



## A Sample List of Physician Collaboration Case Studies

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### ***ACE Inhibitors***

- Snake venom played a critical role in creating ACE inhibitors, which now stand among the most successful and widely used drugs in the world. ACE inhibitors have transformed the treatment of congestive heart failure and high blood pressure.

### ***Benzodiazepines***

- A chance discovery led to the development of benzodiazepines, some of the most widely prescribed drugs for the treatment of anxiety disorder and other mental health conditions.

### ***CAT Scan***

- Refusing to take “no” for an answer leads to a Nobel Prize for the creator of the CAT scan, a life-saving diagnostic tool now used 52 million times a year around the world.

### ***Cervical disc***

- A neurosurgeon imagined a device that could be implanted in the neck to replace a deteriorated disc while still allowing for normal movement between the vertebrae.

### ***Chickenpox vaccine***

- A workshop of scientists was the catalyst for the creation of a vaccine for chickenpox.

### ***Childhood pneumococcal Vaccine***

- A doctor and two colleagues set out to find a new approach for vaccine creation that eventually led to a childhood pneumococcal vaccine that saves the lives of an estimated one million children worldwide every year.

### ***Coronary stent***

- Millions of Americans who suffered from heart disease had no alternative to open heart bypass surgery until a garage experiment with metal wires resulted in a less invasive, more effective treatment for coronary artery disease.

### ***Cortisone***

- A doctor and professor from Mayo Clinic develop a compound to battle severe inflammation, a discovery The New York Times hailed at the time as a “modern miracle.”

### ***Cystic fibrosis diagnostic test strips***

- A childhood fascination with a Life magazine cover featuring an image of DNA’s double helix structure led to a career in genetics and a test for cystic fibrosis that has significantly lowered the incidence of cystic fibrosis among newborns.



### ***Deep brain stimulation***

- A French neurosurgeon and a neurologist were treating patients for tremors one day when their “Eureka moment” led to a therapy known as Deep Brain Stimulation. DBS therapy represents one of the best stories of a medical discovery that led to a unique physician-industry collaboration that benefits patients suffering from neurological diseases such as Parkinson’s disease.

### ***EEG (electroencephalogram)***

- A German physician began working on ways to measure brain electricity to better understand mental processes. His work led to the electroencephalogram, which remains the standard and most important non-invasive device for diagnosing epilepsy.

### ***Fluorouracil***

- A University of Wisconsin researcher teams up with Hoffman-LaRoche to develop fluorouracil, an important weapon in fighting cancer, particularly pre- and post-surgery for colon cancer, as well as in other cancers, including breast and certain head and neck cancers.

### ***Gleevec***

- As recently as a decade ago, chronic myelogenous leukemia patients had no good options to treat their disease – either a highly risky bone marrow transplant for which few patients qualified, or chemotherapy treatment that prolongs survival only by an average of two years, with debilitating side effects. That changed with the development of Gleevec, a pill which targets cancer cells and leaves healthy cells alone.

### ***Haemophilus Influenza Type B vaccine***

- Before a vaccine was developed, Hib was the leading cause of acquired mental retardation nationally, and the treatment of Hib-related illnesses cost the U.S. health care system over \$2 billion each year. In the United States alone, the instance of Hib-related meningitis and other diseases has been reduced by 99%, such that Hib-related infections are rarely seen today.

### ***Heart and lung bypass machine***

- In 1930, after witnessing the death of a patient from a pulmonary embolectomy, a young physician conceived the idea of a machine that could support cardiac and respiratory functions during surgical procedures to repair defects in the heart and lungs. He eventually persuaded IBM to provide him with the technical expertise needed to produce a sophisticated device.

### ***Hepatitis B vaccine***

- An accidental discovery revealed an elusive virus and led to a vaccine for Hepatitis B, a virus estimated to be 100 times more infectious than HIV. This vaccine is believed to have saved tens of millions of lives in the 30 years since its creation.

### ***Herceptin***

- A concept initially greeted with skepticism led to the novel approach of targeting a specific form of breast cancer with a genetic compound. Herceptin kills the cancer cells and decreases the risk of reoccurrence, with a 49 percent improvement in overall survival.



### ***Integrated insulin pump therapy***

- The idea for an automatic insulin pump that would replace manual insulin injections circulated among diabetes specialists for years before the first version was created in the late 1970s. The CEO of Pacesetter Systems then formed a team in 1980 to develop a wearable insulin pump in conjunction with NASA and the Applied Physics Laboratory at Johns Hopkins University.

### ***Laser eye surgery***

- A laser originally used for etching silicone computer chips in the 1970s became a tool to restore sight for over five million people worldwide. Two doctors and an IBM researcher found that the laser could remove biologic material without causing heat damage to the neighboring material.

### ***Measles vaccine***

- A vaccine against one of the most contagious diseases known to man is created in a partnership between a celebrated virologist and researchers at Merck. An estimated 110 million lives have been saved in the 50 years since the measles vaccine.

### ***Mumps vaccine***

- A researcher developed a vaccine for mumps from the illness of his own five-year-old daughter. The vaccine has become one of the most widely used in the world, with over 500 million doses distributed worldwide.

### ***Negative wound pressure therapy***

- Two plastic surgeons discovered that treating hard-to-heal wounds with sub-atmospheric pressure in a localized vacuum showed promising results. They teamed up with a leader in wound management therapies to create new technologies that have dramatically improved chronic wound care and healing.

### ***Neupogen***

- Researchers cracked the code of white blood cell production and developed a compound that allows cancer patients to better withstand chemotherapy treatments. Neupogen has revolutionized the way cancer patients are treated.

### ***Oral Contraceptives***

- A pioneer and activist team up with a renowned biologist to achieve one of the 10 greatest public health accomplishments of the 20th century.

### ***Pacemaker***

- In the 1950's, external heart pacemakers existed to help regulate heart rhythm, however they were bulky, relied on external electrodes, and had to be plugged into a wall outlet. The co-founder of medical device manufacturer Medtronic, collaborated with a pioneer in open heart surgery at the University of Minnesota Medical School to develop a wearable, external, battery-powered pacemaker.



### **Penicillin**

- A professor of bacteriology in London returned from a holiday to find an unusual mold growing in a petri dish. The zone immediately around the mold was clear, as if the mold had secreted something that inhibited bacterial growth. Researchers at Oxford University helped turn the discovery from a laboratory curiosity into a life-saving drug, and launch the age of antibiotics.

### **Polio Vaccine**

- Polio had been around since the beginning of human history as a source of childhood paralysis. But it wasn't until the 1950's that two March of Dimes grantees took separate routes to find the cure that has all but eliminated polio in the United States and most of the world.

### **Prostate specific antigen (PSA) screening test**

- Scarcely a quarter century ago, the diagnosis of prostate cancer was the equivalent of a death sentence, since only 4% of prostate cancers diagnosed were curable, and there was no easy way to detect the disease in an early state in men. A team of 20 scientists successfully located a prostate-specific antigen, and in partnership with the biomedical industry testing kits were developed that have now been administered more than 1 billion times worldwide.

### **Recombinant Factor VIII**

- In the early 1980s, a small group of scientists in the San Francisco Bay Area teamed up with the young biotechnology company Genentech with the aim of discovering a way to make a blood treatment without using donated blood plasma. They were motivated by the added urgency of the recent discovery of a deadly new disease called HIV-AIDS that could be transmitted through contaminated blood plasma. Recombinant Factor VIII has virtually eliminated the transmission of HIV-AIDS and hepatitis through blood donations.

### **Starr Edwards Heart Valve**

- A retired engineer with a passion and a garage-laboratory collaborated with a young surgeon to develop a mechanical device to replace the heart's natural valves. Once considered a "mystery killer," heart valve disease, which affects more than five million Americans, is now routinely treatable.

### **Statins**

- Building on the earlier work of a Japanese biochemist, the chief scientist and later CEO of Merck developed the first cholesterol-lowering statins from a fungus. In the quarter-century since they were developed, statins have lowered the cholesterol and extended the lives of millions of people around the world.

### **Swan-Ganz Catheter**

- Watching sailboats off the coast of California led a doctor to begin work with a medical device company to eventually create a catheter that for the first time allowed doctors to determine exactly how much blood to give trauma patients, monitor their overall blood flow, and confirm other diagnoses such as heart failure.



### **Total Knee Replacement**

- Little more than a quarter-century ago, people suffering from arthritis of the knee and other debilitating joint conditions were forced to accept a difficult truth: for the remainder of their lives the best any doctor could do was minimize their pain. Today, through the work of pioneering orthopedic surgeons and a leading medical device maker, new knee replacement technology has transformed the lives of millions of people, who are up and walking hours after surgery.

### **Transcatheter Aortic Valve Implantation**

- A pioneering cardiologist teamed up with a small company to invent a device that was “nothing less than transformational,” by providing a therapeutic solution for a very large number of elderly patients with aortic stenosis who were not good candidates for traditional open-heart surgery, due to their age and condition.

### **Ultrasound/Echocardiogram**

- Researchers harnessed a military technology to develop a simple diagnostic device that is used painlessly to detect and analyze not only diseases of the heart, but just about every major medical condition involving soft tissue.

### **Vacuum-Assisted Breast Biopsy**

- While breast mammograms have significantly lowered the death rate from breast cancer, mammograms don't always give a complete picture. Biopsies required an invasive surgical procedure several hours in length, involving high costs and often producing substantial physical scars. That changed when a doctor and inventor founded a company to develop a device that allows for quick, multiple captures of breast tissue for biopsies through a very small incision, leaving women with hardly a scar and almost immediate recovery.