	not developed
Odds	probability
Aristocratic	relating to the highest class in society
Scars	marks left on the body after an injury has healed
Encouraging	promising, giving you hope
Roadblock	something that stops the progress of a plan
Went from strength to strength	improved consistently
Innovative	using new methods
Widespread	happening in many places
Lethal	able to cause death
Hypothesised	thought was possible
Immunising	protecting a person by putting a small substance into their body
Symptoms	feelings or changes typical of a disease
Immune	protected against a disease
Immunology	the scientific study of disease prevention

Immunisation	the process of being made immune
Banned	not allowed
Philanthropic	relating to helping the poorest in society
Missions	important jobs, especially that involve going to another place
Inoculating	treat with a vaccine
Awarded	given as a reward
Medal	a small metal disc, given as a reward
Eradicated	got rid of completely
Spiralling out of control	becoming less and less easy to control
Eradicate	get rid of completely
Body	a group of people within an organisation
Rabies	a serious disease of the nervous system
Anthrax	a disease that causes fever and death
Subsidised	made cheaper
Opposed	if you are opposed to something, you disagree with it

Sceptical	doubting
Scepticism	the state of doubting something
Transmitted	passed (to someone else)
Herd immunity	the state of enough people in a group being immune to a disease, so that others are protected
Recap	to repeat
Debunked	proved to not be true
Measles	a disease that produces small, red spots
Rubella	a contagious disease often called German measles
Autism	a mental disorder making it hard to communicate properly
Struck off	removed from an official list
The medical register	the list of people who are allowed to practise medicine
Journal	a serious magazine
Then	at that time
Reputable	having a good reputation
Fraud	if something is a fraud, it is not what it claims to be

Highest profile	most well known
Figurehead	someone who seems to be the leader of a movement or country, but has no real power
Means	ability (to do something)
Transmission	passing from person to person
Consequent	happening one after the other
Distrust	not believe
Misinformation	false information
Spreads	moves quickly
Scratching their heads	not sure about what to do
Conditioned	if you are conditioned to do something, you have been taught to do it
Bodies	departments, groups
Reinforce	make something stronger
Pre-existing	current
Amplifying	making louder

Spreading	causing to reach more people
Ideological	relating to ideas and beliefs
Troll farm	an organisation employing people to make deliberately offensive or provocative online posts in order to cause conflict or manipulate public opinion.
Bots	computer programmes that work automatically
Amplify	make louder
Prominent	well known
Fan the flames	make feelings stronger
Elephant in the room	an important subject that is not talked about
Ongoing	continuing to exist or develop
Declared	officially said to be
At the last count	according to the latest information
Hot potato	a problem that divides opinion

We'd love to get your feedback on this podcast.

What did you like? What could we do better?

What did you struggle to understand?

Let us know in the forum community.leonardoenglish.com

