



The research-based pharmaceutical industry has developed the vast majority of new medicines and vaccines – over 1,200 since 1950.

The cost of innovation grows each year, with industry currently spending over USD 120 billion on R&D annually.

Collaborative innovation is increasingly important in sharing knowledge and accelerating R&D.

Improving Global Health through Pharmaceutical Innovation



International
Federation of
Pharmaceutical
Manufacturers &
Associations

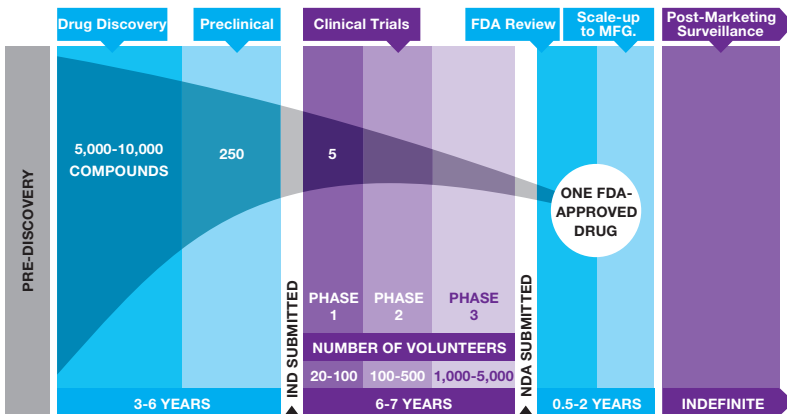
A Tradition of Innovation

A commitment to innovation drives pharmaceutical research and development. By consistently pushing beyond the limits of scientific knowledge, the pharmaceutical industry has been a proven leader in advancing global health for well over a century, with over 1,200 innovative pharmaceutical products introduced since 1950¹.

The Long Road to New Pharmaceutical Products

- On average, researchers screen between 5,000 and 10,000 chemical and biological compounds before finding a promising lead compound;
- For each useful compound, researchers must then invest three to six years of extensive testing to ensure its safety and efficacy, followed by another six to seven years for clinical trials;
- Each step along the way to a new medicine is fraught with risk: over 93% of potential therapeutic molecules do not make it beyond the pre-clinical stage².

The research and development process



Source: PhRMA 2011 profile, Pharmaceutical Industry, p. 12.
Available at: http://www.phrma.org/sites/default/files/159/phrma_profile_2011_final.pdf

¹ Munos, B. "Lessons from 60 years of Pharmaceutical Innovation," Nature Reviews, Drug Discovery, 8, 959-968, (Dec 2009).
² Pammolli, F., Magazzini, L., Riccaboni, M., "The Productivity Crisis in Pharmaceutical R&D," Nature Reviews Drug Discovery, 10, 428-438 (June 2011).

What are the Benefits of New Medicines?

The research-based pharmaceutical industry uses state-of-the-art technologies to increase scientific knowledge about the biological mechanisms responsible for diseases.

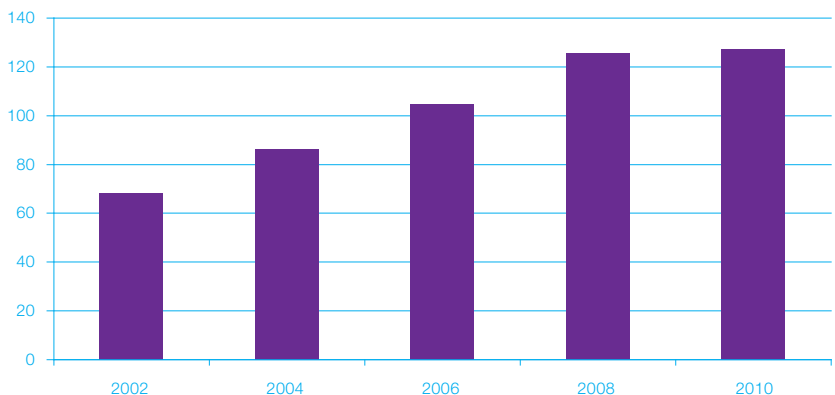
Patients benefit directly from this investment in innovation through:

- Improved health through expanded number of treatments for complex diseases, like HIV/AIDS and cancer;
- Improved treatments that more efficiently target diseases;
- Simplified medicine regimens that make patients' lives easier.



© GlaxoSmithKline

Pharmaceutical R&D Spending



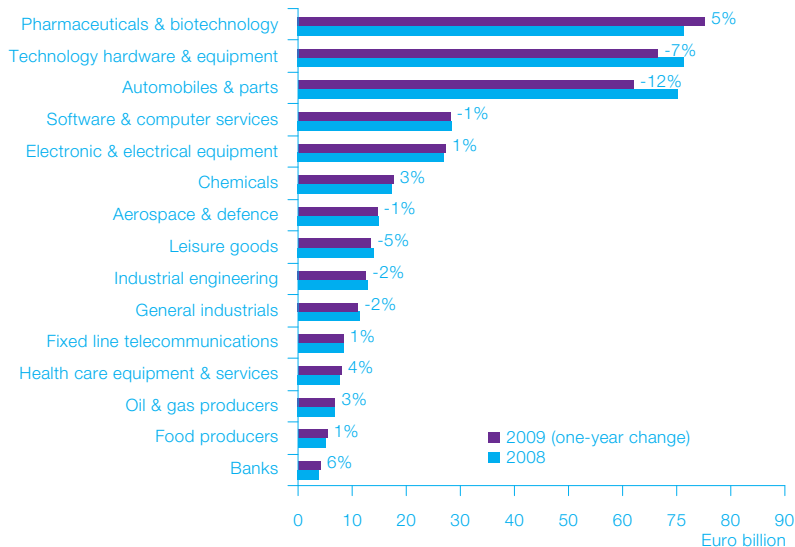
Source: EvaluatePharma. 2010. "Pharma industry cutting its R&D cloth to more sustainable levels" in World Preview 2016. Available at: <http://www.evaluatepharma.com/Universal/View.aspx?type=Story&id=217946§ionID=&isEPvantage=yes>

The Price of Innovation

The increasing complexity of innovation is leading to higher R&D costs, higher regulatory hurdles, and longer product development times:

- A focus on more complex diseases has led to significantly higher failures rates at all stages of R&D;
- The average product development time is increasing;
 - 9.7 years in the 1990s;
 - 13.9 years since 2000³;
- The average cost of developing new medicines has risen from over USD 800 million in 2000⁴ to over USD 1.3 billion in 2011⁵.
- Despite the increase in costs, five of the 10 leading global R&D firms were pharmaceutical companies in 2010⁶.

R&D Investments by sector (EUR Billion)



³ Pammolli, F., Magazzini, L., Riccaboni, M., "The Productivity Crisis in Pharmaceutical R&D," Nature Reviews Drug Discovery, 10, 428-438 (June 2011).

⁴ DiMasi, J., Hansen, R. & Grabowski, H. "The Price of Innovation: New Estimates of Drug Development Costs" J. Health Econ. 22, 151-185 (2003).

⁵ J Dimasi & H G Grabowski, "The Cost of Biopharmaceutical R&D: is Biotech Different?" Managerial and Decision Economics No. 28 (2007): 469-79 ; J Dimasi, R W Hansen, and H G Grabowski, "The Price of Innovation: New Estimates of Drug Development Costs," Journal of Health Economics 22 (2003): 151-185.

⁶ European Commission. 2010. EC Joint Research Center's 2010 Scoreboard presentation from 17/11/2010, Page 9. Available at iri.jrc.ec.europa.eu/research/docs/2010/SB2010_final_report.pdf

Towards a Collaborative Research Paradigm

Rising R&D costs associated with more complex technologies, riskier therapeutic targets, and an increasingly stringent regulatory process have made needed innovation even more challenging.

IFPMA member companies are therefore turning towards collaborative research platforms to help lower their R&D costs and accelerate product development.

Demystifying Collaborative Innovation

Collaborative innovation means companies work with a range of partners to accelerate and enhance the R&D process.

Each partnership is unique, but often entails:

- Cooperation between the academia, public research institutions, philanthropic organizations, and small, medium and large biopharmaceutical companies;
- In-and-out licensing;
- Provision of access to medicine compound libraries.

The Advantages of Collaboration

- Lower cost of sharing technologies and know-how;
- Dissemination of knowledge and technologies to a broader scientific community.



© Bayer HealthCare

Partnering to Tackle Neglected Tropical Diseases

To overcome the unique challenges of fighting diseases that disproportionately affect developing countries, the pharmaceutical industry is working with a wide range of partners to accelerate the development and distribution of needed life-saving pharmaceuticals for neglected tropical diseases.

Quick Facts on Neglected Tropical Diseases

- These diseases — including cholera, dengue, guinea worm disease, and trachoma — are found primarily in tropical and subtropical areas;
- Over one billion people in developing countries are affected by these diseases;
- Left untreated, many of these diseases can be fatal or cause life-long disabilities.
- The research-based pharmaceutical industry is donating 14 billion treatments to eliminate or control nine key neglected tropical diseases.

Industry Commitment to Improving Health in Developing Countries

From the creation of specialized research centers to product development partnerships, IFPMA member companies are leveraging their time, R&D expertise, and money to develop sustainable, innovative solutions to improve quality of life in disease endemic countries.

Industry R&D for Neglected Tropical Diseases

| Diseases | Ongoing Medicines R&D Projects | Ongoing Vaccines R&D Projects | Approvals Since 2005 | R&D Projects Terminated Since 2005 |
|-------------------------|--------------------------------|-------------------------------|----------------------|------------------------------------|
| Tuberculosis | 28 | 3 | 0 | 6 |
| Malaria | 36 | 5 | 2 | 13 |
| Other Tropical Diseases | 27 | 3 | 3 | 8 |
| Totals | 91 | 11 | 5 | 27 |

Source: IFPMA

Public Private Partnerships (PPPs)

Public Private Partnerships (PPPs) offer collaboration platforms that leverage their partners' knowledge and expertise to research, develop, and support accessibility of new health technologies for neglected tropical diseases.

| Partnership Name | Year Created | Disease Area | Program Type |
|--|--------------|-----------------------------|--------------------------------------|
| International AIDS Vaccine Initiative | 1996 | HIV/AIDS | Advocacy, Education, R&D |
| Drugs for Neglected Diseases Initiative (DNDi) | 1999 | Neglected Tropical Diseases | Advocacy, R&D, Support, Training |
| Medicines for Malaria Venture (MMV) | 1999 | Malaria | R&D |
| GAVI Alliance | 2000 | Child Health | Donation, Pricing, Support, Training |
| Stop TB Partnership | 2000 | Tuberculosis | Donation, Pricing, R&D |

A complete list of IFPMA member company partnerships can be accessed at: <http://www.ifpma.org/resources/partnerships-directory.html>

Specialized Research Centers

Since 2000, a number of IFPMA member companies have created research centers of excellence targeting neglected tropical diseases. Other companies have chosen to integrate R&D activities for these diseases within their R&D organization.

WIPO Re:Search – A Consortium of Public and Private Sector Organizations

- Working with the pharmaceutical industry and BIO Ventures for Global Health, the World Intellectual Property Organization (WIPO) launched WIPO Re:search in 2011 for R&D on neglected tropical diseases, tuberculosis and malaria.
- This consortium provides a searchable public database which links to clinical trial data, compound libraries, knowledge and expertise, including intellectual property assets, to encourage innovation in R&D for diseases that disproportionately affect the developing world. <http://www.wipo.int/research/en/>

The Global Health Dividends of Innovation

By adopting new technologies and building state-of-the-art research centers, IFPMA members have progressively tackled more complex diseases like cancer, cardiovascular disease, and HIV/AIDS.

Growth in collaborative innovation platforms will help advance pharmaceutical R&D, disseminate scientific expertise, and accelerate new product development for both “mainstream” and “neglected” diseases.

The research-based pharmaceutical industry’s commitment to innovative R&D has helped raise global health for over 100 years. Thanks to its investments, billions of people can expect to live longer, more productive lives than any previous generation.



IFPMA

**15, Ch. Louis-Dunant
P.O. Box 195
CH-1211 Geneva 20
Switzerland**

**Tel: + 41 22 338 32 00
Fax: + 41 22 338 32 99**

www.ifpma.org