
Planning and costing cancer control interventions: a health economics perspective

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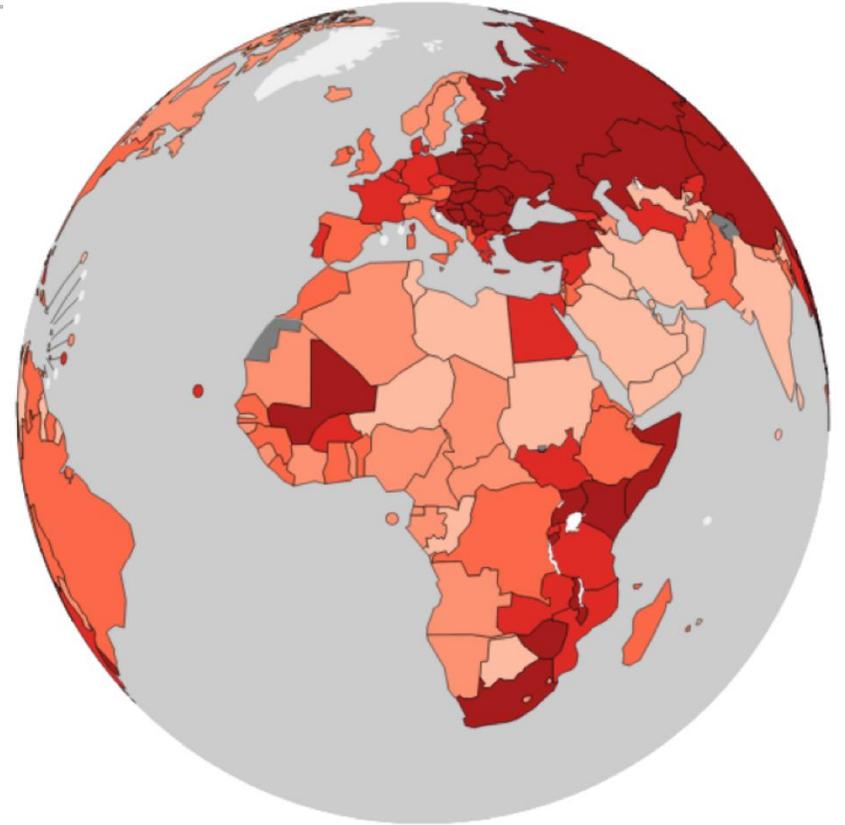
Global economic impact of cancer...

Cancer is the second leading cause of death worldwide.

About 170 million years of healthy life were lost due to death and disability because of cancer.

The total annual economic cost of cancer is estimated at US\$1.2 trillion.

Cancer causes the highest economic loss of all of the 15 leading causes of death worldwide.



Sources: Bray *et al.* 2018, *CA Cancer J Clin* 68(6):394-424; Soerjomataram *et al.* 2012, *Lancet* 380: 1840–50; Sutcliffe 2014. World Cancer Report 2014; John & Ross 2010. <http://pressroom.cancer.org/releases?item=262>; Knaul *et al.* 2012. Chapter 3. <http://www.hup.harvard.edu/catalog.php?isbn=9780982914403>.

... and financial burden to patients and families

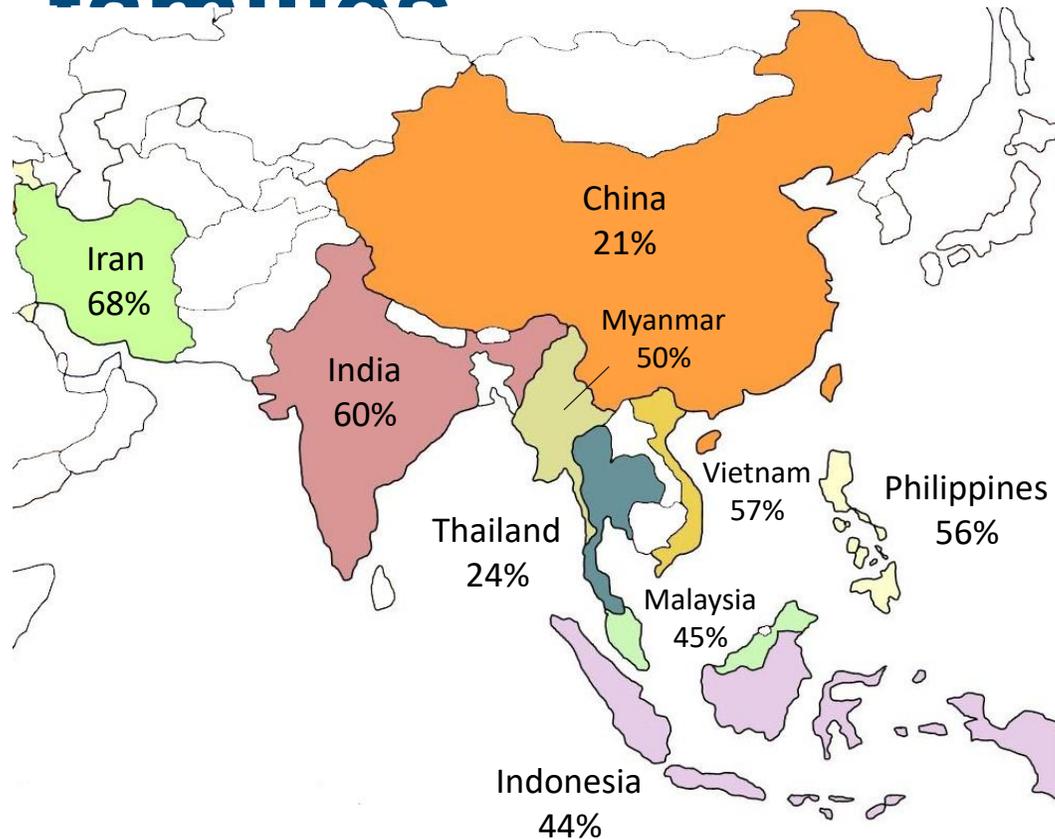


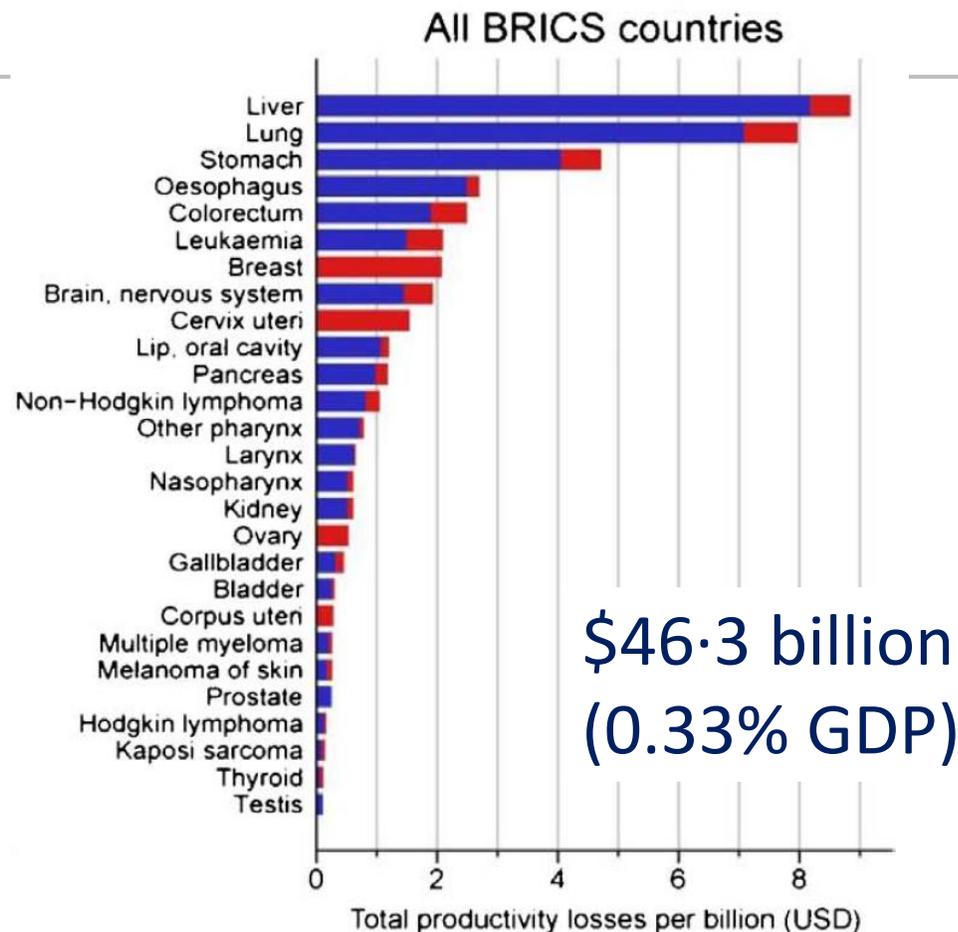
Figure: Financial catastrophe due to the costs of cancer treatment

Large out-of-pocket spending puts a heavy burden on families, especially the poor; risk of impoverishment due to catastrophic health spending.

In many countries, patients bear the cost for diagnosis and treatment of cancer and for those that can't bear the cost they forgo treatment.

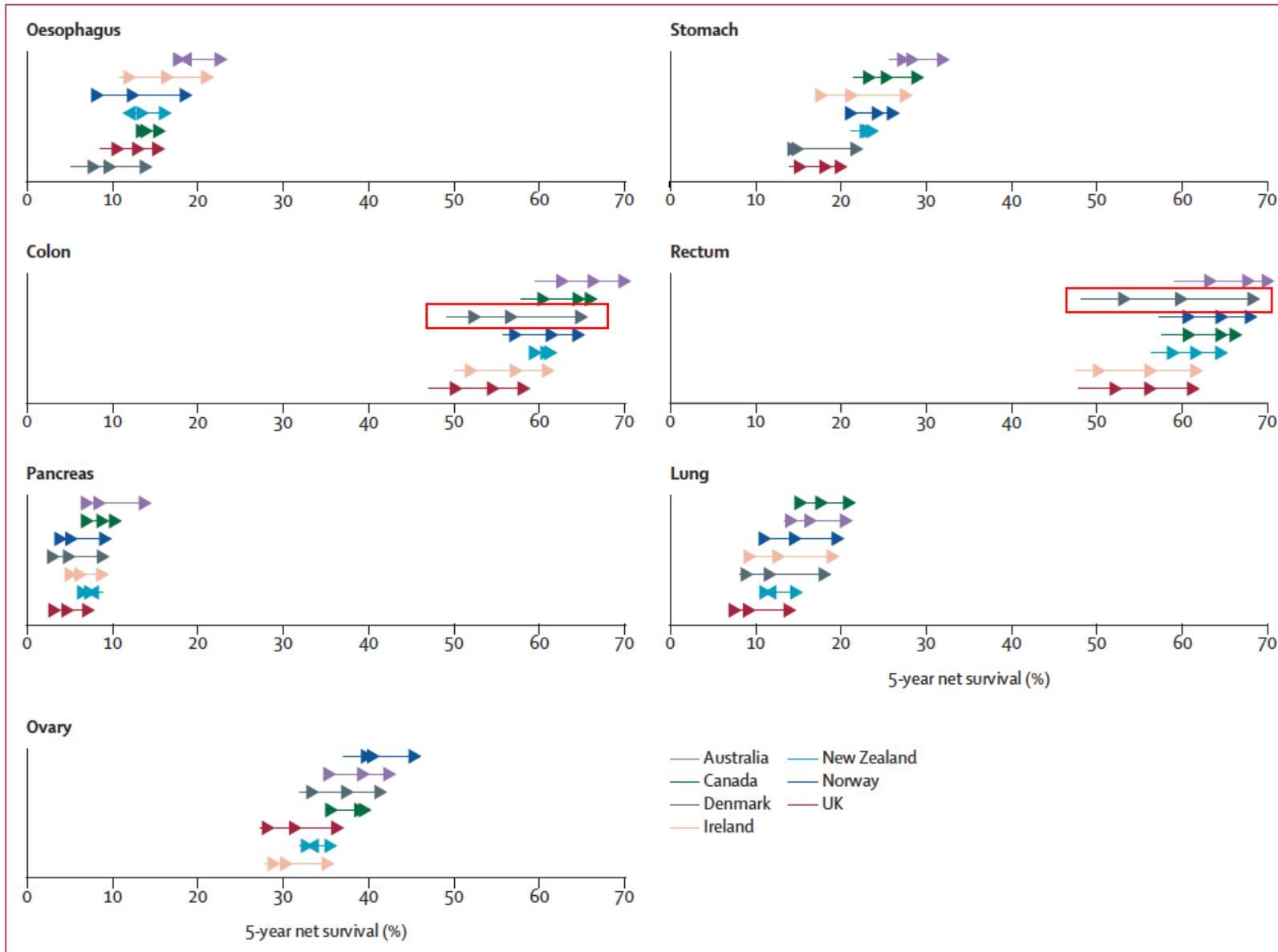
Source: Jan et al. 2018. *Lancet* 391(10134):2047-2058; Rajpal et al. 2018. *PLoS ONE* 13(2): e0193320; Hoang 2017, *BioMed Res Int*, <https://doi.org/10.1155/2017/9350147>

Cancer-related productivity costs in BRICS countries



Country	Total cost as a % of GDP
Brazil	0.21
Russia	0.25
India	0.36
China	0.34
South Africa	0.49
BRICS combined	0.33

Benefits of investing in cancer prevention and control on health

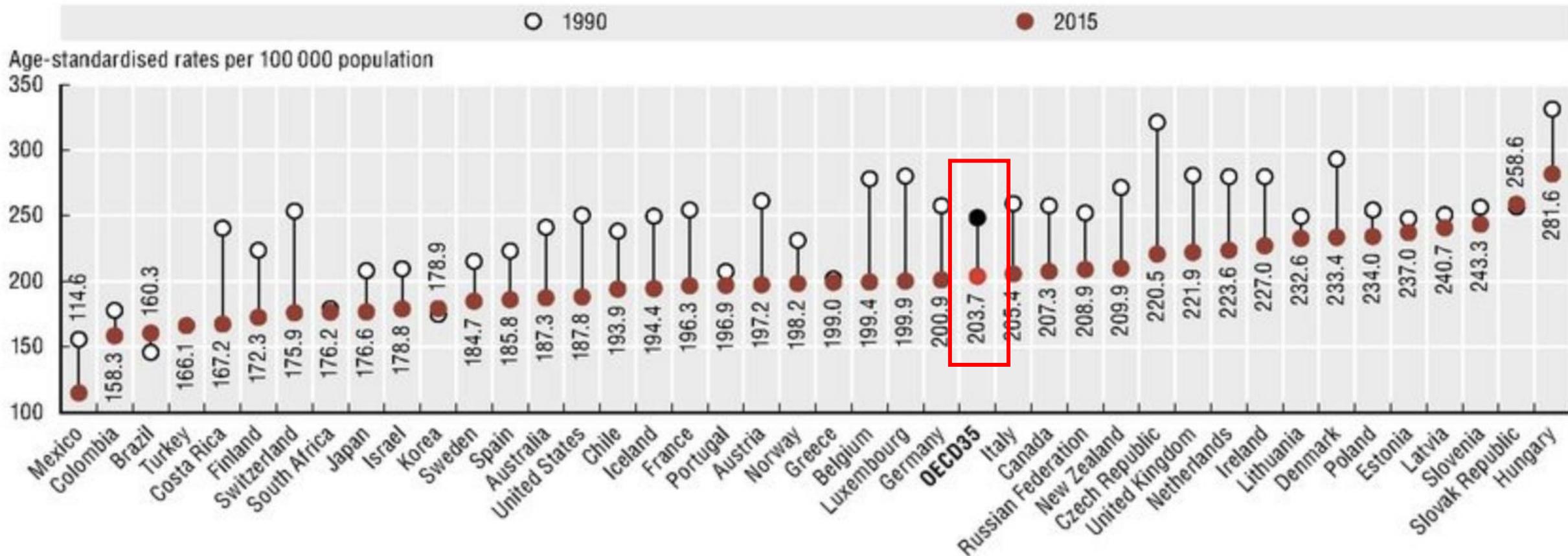


Age-standardised 5-year net survival by site, country, and period of diagnosis, 1995–2014

Source: Arnold et al. 2019. *Lancet Oncol.*
[http://dx.doi.org/10.1016/S1470-2045\(19\)30456-5](http://dx.doi.org/10.1016/S1470-2045(19)30456-5)

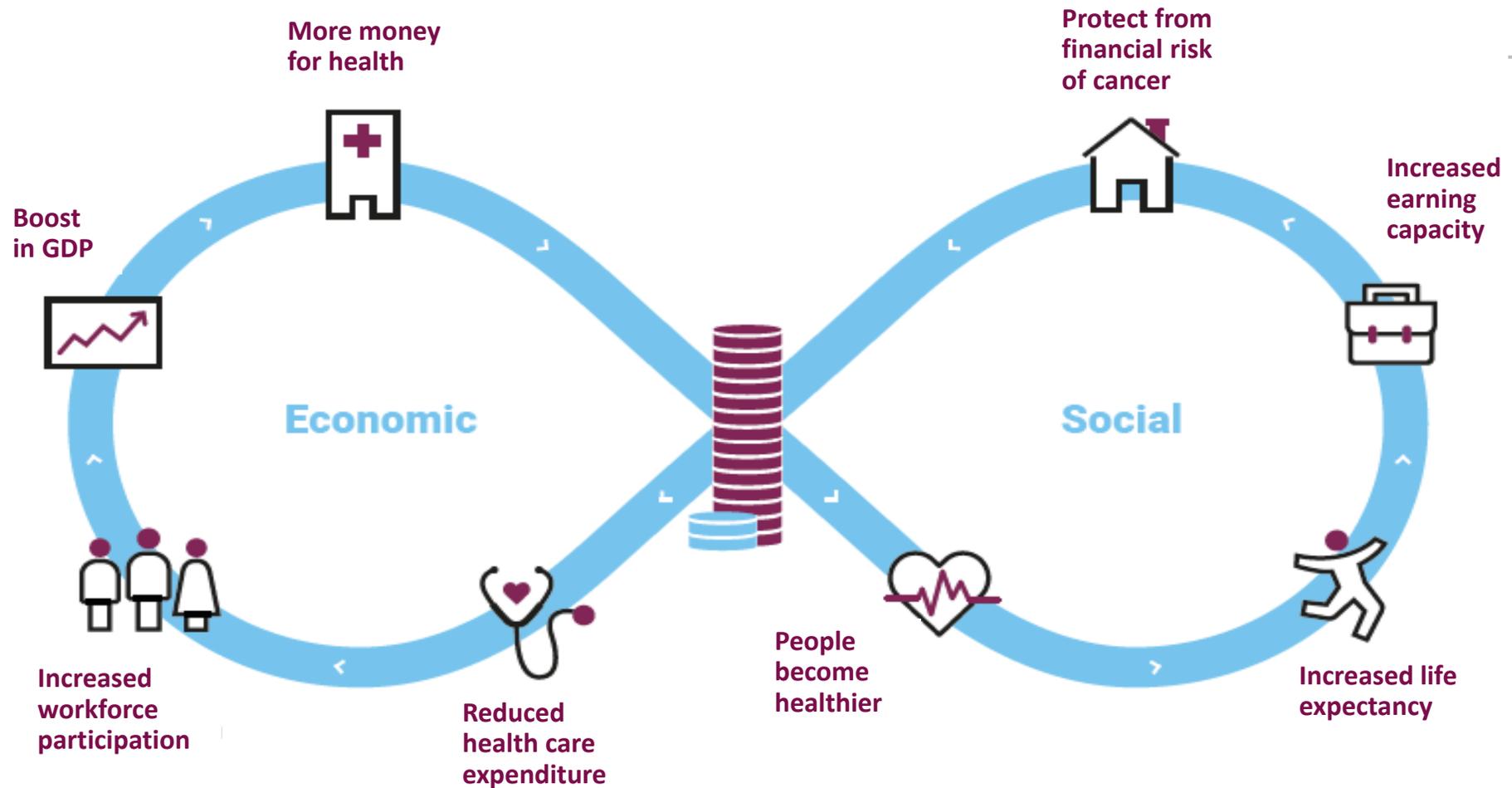
Benefits of investing in cancer prevention and control on health

3.10. Cancer mortality, 1990 and 2015 (or nearest year)



Sources: OECD (2017), Health at a glance 2017: OECD indicators. https://dx.doi.org/10.1787/health_glance-2017-en

Benefits of investing in cancer are broader than health



Sources: WHO 2018. Saving lives, spending less. WHO-NMH-NVI-18.8

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Rising costs of cancer

Burden of cancer is growing and its cost is fast becoming unaffordable in many countries.

Cost growth is faster than GDP and aging of population in developed countries.



We are at a crossroads for affordable cancer care, where our choices - or refusal to make choices - will affect the lives of millions of people.

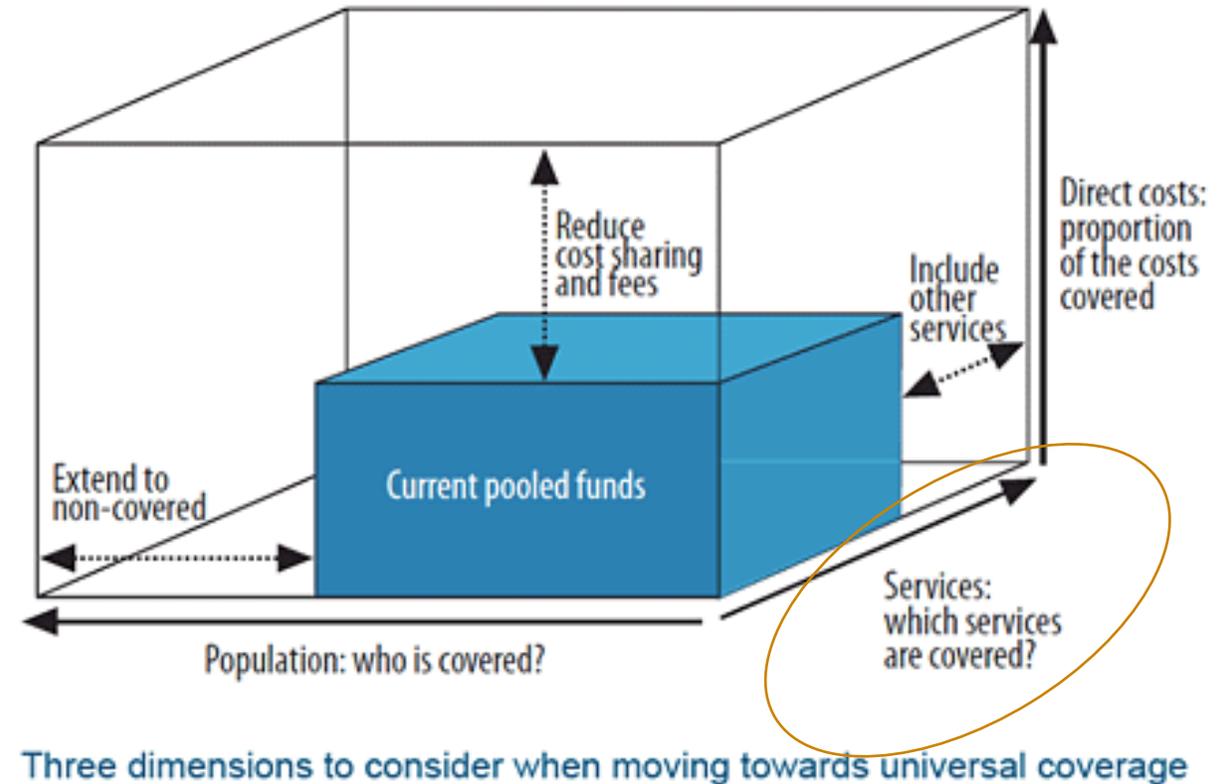
Sullivan *et al.* 2011. *Lancet Oncol* 2011; 12: 933–80

Dimensions of universal health coverage

What services? All services?

Who will receive? (coverage)
Everyone, regardless of precondition

How much will be paid?
• Minimize user fees



Which services to cover?

Decision

Clearly defined legal
mandate

Citizens voice

Dialogue

Legitimacy

Accountability

Transparency

Inclusiveness

Data

**Focus on criteria
for health
priorities**

Burden

Cost-effectiveness

Budget impact

Financial Risk

Protection

Fairness

Acceptability



Limited resources → choices



Explicit criteria for decision making
promotes transparency



There is no “right” set of criteria

Data

Criteria for reimbursement decision making should be selected through an inclusive and transparent process, and should be based upon the values of the population being served

Safe and effective?

Cost-effective and affordable?

Is implementation feasible?

Does it target disadvantaged or vulnerable populations?

Financial protection?

Are there other ethical considerations?



Manage Cancer

'Best buys' and other recommended interventions

'Best buys': effective interventions with cost effectiveness analysis (CEA) \leq \$100 per DALY averted in LMICs



Vaccination against human papillomavirus (2 doses) of 9–13 year old girls

Prevention of cervical cancer by screening women aged 30–49, either through:

Visual inspection with acetic acid linked with timely treatment of pre-cancerous lesions²²

Pap smear (cervical cytology) every 3–5 years linked with timely treatment of pre-cancerous lesions²³

Human papillomavirus test every 5 years linked with timely treatment of pre-cancerous lesions²⁴

Effective interventions with CEA $>$ \$100 per DALY averted in LMICs



Screening with mammography (once every 2 years for women aged 50–69 years) linked with timely diagnosis and treatment of breast cancer²⁴

Treatment of colorectal cancer stages I and II with surgery +/- chemotherapy and radiotherapy

Treatment of cervical cancer stages I and II with either surgery or radiotherapy +/- chemotherapy

Treatment of breast cancer stages I and II with surgery +/- systemic therapy.

Basic palliative care for cancer: home-based and hospital care with multi-disciplinary team and access to opiates and essential supportive medicine²⁵

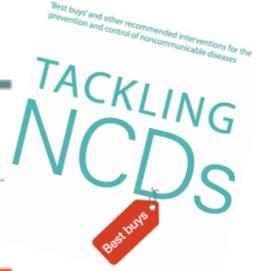
Other recommended interventions from WHO guidance (CEA not available)



Prevention of liver cancer through hepatitis B immunization

Oral cancer screening in high-risk groups (for example, tobacco users, betel-nut chewers) linked with timely treatment

Population-based colorectal cancer screening, including through a faecal occult blood test, as appropriate, at age $>$ 50, linked with timely treatment



Current guidance

Appendix 3 of WHO Global Action Plan = “Best Buys for NCD Prevention & Control”

Widespread support from Member States (requested menu of options)

Significant interest in developing further

How are WHO and IARC supporting countries in integrating Cancer interventions into UHC planning?

Welcome to the WHO-IARC Cancer Costing and Planning Tool

A tool developed by the World Health Organization
and the International Agency for Research on Cancer (IARC)

This tool has been developed to support country planners in scaling up cancer responses. The tool consists of 4 basic steps:

1. A situation assessment of the current health system strength to assist in developing a targeted intervention package
2. Contextualisation of default data provided to the local setting
3. Analysis of costs and benefits of scaling up cancer programmes
4. Evaluation of the outputs of the analysis in terms of assessing feasibility of the proposed plan

As with any tool, the strength of the analytic results and evaluation of these is only as strong as the data that goes in. We have highlighted critical input data where attention should be focused on ensuring applicability in the local setting.

Although the tool is hoped to be self explanatory, a user guidance document is available.

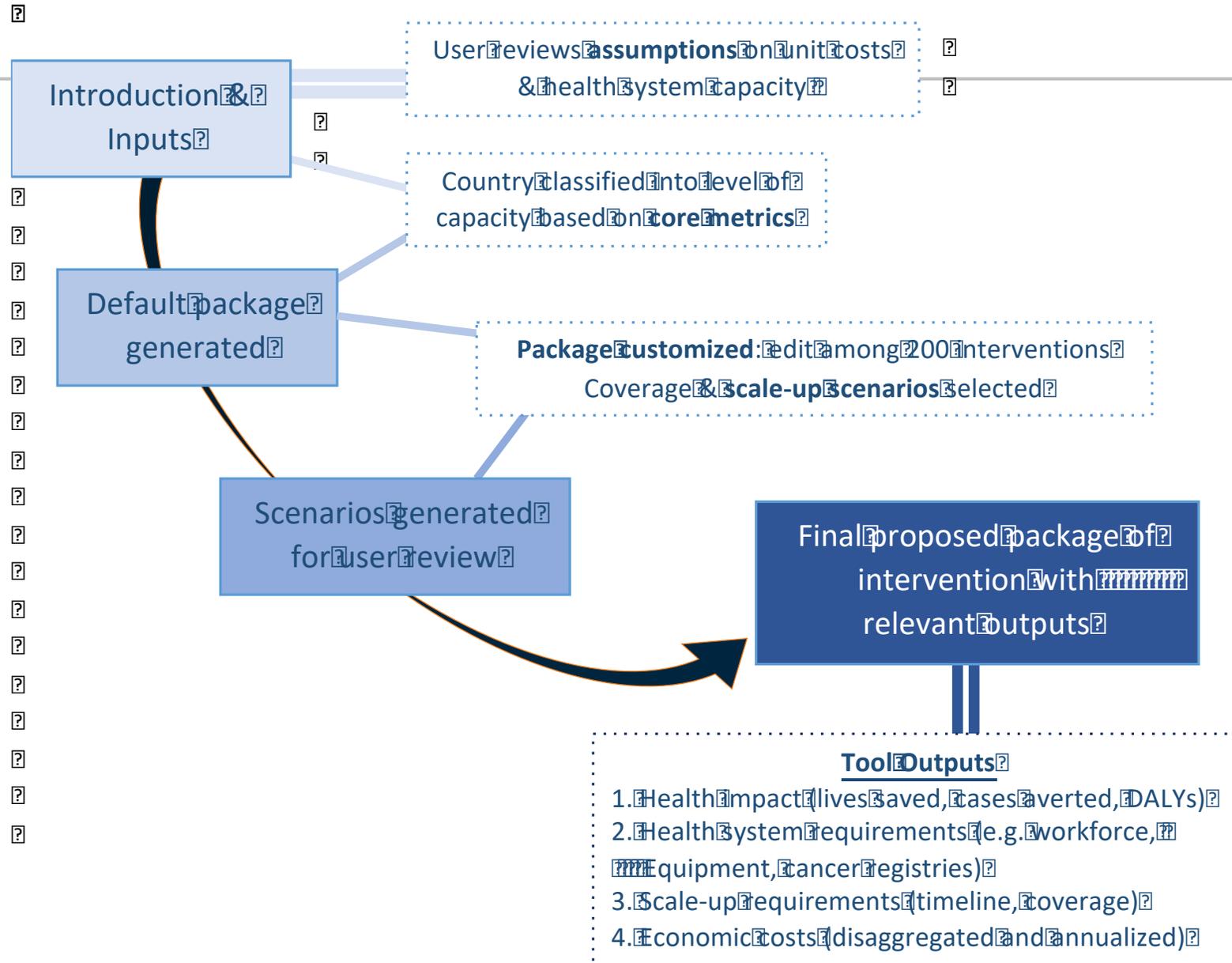
The intention of this tool is to be compatible with the OneHealth Tool for costing and strategic planning, and future iterations of this too will be incorporated into the OneHealth Platform.

Ready to get started?

Simply answer the questions below, and you will receive a proposed intervention package.

This suggested package can be overwritten if it does not respond to the countries needs - simply select "no" when questioned if you would like to select the proposed package, and select an alternative package from the drop down menu.

Structure of the tool



Outputs: Pilot study

Situational assessment (country X)

Burden of cancer (2018)

6545 new cases; 4497 cancer deaths

Current interventions

No HPV vaccination

2 pilots cervical cancer screen & treat

Review of NCCP 2020-2024

Comprehensive plan with 118 interventions

No priorities defined

Most patient are diagnosed at a late stage (42% stage IV for breast and cervical cancer)

Current health expenditure = 3% of GDP; 55.6% out-of-pocket expenditure.

Outputs: Costing

NCCP 2020-2024 identified 118 interventions and no priorities.

Total programme costs = 2,863,278 US\$

→ budget not available

Cost of clinical services = anywhere between 500,000 and 10 million USD.



Defined priority interventions → programme costs reduced to 728,000 USD

Cost of clinical services = 3.4 million USD, 59% for medicine and health products

Human resources: identified number of full time equivalents required.

Equipment and infrastructure scale-up.

Scenario Modeling : ↓ med prices

Item	Global ref cost per unit	Price paid by country	% difference
5-FU, 500mg vial (50mg/ml)	2.40	5.71	138%
Cisplatin 50mg (1mg/ml)	6.05	22.14	266%
Cyclophosphamide, 1g	9.25	5.43	-41%
Docetaxel 20mg/ml, 80mg	17.51	21.43	22%
Doxorubicin, 50mg vial	5.41	20.71	283%
Etoposide 100mg (20mg/ml)	2.03	10.00	393%
Filgastrim, 30 MU	4.50	54.29	1106%
Irinotecan, 300mg	4.66	220.53	4637%
Letrozole	0.42	0.95	128%
Leucovorin, 50mg	2.34	4.54	94%
Oxaliplatin, 100mg	74.77	18.33	-75%
Paclitaxel 100mg (6mg/ml)	11.08	107.14	867%
Tamoxifen, 20mg tablet	0.11	0.08	-33%
Zoledronic acid 4mg	25.45	164.29	546%

Current situation:

Current drug prices in country

New Scenario:

Global reference drug prices

Potential annual saving = \$500,000

Key messages



Government commitment to cancer care action and integration into UHC



Implement value for money solutions



Prioritize important programmes and policies



Ensure financial protection



Health systems approach – facilities and human resources at the health planning

Thank you

The WHO/IARC Costing and Planning Tool Group:

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**World Cancer
Leaders' Summit**

International Agency for Research on Cancer



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