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| These discoveries saved billions of lives | | | |
| Toilets, blood transfusions and vaccines are each credited with saving 1 billion lives. | | | |
| What were the major innovations that made the last century so very fruitful in saving lives? IMPORTANT BREAKTHROUGHS What were the major innovations that made the last century so very fruitful in saving lives?  Today’s infographic from AperionCare highlights the top 50 breakthroughs, ranging from pasteurization to the bifurcated needle, that have helped propel global life expectancy upwards.  Interestingly, while many of these innovations have some linkage to the medical realm, there are also breakthroughs in sectors like energy, sanitation, and agriculture that have helped us lead longer and healthier lives.  [Research Overview - David Geffen School of Medicine - Los Angeles, CA](https://medschool.ucla.edu/research-overview) | Life Expectancy Arij Wesleti  For most of civilized history, life expectancy fluctuated in the 30 to 40 year range.  Child mortality was all too common, and even for those that made it to adulthood, a long and healthy life was anything but guaranteed. Sanitation was poor, disease was rampant, and many medical practices were based primarily on superstition or guesswork.  By the 20th century, an explosion in new technologies, treatments, and other science-backed practices helped to increase global life expectancy at an unprecedented rate. From 1900 to 2015, global life expectancy more than doubled, shooting well past the 70 year mark.  Timeline of innovations affecting life expectancy | | |
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| WILL TO LIVE | | | |
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**ARIJ WESLETI**

From a clinical standpoint, medicine today has evolved from the medicine of 50 years ago. While you might debate whether being a doctor in 1970 was better or worse than it is today it’s undeniable that the quality of medical care has never been better. New vaccines, pharmaceuticals, surgical breakthroughs, and medical imaging, among myriad other developments, have improved patient outcomes and quality of life.

The pace of medical change

Perhaps as a byproduct of the information age, we tend to think that the advancements of the last 50 years have been the most impactful. But according to Podolsky, developments in the previous half-century were more radical.

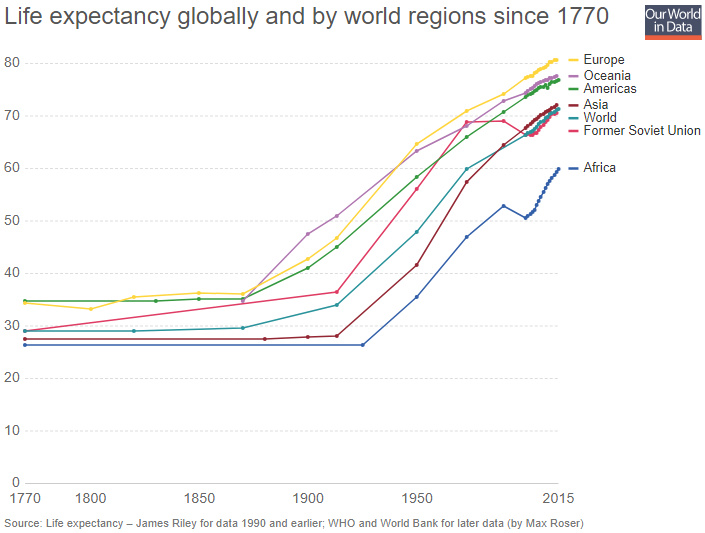
“Medicine in 2020 is much closer to medicine in 1970 than medicine in 1970 was to medicine in 1920,” he says.

From 1920-1970, American physicians saw the advent of private insurance, as well as Medicare and Medicaid. Throw major pharmaceutical breakthroughs into the mix, such as antibiotics, antihypertensives, antidepressants, antipsychotics, and steroids, and you have radical transformation.

“The whole pharmaceutical revolution really happens after World War II,” Podolsky says. “The advance of the randomized control trial as the arbiter of therapeutic efficacy happens between 1920 and 1970. I write a lot about medical history in 1970, and I can say that it looks similarly to how it looks today. But there are still important differences.”

Those important differences, Podolsky says, include additional antimicrobials, the practice of medicine itself, diagnostics, treatment, the advent of professionalism and bioethics, and understanding the risk factors and burden of disease. We’ll get into each of these.

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| The breakthroughs that are credited with saving the most lives? Toilets, synthetic fertilizers, blood transfusions, the green revolution (also known as the “Third Agricultural Revolution”), and vaccines are each credited with saving 1 billion lives. Meanwhile, pasteurization, water chlorination, antibiotics, antimalarial drugs, and the bifurcated needle have saved hundreds of millions of lives each.  There are also some unusual entries to the list.  It turns out that satellites have actually saved 250,000 lives, thanks to the ability to better forecast natural disasters. Nuclear power also gets a shout out – and it may surprise some people that nuclear energy is the [least deadly form of energy](https://www.forbes.com/sites/jamesconca/2012/06/10/energys-deathprint-a-price-always-paid/) per kilowatt generated. | |
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| |  |  | | --- | --- | | **ARIJ WESLETI** | | | Progress in Life Expectancy For a graphical look at how this all has impacted life expectancy, the following chart from [Our World in Data](https://ourworldindata.org/life-expectancy) makes a very clear case:  The impact from these new technologies was first experienced in Europe at the end of the 1800s – and other continents quickly saw the benefits thereafter.  Medical Technologist Degrees | All Allied Health SchoolsImpressively, Africa has now passed the 60 year mark in life expectancy, with numbers still rising. Technology It also helps that physicians today are armed with numerous technological advances.  Seeing is believing. MRI, CT scan, and ultrasound have all been transformative, Podolsky says.  “Some would say they have degraded physicians’ physical exam skills,” Podolsky says. “There are certainly unintended side effects such as this, or the radiation involved with CT, or a bunch of incidental findings that we never wanted to know about. But nobody wants to go back to a time when we didn’t have these three modalities.”  Technological advances aren’t just confined to imaging. Surgical patients and surgeons themselves have benefited. | |  |  | | | |



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| 4 great medical discoveries that were purely accidental “One sometimes finds what one is not looking for.”‑sir Alexander Fleming | |
| Arij Wesleti  Scientists may have made a giant leap forward in the treatment of cancer – by accident.  A team of Danish researchers, looking for a way to protect pregnant women against malaria, found that proteins in the malaria parasite can attack cancer cells. The discovery is a potential game-changer in the hunt for a cure for cancer.  The scientists from the University of Copenhagen found that malaria proteins, armed with a toxin, sought out and absorbed cancer cells, released the toxin and then destroyed the cells. The tests were carried out on mice, but the team plans to start testing on humans within four years.  “For decades, scientists have been searching for similarities between the growth of a placenta and a tumor,” Ali Salanti, a professor in the department of immunology and microbiology at the University of Copenhagen, said in a press release. “The placenta is an organ, which within a few months grows from only few cells into an organ weighing [approximately] 2 pounds, and it provides the embryo with oxygen and nourishment in a relatively foreign environment. In a manner of speaking, tumors do much the same – they grow aggressively in a relatively foreign environment.”  If the discovery lives up to its promise, it wouldn’t be the first time a monumental medicinal discovery was made by accident. Here are four more. | ****Penicillin**** On returning to his lab after a month-long holiday in 1928, Scottish doctor Alexander Fleming discovered that a culture of the bacteria staphylococcus aureus, which he had been experimenting with, had been destroyed by a mould growing in his petri dishes. Fleming had discovered the first antibiotic, which he called penicillin. The drug has saved countless lives and Alexander Fleming was awarded the Nobel Prize for medicine in 1945. The implantable pacemaker Wilson Greatbatch invented the implantable pacemaker – but he didn’t mean to. The American engineer, a lifelong inventor, was attempting to build a device that recorded heart rhythms, but after he mis-assembled the contraption, he noticed that it was giving off a heartbeat-like pulse. Greatbatch realized that this could be used as a pacemaker, only a much smaller one than previous models. After two years of refinements, his design was patented in 1960 and soon went into production. Warfarin The blood-thinner, or anticoagulant, was discovered in the 1930s by American biochemist Karl Paul Link. The scientist was approached by a Wisconsin farmer whose cattle were experiencing unexplained haemorrhages. Examining the cattle’s feed, Link discovered that it contained the anticoagulant substance. Link was able to isolate a compound in what is now known as warfarin that could treat patients suffering from blood clots, and it’s still in use today. Nitrous oxide Nitrous oxide, or laughing gas as it’s often called, was discovered in 1772 by English clergyman and scientist Joseph Priestly (the man who also the first to isolate oxygen, carbon monoxide and carbon dioxide). Priestly found that putting iron fillings into nitric acid released the gas, which had anti-panic properties. But it wasn’t until the 1840s when forward-thinking doctors and dentists began experimenting with it as a tranquilizer. In between, it had mainly been used as a mood enhancer at parties, and had gained a reputation as something of a recreational drug. |
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