**Medicine 1 Lesson 1: The Origins of Modern Medicine**

**What is Medicine?**

Today, we take for granted that if someone we know suffered an accident and lost a lot of blood they would be able to have blood transfused to them (since 1818), that the medical team involved in their care would wash their hands (since 1847) and that the surgical tools required would be sterilised (since 1867). They could have an X-ray (since 1895), be prescribed a course of antibiotics (since 1928) or if the situation had reached a critical point, have been given CPR by a doctor (since 1960). These are all relatively modern discoveries or techniques (in historical terms) and demonstrate that the field of Medicine is ever-changing, based on new evidence.

Medicine as a concept is as old as humanity, but there are some significant moments which changed the course of Medical History, accelerated progress, and made further improvements possible. Hippocrates was born almost 2,500 years ago, and whilst Medicine was certainly practiced long before that time, he is often described as “the Father of Modern Medicine.” Hippocrates believed that sickness was not caused by the gods (as most had believed) but that it was a natural process, and that the cures were not to be found in offerings to gods, but in natural remedies. He brought some professionalism to Medicine by writing his observations of symptoms and the treatments which worked (**clinical observation**), and teaching this to other people. He also instigated the **Hippocratic Oath**, an oath still taken around the world today (though heavily adapted now!) but which made doctors commit to patient confidentiality and to treating them to the best of their ability. These improvements paved the way for the next two and a half millennia of development and innovation, with some fairly crucial discoveries within that large timeframe.

This course is not about Hippocrates or the history of medicine, it is about giving you a better insight into the study of Medicine and the issues in the field, but it is vital that any medic understands that Medicine is a process and that it has changed over the centuries, and will change throughout your career. Looking at some of the most important developments in recent time is an important part of understanding that process and how we got to where we are now.

**Vaccination:**

One of the most important discoveries in Medical Science was vaccination, which has saved countless millions of lives around the world, and will continue to do so. The name can be traced back to British Doctor Edward Jenner’s **Smallpox** Vaccine, which was named (he credited his friend for the name) after the Latin word for a cow, which is Vacca. The reason he named one of the most important medical discoveries after a farm animal is that he had observed that milk maids who developed cowpox did not suffer from smallpox, which was a major killer disease at that time. In 1796 he was able to give a boy cowpox, and then prove that he was immune from smallpox. Despite the availability of this vaccine, over 500 million people died from Smallpox in the final 100 years of the disease before it was confirmed to have been completely eradicated in 1979.

Whilst Jenner’s vaccine is the best known, partly because it inspired others, and also because of the amount of people that smallpox killed worldwide, the most important vaccine is Louis Pasteur’s Rabies Vaccine which he created in 1885. The reason that this was the most important is that the technique he used to create it would allow for future vaccines, as Jenner’s vaccine had relied on a similar but different disease, but Pasteur’s was the actual disease itself, but in a modified way that reduced the force of it, known as **attenuation**. This process allowed for other vaccines to be created using the disease that they were trying to fight. Pasteur’s work has allowed for the eradication of some diseases and severe restriction of others such as whooping cough, polio and tuberculosis as well as measles, mumps and rubella through the combined MMR vaccine.

**Public Health:**

There have been many notable discoveries or improvements in public health which have led to improved outcomes and reduced incidence of disease around the world. One such discovery was John Snow’s theory on how Cholera is spread. Cholera is a disease which infects the small intestine leading to severe diarrhoea, and which still to this day kills between twenty and thirty thousand of the estimated five million sufferers. In Snow’s day, London was suffering from the third global Cholera pandemic, with around 10,000 deaths per year in London. Snow had a theory that the cause was not particles in the air (as most believed) but contaminated water, and he was able to prove that in his famous Broad Street Pump experiment.

In 1854 over 600 people in the area around Broad Street in London had died, and Snow argued that it was a contaminated water supply which had caused this. The handle from the pump was removed, meaning people had to go to other pumps for water, which came from other sources, and the infection rate reduced. Snow had proven his theory that cholera was a water borne disease, which led to important work in how to combat it, such as improving the sewer network. At that time London was over-populated and the sewage it produced was too much to handle, which led to contaminated drinking water. It was noted that those who drank beer, rather than water, were not at risk, even though the same water being used, because boiling the water during brewing had removed the bacteria which causes the infection.

This is an example of a **public health** measure (improving sanitation), and it is important to note that it is not always necessary to dispense medicine or find a cure for a disease, but that health can be improved through public action. Examples of this include promoting hand washing, nutritional information, encouraging take-up of vaccines and, more recently, the use of face masks on public transport. Some of the most important public health measures in recent years have been those which contribute to a reduction in smoking.

Worldwide over 5 million people die as a result of smoking related illnesses each year. The smoking industry were able to deny that smoking causes illness and death until the 1950s, at which point the evidence became overwhelming. Nowadays, smoking is actively tackled by many governments and there are bans on smoking indoors in public in the UK and in many other countries due to the proven danger of second-hand smoke. Smoking is likely to become the number one global cause of death in this century, as the amount of people smoking in developing countries continues to rise, but in the developed world, the number of smokers is falling due to public health measures such as the smoking ban, education and plain packaging.

**Today:**

Smoking is just one of the major threats to health in this century, and the Covid-19 pandemic shows that health is not something that should ever be taken for granted. Despite this, it is clear that modern Medicine is significantly more advanced than even twenty years ago, and the advances keep coming.

In the first ten years of this century, the first partial face transplant, and first full face transplant took place to treat significant facial injuries, and a bioartificial liver, using suspended rabbit cells, was used successfully to treat a patient. More recently, HIV drugs have improved to the extent that people with HIV who take their medication are not able to pass HIV on to anyone else, whilst gene editing is opening up the possibility of preventing **hereditary** diseases from being passed on. Previously unthinkable treatments now exist or are under development, and there have been significant breakthroughs in the treatment of some cancers. Many more diseases could be eradicated this century in the same way as smallpox was in the last.

For the 21st century Medic, keeping up with innovation and knowledge is one thing, but it remains the case that Doctors deal with people, and that the qualities most commonly associated with a good Doctor are that they listen and that they are personable. Doctors deal with people at some of the most challenging moments of their life, and the ability to do this with compassion and empathy is essential.

**Medicine 1 Task 1: The Origins Of Modern Medicine**

Please complete this week’s task as a word document and return it as an attachment on teams. The document title should be PUPIL NAME Medicine week 1.

**Part A:**

The Covid-19 Pandemic has put vaccination on the top of the world’s agenda. Watch this short video about how quickly vaccines can be made <https://www.youtube.com/watch?v=74WQgNa3OsQ> and then answer the following:

During a global pandemic is it more important to rush out a short-term vaccine (like the flu jab) or to fully develop a lifelong vaccine which will help eradicate the disease (like Smallpox). You may wish to use knowledge and terminology from the video in your answer, which should be **no more** than 300 words.

**Part B:**

John Snow’s Broad Street Pump Experiment occurred during the 3rd global cholera pandemic, we are currently still in the 7th. Worldwide, millions still die of preventable disease, but more so in the developing world than the developed world. Using your knowledge of public health, and some research, choose any public health measure which would save lives in the developing world, and explain why that is the case.

**Part C:**

Throughout this lesson, certain words appeared **in bold**. This task is entirely optional, but by writing those words down, and writing down their meaning, you can create a glossary which could be useful to you in the future.

**Next Time:**

In the next lesson we will look at ethics, which is fundamental to being a Doctor, including issues such as confidentiality and assisted dying.

**Further Reading:**

If you want to know more about the history of vaccination then this timeline is a very useful and easy to read resource: <https://www.historyofvaccines.org/timeline#EVT_100868>

The British Medical Journal have a short but informative article about how improved sanitation as a public health measure made a significant impact in improving life expectancy and reducing disease: <https://www.bmj.com/content/334/suppl_1/s17>

If you want to know more about the 7th Cholera Pandemic that we are still in, then this article is a lengthy, and at times technical, explanation of how that pandemic came to be and its impact: <https://www.pnas.org/content/113/48/E7730>

If you want to know more about how smoking impacts the body, this is a very watchable short Ted-ED video with easy to follow medical terminology: <https://www.youtube.com/watch?v=Y18Vz51Nkos>