

THEN. NOW. IMAGINE.

AN A-TO-Z LOOK AT DISEASES, CONDITIONS, AND
DISORDERS THAT IMPACT OUR LIVES



OCTOBER 2021



This report is a collaboration between **Research!America** and the **Lasker Foundation**, organizations committed to advancing and advocating for research to improve human health.

In this report, we reflect on where we've been, where we are now, and the kind of future we can imagine with continued medical research.

All information originates from Research!America's "**Investment in Research Saves Lives and Money**" fact sheet series. To view the fact sheet associated with a given section, simply click the title.





INTRODUCTION

Medical research saves lives. Thanks to scientific breakthroughs, new options for prevention and treatment of illness are available to patients around the globe. Patients now have more hope for a healthy life. People with diabetes can manage their diseases with diet, oral medications, or insulin; childhood leukemia survival rates have improved to exceed 80%; and HIV has evolved from a "death sentence" to a chronic illness with multiple treatment options.

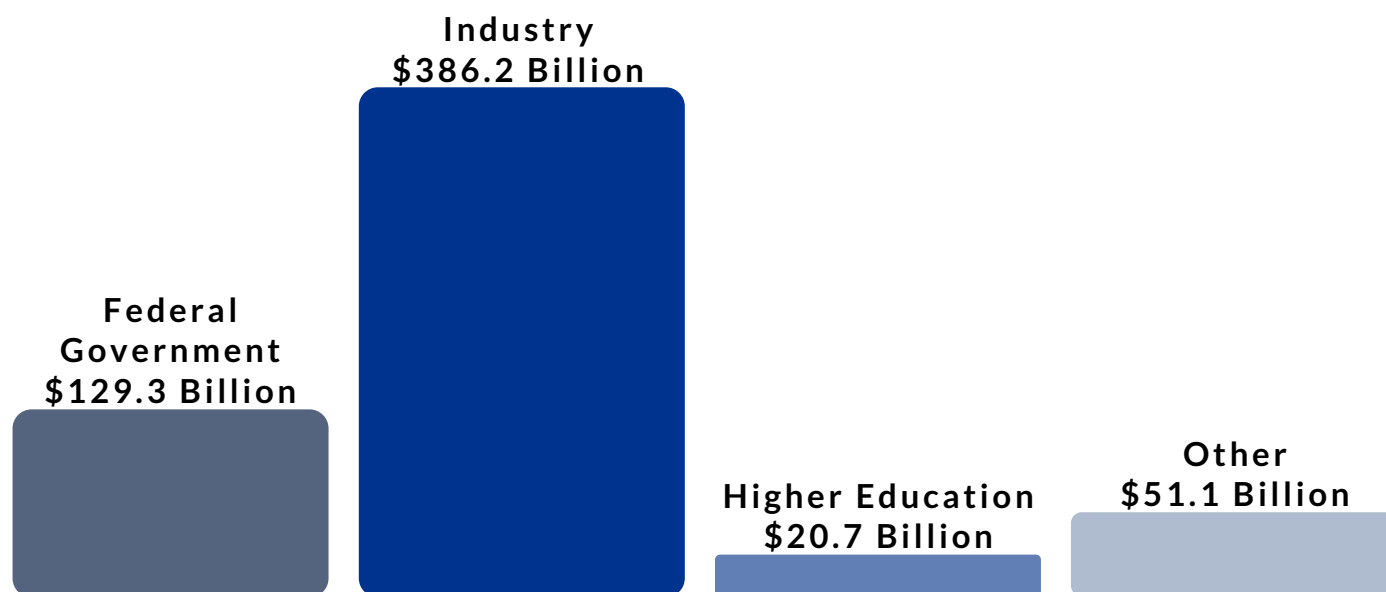
The power of science is immense. Consider that the deadly scourge of smallpox was eradicated with a vaccine and that cervical cancer can now be prevented with the HPV vaccine. Artificial heart valves can restore cardiac function, and artificial joints allow arthritis sufferers to resume their daily activities. Cataract surgery allows people to see, and cognitive behavioral therapy can successfully restore mental health for many.

But big challenges remain. Patients are urgently awaiting further advances. Finding the answers they need requires sustained increases in research investment. From supporting science education to funding for research labs to incentivizing innovative partnerships, investment in medical research has profound impacts — preventing disease, producing cures, and improving quality of life. Medical research shapes the well-being of our world.

This report provides an overview of 60 diseases and conditions impacting people around the globe, emphasizing the myriad ways in which medical science has improved outcomes today and holds the tantalizing potential for further progress in the decades ahead. It recalls past realities of untreatable diseases, illuminates the medical triumphs that allow for better outcomes now, and imagines how biomedical research might pave the way for healthier lives tomorrow.

RESEARCH FUNDING U.S.

R&D Funding by Source (2018)¹



NSF², NIH, FDA, CDC, and AHRQ³ FY20 Funding

\$40.3 Billion

1. National Patterns of R&D Resources: 2017-2018 Data Update.

<https://nces.nsf.gov/pubs/nsf20307#data-tables>

2. Research Spending and Results. Accessed May 2021. research.gov

3. Federal RePORTER. federalreporter.nih.gov



HEALTHY AGING

- More than **1 in 6** Americans are 65 or older. The Census estimates that **1 in 5** Americans will be 65 or older in 2050.
- The annual cost for a private room in a nursing home is **\$92,376**, a cost that is often not covered by Medicare.
- Researchers have identified **59 genes** that might modulate the aging process. These results suggest potential targets for therapeutics that enhance healthy aging.

ALLERGIES

- In 2018, **19.2 million** adults in the U.S. were diagnosed with allergic rhinitis, known as hay fever.
- The cost of annual medical expenses due to allergies in the U.S. is **\$18 billion** as of 2018.
- During allergen-specific immunotherapy, small doses of an allergen are administered to a patient over time so that the immune system becomes less sensitive to the presence of that allergen. One randomized controlled trial showed a **30%** decrease in seasonal allergy symptoms after receipt of allergen-specific immunotherapy.



ALOPECIA AREATA

- **147 million** people worldwide are affected with alopecia areata, including **6.8 million** in the U.S. who have experienced the autoimmune disease in their lifetime.
- In a survey of 675 patients, nearly **60%** said that the disease has placed a moderate to severe financial burden on their lives.
- Molecular pathways involving Janus kinase (JAK) enzymes are often disrupted in patients with alopecia areata. Clinical trials have shown that JAK inhibitors can reverse the effects of alopecia areata.

ALZHEIMER'S DISEASE

- An estimated **5.8 million** Americans are living with Alzheimer's. Between 2000 and 2017, deaths from the disease increased **145%**.
- Each year, over **16 million** Americans contribute nearly **18.5 billion** unpaid hours caring for people with Alzheimer's. This care is valued at over **\$230 billion**.
- There is a strong pipeline of therapeutic candidates for Alzheimer's. As of May 2019, there were **517** active clinical trials.

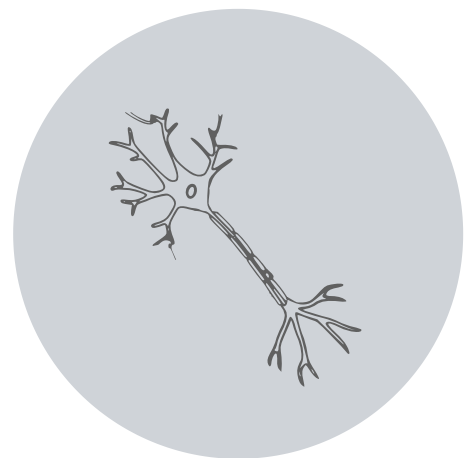


AMYLOIDOSIS

- Amyloidosis is a group of diseases that involve the buildup of amyloid deposits, which progressively damage and impair tissues and organs. All types of amyloidosis combined affect almost **200,000** Americans.
- In 2015, average annual health care costs for patients with AL amyloidosis (one of the most common types) totaled **\$114,030**.
- The first therapeutic treatment for hereditary amyloidosis symptoms was approved by the FDA in 2018. The treatment is based on RNA interference.

AMYOTROPHIC LATERAL SCLEROSIS (ALS)

- As many as **30,000** Americans may be living with ALS. **90%** of ALS cases are considered "sporadic," meaning the disease occurs at random with seemingly no inherited link or cause.
- Per patient, health care costs associated with ALS can range from **\$16,000** to **\$200,000** each year.
- A gene called *STMN2*, which helps cells regenerate, is a promising therapeutic target for treating ALS cell damage.



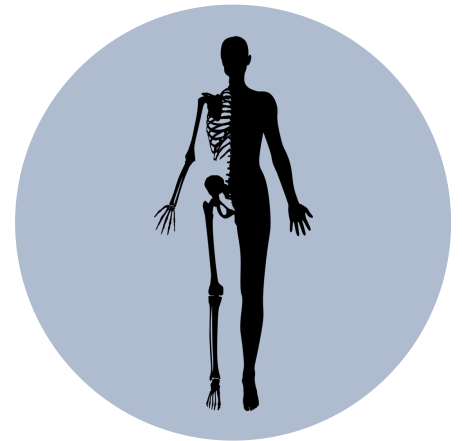
ANTIMICROBIAL RESISTANCE (AMR)



- Almost **3 million** Americans get an antibiotic-resistant infection every year. In most cases, these infections require longer hospital stays, more follow-up doctor visits, and costly alternative drugs.
- Between 2014 and 2050, the global cost of antimicrobial resistance is expected to total **\$100 trillion**.
- Vaccines are a powerful tool against drug-resistant infections. Because they prevent rather than treat diseases, they decrease our use of antimicrobials and our need for new ones.

ARTHRITIS

- By 2040, it is estimated that **78 million** American adults will have arthritis due to the increasing and aging population.
- Total health care costs are **three times** higher for Medicare patients with rheumatoid arthritis compared to other Medicare patients.
- Research has demonstrated that treating arthritis earlier can slow or prevent its progression and improve patient outcomes. New imaging techniques are being developed that could allow for the earlier detection of various types of arthritis.



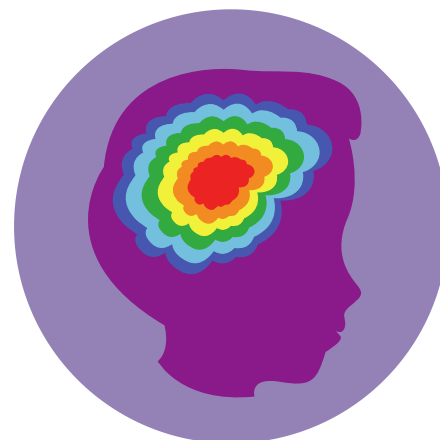
ASTHMA

- More than **26 million** Americans have asthma. Asthma is the third leading cause of hospitalization among children under 15 years of age.
- The annual national cost of asthma is **\$81 billion**.
- Many asthmatics use corticosteroids to ease symptoms. A clinical trial found that an antibody called dupilumab reduced oral corticosteroid use while decreasing the rate of severe asthma symptoms.



AUTISM

- Autism Spectrum Disorder (ASD) affects roughly **1 in 59** children in the U.S. and affects **four times** more boys than girls.
- By 2025, the estimated annual cost of caring for Americans with ASD is expected to reach **\$461 billion**.
- A 2018 study found that both deleted and duplicated DNA sequences in the human genome may predispose children to ASD. The discovery was made by analyzing more than **9,000** genomic sequences from families affected by ASD.



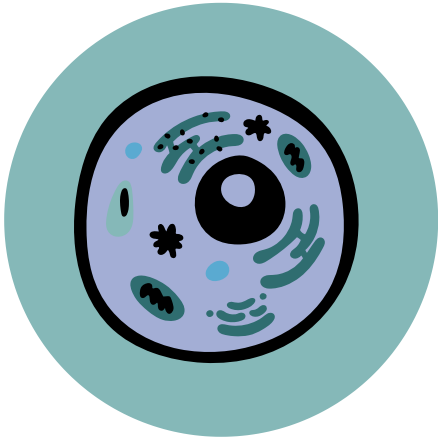
BREAST CANCER

- **1 in 8** women will be diagnosed with breast cancer in her lifetime.
- **98%** of uninsured and **41%** of insured women refuse or delay breast cancer treatment due to cost, according to a survey of U.S. patients with metastatic breast cancer.
- Trastuzumab (Herceptin), approved in 1998 for metastatic breast cancer and 2006 for early breast cancer, can slow or stop the growth of breast cancers containing elevated levels of a protein called HER2.

BURNS

- The number of burn-related deaths has declined by over **50%** in the last 40 years. Today, **96.7%** of patients treated in burn centers survive.
- The average cost of burn-related hospital stays is **\$24,000**, which is twice the average cost of all other hospital stays.
- Patients who received the amino acid glutamine intravenously after a burn injury were **three times** less likely to have bacterial infections. The treatment also significantly reduced mortality.



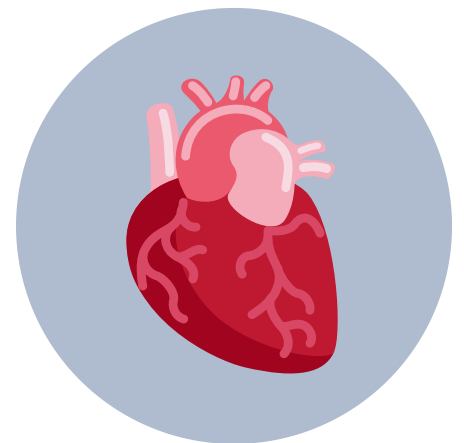


CANCER

- Cancer is the second leading cause of death in the U.S. with an estimated **1,670** deaths each day in 2018 alone.
- Smoking cessation programs, if offered by every state, could save the U.S. **\$711 million** in costs associated with the treatment of cancers linked to tobacco use.
- Cancer research is advancing in extraordinary ways. For patients with chronic myeloid leukemia, a molecular therapy known as imatinib (Gleevec) has nearly tripled the five-year survival rate.

CARDIOVASCULAR DISEASE

- In the U.S., approximately **1 in 3** deaths are caused by cardiovascular disease.
- By 2035, the cost of treating cardiovascular disease in the U.S. is expected to exceed **\$1 trillion**.
- Research has found that for every **\$1** spent on community-based health education interventions that include weight loss, medication adherence, and medical screening — the primary prevention strategies for cardiovascular disease — **\$5.60** in health care costs and lost productivity is recouped within five years.



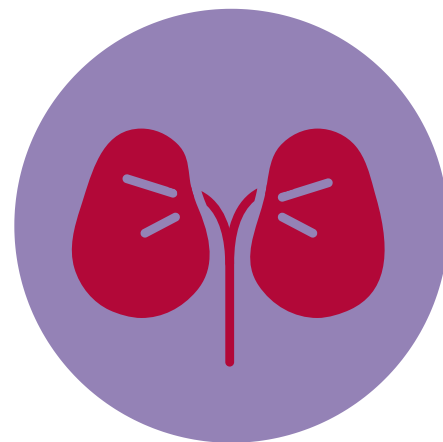
CELIAC DISEASE

- **1** out of **133** Americans has celiac disease.
- Celiac patients are estimated to have **two to four times** greater health care costs than those without celiac disease.
- While there are currently no FDA-approved treatments for celiac disease, a clinical trial is currently underway examining the compound larazotide acetate as a potential therapy for the symptoms of celiac disease if taken prior to consuming gluten.



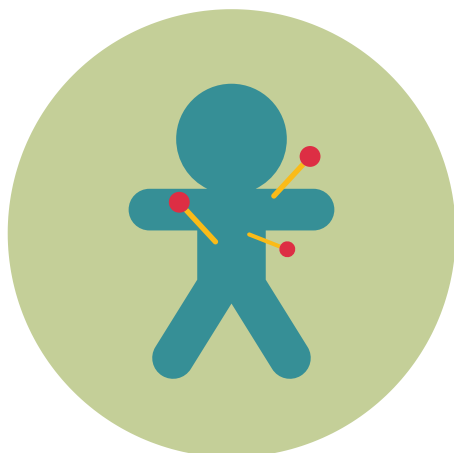
CHRONIC KIDNEY DISEASE

- Every **24 hours**, approximately **340** people in the U.S. begin dialysis treatment for kidney failure.
- Medicare costs for people with all stages of chronic kidney disease in 2016 totaled **\$114 billion**.
- Researchers have explored the effects of low-protein diets in patients with chronic kidney disease. In a study of **122** patients, those on low-protein diets spent fewer days in the hospital compared to those on normal diets, and these diets also have the potential to postpone the start of dialysis by **six months**.



CHRONIC PAIN

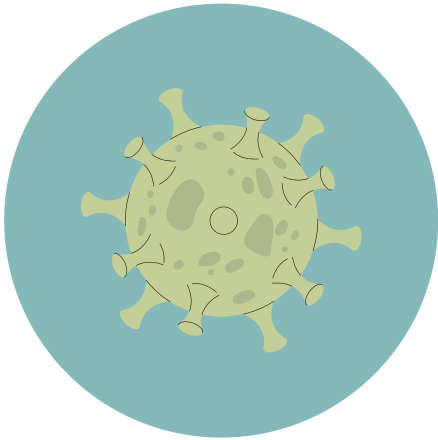
- **19.6 million** American adults live with high-impact chronic pain, or chronic pain that limits at least one major life activity. Of those, **one third** have difficulty with self-care activities such as getting dressed.
- The total annual financial cost of pain to the U.S. is **\$635 billion**.
- A 2017 study found that patient access to a prerecorded virtual therapist via interactive voice response-based cognitive behavioral therapy (IVR-CBT) resulted in similar improvements in chronic pain management as in-person therapy, highlighting the potential role of telemedicine in treating chronic pain.



CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

- Over **16 million** Americans have been diagnosed with COPD, and nearly a quarter of those diagnosed have never smoked.
- The predicted 2020 national medical costs attributable to COPD amount to **\$49 billion**.
- The COPDGene Study, which began in 2009, has yielded numerous discoveries, including potential genetic indicators, relationships with other diseases like asthma, and the impact of factors like age, race, and sex.





COVID-19

- COVID-19 patients with underlying conditions such as heart disease, diabetes, and chronic lung disease are **12 times** more likely to die.
- The average cost of hospital care for an uninsured COVID-19 patient in the U.S. is **\$78,000**.
- Laboratory engineered antibodies, or monoclonal antibodies, that mimic the immune system's ability to fight infection may help patients with mild to moderate COVID-19. Emergency Use Authorizations have been granted for select monoclonal antibodies.

CROHN'S AND COLITIS

- It is estimated that Crohn's disease and ulcerative colitis affect approximately **3.1 million** Americans.
- The annual direct cost of care, including hospitalizations, prescription drugs, and other health care services, for patients with inflammatory bowel disease (IBD) is **\$22,987**, compared to the **\$6,956** for non-IBD patients.
- In 2019, researchers found **two** drugs — adalimumab (Humira Pen) and vedolizumab (Entyvio) — were as effective as the standard ulcerative colitis drug infliximab (Remicade) in patients who became unresponsive to infliximab, showing promise for expanded treatment options.



CYSTIC FIBROSIS (CF)

- More than **30,000** Americans live with CF.
- In the U.S., the annual cost of medical expenditures for individuals living with CF is **\$131,000**.
- Since the discovery of the CF gene **30 years** ago, research has led to the creation of **13 drugs**.

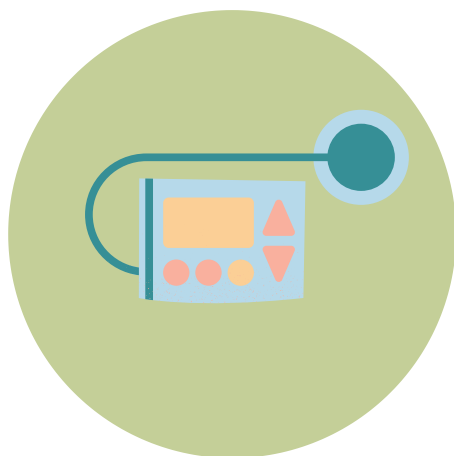
DEPRESSION

- **17.3 million** Americans, or **7.2%** of the adult population, had at least one major depressive episode in 2017.
- Individuals living with treatment-resistant depression spend an average of **\$9,917** more per year on health care than those without depression.
- Cognitive Behavioral Therapy is an available treatment for depression. Research has shown that individuals who received **12 to 18 sessions** were twice as likely to enter remission lasting more than **three years**.



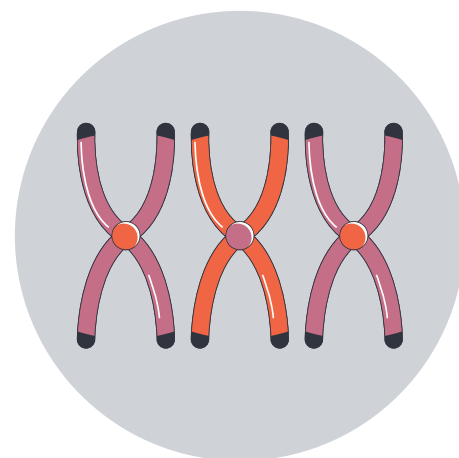
DIABETES

- Diabetes was the **7th** leading cause of death in the U.S. in 2016.
- The cost of diabetes in 2017 was **\$327 billion**. This number includes **\$237 billion** for direct health care costs and **\$90 billion** for indirect costs such as lost productivity and premature death.
- Research has led to the development of small, wearable pumps that improve insulin delivery. These medical devices provide better control over blood glucose levels leading to better health, fewer diabetic conditions, and fewer costly hospital visits.



DOWN SYNDROME

- **One out of 700** infants born in the U.S. has Down syndrome.
- On average, parents of children with Down syndrome pay an additional **\$84** per month for out-of-pocket medical expenses compared to parents of children without Down syndrome.
- Due to ongoing research efforts, increased access to care, and improved medical care, the current average lifespan for those with Down syndrome in the U.S. is **60 years**.



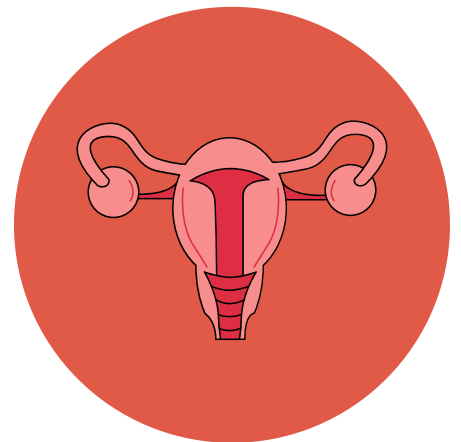


EATING DISORDERS

- Anorexia nervosa has one of the highest mortality rates of any mental illness.
- Average annual health care costs of American adults with an eating disorder are **\$5,779**, compared to **\$3,910** for the general population.
- One year after finishing therapy, adolescents participating in family-based treatment had a **49%** rate of remission, compared to **23%** for those who received "adolescent-focused individual therapy."

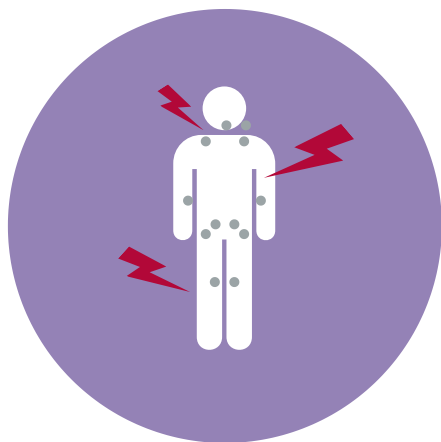
ENDOMETRIOSIS

- Endometriosis, a major cause of female infertility, affects at least **11%** of women in the U.S.
- The average individual cost to treat endometriosis is **\$13,670**, and total annual health care expenditures for endometriosis are estimated at **\$69.4 billion** in the U.S.
- One study found that a protein called galectin-3 (Gal-3) has a role in the growth of endometriotic lesions and that treatment with Gal3C, which inhibits Gal-3 production, reduced development of these lesions.



EPILEPSY

- Epilepsies affect **3.4 million** people in the U.S. and **65 million** people worldwide.
- The global estimate for lost economic welfare due to epilepsies in 2016 alone totaled **\$647.4 billion**.
- A gene called SCN has mutations linked to multiple types of epilepsies and intellectual disabilities. Modern DNA sequencing techniques are facilitating targeted therapy development.



FIBROMYALGIA

- Approximately **6 to 12 million** people in the U.S. are living with fibromyalgia, a condition that causes pain, sleep problems, stiffness, fatigue, and often emotional and mental distress.
- It costs **\$12 to \$14 billion** per year to treat fibromyalgia in the U.S.
- Researchers are using a technique known as vibrational spectroscopy to identify proteins or molecules linked to fibromyalgia that could help diagnose and treat patients.

FOOD ALLERGIES

- Between 2007 and 2016, treatment for severe food allergy reactions increased by over **400%**. During that time, laboratory service costs for diagnosing those reactions grew by over **5,000%**.
- The most recent estimate of the annual economic burden of food allergies in the U.S. is **\$24.8 billion**.
- Researchers have developed a molecule that blocks interaction between the immune system and allergy-causing proteins in peanuts, effectively "hiding" peanuts from the allergic person's immune system.



FRIEDREICH'S ATAXIA (FA)

- Friedreich's Ataxia is a genetic neurodegenerative disorder that affects **1 in 50,000** people in the U.S. Most individuals lose the ability to walk **10 to 12 years** after the onset of symptoms.
- The average annual cost to FA families in the U.S. is **\$118,000**.
- FA is caused by silencing, or "turning off," of the *FXN* gene, leading to severe reduction of the frataxin protein. Advances in gene therapies show promise for repairing or replacing the broken *FXN* gene.

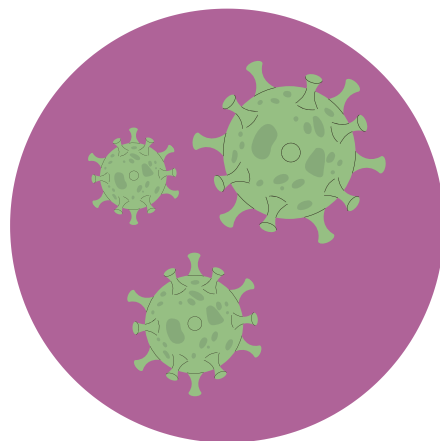


HEALTH DISPARITIES

- Latinx people in the U.S. are **three times** less likely to have health care coverage than the majority of the U.S. population, while Black Americans are **77%** more likely to develop diabetes compared to white Americans.
- One study found that transgender adults are **48%** more likely to have suicide ideation compared to heterosexual adults, highlighting the mental health disparities that LGBTQ+ populations face.
- The direct cost savings to medical care spending if health disparities were eliminated is estimated at **\$230 billion**.

HIV/AIDS

- About **1.1 million** Americans are currently living with HIV. **One in 7** do not know they have it.
- The annual cost of HIV antiretroviral treatment for an American patient is estimated at **\$28,861–\$40,804**.
- Scientists recently discovered a rare mutation in a receptor called CCR5 which essentially protects people from the virus. Now, researchers are exploring the development of HIV drugs or therapies that mimic this mutation.



INFECTIOUS DISEASES

- Globally, infectious diseases are a leading killer of infants and children under the age of 5.
- The medical cost savings if the U.S. could reduce health care-associated infections by 70% is estimated at **\$25–31 billion**.
- Insights on the biology of hepatitis C virus have led to the development of new drugs with cure rates of **95–99%**, compared to treatments prior to 2010 that were **40–50%** effective.



INFLUENZA

- The 2017–2018 flu season, the most severe in decades, resulted in the death of over **80,000** Americans.
- The average annual economic burden of flu in the U.S. is **\$11.2 billion**, including direct medical costs, loss of productivity, and other indirect impacts.
- The FDA recently approved baloxavir marboxil (Xofluza), the first truly novel antiviral flu treatment authorized in over **two decades**. Baloxavir marboxil stops the flu virus from multiplying in the body.

LUPUS

- An estimated **1.5 million** Americans — mostly women — have lupus, a chronic, inflammatory autoimmune disorder.
- Nearly **half** of employed lupus patients lost their jobs over a 13-year period.
- Approved by the FDA in 2011, belimumab (Benlysta) is the first medication specifically designed to treat lupus. It can significantly limit the organ damage that frequently accompanies the condition.



MATERNAL HEALTH

- Over **50,000** women a year in the U.S. experience severe maternal health issues.
- The annual maternal health care costs associated with preeclampsia — a leading cause of maternal morbidity and mortality — totals **\$2.18 billion**.
- A "sonographic short cervix," when a mother's cervix is shorter than normal, is a leading predictor of spontaneous preterm birth. Researchers have discovered that administering the hormone progesterone in these cases reduces preterm births by **45%**.



MENINGITIS

- In 2006, there were more than **72,000** meningitis-related hospitalizations in the U.S.
- The average inpatient expenditures for a patient hospitalized with meningitis are **\$36,891**.
- Researchers determined that serum procalcitonin can help providers distinguish between bacterial and viral meningitis. This tool holds potential for confirming bacterial meningitis and reducing the inappropriate prescription of antibiotics for viral meningitis.

MIGRAINE

- In 2015, **20%** of adult women and **9.7%** of adult men reported having a severe headache or migraine attack in the past three months.
- The direct and indirect costs of migraine totaled **\$36 billion** in 2016.
- In 2019, research efforts resulted in FDA approval for a new class of drugs that block a particular molecule which, if left unblocked, can worsen migraine attacks. This is the first new class of drugs specifically developed for migraine prevention in more than **50 years**.



MULTIPLE SCLEROSIS (MS)

- MS affects nearly **1 million** adults in the U.S. and is **two to three times** more common in females compared to males.
- Individuals with MS have annual direct health care costs that are **\$24,327** higher than the general population.
- Although there are currently no cures available for MS, the FDA has approved disease-modifying therapies, including monoclonal antibodies and chemically modified proteins, that delay the progression of disability and limit the severity and frequency of clinical relapses.

NEGLECTED TROPICAL DISEASES (NTDs)

- Globally, more than **1 billion** people are infected with one or more NTDs.
- Most NTD treatment packages are estimated to cost less than **50 cents** per person, per year.
- Mass drug administration — treating an entire at-risk population to prevent people from getting sick and stalling the spread of the disease — has significantly reduced the burden of disease since the early 2000s, decreasing the lost years of healthy life due to NTDs by up to **46%**.



NEWBORN SCREENING

- More than **98%** of babies born in the U.S. are screened.
- Most screenings cost **\$100** per newborn and screening is performed regardless of the parents' health insurance status or ability to pay.
- One observational study between 2007 and 2013 found that there was a **33.4%** decline in infant deaths from critical congenital heart disease in eight states with mandated screening policies compared to states without mandated screening policies.

OBESITY

- Obesity-related conditions are some of the leading causes of preventable, premature death, including heart disease, stroke, Type 2 diabetes, and certain types of cancer.
- The annual health care costs of obesity-related illnesses total approximately **\$109.2 billion**.
- Groundbreaking research has been conducted on the role of gut bacteria and how it can affect obesity, energy metabolism, and digestion, pointing to promising therapeutic avenues for obesity and disease.





OSTEOPOROSIS

- Approximately **50%** of women over the age of 50 will experience an osteoporotic fracture.
- Total direct medical costs of osteoporotic fractures in 2018 were **\$48.8 billion**. By 2040, that number is expected to increase to **\$81.5 billion**.
- Osteoporosis medications, such as the class of drugs bisphosphonates, can reduce the risk of fracture by **50%**.

PARALYSIS

- Nearly **5.4 million** Americans were living with paralysis in 2013.
- The indirect cost of paralysis for a single patient due to loss in wages and productivity is **\$77,701** per year.
- Research has shown that the nervous system is not hard-wired — it can adapt itself after injury — leading to rehabilitation techniques that have allowed some paralyzed patients to regain partial functions and/or sensation.

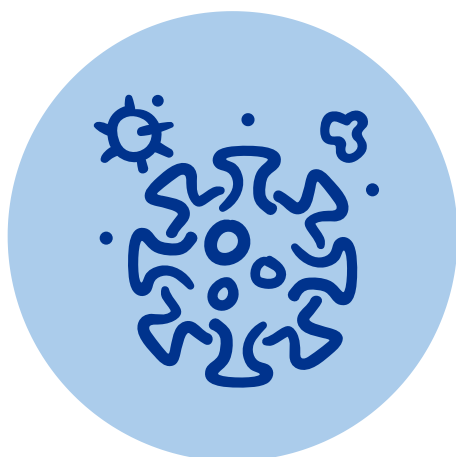


PARKINSON'S DISEASE

- An estimated **1.07 million** Americans were living with Parkinson's in 2017.
- The out-of-pocket costs alone for a person with Parkinson's disease can exceed **\$2,500** a year.
- Deep brain stimulation (DBS) is a type of surgery that can help alleviate some symptoms of Parkinson's. The surgery involves the placement of electrodes into the brain which deliver electric pulses to a targeted area. DBS can help alleviate stiffness, slowness, and tremor.

POLYCYSTIC OVARIAN SYNDROME (PCOS)

- PCOS affects approximately **6–12%** of women of reproductive age in the U.S., and **80%** of women with PCOS experience infertility.
- The estimated annual medical costs in the U.S. associated with PCOS are **\$1.16 billion**.
- A study in 2001 showed that **24%** of the mothers of patients with PCOS, as well as **32%** of the patients' sisters, also had PCOS. This reaffirmed the notion that PCOS is a heritable condition.



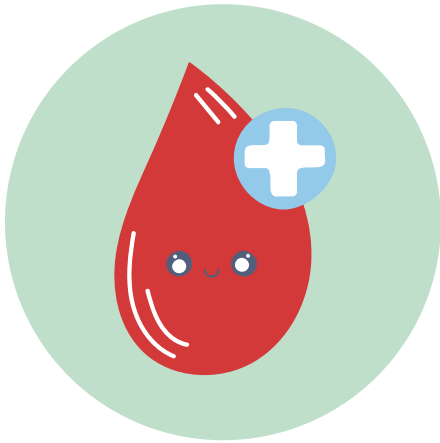
RARE DISEASES

- It is estimated that **1 in 10** Americans and **350 to 400 million** people worldwide are living with a rare disease.
- **Three-quarters** of rare disease caregivers worry about their family's ability to pay for care.
- The international research effort to sequence all human genes, known as the Human Genome Project, led to the identification of the precise genetic cause of many rare diseases.

SEPSIS

- Sepsis affects **1.7 million** adults every year in the U.S.
- **17.5%** of patients with sepsis are readmitted within **30 days** of discharge, with each readmission costing **\$16,500** on average.
- In 2019, researchers used clinical computer algorithms to uncover four different subtypes of sepsis, pointing to a need for personalized treatments tailored to the individual patient's sepsis disease.





SICKLE CELL DISEASE

- It is estimated that **1 in 13** African Americans are born with sickle cell trait and **1 in 365** with sickle cell disease.
- The average annual cost for sickle cell disease care is more than **\$10,000** for children and **\$30,000** for adults.
- In clinical trials of L-glutamine, a new treatment for sickle cell disease, patients experienced decreased hospitalization rates and **14.5%** fewer instances of acute chest syndrome.

SKIN CANCER

- **20%** of people in the U.S. will develop skin cancer by age 70.
- The average annual cost of treating skin cancer from 2007 to 2011 was **\$8.1 billion**.
- Cancer immunotherapies such as PD-1 inhibitors and CTLA-4 inhibitors unleash a person's immune system in order to fight off cancer. Together with targeted therapies, cancer immunotherapies have revolutionized the care of patients with advanced melanoma.



SPINA BIFIDA

- **1,500 to 2,000** babies are born with some form of spina bifida each year in the U.S.
- The estimated lifetime cost of care for a person with spina bifida in the U.S. is **\$791,900**.
- In 2003, the Management of Myelomeningocele Study (MOMS) trial started and found that prenatal surgery greatly improved outcomes for babies with spina bifida.

STROKE

- **795,000** Americans experience a stroke each year — that's **one** every **40 seconds**.
- The median hospital cost for an uninsured patient with a stroke is over **\$31,000**.
- New stent and imaging technology allows surgeons to clear blood clots up to **24 hours** after a stroke occurs. With blood flow restored to the brain, more patients survive strokes without serious impairments.



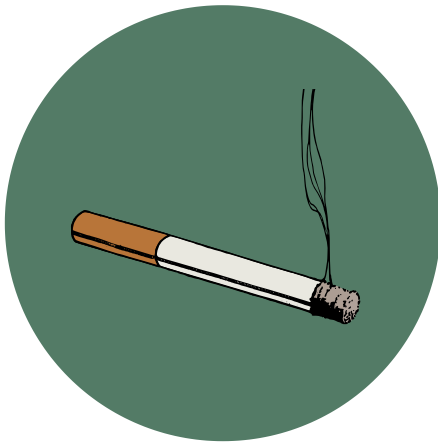
SUBSTANCE USE DISORDER (SUD)

- Over **70,000** Americans died of drug overdose in 2017.
- The U.S. spent **\$120 billion** on direct and indirect costs of SUDs in 2016.
- Buprenorphine has been successful for [Opioid Use Disorder](#) treatment in many clinical trials, and it also has the added benefit of being a promising treatment for depression, anxiety, and neonatal opioid withdrawal symptoms.

SUICIDE

- Suicide is the **second** leading cause of death among Americans aged 15–24. In 2017, **47,173** Americans died by suicide.
- Suicide costs the U.S. almost **\$70 billion** per year between lifetime medical expenses and lost work.
- Researchers have examined the effectiveness of a family based cognitive therapy called Safe Alternatives for Teens and Youths. For every three enrollees, researchers estimated one possible suicide attempt was prevented.





TOBACCO USE AND ADDICTION

- **480,000** people in the U.S. die each year as a result of the effects of cigarette smoking.
- The annual total cost of smoking-related illnesses in the U.S. is **\$300 billion**.
- Researchers discovered the drug varenicline (Chantix) by making modifications to the chemical structure of a known natural inhibitor of the nicotine receptor. Varenicline works by limiting tobacco cravings and withdrawal symptoms and is now commonly used to help smokers quit smoking.

TRAUMATIC BRAIN INJURY (TBI)

- The annual TBI-related indirect costs in the U.S. (including loss of wages and productivity and non-medical expenses) are **\$64 billion**.
- There are nearly **57,000** TBI-related deaths each year in the U.S., including more than **2,500** children.
- Decompressive surgery (partial removal of the skull) is being pioneered as a means of reducing the risk of death in severe TBI patients. In preliminary surgical trials, the patient's rate of mortality fell from nearly **50%** to less than **27%**.



TUBERCULOSIS (TB)

- Tuberculosis, a bacterial airborne infection, affected **10 million** people and killed **1.5 million** in 2018 alone.
- The global cost of TB annually is **\$21 billion** and the average cost in the U.S. for treating a single case can range between **\$294,000** and **\$694,000**.
- Research to improve treatment, as well as diagnostics and surveillance, led to a near **10-fold** decrease in TB cases in the U.S. In 2019, a promising new TB vaccine candidate called M72/AS01E showed significant protective results against TB.



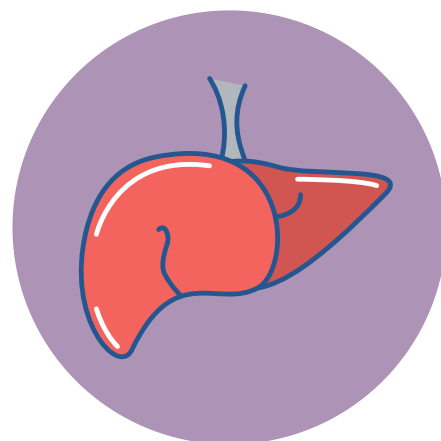


VACCINES

- The number of U.S. children without childhood vaccinations is increasing. The percent of 2-year-olds who had not received their childhood vaccinations rose from **0.9% to 1.3%** between 2011 and 2015.
- Pre-COVID-19, the annual economic burden incurred by vaccine-preventable diseases in the U.S. was **\$9 billion**.
- Vaccinations among Americans born between 1994 and 2018 will prevent **419 million** illnesses, help avoid **936,000** fatalities, and save nearly **\$1.9 trillion** in direct costs and indirect costs.

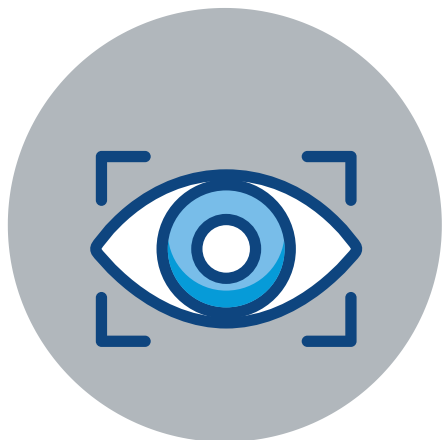
VIRAL HEPATITIS

- Almost **11,000** new cases of hepatitis (A, B, and C) were reported in the U.S. during 2017.
- The total annual cost of chronic hepatitis C infections in the U.S. is expected to reach **\$9.1 billion** by 2024.
- Scientists developed direct-acting antiviral (DAA) therapies that could be used to treat hepatitis C infections. Vaccines exist to prevent the spread of hepatitis A and B, and there are effective treatments for chronic hepatitis B and hepatitis C.



VISION & BLINDNESS

- By 2050, the expected number of people with blindness will double to roughly **8 million**.
- The annual medical cost for people with blindness and low vision ranges between **\$1,500** to more than **\$10,000**, with costs increasing with age.
- Following decades of research, two new medications for glaucoma, latanoprostene bunod (Vyzulta) and netarsudil (Rhopressa), were approved in 2018. These medications treat the tissue in the eye responsible for abnormally high pressure, the underlying cause of optic nerve damage that leads to glaucoma.



"If you think research is expensive, try disease."

-Mary Lasker





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