Pharmaceutical research and development

Pharmaceutical research and development (R&D) is funded via a mix of private and public sources. Governments typically fund basic and early-stage research through budget allocations, research grants and public ownership of research and higher education institutions. The pharmaceutical industry funds R&D across all phases and most pre-registration clinical trials, but mostly contributes to translating and applying knowledge to develop products, with some support from R&D subsidies or tax credits. In 2021, governments in 35 OECD countries for which data are available, collectively budgeted USD 69 billion for health-related R&D. While this figure goes beyond pharmaceuticals, it understates total government support, as it excludes most tax incentives and funding for higher education and publicly owned enterprises. About two-thirds of this was spent in the United States (USD 45 billion), which also spent the most as a share of gross domestic product (GDP) (Figure 9.9). Since 2010, government-allocated budgets for health-related R&D have increased by 45%.

The pharmaceutical industry spent USD 129 billion on R&D in 2021, with the majority again spent in the United States. Business-based pharmaceutical R&D expenditure (BERD) has increased by 39% in real terms since 2010. Most of this growth occurs in OECD countries, specifically driven by the United States (69% of the OECD total). However, the non-OECD share is increasing. Notably, R&D expenditure in partner country the People's Republic of China increased from USD 4.9 billion (in constant 2015 PPPs) to USD 14.2 billion in 2019 (189%) – a higher growth rate than any OECD country (OECD, 2021[1]).

The pharmaceutical industry is more R&D intensive than other, similar industries. Among OECD countries, it spends over 30% of its gross value added on R&D – more than the electronics and optical industry (23.5%), air and spacecraft industry (14.7%) and manufacturing as a whole (8.4%) (Figure 9.10). This is a notable increase, as R&D intensity of the pharmaceutical industry was only 13.3% in 2018: below that of the electronics and optical industry (16%) and near the air and spacecraft industry (13.1%).

Actual R&D activity can be observed through the number of products or medicines in development by therapeutic class and indication of treatment. Between 2011 and 2020, the total number of product-indication combinations that were in active development worldwide nearly doubled, to reach 28 643 (Figure 9.11), although this was driven in part by products with multiple indications. In any given year, the majority of active development projects are pre-existing projects that remain in active development. However, the number of new projects that enter active pre-clinical or clinical development has also increased – from 2077 in 2012 to 8 227 in 2020. In terms of disease focus, product development priorities have not changed dramatically since 2011. Cancer has accounted for the largest share of product indications in development in every year since 2011, and has increased steadily – from 27% of all product-indication pairs in 2011 to 38% in 2020.

Definition and comparability

Government budget allocations for R&D (GBARD) capture R&D performed directly by the government and amounts paid to other institutions for R&D. Health-related R&D refers to GBARD aimed at protecting, promoting and restoring human health, including all aspects of medical and social care, but excluding spending by public corporations or general university funding subsequently allocated to health.

Direct subsidies to the pharmaceutical industry for R&D consist of funding from non-industry entities such as governments and their agencies, higher education institutions, and private non-profit entities, such as philanthropic organisations.

Business enterprise expenditure on R&D (BERD) covers R&D by corporations regardless of the source of funding. BERD is recorded in the country where the R&D activity takes place. National statistical agencies collect data primarily through surveys and according to the OECD Frascati Manual, but there is some variation in national practices. Pharmaceutical R&D refers to BERD by businesses classified in the pharmaceutical industry.

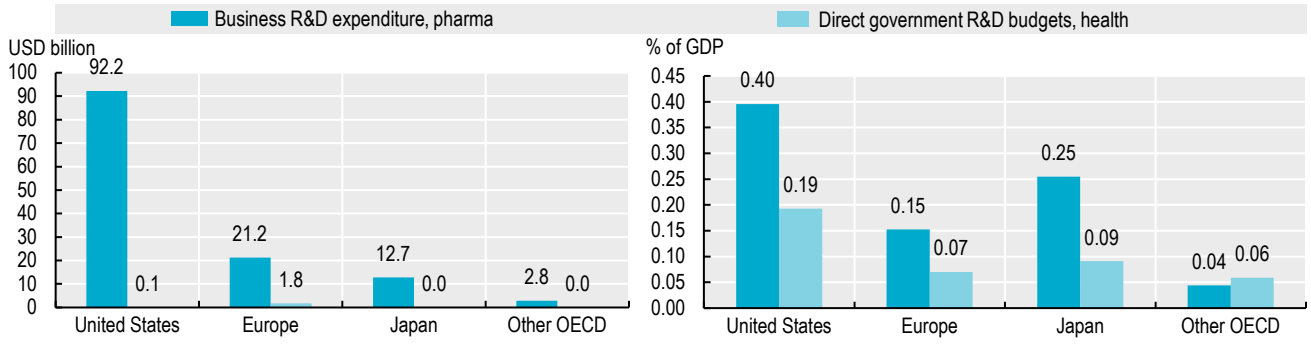
The gross value added of a sector equals gross output less intermediate consumption. It includes wage costs, consumption of fixed capital and taxes on production. The OECD averages in Figure 9.10 show unweighted means of R&D intensity, based on 17 countries with data available for air and spacecraft; and on 31-34 countries for all other industries.

Figure 9.11 includes the number of product-indication pairs in active development identified in the proprietary AdisInsight database curated by Springer Nature, which tracks commercial product development projects from discovery to market launch worldwide based on publicly available information.

References

OECD (2021), *Analytical Business Enterprise R&D (ANBERD) and Main Science and Technology Indicators (MSTI) Databases*, https://stats.oecd.org/. [1]

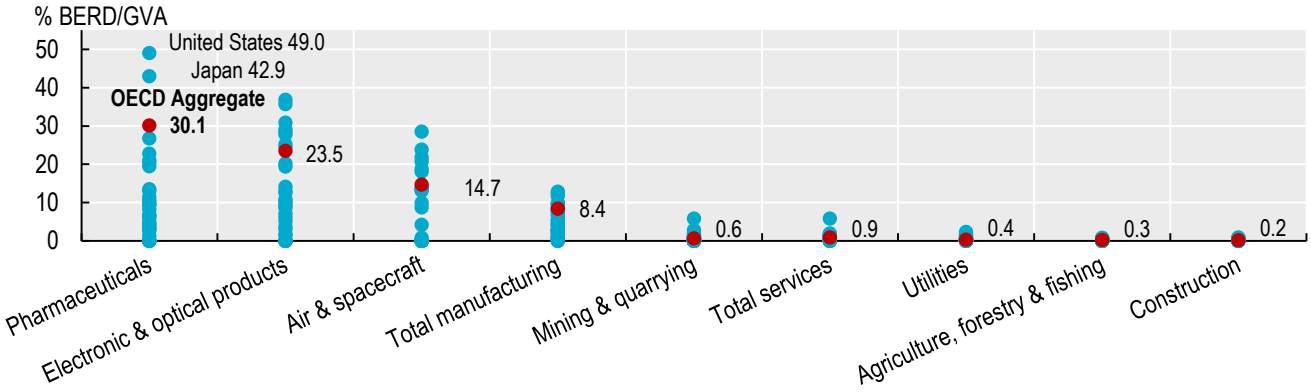
Figure 9.9. Business enterprise expenditure on pharmaceutical R&D and government budgets for health-related R&D, 2021 or latest year available



Note: Europe includes 21 EU Member States that are also OECD countries.
Source: OECD R&D Statistics.

StatLink https://stat.link/mplt94

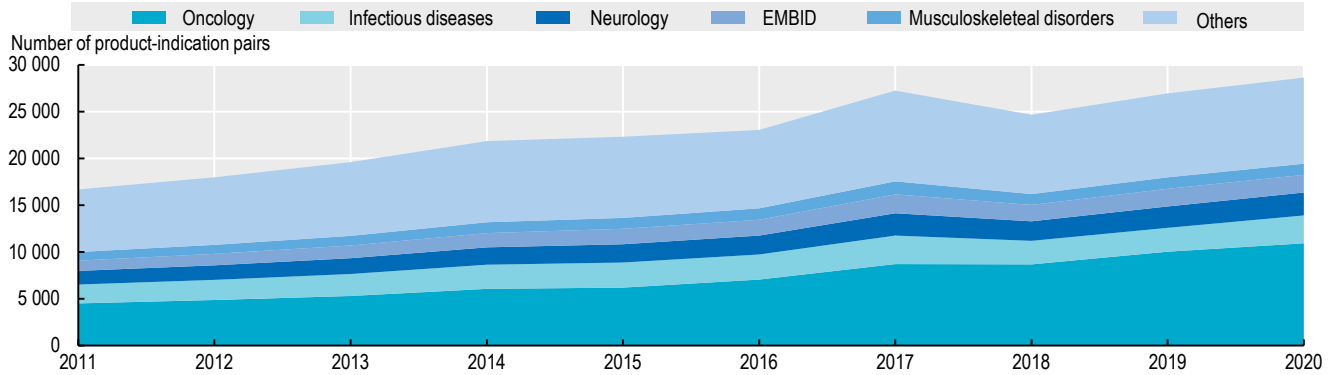
Figure 9.10. R&D intensity by industry: Business enterprise expenditure on R&D as a share of gross value added, 2019 (or nearest year)



Source: OECD Analytical Business Enterprise R&D (ANBERD), Structural Analysis (STAN) and System of National Accounts (SNA) databases.

StatLink https://stat.link/wpmaf0

Figure 9.11. Top health categories for product-indication pairs in active development, 2011-20



Note: Oncology includes malignant neoplasms; EMBID includes endocrine, metabolic, blood and immune disorders; infectious diseases also include parasitic diseases; musculoskeletal disorders include musculoskeletal and connective tissue disorders.
Source: AdisInsight.

StatLink https://stat.link/czml93