THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Population health impact of new drugs

An evaluation of new drugs recommended by the National Institute for Health and Care Excellence (NICE) in England

Huseyin Naci, PhD
Department of Health Policy
London School of Economics and Political Science

Pharmaceutical Policy Lab

Acknowledgements and disclosures

Collaborators:

- Peter Murphy, Beth Woods, and James Lomas (Center for Health Economics, University of York, UK)
- Jinru Wei and Irene Papanicolas (Center for Health System Sustainability, Brown School of Public Health, USA)

This project was partly funded by the Commonwealth Fund Senior Harkness Fellows Grant Scheme

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Background

Pharmaceutical Policy Lab

The National Institute for Health and Care Excellence (NICE)

- NICE was established in 1999 to evaluate new drugs following regulatory marketing authorisation.
- NICE's remit is to make funding recommendations for the National Health Service (NHS) in England.
- Local decision makers in England are mandated to make funding available for treatments recommended by NICE within a specified timeframe.

NICE and value for money

- NICE's stated goal is to base its recommendations on an assessment of population benefits and value for money.
- NICE explicitly mentions that its assessments consider the 'opportunity cost' of recommending one intervention instead of another.

Image credit: BMJ. 2004; 329(7459): 227–229.

NICE and quality-adjusted life years (QALYs)

- NICE assessments compare the *clinical-effectiveness* and *cost-effectiveness* of new versus existing treatments.
- NICE measures health benefits (*clinical-effectiveness*) in terms of quality-adjusted life years (QALYs).
- QALYs are an overall measure of health that weigh the **life expectancy** of an individual with an estimate of their **health-related quality of life**.
- 1 QALY = 1 year spent in perfect health.

NICE and cost-effectiveness analysis

- NICE estimates the new treatment's costs and how much benefit it produces compared with the next best alternative:

$$\textit{Incremental cost-effectiveness ratio (ICER)} = \frac{Cost_{new\ treatment} - Cost_{\ alternative\ treatment}}{Benefit_{new\ treatment} - Benefit_{alternative\ treatment}}$$

- Expressed as cost (in £) per additional QALY gained.
- NICE considers drugs with an incremental cost-effectiveness ratio between £20,000 and £30,000 per QALY gained as cost-effective.
- There is no empirical evidence to support NICE's current funding threshold.

Motivation for our work

- Econometric analyses examining the relationship between NHS expenditures and health outcomes have provided empirical estimates of the health system's marginal productivity.
- NHS in England spends approximately £15,000 to generate one additional QALY.
- **Paying more than £15,000 per QALY for health benefits of new drugs would represent poor value for money and do more harm than good to population health.**
- Our aim was to quantify the net health benefits of NICE-recommended new drugs, considering both the health benefits of new drugs and the health opportunity cost of resources required to pay for them.

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Methods (in brief)

Pharmaceutical Policy Lab

Estimating the net health benefits of new drugs

The amount of NHS spending for a new drug is determined by NICE's funding threshold for recommending that drug.

£30,000 per QALY gained

1000 patients receive the drug
1000£30,000 = £30,000,000*

1000 QALYs

Estimated health benefits gained from using the new drug in the NHS

1 additional QALY

—

2000 QALYs

Estimated health benefits that can theoretically be gained from reallocating that same money to other services in the NHS

2 additional QALYs

Net health effect
the difference between what is gained with new drug vs what could be gained by reallocating the funding to other services

Negative net benefit
(-1 QALY)
(-1000 QALYs)

Data and approach

1

New drugs and indications appraised by NICE

Publicly available information from:

- EMA website
- NICE documents

2

Value for money (ICER)

Incremental health benefits of new drugs

Incremental costs of new drugs

Publicly available information from:

- NICE documents
- Other HTA organizations
- Peer-reviewed literature

3

Numbers of patients receiving new drugs

Proprietary data from IQVIA

+

Publicly available data from peer-reviewed literature

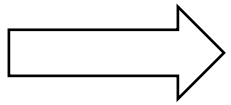
THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Results

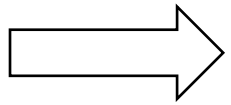
Pharmaceutical Policy Lab

Final analysis sample

We included **183** new drugs



approved in **287** indications

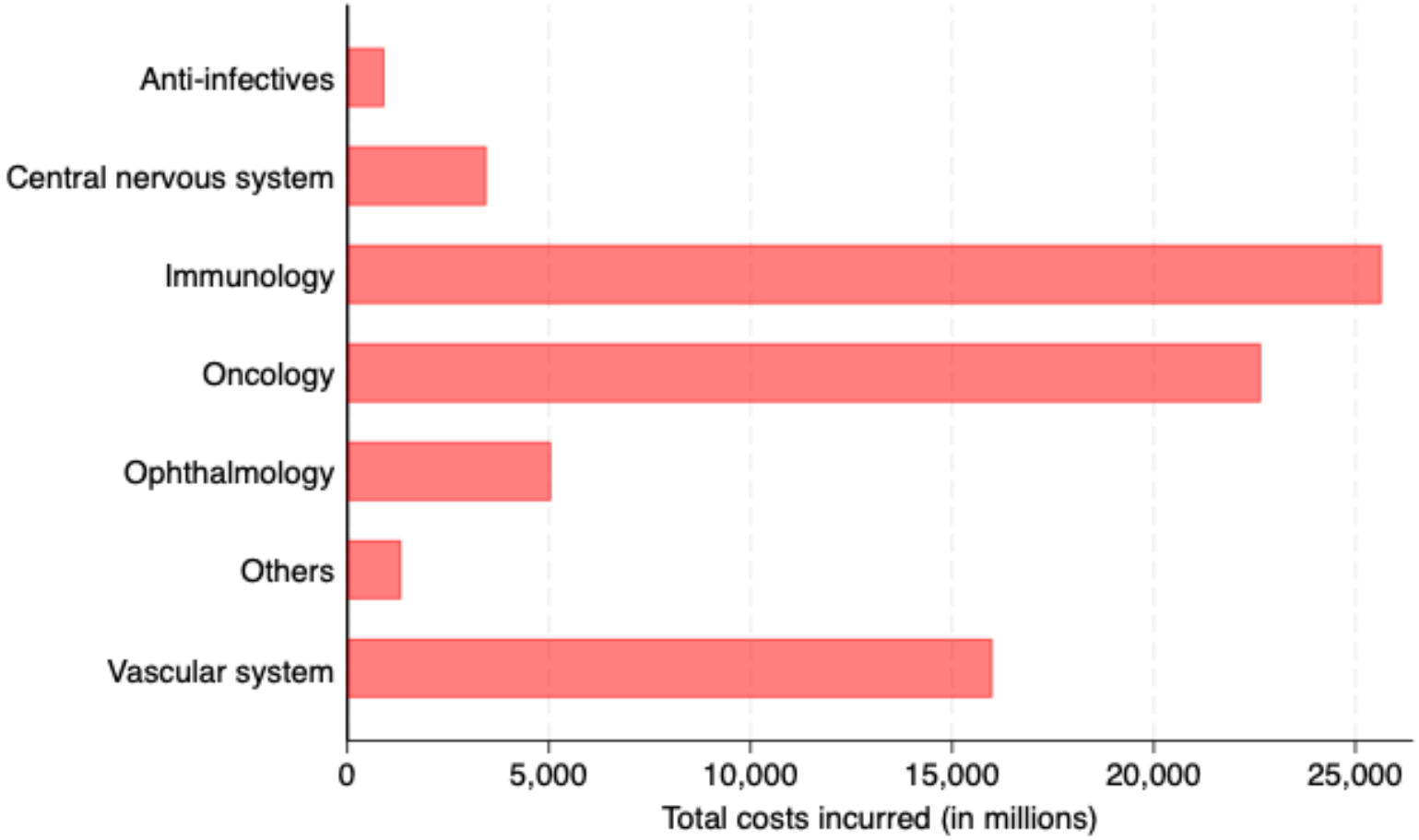


with **339** appraisals

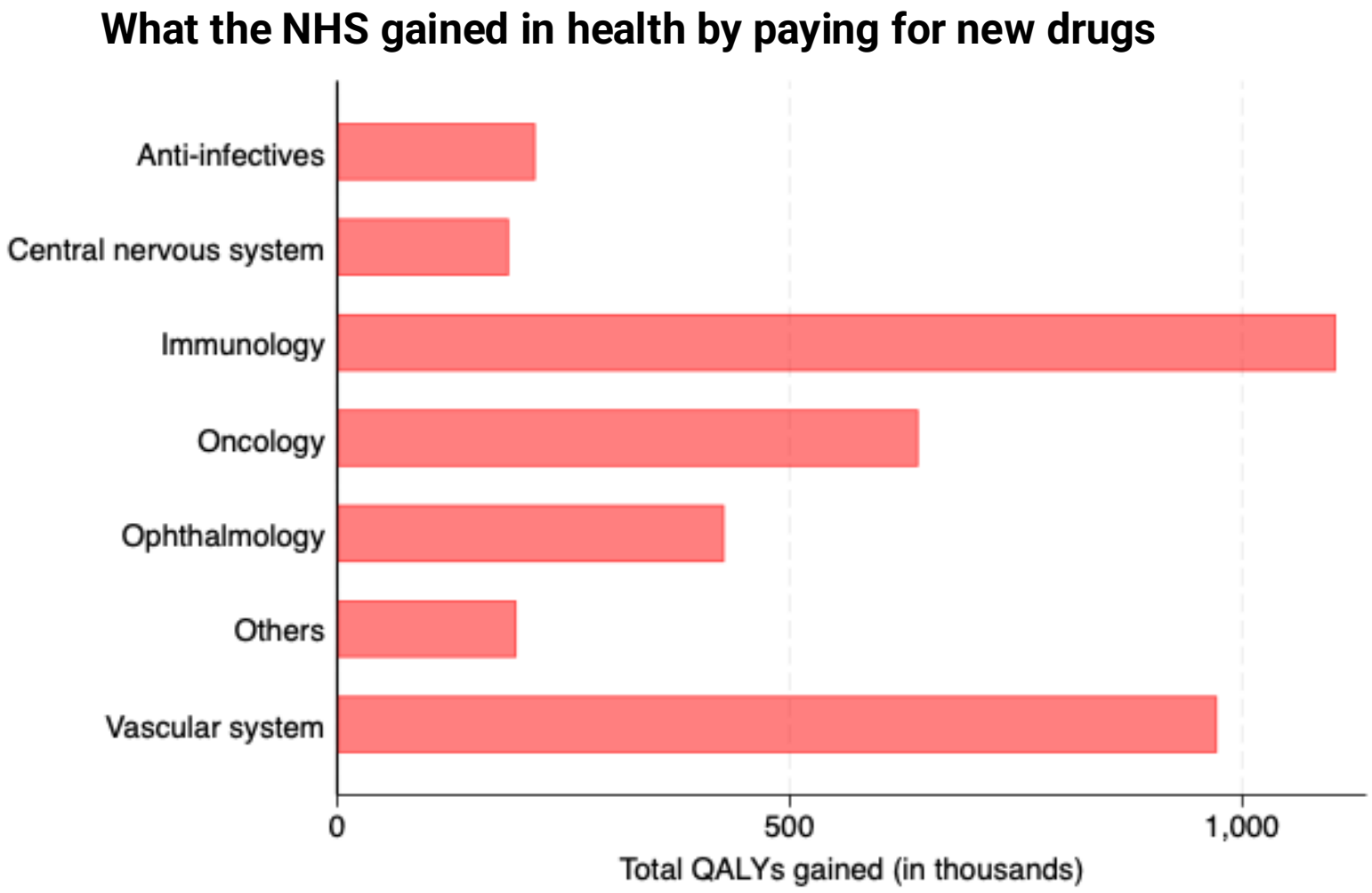
- Appraisals for cancer drugs accounted for nearly half of all appraisals (46%).
- More than half of appraisals were published between 2015-2020.

Total additional costs of new drugs

~20 million patients received new drugs recommended by NICE with an additional cost to the NHS of £75.1 billion

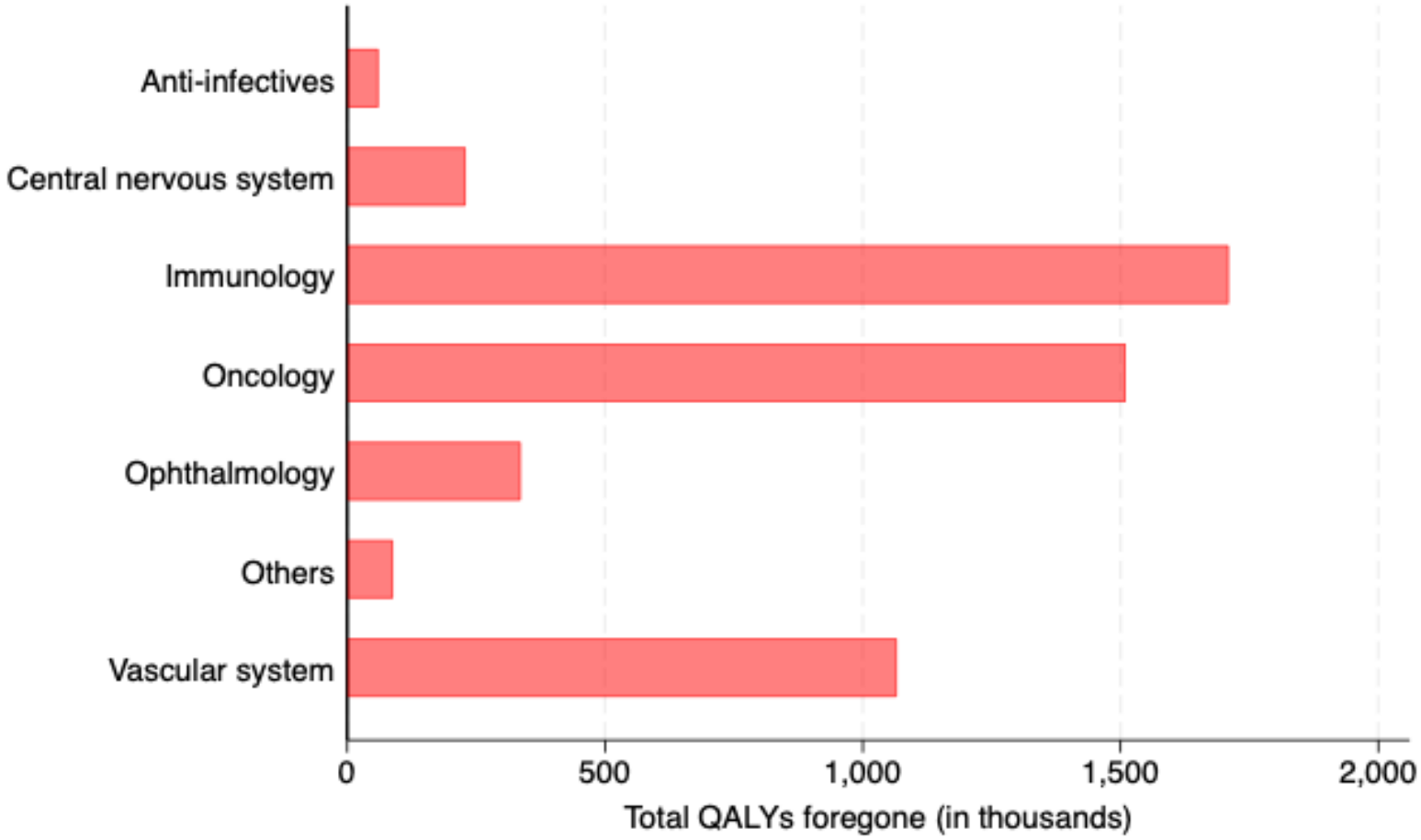


Total additional benefits of new drugs

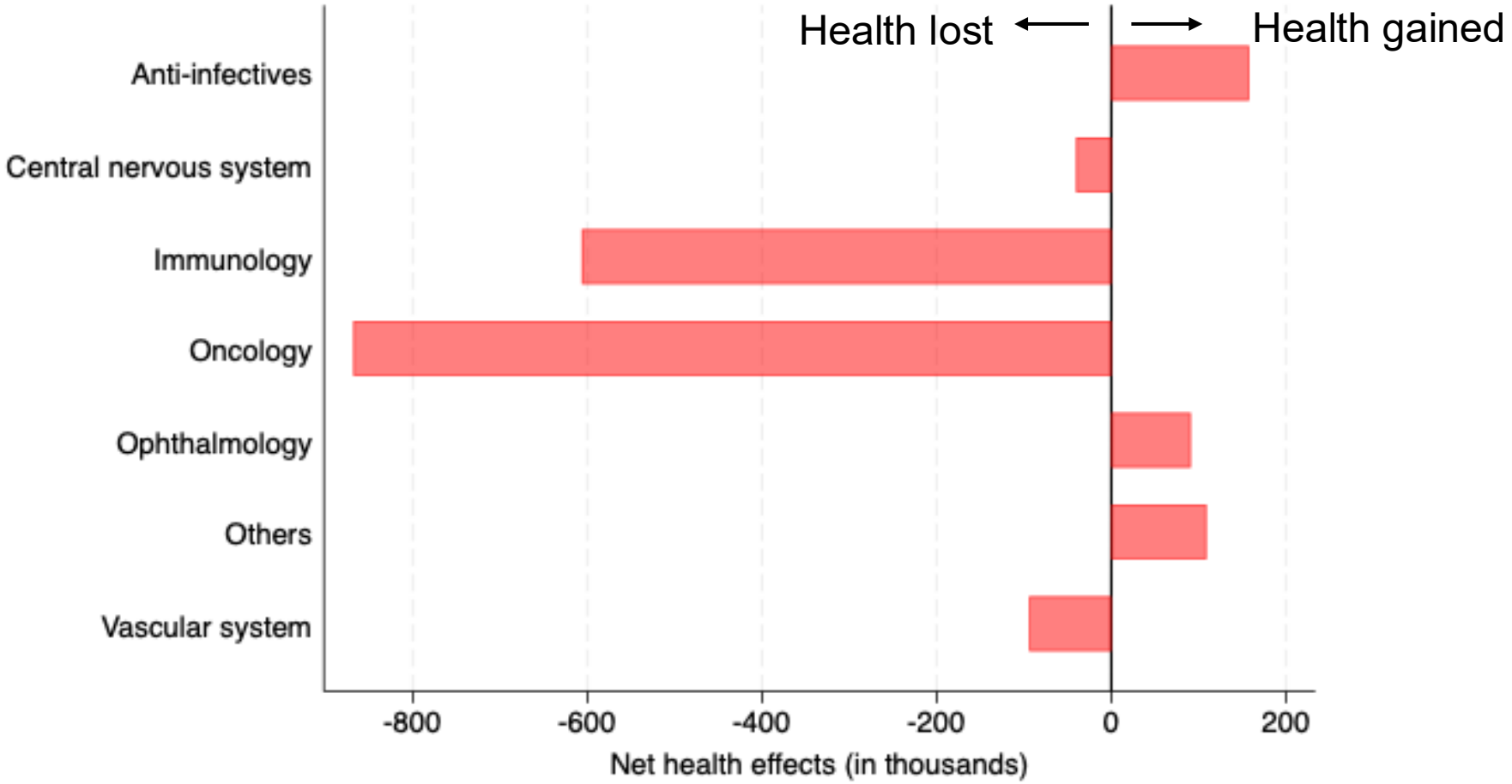


Total foregone health benefits

What the NHS gave up in health by paying for new drugs

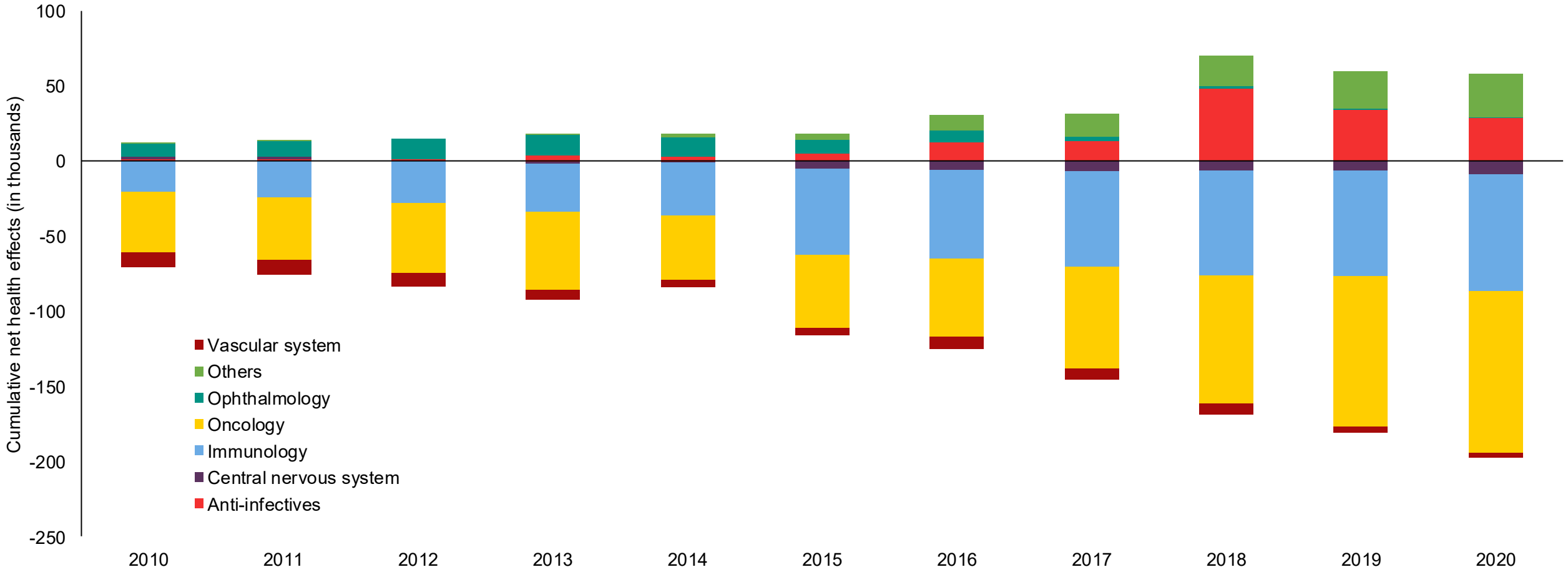


Net health effects of new drugs



THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Population health impact of new drugs over time and by therapy area



Pharmaceutical Policy Lab

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Discussion

Pharmaceutical Policy Lab

Discussion (I)

- High drug prices have health consequences, not just economic ones.
- In England (2000–2020), NHS coverage of new drugs displaced more population health than it generated.
- These results highlight trade-offs and implicit prioritisation: if drug prices are high, people who benefit from new drugs are prioritised over those who do not.
- NICE prioritises patients who could benefit from new drugs, valuing their health gains more than those of patients whose needs can be met elsewhere in the NHS.
- NICE's funding threshold means it is willing to pay twice as much for health gains from a new drug as the NHS typically spends to achieve the same benefit through existing services.

Discussion (II)

- English NHS operates under a limited budget and intense resource constraints.
- The most critical performance indicators of the NHS are no longer met.
- Paying high prices for new drugs can adversely affect population health in this environment.
- The concept of opportunity cost is relevant across all health systems.

Discussion (III)

- Opportunity costs can take different forms:

  ➢ In health insurance plans, including high-cost medicines in formularies can increase premiums. Higher premiums may lead some members to drop coverage, which can worsen outcomes.

  ➢ Even when additional resources are available, they may be more effectively used elsewhere. In some cases, investing these resources in other health interventions can generate greater overall health gains than spending them on drugs.

Articles

Population-health impact of new drugs recommended by the National Institute for Health and Care Excellence in England during 2000–20: a retrospective analysis

Huseyin Naci, Peter Murphy, Beth Woods, James Lomas, Jinru Wei, Irene Papanicolas

Lancet 2025; 405: 50–60