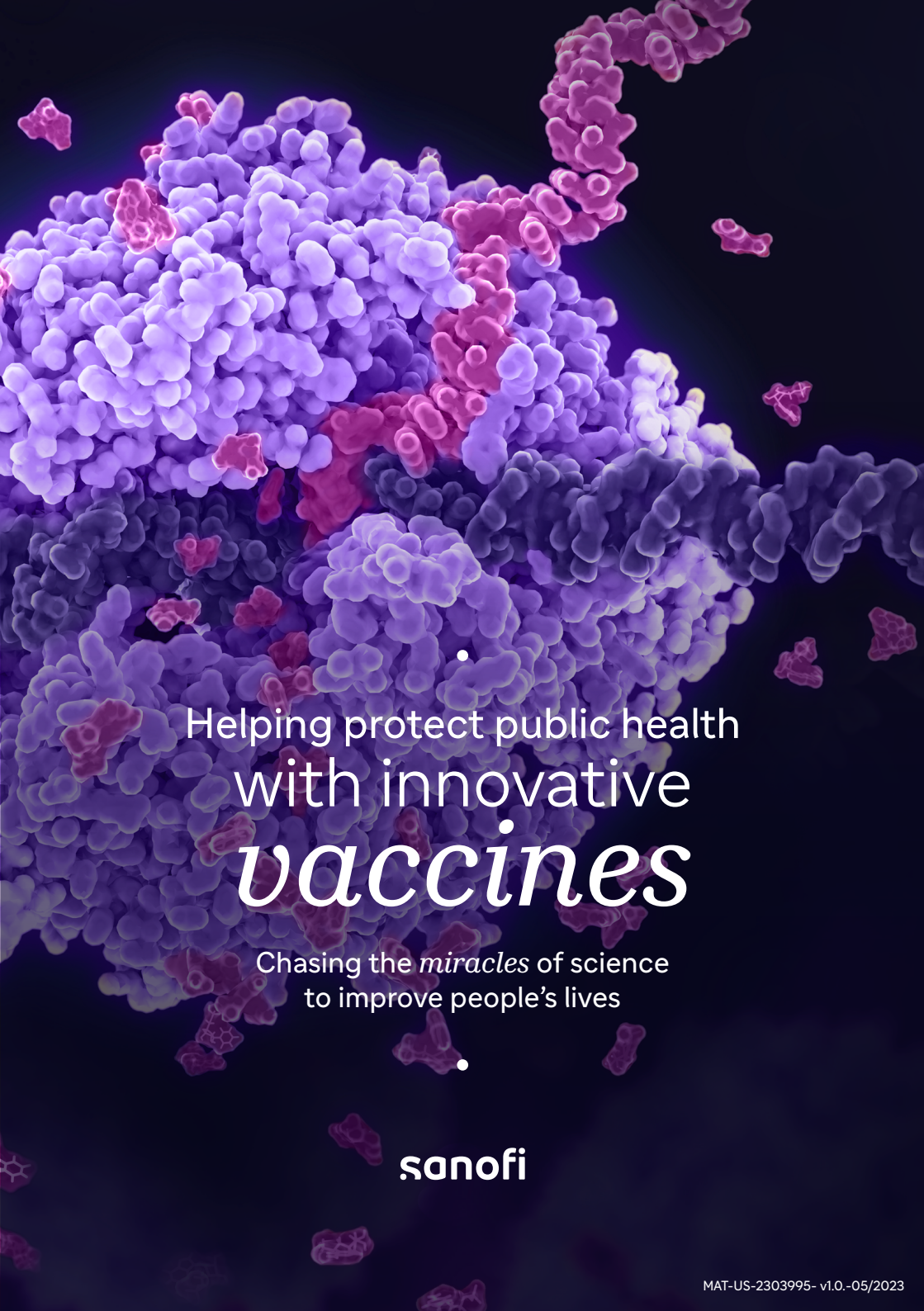

Helping protect public health with innovative *vaccines*

Chasing the *miracles* of science to improve people's lives

sanofi

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Our *purpose*

Helping protect public health with innovative vaccines

Sanofi has been a leader in vaccines for over 100 years: the combination of our innovative vaccines and global reach means that many diseases do not hold the power they once did. Our determination to improve public health motivates us to develop new vaccines to address unmet medical needs.

Fueled by new data and digital technologies, our science and manufacturing have the potential to transform the practice of medicine for millions of people around the world. And when we discover the extraordinary, we're already planning where to go next. Because everyone deserves a chance to plan for their future, to dream big.

Davide's Story

Davide is an inspirational athlete and meningitis survivor. He shares his story to help raise awareness about prevention of this potentially devastating infection.

"I was not vaccinated, so I was unprotected against meningitis. Now, as a national ambassador of the Spanish Association Against Meningitis, my advice is to vaccinate against this terrible disease."

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Dream Big, *vaccines help protect us*

Vaccines help protect us from diseases and let us focus on a future filled with hope. They give us the chance to appreciate the little things that make our day, and dream about the big ones that rock our world. Countless people vaccinated. Countless dreams pursued.

Georgia and Sienna - London - UK

“Giving birth was, in fact, the making of the real me. I found it empowering, despite even going through a miscarriage. I realized that sense of empowerment in childbirth was integral to my goal of happiness. So, I changed careers, left my job as a journalist in London, and focused on helping other parents feel empowered by their birth experiences. My dream is that all new parents go into a birth informed and educated so that they make the right decisions for them.”

Georgia, UK

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Sanofi's vaccines *in numbers*

"From helping to prevent infectious diseases at every stage of life, to protecting humanity against emerging epidemics, vaccines help to create and maintain healthy communities that keep life moving forward.

Paul Hudson
Chief Executive Officer

"We supply millions of vaccine doses for nearly a dozen diseases every day, making it possible to vaccinate over half a billion people worldwide, each year.

Thomas Triomphe
Executive Vice President, Vaccines

We are a worldwide leader *in human vaccines*[1]*:*

500 million
people vaccinated annually with our vaccines, worldwide

12 **vaccine manufacturing sites** in 8 countries

2.5 million **vaccine doses** supplied, every day

$6.3 billion
in sales in 2021, representing +6.8% sales growth

Our vaccines are available in about
150 countries

$500 million
invested in vaccines R&D each year

375 million
polio vaccine doses supplied to UNICEF since 2014

A world leader
in **influenza** and **pediatric vaccines**

Discover more key figures on vaccines on the Sanofi Integrated Report 2021

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Our immunization *portfolio*

We are the leader in pediatric combination vaccines, including shots that help protect against diphteria, tetanus, polio, pertussis, Hib and hepatitis b.

We provide booster vaccines for children, adolescents and adults, helping to protect against several potentially life-threatening diseases throughout life. We also developed a pertussis vaccine indicated in pregnancy for the prevention of pertussis in young infants. We are the leader in influenza vaccines: our portfolio includes vaccines that can help protect against flu and flu related complications. We provide vaccines to help protect against meningococcal meningitis, a bacterial infection which can have devastating consequences in 24 to 48 hours.

Infectious diseases we offer vaccination against in the U.S.:

Bacterial Infections

- *Diphtheria*
- *Tetanus*
- *Haemophilus influenzae type b*
- *Typhoid fever*
- *Meningococcal meningitis*
- *Whooping cough (Pertussis)*

Viruses

- *Dengue*
- *Influenza*
- *Hepatitis B*
- *Poliomyelitis*
- *Rabies*
- *Yellow fever*

Cosmos Okoli - Polio survivor

"I survived Polio when I was four years old... If a vaccine had been available, I would have been vaccinated. I don't want to see any child with polio deformities. It hurts me because it shouldn't happen, as there is a way to stop it."

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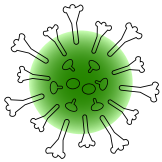
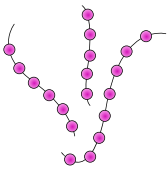
Our *technologies*

We use a wide range of tools to develop vaccines that can target proteins, sugars (polysaccharides), or other features that enable viruses and bacteria to thrive in the human body. We are developing vaccines by leveraging different technologies:



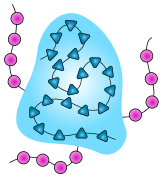
Inactivated vaccines

Inactivated vaccines use the killed version of the germ that causes a disease.
Ex.: Polio, rabies, influenza



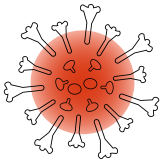
Polysaccharide-based vaccines

Some disease-causing bacteria have a coating made of polysaccharides (sugars) that protects them from being seen and destroyed by cells in our immune system. Using one of these sugars in the vaccine alerts the body to kill the bacteria.
Ex.: Typhoid



Conjugated-polysaccharide vaccines

To help the body remember the bacteria longer and to stimulate a better immune response in children, the sugar is linked to a protein.
Ex.: Invasive disease caused by Neisseria meningitidis (serogroups A, C, W, Y), Haemophilus influenzae type b in infants.



Live-attenuated vaccines

Some vaccines are based on weakened whole viruses, which help the body build its defenses without causing disease.
Ex.: Yellow fever

Nikita Khadse and Natalia Vargas - Research & Biomarkers lab - mRNA - Waltham - Massachusetts - United States

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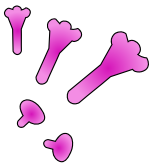
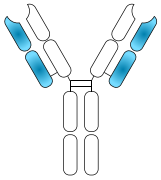


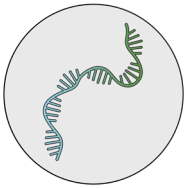
Recombinant protein vaccines

When only part of a pathogen, like a protein, is needed to create a vaccine, sometimes the right approach is to synthetize that protein using recombinant technology. This involves producing the protein in the lab and formulating it into a vaccine.
Ex.: Hepatitis B and one of our influenza vaccines



Monoclonal antibody

Rather than stimulating the body to produce its own antibodies, we can design monoclonal antibodies that can offer protection against certain diseases. This kind of rapid protection could bridge important gaps in immunity, especially among very young infants and other at-risk populations.



Messenger RNA vaccines

mRNA carries messages that instruct human cells to directly manufacture the antigen (e.g. a well identified protein from a virus), in the body, which stimulates the immune system to produce protective antibodies. The mRNA instructions are vaccnated by a lipid barrier to shield it from destructive enzymes and shuttle it into cells.
Ex.: Investigational vaccines for influenza, RSV for adults, chlamydia

Our vaccine *R&D*

We invest *more than $500M in vaccines R&D annually.*
Our most exciting current R&D avenues include:

- Investing in mRNA to accelerate the delivery of vaccines for stubborn pathogens: our mRNA Center of Excellence (CoE) is focused on tolerability and thermostability development of mRNA vaccines. The CoE houses 400 colleagues across research sites in France and the United States, all concentrated on adapting mRNA technologies from pandemic to routine use across several different disease areas.
- Developing novel vaccines in areas of continued unmet need: RSV vaccines for infants, toddlers, and older adults; a pentavalent meningococcal vaccine with broad strain coverage; development of influenza vaccines; a pneumococcal vaccine candidate covering 21 serotypes; and development of rabies and yellow fever vaccines.

Nick Clark - Research & Biomarkers lab - mRNA - Waltham - Massachusetts - United States

- Pioneering new areas of development, including early-stage research for first-ever vaccines against chlamydia and acne.
- Expanding our leadership in R&D with a full suite of development platforms designed to improve antigen design with the help of artificial intelligence and other digital technologies.

Sanofi mRNA Center Of Excellence - R&D - Marcy-l'Étoile - France

In all, we aim to have *10 new vaccines* in clinical trials by 2025, including 6 using mRNA technologies.

We never stop innovating. We constantly pursue progress, turning science into vaccines that help protect people and communities around the world.

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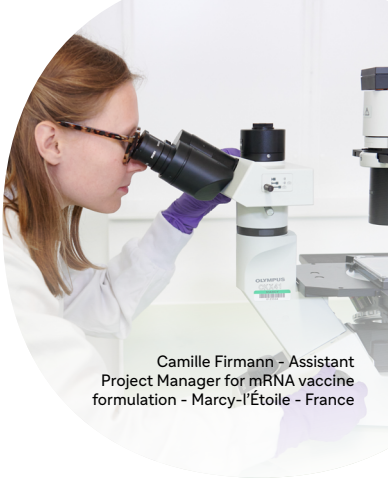
The *mRNA* Center of Excellence



Camille Firmann - Assistant Project Manager for mRNA vaccine formulation - Marcy-l'Étoile - France

We're using mRNA with the goal of developing new, innovating vaccines and to address long-standing challenges in cancer, immune-mediated diseases, and rare diseases.

Our teams are working to develop mRNA vaccine candidates with a focus on thermostability and tolerability.

- **Tolerability**
  Limiting the frequency and severity of side effects.
- **Thermostability**
  Developing vaccines that are stable within a wide range of temperatures, making it easier to transport them over long distances and store them for longer periods of time.

Approximately *$400 million investment* annually to accelerate end-to-end R&D development of vaccines

A focus on *innovating mRNA vaccines* beyond the pandemic context to routine use in disease areas with unmet medical needs

6 clinical candidates using mRNA technologies by 2025

How does *mRNA work?*

mRNA science has given our R&D teams more ways to develop vaccines against different infectious diseases and to keep pace with emerging health threats.

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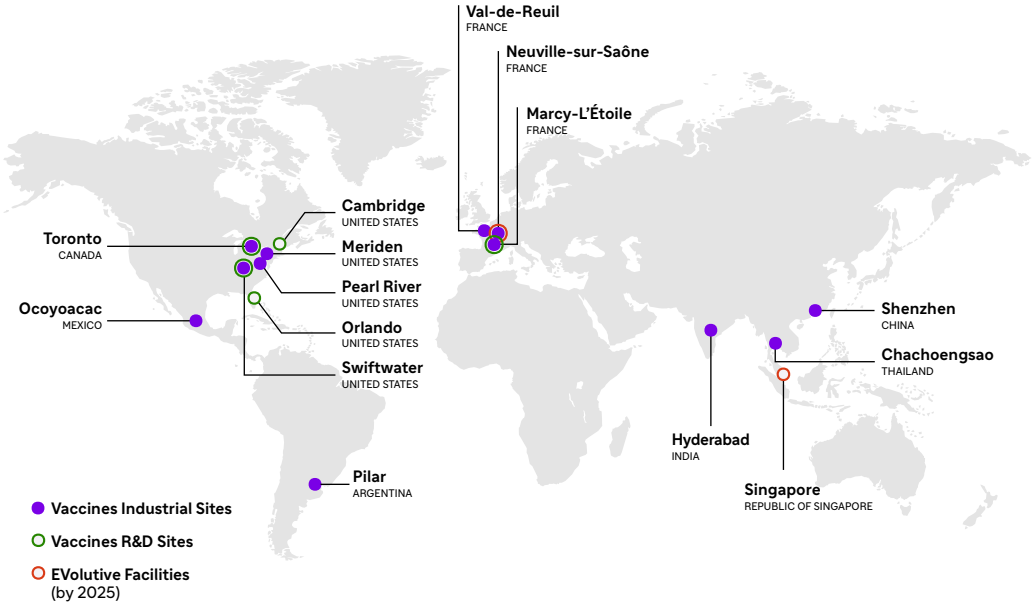
Maël le Corre - USP Technician - Vitry - France

Our industrial *footprint* in vaccines

Innovate in production

Our manufacturing sites are powered by big data and digital technology. They are the bridge between scientific advancement and transformative medicine serving millions of people around the world.

In 2023, we produce vaccines across *12 manufacturing sites.* We will add *two EVolutive Facilities* to that industrial footprint by 2025.



EVolutive Facilities

We are digitizing our industrial footprint, modernizing our diversified network and transforming our sites into factories of the future where objects, infrastructure and people are connected.

Digital transformation improves performance, ensures reliability of production and customer service, delivers consistent compliance and quality across our products, and adapts our processes to fluctuations in demand, user needs, and logistics.

Future EVolutive Facilities for Vaccine Manufacturing - Neuville-sur-Saône - France

50 weeks
of production per year

About 12 days
to switch from manufacturing one vaccine to another

Up to 4 vaccines
can be produced simultaneously on a single production site

90%
of the electric consumption comes from *green energy*

We are adding two new EVolutive Facilities to our global industrial footprint, one in France and the other in Singapore.

These production units (EVF) represent the future of vaccine manufacturing. They allow us to increase our capacities while making production more flexible and respectful of the environment.

Our *partnerships*

External collaborations play a major role in Sanofi's pipeline development. Over the years, we have transformed patients' lives by delivering breakthrough medicines, working in close partnership with other innovators.

Together we can be more ambitious in clinical development, bring products to more patients in more geographies, and create a powerful ecosystem supporting our medicines.

Véronique Chiavazza and Séverine Nury - R&D lab - Marcy-l'Étoile - France

In some of our most important efforts, *we have partnered* to help impact *in public health worldwide*.

Access to Vaccines

We work with the GPEI in the polio eradication effort.

Life course immunization

We team up with industry trade associations like the IFPMA to raise awareness and access to vaccines for people throughout life.

Disease surveillance

We partner with the GISRS to conduct and report on influenza epidemiology.

R&D Partners

We join forces with public and private research organizations in early-stage vaccine discovery.

Pandemic preparedness

Our pandemic preparedness is founded in collaborations with the US BARDA and EU HERA.

*GPEI: Global Polio Eradication Initiative
*IFPMA: International Federation of Pharmaceutical Manufacturers & Associations
*GISRS: Global Influenza Surveillance and Response System
*US BARDA: US Biomedical Advanced Research and Development Authority
*EU HERA: European Health Emergency Preparedness and Response Authority

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Delivering on *Environmental* and *Sustainability Goals*

We contribute to Sanofi's industry-leading Environmental and Sustainability Goals in several ways:

In the workplace and beyond, *we're ensuring diverse leadership in our company* and **strong social and economic engagement in the communities we serve.**

We are continuously improving our efficiency and sustainability **by moving to reduced-plastic packaging**, aiming to save 330 tons of plastic per year and reducing our carbon footprint by 15% by 2027.

We aim to move to 100% renewable energy **across all of our manufacturing sites by 2030** to reduce our carbon footprint and contribute to a healthier planet.

We support the fight to eradicate polio, including **supplying more than 50 million doses of polio vaccines to UNICEF** for countries which need it most. This is in addition to the 1 billion doses of inactivated polio vaccines we've delivered to the world, either as standalone IPV vaccines or as part of pediatric combination shots.

Fatima Mohamed Bello - Community Health worker - Ogudu Primary Health Center - Lagos - Nigeria

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1. Internal data - October 2022

2. World Health Organization (2021) Meningitis. Accessed May 2023.

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