

# The Black Death's Effect on Medicine & Medical Practices

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## Introduction

When people hear the word "plague" it is generally safe to assume that most will think first of the Black Death. The Black Death is particularly ingrained in the minds and education of most of the general public due to its exceptionally large and destructive impact on more than a substantial portion of the world at its time. The plague devastated most of Europe and Asia during the fourteenth century and is still the deadliest plague in recorded history. Medicine at the time was far from adequate under the circumstances. Physicians lacked sufficient knowledge on most aspects of the field, making it extremely difficult for civilizations to fight back against the plague in this era. Though the Black Death was exceptionally devastating for the majority of the world, it is likely that it did allow for the outset of medical and scientific developments as a result of being forced to learn and deal with a disease people were not yet equipped to handle. To fully understand the effect that the Black Death had on medicine and medical practices, if any, we must examine the medical practices and medicine used before, during, and after the plague.

The Black Death, or more specifically, the Bubonic plague, had more than a single appearance throughout history, but the most significant of which was its appearance and initial outbreak during the middle of the 14th century. The plague is thought to have originated in Asia, and moved throughout the continent in countries such as China, India, and Egypt in the early 1340's. Eventually the plague spread to Europe around 1347, when a group of ships from the Black Sea docked at a Sicilian port. When civilians came to greet the sailors from the ships, they found them to basically all be either dead, or sick and covered with black boils; "plague boils" being a primary symptom of the disease. Though the people attempted to force the ships to leave after seeing the status of those on board, it was ultimately futile because the plague had already begun to spread amongst the citizens of the port, and eventually throughout most of Europe.

Primarily, the rapid spread, and therefore substantial loss of life, of the plague was due to the manner in which the disease was transmitted, along with trading/shipping routes and medical inadequacies. The Black Death is an airborne transmitter that can also be transmitted specifically through rats and fleas, making it incredibly difficult to defend against; especially with the lack of knowledge in the medical and scientific fields at the time. In addition to this, the plague was able to spread so far due to trade/shipping routes that would carry the

disease through infected passengers and/or rats that would then infect different populations as ships moved from one location to another. The medical and scientific inadequacies of the time made the plague particularly difficult to defend against, especially when considering the fact that people and physicians had no concept of what a germ even was. These inadequacies caused the majority of the world to be all but completely helpless against the disease.

Overall, the initial outbreak of the plague lasted from about 1346, primarily in Asia at this time, to around 1353 as it began to disappear naturally. In this relatively short period of time, the plague was able to cause exponentially high death totals that have still yet to be replicated in the world to this day. Medicine and medical practices prior to, and during, the initial outbreak of the Black Death were simple and reflected the general lack of understanding in the medical field and science at the time. Scientists and/or physicians had no knowledge of germs or how most of the internal workings of the body actually functioned. This lack of knowledge resulted in the majority of medical practices and study focusing generally on prevention rather than treatment of an illness or disease. Because the general focus of medical practice and study revolved primarily around prevention, medicine and treatment were largely based on religious or cultural beliefs, rather than scientific facts. These beliefs led to a great deal of nonsensical medical practices being passed down to generations and cultures throughout history; practices that were rarely questioned or improved upon.

One primary example of medicine's connection to religious and/or cultural beliefs at this time, is the theory of humorism. Humorism was prevalent in medicine for centuries; originating around 500 B.C. in many of the first recorded human civilizations, and then finally dissipating roughly around the 1700's and 1800's. This theory of humorism was based on the basic idea that a person's health and personality is tied to four humors (liquids) in the body that needed to be in balance for a person to be healthy; the four humors being: blood, yellow bile, black bile, and phlegm (clear liquids). In addition to this, these humors were tied to different symptoms, seasons, and areas of the body. For example, if a person had something wrong with a specific part of their body or had certain symptoms, a doctor would connect it to an imbalance of one of the four humors and then attempt to fix the imbalance, usually by removing a portion of one of the liquids from the body.

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## Treatments

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Humorism was still one of the primary medical concepts used during the Black Death. Originating early in civilization's history, humorism was eventually helped to spread when the Greek physician Hippocrates adopted it; the concept then continued to be passed down through generations as further study of medical treatments were infrequent. As a result of humorism's prevalence in medicine, many subsequent medical practices became exceedingly common or popular in the goal of returning the humors to balance. One of the primary medical practices/treatments used during the plague to bring the humors back to balance, was

bloodletting. The basic concept of bloodletting being that, the doctor would first determine there was an imbalance of blood (humor) in the patient which is causing the sickness. The physician would then place leeches on the patient's body with an understanding that the leeches would act to remove the "excess" blood, therefore balance would be restored and so too would the patient's health.

There were many other treatments used during this time, both in practicing humorism and not, that were backed up by basically zero scientific evidence. Another example of the generally nonsensical treatments used at this time, was the use of seeds. For example, doctors would use seeds known as "skullcap" to cure headaches. The doctors would use these seeds to cure headaches or other internal ailments involving the head, for the simple fact that the seed resembles a human skull. The logic being that, because the seed resembles a human head, it therefore meant it would help ailments involving the head; headaches. Another example of a medical treatment used prior to, and during, the time of the Black Death, is trepanning. Trepanning was the practice that if a patient was suffering from some kind of neurological disorder (ex: epilepsy), the doctor would then drill a hole in the patient's skull so that the "demons could be released" and the illness would be cured. Trepanning was practiced all the way up until the early 16th century; a testament to the complete lack of understanding of medicine and/or science at the time; especially when it came to treatments.

Because medicine was primarily focused on prevention rather than treatment, many treatments like bloodletting, trepanning, and the use of seeds were left unquestioned, and therefore continued to be taught as "medicine" for centuries. Though medicine and medical practices were generally based on religious or cultural beliefs, backed by little-to-no scientific evidence, there were some forms of medical treatments used at this time that were actually

beneficial for the patients. A prime example of one of the beneficial treatments used prior to, and during, the Black Death, was the use of wine as an antiseptic. At some point in history, people discovered that if they used wine to clean out a wound, then it would prevent an infection. Cauterization (burning flesh) was also used for wounds as a means of preventing infection, but the discovery of both of these practices had to be a result of either luck, or a very good guess.

People at the time of the Black Death had no concept of what a germ was, and therefore could not have understood its relation to infection or what an infection actually was. For people to have discovered the use of wine or cauterization as an antiseptic, they would have had to have simply stumbled upon its use by pouring wine on or burning a wound and then discovering that whenever these were done, the wound would heal without infection. Similarly, people during the time of the Black Death and before, used opium and/or hemlock as an anesthetic. As previously stated with the use of wine and/or cauterization as an antiseptic, people would have had to have determined by accident that opium and/or hemlock can be used as an anesthetic. Civilizations and people of the time did not have the scientific or medical knowledge to determine, based on scientific understanding, that opium and/or hemlock can be used to reduce pain. The logical explanation being that, they must have randomly come across this result after consuming either of them, and then discovered their effects.

Similarly, other medical treatments, like the use of herbs, were accidentally successful in helping to manage or cure ailments. Though herbs are proven to have legitimate medical benefits in some cases, the use of them was not a result of science. Instead, the use of herbs as a medical treatment was the result of random discoveries and cultural/religious beliefs. Herbs were used primarily in relation to humorism, as a means of returning the humors and the body to balance. Medical study prior to, and during, the time of the Black Death was so rarely focused on treatment, that it caused civilizations to be ill prepared for such a deadly plague. Medicine was generally grounded in belief rather than truth. The foundation that medicine of this time was built upon resulted in a complete lack of understanding of the field, along with treatments that were far from adequate in dealing with most ailments and illnesses; let alone the Black Plague.

Medicine and medical study at the time was completely lacking in basic understanding of science and the human body. People were nowhere near well enough equipped to handle something as catastrophic and significant as the Black Death,

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which is a lot of the reason for the plague's exceptionally large death totals. When the plague initially broke, people's lack of scientific understanding caused them to be unable to determine crucial information; information such as: how it spread, how to prevent it, and how to treat it. People at this time in history did not have a basic understanding of the relationship between hygiene and infection. If someone had some sort of open wound on their body, no one understood the fact that if the wound got dirty it would then get infected. When you don't have knowledge of things that are now considered basic, like germs, infection can be very serious.

There was practically zero chance that the world was ready to handle something as significant and deadly as the plague at that time of its initial outbreak, because medical knowledge and understanding was either misplaced, or nonexistent. People believed that pus was actually a good thing in most cases, because it was acting to release all of the bad or "evil" from the body. How can people that misunderstand so many crucial aspects of medicine and science expect to stand a chance against a plague. People of the time were barely able to handle sick people that didn't have a deadly and highly contagious disease. Hospitals were basically used as homeless shelters because doctors and physicians lacked knowledge of the treatments required to help the majority of sick individuals. If a person was sick, doctors might attempt any of their delusional treatments to help cure the patient; but when those inevitably failed, the patient had no other option than to remain in the hospital. In many cases, these patients lived in the hospitals without care because there was simply no care available; people just lived sick in these hospitals instead of actually being treated.

When the Black Death initially came into fruition and wiped out a large portion of the global population in a relatively short amount of time, the inadequacies of the scientific and medical fields became very apparent. People quickly realized during the plague, that the majority of their medical practices were ineffective and lacking in basic knowledge; therefore lacking the ability to deal with a problem of such magnitude. Obviously we have determined that medicine at this time in history was mostly useless and rarely based on facts, but the important question in researching this is, how did it change after the Black Death? People were forced to deal with a disease that they were not yet equipped to handle, but that does not necessarily mean that the Black Death resulted in an immediate and/or substantial change in medical practices.

During, and after, the time of the Black Death's initial outbreak, medicine and medical

practices remained very much the same. There were basically zero significant medical discoveries or advancements during and directly after the time of the black death, but there were some new concepts used in response. There may have been new medical concepts developed to treat the Black Death, but these concepts mostly mirrored that of their predecessors by being based on belief rather than facts and evidence. An example of one of these concepts is the emergence of the idea that a person should avoid taking hot baths because they can relax and moisten the body. When a person takes a hot bath, their body is relaxed and moistened; which by the logic of the time, meant that the person was now more susceptible to getting the disease and would also be less able to endure its effects.

This theory on taking hot baths was multifaceted. While doctors of the time would suggest most people avoid hot baths because it makes them more vulnerable to the plague, doctors would also suggest taking a hot bath to release the evil of the disease, but only if the person was strong enough or their body had grown accustomed to them. The idea of this medical suggestion is that, if a person was strong enough or their body was used to taking hot baths, then they would not be as susceptible to the disease when their skin moistened, so it would allow for the evil to be released safely. Some other medical theories that developed during the time of the Black Death involved eating and drinking. Generally, doctors would suggest minimizing eating and drinking because food and drinks were believed to be a possible cause of the plague, amongst many other things. Doctors suggested eating food that can easily be digested, therefore it would be in the system for less time and have less time to infect. Doctors also suggested eating food that enriches the blood, which would make the person stronger and more capable of fending off the disease.

Not all of the medical concepts and practices developed during the Black Death's initial outbreak were foolish. Eventually, people seemed to have deduced that the plague, at least in part, was transmitted through air. How they determined the plague's method of transmission remains a mystery, but it is probably safe to assume that it became evident over time as people witnessed infection from one person to another. This knowledge of the plague's transmission method can be seen in some of the medical concepts and practices developed during this time. One of the concepts developed in response to the plague, was the avoidance of contaminated air. Doctors would suggest that their patients avoid air contaminated by those infected with the disease because they would then be more likely to contract it.

Similarly, doctors would suggest that

patients avoid exercise. This again seems to be evidence of some basic knowledge of the plague's transmission method. It is only logical to assume that exercise makes you healthier and therefore you should exercise so that your body is better equipped to handle the disease. The doctors of the time concluded that exercise caused increased breathing which would lead to a higher chance of the disease's spread because they were aware that it was transmitted through air. Many of the medical practices used or developed during the Black Death's initial outbreak were ineffective and were not based on credible evidence. Though the inadequacies of most medical practices at this time remain true, it does appear to be evident that people had somehow determined the disease was an airborne transmit and responded accordingly, which is far better than the majority of practices and medical knowledge at the time.

**Discussion & Conclusion**

The Black Death caused physicians to realize that the majority of their field focused on the prevention of illnesses; they lacked understanding of medicine and medical treatments. The majority of medical practices were not abandoned after the Black Death's initial outbreak, but they were now understood to be insufficient. The Black Death highlighted the inadequacies of the medical field and the overall lack of scientific/medical understanding, which created an awareness of the need for a shift in focus towards medical treatments. Though there was not an immediate and/or catastrophic change in medicine and medical practices following the initial outbreak of the Black Death, there is some evidence to suggest that the shift in focus of the medical field as a result of the Black Death, led to an eventual increase in

the quality of medicine. In a 2014 research article by Sharon N. DeWitte, published in journals.plos.org, DeWitte provides data and graphs suggesting an increase in the quality of life and medical practices following the Black Death.

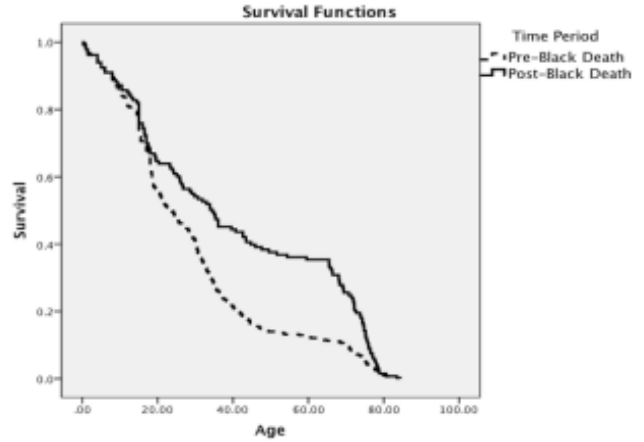


Figure 2

In Figures 1 and 2, DeWitte uses "age-at-death distributions" and "survival functions" relative to a percentage of samples from before and after the Black Death, to highlight the shift in quality of life following the plague; data that I believe indicates an increase in quality of medical care as well. To acquire the data used in Figures 1 and 2, DeWitte used graves from different London cemeteries and distributed the graves/data by age-at-death and the time period of the death. The graves used to acquire the data for pre-Black Death were from two London cemeteries, Guildhall Yard (75 graves) and St. Nicholas Shambles (246 graves), that were both dated from the 11th to 12th century. DeWitte also took another sample from St. Mary Spital cemetery (143) that is dated from 1120-1300. The graves used to acquire the data for post-Black Death were taken from St. Mary Graces cemetery (133 graves) and is dated from 1350 to 1538. According to DeWitte, "By applying Kaplan-Meier analysis and the Gompertz hazard model to transition analysis age estimates, and controlling for changes in birth rates, this study examines differences in survivorship and mortality risk between the pre- and post-Black Death populations of London" (journals.plos.org). Figure 1 depicts distributions of the age-at-death for the samples acquired from prior to and after the Black Death. The data in Figure 1 indicates that, from ages 0-50, the percentage of the sample's age-at-death was higher prior to the initial outbreak of the plague, and the age-at-death also increased after the plague for ages 50-70+. This means that the percentage of people dying prior to the Black Death's initial

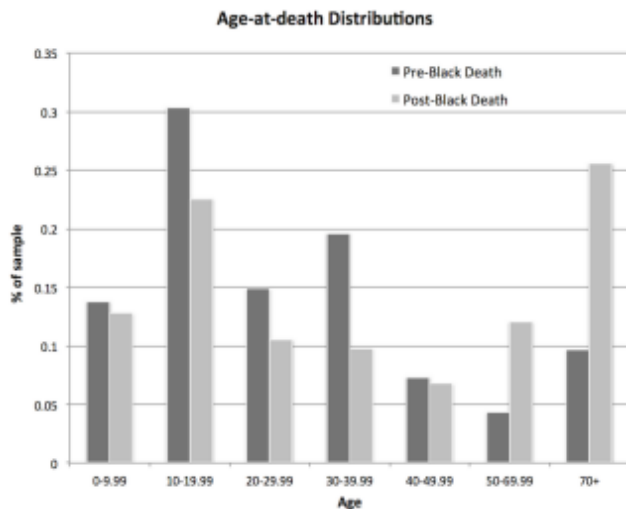


Figure 1

outbreak was higher, and that less people were dying from ages 0-50 after the plague. Though the data shows that more people were dying from ages 50-70+ after the plague, this can be interpreted as a positive because less people were dying from ages 0-50, so those people were living longer after the Black Death and therefore there was an increase in the number of deaths in that higher age range. This data appears to indicate that there was some change causing deaths to decrease at earlier stages of life following the outbreak of the plague, and I would attribute that to the realization of a necessary shift in focus for the medical field towards treatments and overall better understanding of medicine and science.

Figure 2 depicts survival functions, in relation to age, prior to and following the Black Death's initial outbreak. A survival function simply provides the probability of something surviving relative to a specific time or age. The data in Figure 2 shows that the probability of survival (survival function) was lower from around the age of 5 to 80 prior to the Black Death. This means that after the Black Death's initial outbreak had ended, the overall probability of survival, at least within this sample, was higher for these people. The fact that the probability of survival increased after the plague, seems to indicate to me some sort of change in the

culture that would result in a lower probability of death. I believe that this increased probability of survival following the Black Death, is a result of a shift in quality of medical practices and an increase in overall medical knowledge that the plague's prevalence initiated.

Overall, it appears evident to me that the Black Death did have an effect on medicine and medical practices, it just wasn't immediate or drastic. There was no new form of medicine or treatment that was discovered or developed as a result of the plague and its devastation. Instead, there was a shift in focus and a realization of the inadequacies of the medical field; a shift and realization that, in my opinion, would have most likely taken far longer to happen. Medicine prior to, and during, the Black Death was generally ineffective and based on beliefs rather than facts, all of which pretty much stayed the same following the initial outbreak of the plague. The Black Death acted as a wake-up call for physicians and people in general; they needed to have a better understanding of science, medicine, and treatments that would allow them to be better prepared for such a significant threat in the future. The Black Death affected medicine and medical practices by causing a shift in the overall focus of the medical and scientific fields.

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