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The World's Five Deadliest Diseases and the Animals Helping to Fight Them

Five diseases account for [forty percent](#) of all deaths worldwide, approximately 22 million people every year. Despite this seemingly large number, the global mortality rate has steadily declined over the past few decades, with one of the primary contributors to its descent being animal research. Through the development of vaccines and other medical procedures, animal studies have accomplished amazing things, extending and improving the lives of both humans and animals. This document explores the significant role animal research has played in pioneering treatments for each of the world's five deadliest diseases.

1. Coronary Artery Disease (Ischemic Heart Disease) – 7.4 million Deaths Annually

Without a doubt, coronary artery disease (CAD) is the world's deadliest illness. It is caused by the buildup of plaque on the walls of the coronary arteries that supply blood to the heart. This limits blood flow to the heart, weakening it, leading to heart failure or arrhythmia, an irregular heartbeat. It is the most common type of heart disease, and kills 7.4 million people annually, accounting for almost 15 percent of all human deaths.

However, the number of deaths from CAD has been [halved](#) in the thirty years between 1980 and 2010, mainly through medical advances that likely would not have been possible without animal research. Studies in dogs were key to the development of [coronary artery bypass surgery](#), which has reduced deaths from heart attacks by clearing the coronary arteries of plaque. Dogs also played an important role in the development of heart transplants by contributing to the evolution of transplant techniques and the discovery of immunosuppressive drugs such as cyclosporine, which prevent organ rejection. Finally, animal research led to the invention and widespread use of the [heart-lung machine](#), an essential device for successful heart surgery.

These discoveries do not just benefit humans - four-legged companions have also benefitted from humane animal research. [Taylor](#), a Doberman/German shepherd crossbreed, has the distinction of being the first dog to undergo open heart surgery to address a rare congenital defect, and countless other successful canine and feline surgeries have followed.

2. Stroke (Cerebrovascular Disease) – 6.7 million Deaths Annually

Strokes are caused by an interruption in blood flow to the brain. This occurs due to either a burst blood vessel (hemorrhagic stroke) or a blocked artery (ischemic stroke). Regardless,

when the brain does not receive enough oxygen and blood, its cells start to die, causing permanent damage.

More than 6 million people die from strokes annually, accounting for 12 percent of deaths globally. Despite this, there is only one established [clinical treatment](#) - tissue plasminogen activator (tPA) - which was developed through studies of stroke in rabbits. It was observed that tPA could break down blood clots blocking blood flow to the brain. Assuming the clots were dissolved soon after they first occurred, no permanent damaged was observed, demonstrating the potential benefits of tPA as a treatment for human stroke.

Animals are also helping scientists learn how to [rehabilitate](#) stroke patients, as brain cells cannot regenerate on their own. Due to their similar DNA and nervous systems, scientists study monkeys to investigate how surviving brain cells might take on new roles and functions, enabling human stroke patients to resume a normal life.

3. Lower Respiratory Infections - 3.4 million Deaths Annually

Lower respiratory infections can be the result of multiple diseases, including pneumonia, bronchitis, and influenza. The infections are caused by either a bacteria or a virus and are difficult to diagnose, but general symptoms include difficult breathing, sneezing, sore throat, and headaches. Together, they account for approximately 3.4 million deaths annually, 5.5 percent of all human deaths.

Vaccines were developed to prevent pneumococcal disease and influenza, and antibiotic and cough medicines are available to treat all three diseases. Animal research has contributed to both methods of treatment. [Ferrets](#) have played an essential role in developing the influenza vaccine because the infection behaves similarly in ferrets and humans, with comparable clinical indicators, pathology, and immunity. Furthermore, studies with ferrets, mice, dogs, and cats have contributed to the development of antiviral agents, such as oseltamivir, zanamivir and peramivir, which inhibit the influenza virus's replication. The antibiotics, cough medicines, and pain relievers used to treat pneumonia and bronchitis were also perfected through careful animal testing, as are the vast majority of medications, in order to receive approval from the Food and Drug Administration (FDA).

4. Chronic Obstructive Lung Disease (COPD) – 3.3 million Deaths Annually

Chronic obstructive lung disease (COPD) is an incurable, progressive lung disease that can take two forms – chronic bronchitis involving long term coughing, and emphysema that gradually destroys the lungs. Mainly caused by smoking and secondhand smoke in the United States, there is no cure for COPD, which kills around 3.3 million people annually.

While, by far, the best way to prevent COPD is not to smoke, its progression can be slowed down by medication. [Animal experiments](#) and studies have revealed useful counteragents such as glucocorticosteroids and bronchodilators, or 'relievers,' that bring rapid relief from symptoms. Bronchodilators also are used to treat asthma, and are commonly found in inhalers. They were developed through work with frogs in the 1930s. Further work in the 1990s in [guinea pigs helped](#) to select the reliever drugs and corresponding dosage that would be the most beneficial to individuals living with COPD.

5. Trachea, Bronchus, and Lung Cancers – 1.6 million Deaths Annually

Of all forms of cancer, respiratory cancers, including trachea, bronchus, and lung cancer, are the deadliest. They are generally caused by smoking, second-hand smoke, and environmental toxins, and kill 1.6 million people annually, representing 3 percent of all deaths globally.

[Treatment](#) depends on the size and location of the tumor, but includes surgery for large benign tumors, and chemotherapy or radiotherapy for smaller or malignant tumors that might spread to other regions of the body. All three treatments, as well as most cancer detection methods, are the results of [animal research](#), generally in mice and rats, which has extended and improved the lives of countless people.

Animals benefit from the research, too. Chemotherapy and cancer surgery for cats and dogs are commonplace, especially as household pets live longer, and are offered by most veterinary hospitals. However, because cancer is not well understood, continued animal research is essential. Only further animal studies can accurately represent the way cancer affects a whole living system, something other methods of research, such as computer modeling and cell cultures, cannot effectively demonstrate. Animal research is incredibly important to finding a cure for cancer, which is [projected](#) to surpass CAD by 2030 as the world's most-deadly disease.