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.

... and financial burden to patients and families

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.

**Figure: Financial catastrophe due to the costs of cancer treatment**

Cancer-related productivity costs in BRICS countries

Country:
- Brazil: 0.21%
- Russia: 0.25%
- India: 0.36%
- China: 0.34%
- South Africa: 0.49%
- BRICS combined: 0.33%

Total cost as a % of GDP: $46.3 billion (0.33% GDP)

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

Benefits of investing in cancer prevention and control on health

Benefits of investing in cancer are broader than health

- More money for health
- Protect from financial risk of cancer
- Increased earning capacity
- Increased life expectancy
- People become healthier
- Reduced health care expenditure
- Increased workforce participation
- Boost in GDP
- More money for health

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

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

Three dimensions to consider when moving towards universal coverage
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
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**

<table>
<thead>
<tr>
<th>‘Best buys’: effective interventions with cost effectiveness analysis (CEA) ≤ $100 per DALY averted in LMICs</th>
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</thead>
<tbody>
<tr>
<td>Vaccination against human papillomavirus (2 doses) of 9-13 year old girls</td>
</tr>
<tr>
<td>Prevention of cervical cancer by screening women aged 30-49, either through:</td>
</tr>
<tr>
<td>Visual inspection with acetic acid linked with timely treatment of pre-cancerous lesions (2r)</td>
</tr>
<tr>
<td>Pap smear (cervical cytology) every 3-5 years linked with timely treatment of pre-cancerous lesions (2r)</td>
</tr>
<tr>
<td>Human papillomavirus test every 5 years linked with timely treatment of pre-cancerous lesions (2r)</td>
</tr>
<tr>
<td>Effective interventions with CEA &gt; $100 per DALY averted in LMICs</td>
</tr>
<tr>
<td>Screening with mammography (once every 2 years for women aged 50-69 years) linked with timely diagnosis and treatment of breast cancer (2r)</td>
</tr>
<tr>
<td>Treatment of colorectal cancer stages I and II with surgery +/- chemotherapy and radiotherapy</td>
</tr>
<tr>
<td>Treatment of cervical cancer stages I and II with either surgery or radiotherapy +/- chemotherapy</td>
</tr>
<tr>
<td>Treatment of breast cancer stages I and II with surgery +/- systemic therapy</td>
</tr>
<tr>
<td>Basic palliative care for cancer: home-based and hospital care with multi-disciplinary team and access to opiates and essential supportive medicine (2r)</td>
</tr>
<tr>
<td>Prevention of liver cancer through hepatitis B immunization</td>
</tr>
<tr>
<td>Oral cancer screening in high-risk groups (for example, tobacco users, betel-nut chewers) linked with timely treatment</td>
</tr>
<tr>
<td>Population-based colorectal cancer screening, including through a faecal occult blood test, as appropriate, at age &gt;50, linked with timely treatment</td>
</tr>
</tbody>
</table>

### 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 tool 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

Introduction & Inputs

Default package generated

Scenarios generated for user review

Final proposed package of intervention with relevant outputs

User reviews assumptions on unit costs & health system capacity

Country classified into level of capacity based on core metrics

Package customized: edit among 200 interventions
Coverage & scale-up scenarios selected

Tool Outputs
1. Health impact (lives saved, cases averted, DALYs)
2. Health system requirements (e.g. workforce, Equipment, cancer registries)
3. Scale-up requirements (timeline, coverage)
4. Economic costs (disaggregated and annualized)
### Outputs: Pilot study

**Situational assessment (country X)**

<table>
<thead>
<tr>
<th>Burden of cancer (2018)</th>
<th>6545 new cases; 4497 cancer deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current interventions</td>
<td>No HPV vaccination</td>
</tr>
<tr>
<td></td>
<td>2 pilots cervical cancer screen &amp; treat</td>
</tr>
<tr>
<td>Review of NCCP 2020-2024</td>
<td>Comprehensive plan with 118 interventions</td>
</tr>
<tr>
<td></td>
<td>No priorities defined</td>
</tr>
</tbody>
</table>

Most patients 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.
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.
## Current Scenario

**Price negotiation**

**Millions (local currency)**

### Total costs

Current drug prices in country

### New Scenario

Global reference drug prices

**Potential annual saving = $500,000**

### Scenario Modeling: ↓ med prices

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

**Current situation:**

Current drug prices in country

**New Scenario:**

Global reference drug prices
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

Invest in data systems. We cannot monitor what we cannot measure.
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