

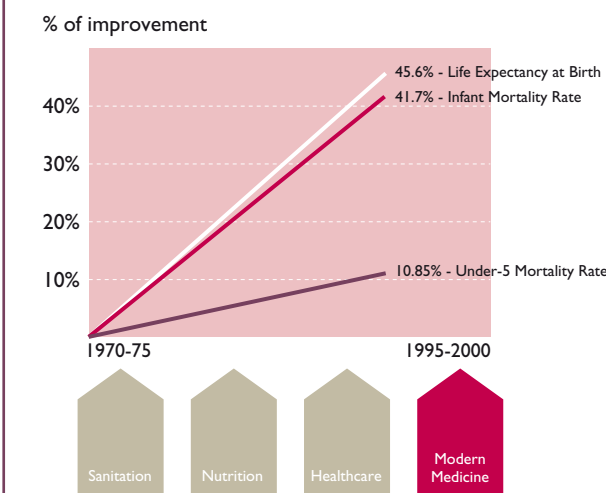
Value of Innovation

The social and economic value of medicines

The twentieth century saw significant increases in life expectancy as a consequence of innovation in health care. Remarkable innovations in pharmaceutical research have helped increase average life expectancy in industrialized countries from 47 years in 1900 to 78 years today – more than a 70 per cent increase.

Yet, more needs to be done to combat existing as well as new and emerging diseases. In 2003, the world spent more than \$125 billion on health research. Almost half of that was spent on research and development (R&D) of new medicines. At any given time, there are over 7,000 investigative compounds being developed worldwide for cures and treatments in all major diseases. Around 35 novel medicines are launched each year.

Global health improvements in 20th century



Source: IFPMA (2007)

Do we need still need innovation?

Yes, because many gaps in medical treatments still need to be tackled, such as:

• Cancer

One in 10 European women will develop breast cancer in their lifetime. Over 300,000 women in Europe are diagnosed with breast cancer each year, and that rate is rising. Prior to ground-breaking new treatments, about 40 per cent of patients suffered a relapse after their initial treatment. In clinical trials with over 12,000 early breast cancer patients from 40 different countries, the risk of recurrence was reduced by half in those patients treated with just one innovative new medicine; the risk of death was reduced by a third.¹ Such results give hope to our mothers, wives, sisters and daughters, which would have been impossible without the significant investments in pharmaceutical R&D over the last decades.

Did you know?

- The proportion of cancer survival increases attributable to new medicines is 50-60 per cent
- The death rate from AIDS has decreased by 80 per cent in the US and Europe since the advent of new anti-viral therapies in 1995
- Over 7000 compounds are in development at any given time

‘ **Disease is a moving target and medicines need to follow it as closely as possible. Many gaps in medical treatments still need to be addressed** ’

• Mental health problems

Mental health problems make up around 13 per cent of the total burden of ill health worldwide.² This estimate is just the tip of the iceberg; what makes mental health almost unique is the broad impact it can have on all aspects of life, including physical health, family relationships and social networks, employment status and contact with the criminal-justice system. A high level of stigma associated with mental health problems can also lead to discrimination and reduced self-esteem. The economic costs of poor mental health are very high because of these multiple adverse consequences.³

Disease is a moving target and medicines need to follow it as closely as possible to address:

- **unmet medical need and changing disease profiles**
- **emerging and re-emerging infections**
- **resistance to existing treatments**
- **constant evolution of science and technology**

Did you know?

- Around 35 novel medicines are launched every year
- 30 emerging and re-emerging infectious epidemics required global mobilization in the 1990s
- A quarter of the genetic origins of 5,000 identified diseases have been documented to date and progress is accelerating
- Global gains from mortality reduction 1970-1998: \$76 trillion
- Each new FDA approved medicine yields benefits worth many times more than its development costs
- A 10 per cent reduction in mortality from heart disease and cancer alone adds around \$10 trillion annual GDP to national wealth

Why do we need more innovation?

	Prevention	Treatment	Cure
HIV/Aids			
Tuberculosis			
Malaria			
Childhood Diseases			
Respiratory Infections			
Cancers			
Neuropsychiatric Disorders			
Cardiovascular Diseases			
Diabetes			
Respiratory Diseases			

Medicines exist > R&D to improve their utility for patients
Medicines exist > R&D to overcome the emerging challenges, e.g. drug resistance
No Medicines > R&D to bridge the gap

Source: Various WHO and industry sources

What is the value of innovation?

‘ **Even without full cures, drugs that greatly delay the onset and severity of major diseases will reduce expensive and unproductive time spent in hospitals, nursing homes, and under the care of family members. New drugs have the potential to cut the growth of medical spending sharply** ’

– Gary S. Becker, University of Chicago Professor and 1992 Nobel laureate⁴

Innovation in healthcare brings multiple benefits. Unique to medicines innovation is the broad scope of benefits that it brings not only to the individual patient, but also the world in which he or she lives.

Innovation benefits patients by saving and improving lives

From expanding what can be treated to improving existing treatment, innovation permits the reduction and avoidance of illness and its complications, as well as improving quality of life and life expectancy. Incremental innovation provides patients with more choice and individualised care, better risk tolerance, improved medicine safety and effectiveness, easier dosing and administration, and fewer side-effects. R&D into second and third in class medicines significantly improves original therapeutic classes by offering choice and new therapeutic alternatives to different patient types within the class.

Innovation benefits healthcare systems

Many innovations are cost saving and improve efficiency, delivering financial benefits to the whole healthcare system, through optimal management and reduction of treatment and hospitalization. The global reduction in mortality from 1970-1998 led to savings of around \$72 trillion, or \$2.6 trillion per year.

Innovation and socio-economic benefits

In the US, medical advances generating a 10% reduction in mortality from heart disease and cancer would add roughly \$10 trillion to the annual Gross Domestic Product (GDP). The average new drug approved by the Food and Drug Administration (FDA) yields benefits worth many times its cost of development. New medicines benefit the economy by increasing worker productivity and reducing absenteeism. In addition, the research-based pharmaceutical industry creates countless high-quality jobs worldwide and greatly contributes to overall economic growth.

Example of benefit from health innovation, cardiovascular diseases

Beta Blockers	<ul style="list-style-type: none">• 23% reduction in long-term risk of death• Improve bypass operation survival rates
ACE Inhibitors	<ul style="list-style-type: none">• 22% reduction in risk of death from heart attack and stroke• 30% reduction in stroke events• 29% reduction in coronary heart disease events
Calcium Antagonists	<ul style="list-style-type: none">• 39% reduction in stroke events• 28% reduction in major cardiovascular events
Statins	<ul style="list-style-type: none">• 30% reduction in risk of death• 60% reduction in risk of heart attack• 17-30% reduction in stroke events
Combination Therapy	<ul style="list-style-type: none">• 72-87% reduction in risk of death when using a combination of anti-plateleters, beta blockers, ACE inhibitors and statins

Source: Adapted from an ABPI report (2004) *The Human and Economic Value of Pharmaceutical Innovation and Opportunities for the NHS: Blood Pressure Lowering Treatment Trialists' Collaboration* (2000) *The Lancet*

The role of medicines on innovation

In addition to the catalytic role of making medicines available, the process of discovery and innovation is of value in itself, stimulating further innovation in healthcare generally through clinical research and applied medicine. Making new medicines available stimulates disease detection and research into optimum disease management techniques, as in the following examples:

• Monoclonal Antibody Therapies

Monoclonal antibodies are highly specific molecular medicines that have opened entire new frontiers in the treatment of many diseases. The first monoclonal antibody therapy for cancer, Rituxan, was a milestone in biotechnology medicine development and a turning point in the treatment of cancer. Since then, numerous other monoclonal antibodies have been developed and proven to significantly improve both survival and quality of life of cancer patients, since these medicines selectively target tumor cells.

• Alzheimer Medicines

Cholinesterase inhibitors are a class of medicines which treat cognitive symptoms of mild to moderate Alzheimer's Disease (symptoms affecting memory and other thought processes). Psychiatrists and psychiatric nurses believe that they simply would not know anything about how to identify and manage this distressing disease if these medicines were not available and that they would not have any tools to help them understand the disease as well as treating it.

Recommended reading

Grabowski H (2004), Are the Economics of Pharmaceutical Research and Development Changing? Productivity, Patents and Political Pressures Pharmacoeconomics; 22 Suppl. 2: 15-24

Landau R Achilladellis B and Scriabine A ed (1999), Pharmaceutical Innovation Revolutionising Human Health

David M.Cutler, Your Money or Your Life; Oxford University Press February 2005

Kevin M Murphy and Robert Topel, Measuring the Gains from Medical Research; University of Chicago Press, 2003

An illustration:

HIV/AIDS: How a death sentence became a manageable disease

The case of HIV/AIDS is very illustrative of the process of pharmaceutical innovation. Although there is not yet a cure for HIV/AIDS and a vaccine will not be available for some years still, tremendous progress has been made in transforming AIDS from a death sentence into a manageable chronic disease. Thanks to more than 20 antiretroviral medicines discovered and developed entirely by the R&D pharmaceutical companies, death rates from AIDS have plunged by 80 per cent in the US and Europe. The pharmaceutical industry continues its effort, and there are currently more than 80 drugs and vaccines in development for HIV/AIDS and its various opportunistic infections.

Peptic Ulcer: from surgery to swallowing a pill

Prior to 1975, surgery was commonly used to treat peptic ulcers. With the discovery of H2 antagonist blockers in the mid-1970s and the launch of a further new class of drugs – proton pump inhibitors – in the late 1980s, the management of peptic ulcer diseases has been revolutionized. For example, in Sweden, from 1956 to 1986, elective surgical operations for peptic ulcers steadily declined from 72.1 to 10.7 per 100,000 inhabitants. Similar changes can be observed in other countries.

REFERENCES

1. Piccart-Gebhart MJ (2005), New Engl J Med; Romond EH (2005), New Engl J Med; Crown J (2006) EJC Suppl
2. WHO (2005) Mental Health Atlas
3. McDaidd D (2005), Funding Mental Health in Europe, Policy Brief, WHO
4. Business Week, March (2004)

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Produced by the IFPMA (International Federation of Pharmaceutical Manufacturers & Associations)

IFPMA
15 Ch. Louis-Dunant
PO Box 195
1211 Geneva 20
Switzerland

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

www.ifpma.org