Cancer control tools to support costing cancer plans and benefit packages

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Context of WHO Cancer Priority Setting Tools

Set priorities / define UHC benefit package

>90% inefficiency in expenditure, breast ca not included in UHC

(1) Meeting Government Needs

Anticipates budget needs (eg, costs)

Only 10% MS cost cancer plans

(2) Member State Mandate

Determines health system requirements (eg, workforce)

>70% LMIC lack cancer system capacity

Generate business plan

No platform for national cancer business plans

Financial burden of cancer to households

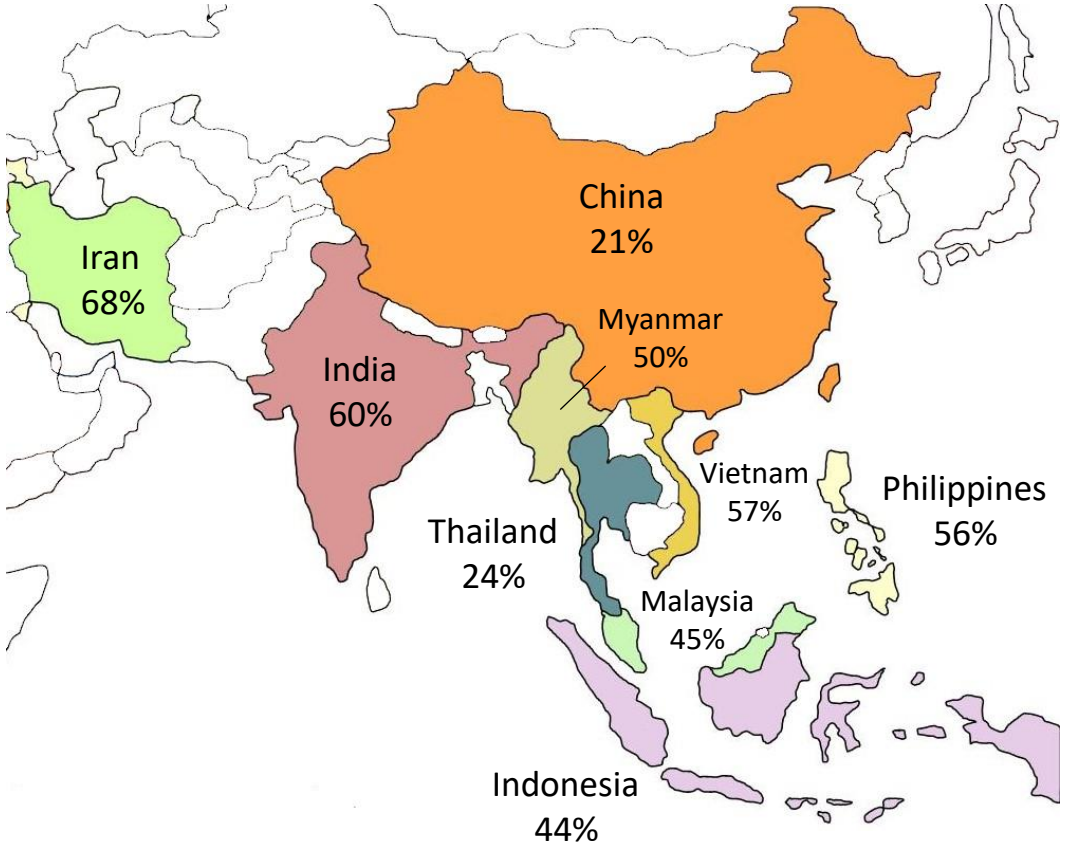


Figure: Financial catastrophe due to the costs of cancer treatment

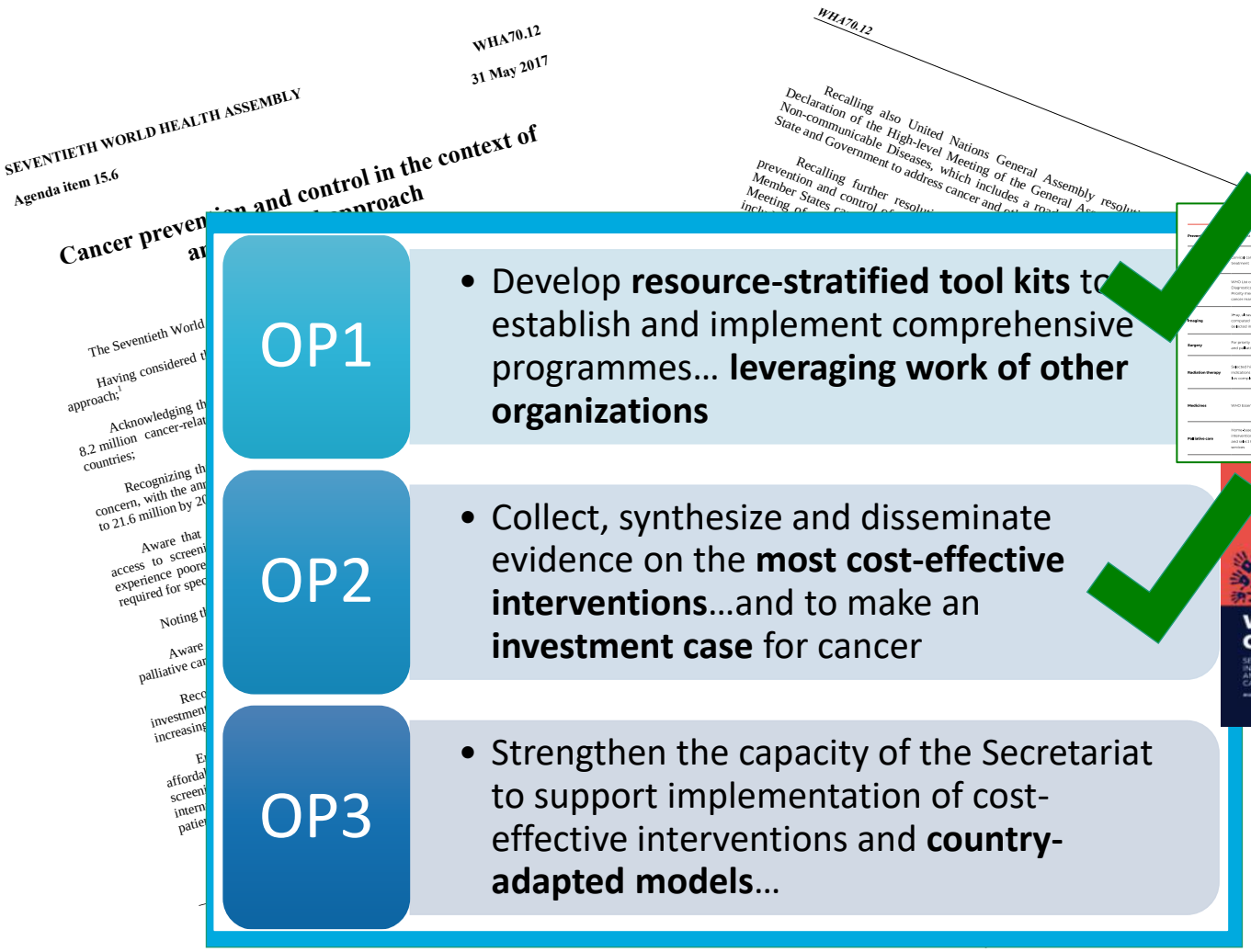
- Large out-of-pocket spending puts a heavy burden on families, especially the poor; risk of impoverishment due to catastrophic health spending.
- In many countries, patients bear the cost for diagnosis and treatment of cancer and for those that can't bear the cost they forgo treatment.

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

Context of WHO Cancer Priority Setting Tools

(1) Meeting Government Needs

(2) Member State Mandate



Tool Functionality

Inputs

Data

Current service analysis

Dialogue

Select package, scale-up

Outputs

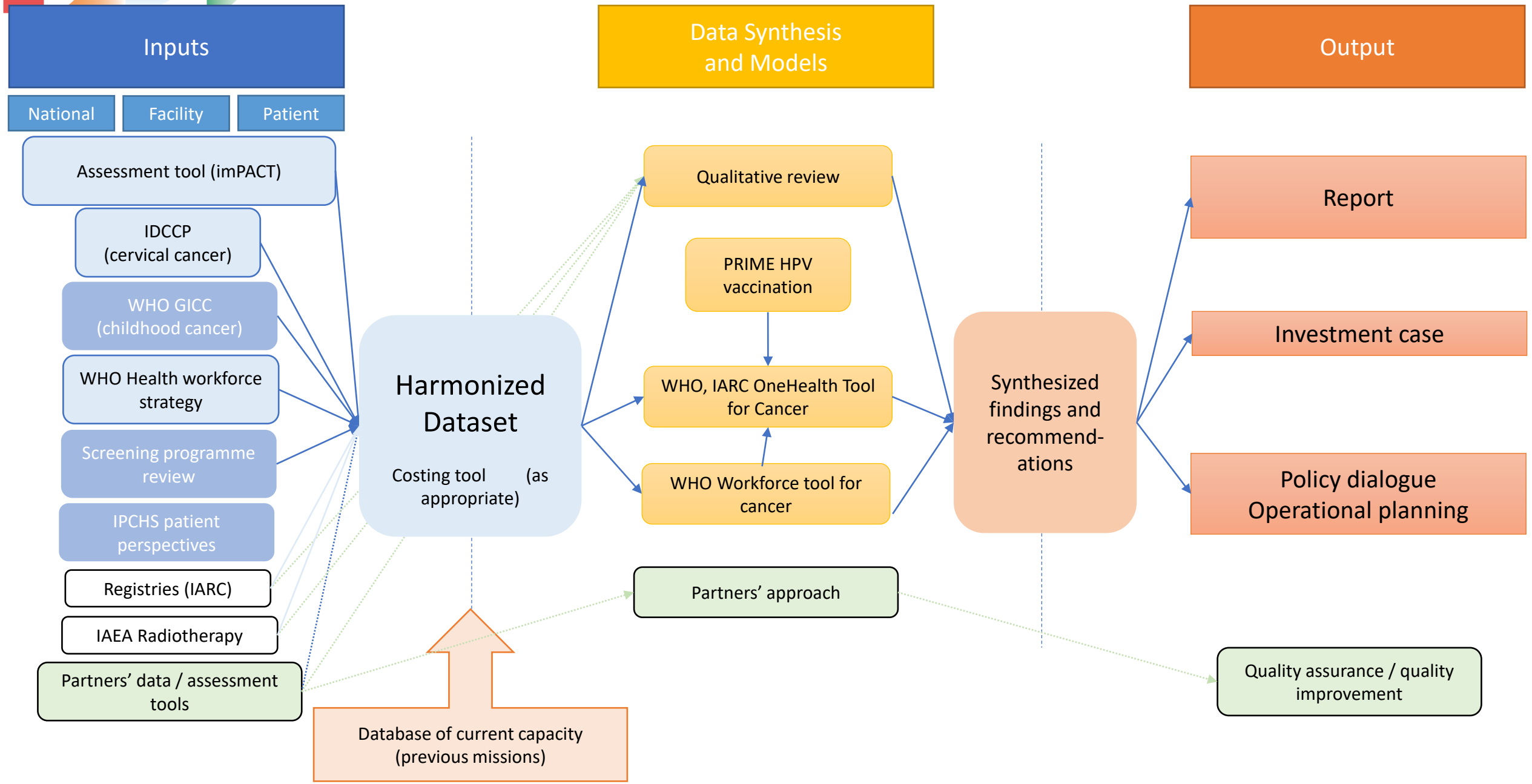
Decision

Assessment tool

IARC, WHO, IAEA database country situational analysis

World Health Organization

Harmonized Assessment Tool



Tool Functionality

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Country Case Study

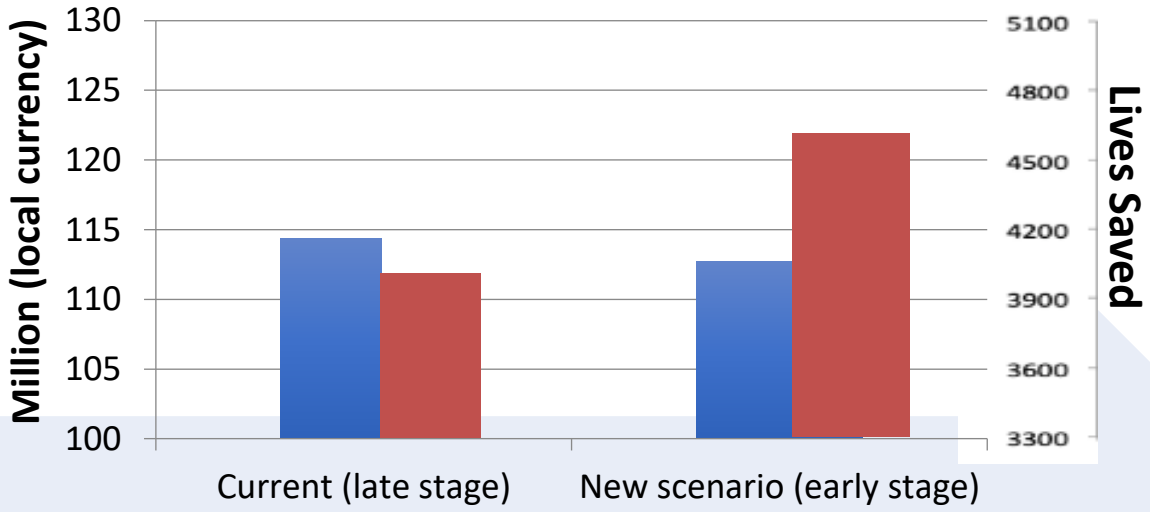
Data

Dialogue

Decision

Current situation:

Advanced stage of presentation (>50% stage III/IV)



Screening

- ~ $1-2 mil per year
- ↑ MG from 3 to 50
- ↑ radiologist 3 FTE & path
- *Impact*: 200-500 lives saved

Early Diagnosis

- ~ $250,000 per year
- Awareness, PC training, referral, navigator
- *Impact*: 200-400 lives saved

Potential annual saving $USD 50,000

500+ lives saved

Government invested in early diagnosis programme + cervical cancer screening

World Health Organization

Country Case Study

Data

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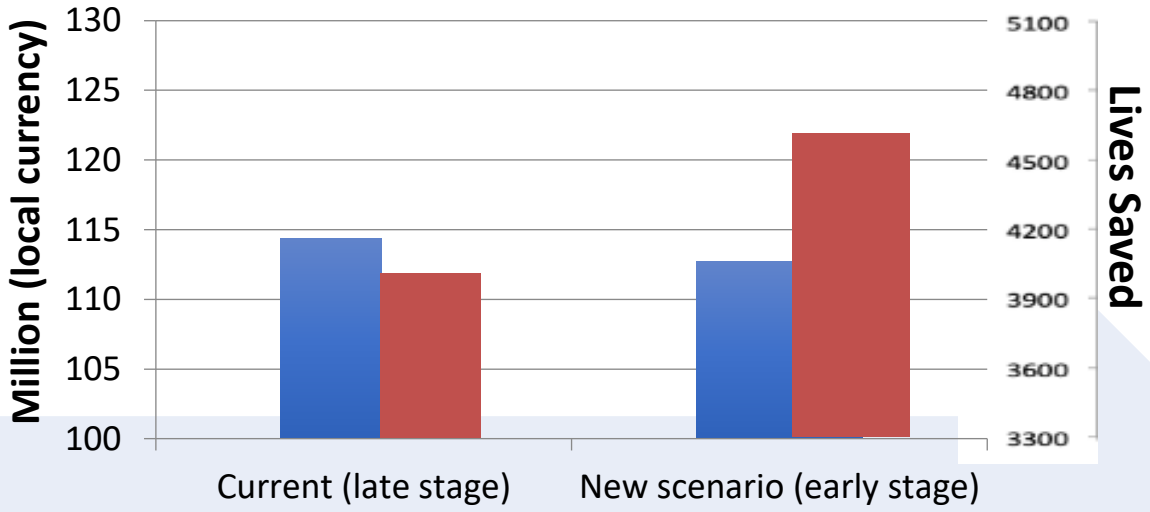

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World Health Organization

Country Case Study

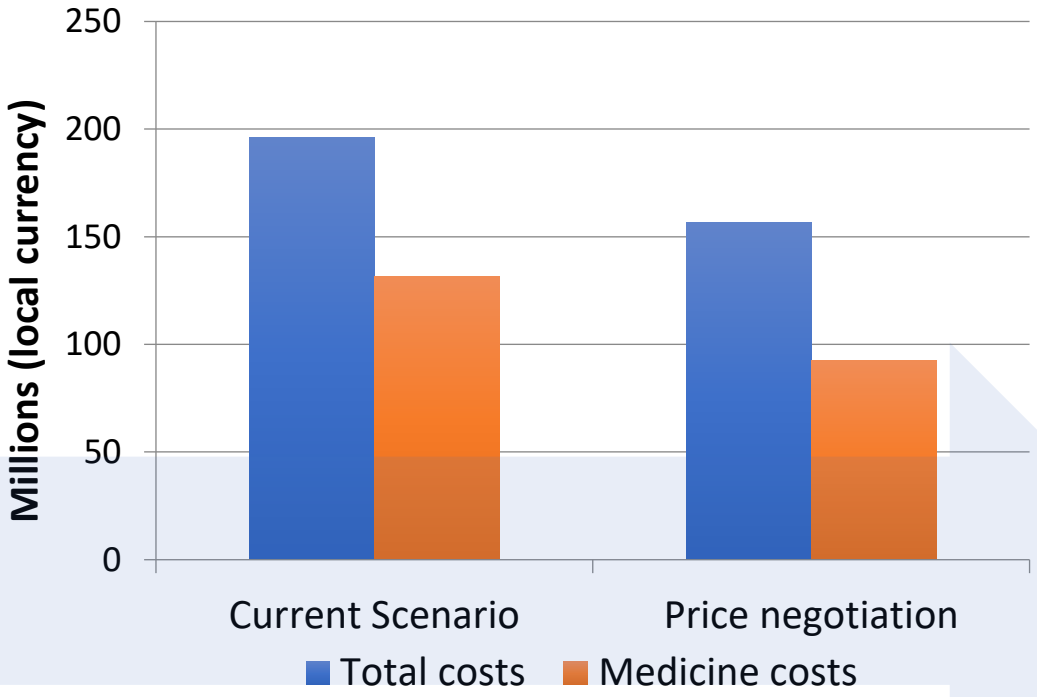
Data

Current situation:

Medicine costs
1-50x higher

Item	Global ref price	Price paid by country	% difference
5-FU	2.40	5.71	138%
Cisplatin	6.05	22.14	266%
Filgastrim	**4.50**	**54.29**	**1106%**
Irinotecan	**4.66**	**220.53**	**4637%**
Paclitaxel	**11.08**	**107.14**	**867%**
Tamoxifen	0.11	0.08	-33%

Dialogue



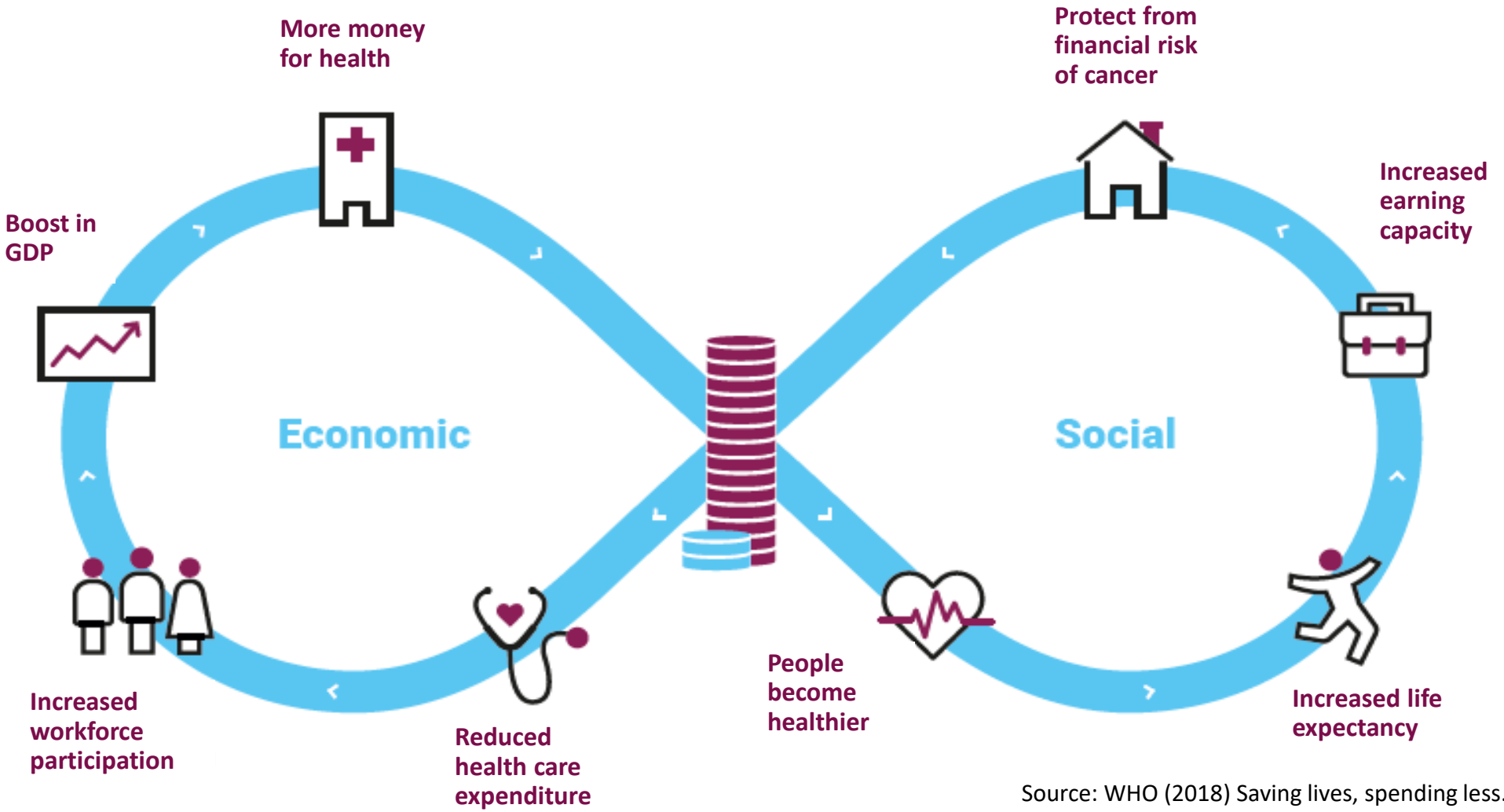
Decision

Potential annual saving
$USD 500,000

Government requested WHO support procurement

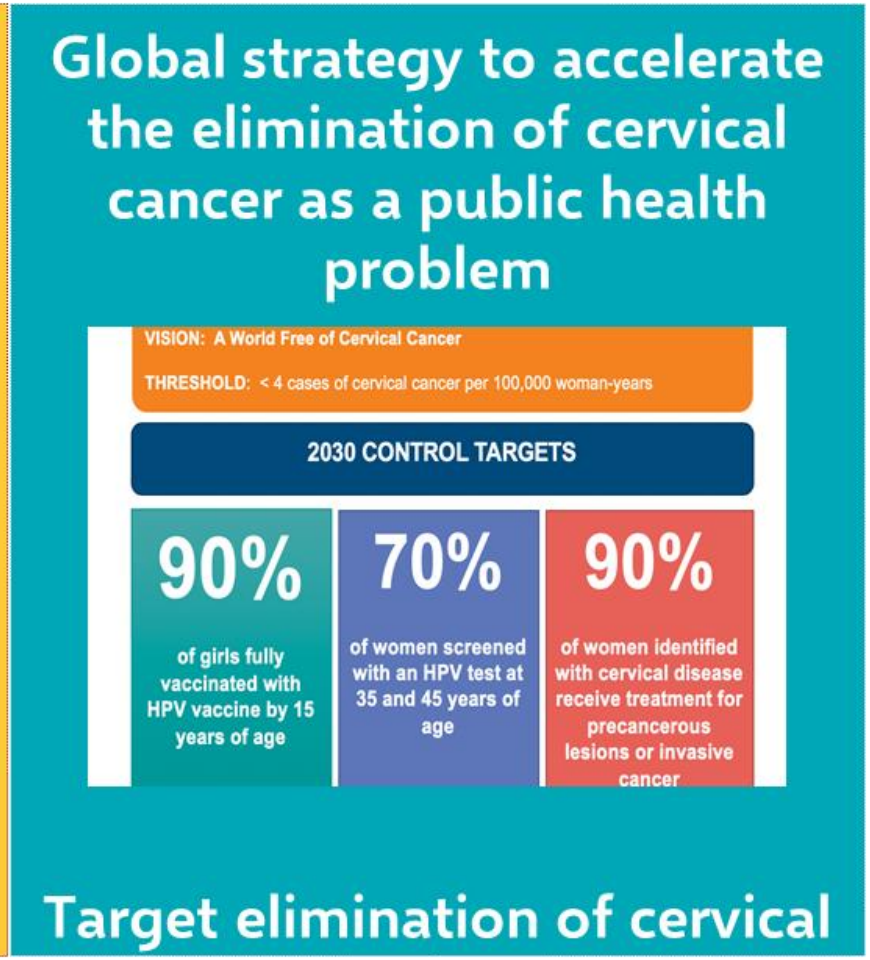
World Health Organization

Defining value of cancer control



Source: WHO (2018) Saving lives, spending less. WHO/NMH/NVI/18.8

WHO Cancer Initiatives

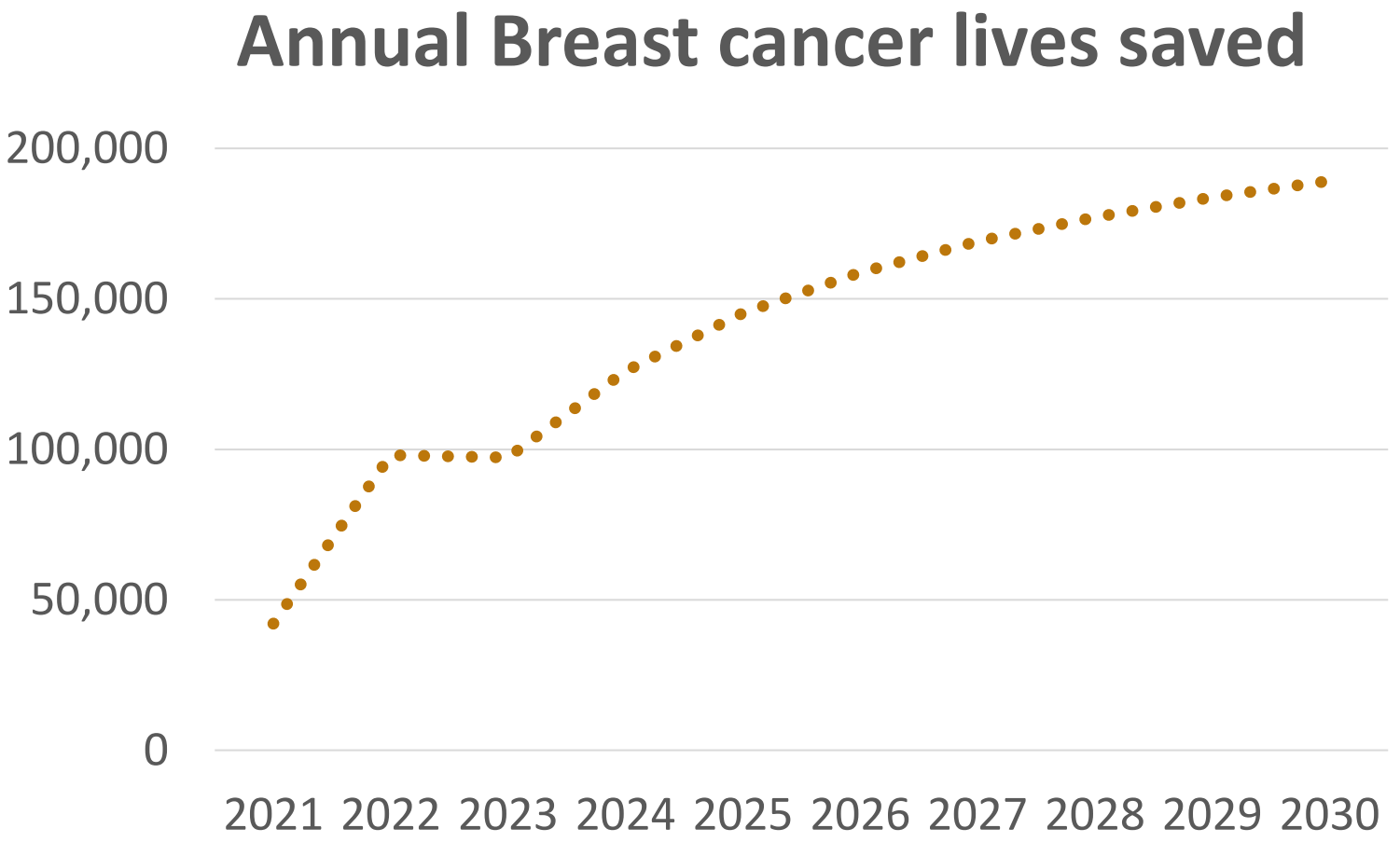


Breast cancer programme planning

>60% stage I + II

Time to initiate treatment <60 days

Treatment coverage 90% by 2030



$US 1.20 per capita

World Health Organization

How can the tool support you?

Data

- ✓Promote data for decision-making
- ✓Generate data on programme impact (implement'n research)

Dialogue

- ✓Facilitates dialogue on priority settings
- ✓Supports discussion on health system planning

Decision

- ✓Promotes budget planning
- ✓Enables multi-sectoral dialogue with partners, donors

Research

- ✓Advances health sciences research
- ✓Produces scenarios to establish best practice

World Health Organization

International Agency for Research on Cancer
World Health Organization

Thank you

World Health Organization

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>100s of international experts
>50 international organization
(including ESMO, NCI, ICCP, St Jude)

Key messages

Government commitment to cancer care action and integration into UHC

Implement value for money solutions

Prioritize important programmes and policies

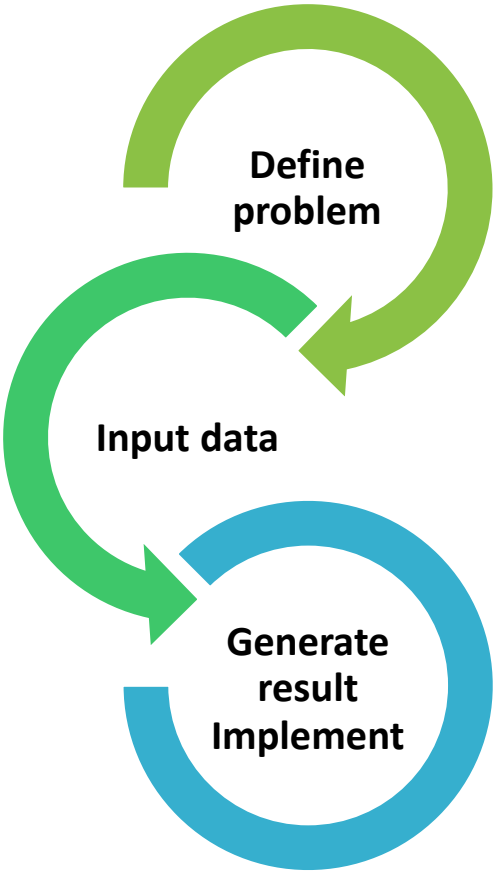
Ensure financial protection

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

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

Tool Application and Adaptability

Cancer & COVID model



Systematic Review

Survey data (WHO, partners)

Delays in diagnosis

Fear to access health care

Limited diagnostic services

Treatment services not accessible

Insufficient staff

Geographic barriers (transport)

Optimal treatment not available

Treatment abandoned

Products not available

Alter care to limit risks

Service interruption

Death from COVID

Mitigation Strategy

Telemedicine

Role delegation

Supply chain manage

Triage patients

Systematic Review

Survey data (WHO, partners)

Results pending (Feb 2021)

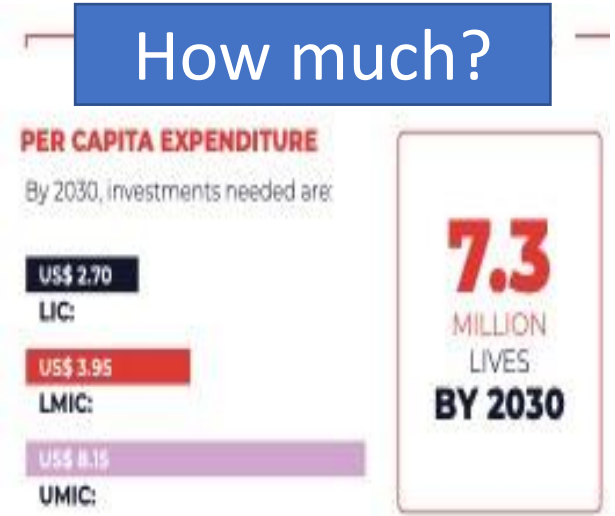
Why Develop Priority Setting Tool?

(3) Supporting Stakeholders

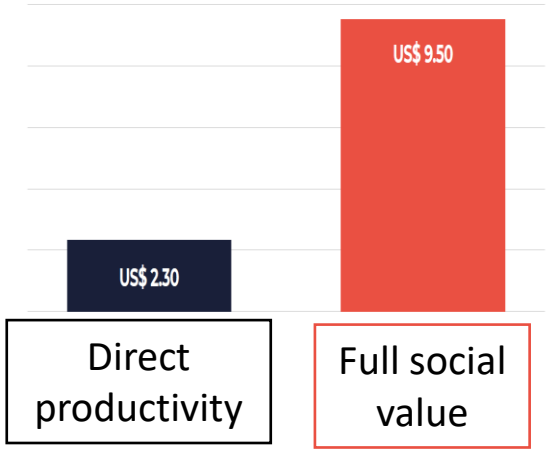
Provide funding "why"

By linking data to decision-making

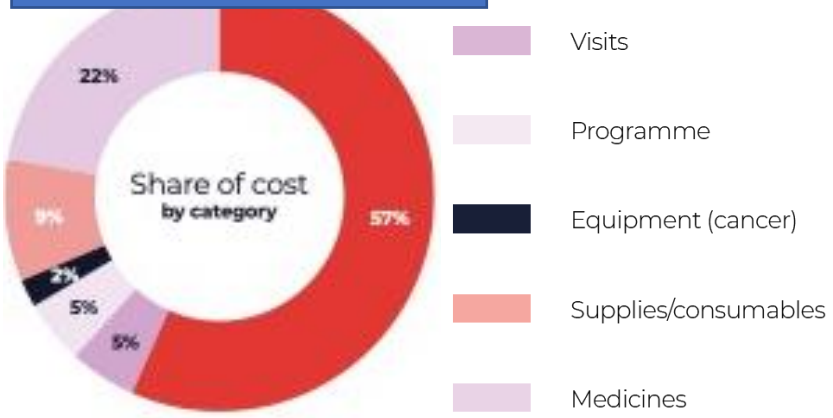
How much?



What benefit?



In what?



Data

International Agency for Research on Cancer

World Health Organization

IARC data and research

Dialogue

World Health Organization

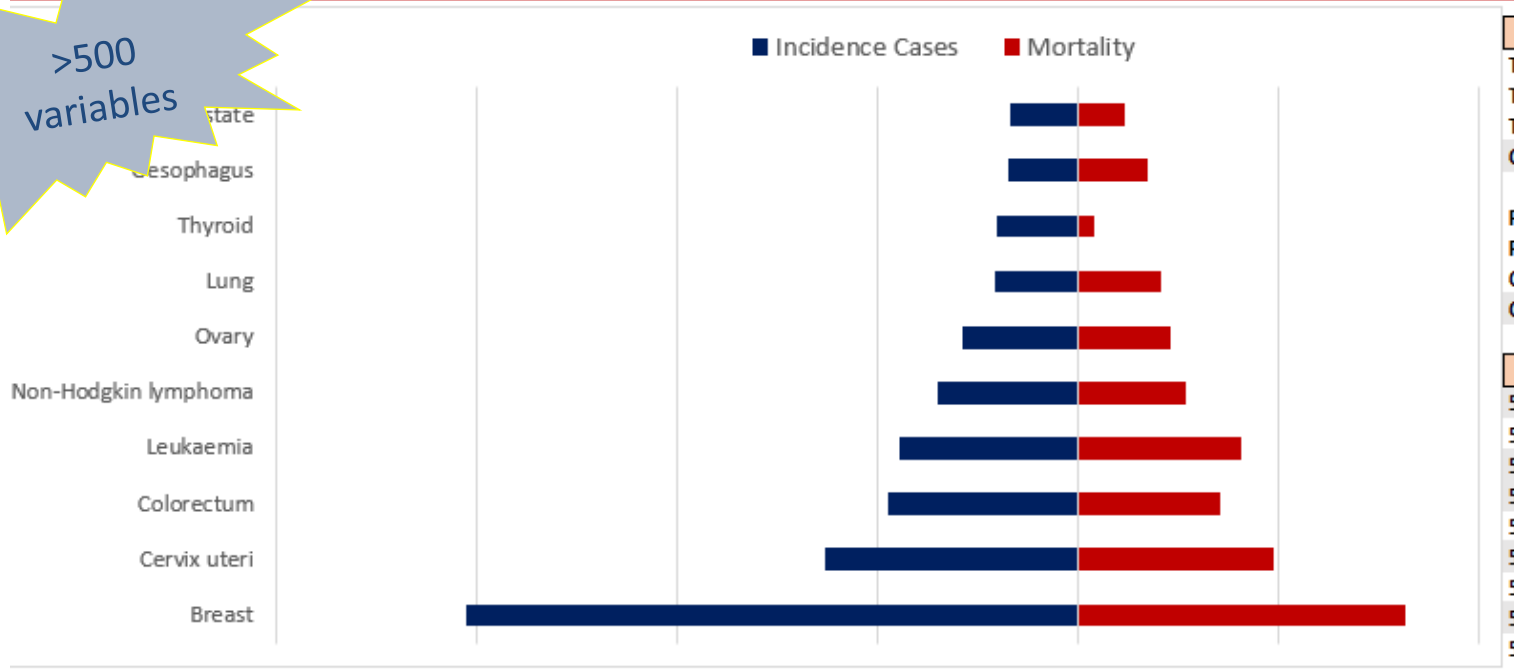
WHO policy dialogue

Decision

Tool Input Structure (1 of 4)

Ethiopia

>500 variables



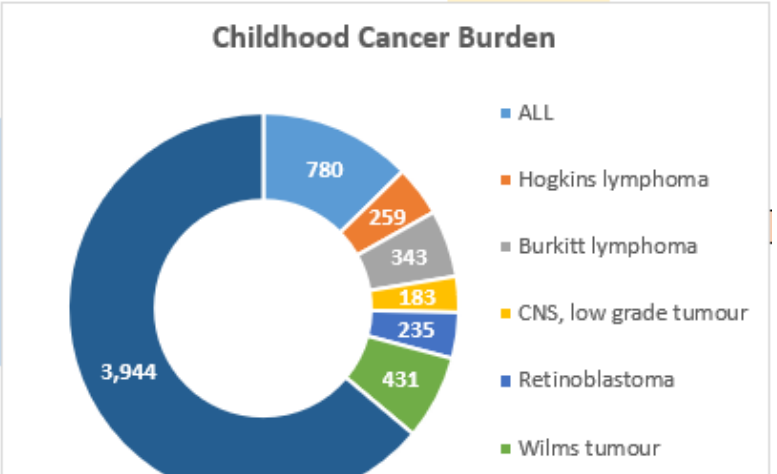
Cancer incidence		Range
Total incidence (2018)	67,573	
Total incidence (2012)	60,960	
Total death (2018)	47,954	
Cancer survivors (per 100,000)		
Premature mortality 2000 (cancer)	8.03%	2.9% - 14.5%
Premature mortality 2016 (cancer)	7.08%	3.0% - 11.1%
Childhood cancer (0-14)	6,175	109 - 6,175
Childhood cancer (0-19)		

Cancer Survival		Range
5 year overal survival (estimated)		
5 year breast cancer survival (CONCORD-3)	#N/A	0 - 0
5 year cervix cancer survival (CONCORD-3)		
5 year colorectal cancer survival (CONCORD-3)		
5 year lung cancer survival (CONCORD-3)	#N/A	0 - 0
5 year ALL cancer survival (CONCORD-3)		
5 year stomach cancer survival (CONCORD-3)	#N/A	0 - 0
5 year liver cancer survival (CONCORD-3)		
5 year prostate cancer survival (CONCORD-3)	#N/A	0 - 0

NCD burden and leading causes of death		Range
Premature mortality (NCD)	119,622	
Cancer (% premature deaths)	30.5%	12.0% - 47.6%
Premature mortality (slope)	0.0%	-0.2% - 0.1%
Premature mortality (change)	-11.8%	-23.5% - 20.2%
Cancer as leading cause of death (<70)	5th-10th	
Cancer as leading cause of death (30-69)	3rd-4th	
Under 5 mortality		
YLD (2017)	23,365	
Most common case (F)	Breast	
Most common case (M)	Leukemia	
Most common death (F)	Breast	
Most common death (M)	Leukemia	

Early Diagnosis		Range
Time symptm to present (months)	19.20	
Time from present to diagnosis (months)	-	
Time from diagnosis to treatment (months)	-	
Time from symptoms to treatment (months)	-	
Stage 1 (breast)	9.0%	2.0% - 19.0%
Stage 2 (breast)	46.0%	10.0% - 56.0%
Stage 3 (breast)	40.0%	23.0% - 65.0%
Stage 4 (breast)	5.0%	1.0% - 34.0%
Stage 1 (cervix)	2.0%	1.6% - 46.0%
Stage 2 (cervix)	38.0%	21.0% - 56.0%
Stage 3 (cervix)	48.0%	18.0% - 68.0%
Stage 4 (cervix)	12.0%	4.0% - 13.0%

Cancer burden projection



Tool Input Structure (2 of 4)

Ethiopia

Cancer Plan		Target
Cancer plan (updated)	yes, for all cancers or cancer in general	
Cancer plan: stage (updated)	operational	
Cancer plan (year implemented)	2015	
Cancer plan (year expired)	2020	

NCD Plans		Target
NCD integrated plan	yes	
NCD integrated plan stage	operational	
NCD integrated plan (multi-sectoral)	yes	
NCD integrated plan (cancer included)	yes	
NCD integrated plan (palliative care)	yes	
Operational NCD plan (palliative care)	yes	
NCD integrated plan (alcohol)	yes	
NCD integrated plan (diet)	yes	
NCD integrated plan (physical activity)	yes	
NCD integrated plan (tobacco)	yes	

Governance		Target
NCD unit in MoH	yes	
Full-time staff in NCD unit	6 to 10	
Dedicated staff for cancer	yes	

Information Systems		Target
Cancer registries	yes	
Cancer registry type (pop vs hosp-based)	pop-based	
Cancer registries coverage	subnatl	
Cancer registries last data year	2015	
Availability of PBCR	PBCR	
Quality of mortality registration	No coverage	
Availability of data for survival	Regional high quality data	

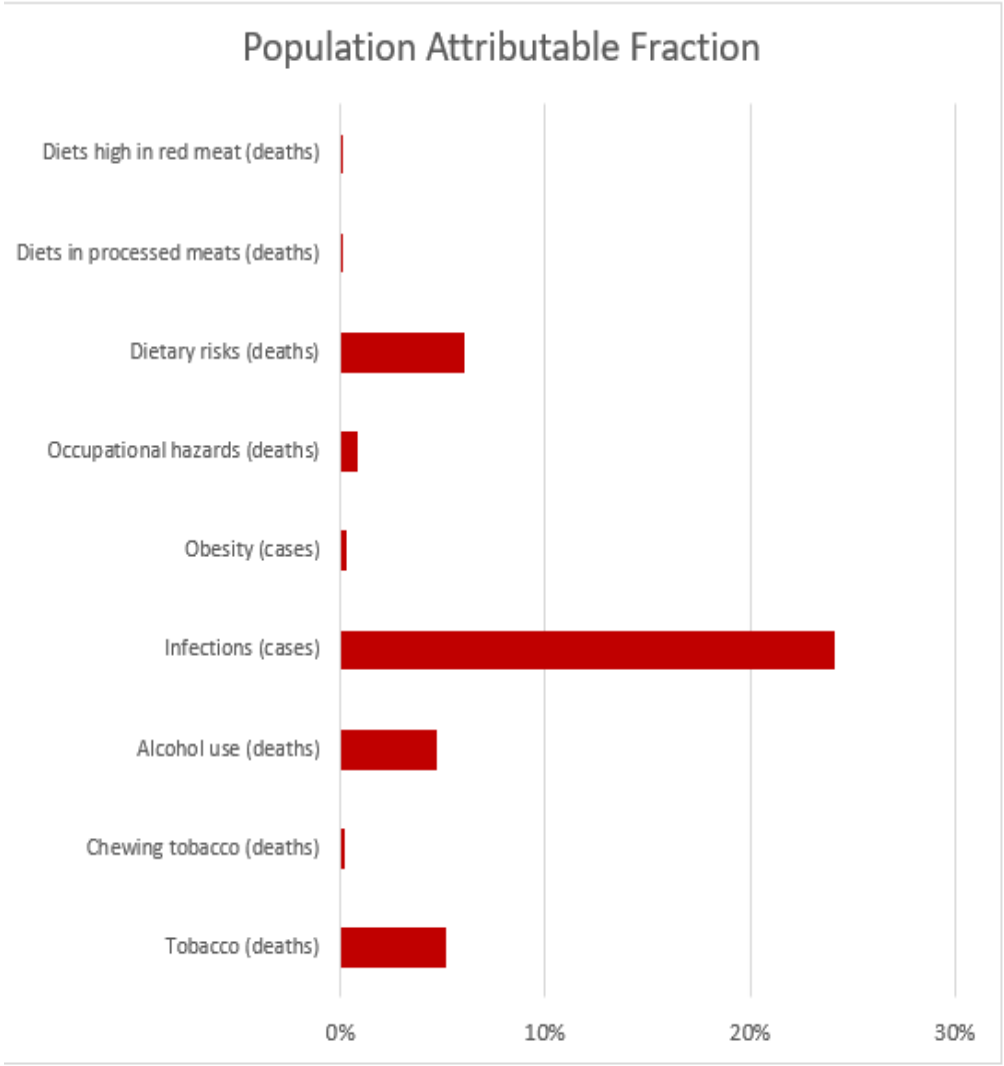
Prevention policies		Target
MPOWER	-	0 - 4
Parties to FCTC	FCTC party	
Tobacco packaging restriction	No graphic warning labels	
HPV vaccination coverage	-	0 - 84
HPV in national schedule	yes	
HPV vaccination coverage (CCS)	<10%	
Hep B immunization coverage	72	41 - 98
Alcohol		

Management Programmes, Policies, Guidelines		Target
Cancer guidelines	yes	
Cancer guidelines incl drug-specific protocols	yes	
Cancer guidelines (utilized in >50% facilities)	no	
Cancer guideline (last updated)	2018	
Cancer guidelines (include referral criteria)	yes	
Breast cancer early detection pgm/guidelines	yes	
Cervical cancer early detection pgm/guidelines	yes	
Colon cancer early detection pgm/guidelines	no	
Childhood cancer early detection pgm/guideline	yes	
Breast cancer defined referral	yes	
Cervical cancer defined referral	yes	
Colon cancer defined referral	no	
Childhood cancer defined referral	yes	

Cancer Screening Programmes		
Breast cancer screening pgm	yes	
Breast cancer screening pgm (type)	opportunistic	
Breast cancer screening pgm (method)	clinical breast exam	
Breast cancer screening pgm (coverage)	<10%	
Breast cancer screening pgm (target age start)	40	15 - 40
Breast cancer screening pgm (target age end)	70	49 - 80
Breast screening test performance (sens)		
Breast screening test performance (sens)		
Cervical cancer screening pgm	yes	
Cervical cancer screening pgm (type)	opportunistic	
Cervical cancer screening pgm (method)	visual inspection	
Cervical cancer screening pgm (coverage)	<10%	
Cervical caner screening (STEPS)	2.7%	0.9% - 16.4%
Cervical cancer screening pgm (target age start)	30	15 - 40
Cervical cancer screening pgm (target age end)	49	39 - 80
Cervical cancer screening test performance (sens)		
Cervical cancer screening test performance (sens)		
Colon cancer screening pgm	no	
Colon cancer screening pgm (type)		
Colon cancer screening pgm (method)		
Colon cancer screening pgm (coverage)		
Colon cancer screening pgm (target age start)	-	0 - 0
Colon cancer screening pgm (target age end)		70 - 70
Colon screening test performance (sens)		
Colon screening test performance (sens)		
Other cancer screening pgm		
Other cancer screening pgm (type)		
Other cancer screening pgm (method)		
Other cancer screening pgm (coverage)		
Other cancer screening pgm (target age range)		

Tool Input Structure (3 of 4)

Ethiopia



NCD/cancer risk factors prevalence		Range
Smoking prevalence (M)	6.2%	6.2% - 44.1%
Smoking prevalence (F)	0.2%	0.1% - 8.5%
Tobacco product use (ASR)	4.60	5 - 32
Prevalence of obesity (M)	1.9%	1.8% - 20.9%
Prevalence of obesity (F)	6.9%	5.4% - 34.8%
Alcohol, total per capita (15+) consumption (in litres of pure alcohol) with 95%CI, 2016	2.9 [2.7-3]	0 - 10
Outdoor air pollution	39	15 - 100
Indoor air pollution	89	0 - 99

Additional cancer-specific risk factors		Range
% of children who receive breast milk	97%	61.0% - 98.7%
Average births per women	5	2 - 7
Hep B seroprevalence		
Hep C seroprevalence	0.010	0 - 0
H. pylori prevalence	#N/A	0 - 0
HIV prevalence	1	0 - 13
Prevalence of condom use by adults during higher-risk sex (15-49) (%) Male, 2007-2013	0.16	4.0% - 47.0%
Prevalence of condom use by adults during higher-risk sex (15-49) (%) Female, 2007-2013	0.47	2.0% - 62.0%

Tool Input Structure (4 of 4)

Ethiopia

Overview: cancer capacity		Target
# of dedicated centres (public)	1.00	
# of dedicated centres (private)	0.00	
Cancer centres/dept at tertiary lev	generally not available	
Pathology services (available)	generally not available	
Cancer surgery (available)	generally not available	
Chemotherapy (available)	generally not available	
Bone marrow transplantation (ava	generally not available	
Radiotherapy (available)	generally not available	

Diagnostics	
Total # of mammography units	n/a
Total # of CT scanners	34.00
Total # of MRI scanners	7.00
Total # of PET (or PET/CT)	0.00
# nuclear medicine	1.00
Flow cytometry	

Treatment		Range
# of radiotherapy centers	1.00	
# of RT units	2.00	
# linear accelerators	0.00	
# cobalt-60	2.00	
Brachytherapy	1.00	
Total # of mammography units per	n/a	0 - 26
Total # of CT scanners per 10,000	5.03	0 - 51
Total # of MRI scanners per 10,00	1.04	0 - 25
Total # of PET (or PET/CT) per 1(	0.00	0 - 1
# dedicated centres (public) per 10	0.15	0 - 25
# dedicated centres (private) per 1	0.00	0 - 14
# of radiotherapy machines per 10,	0.10	0 - 3

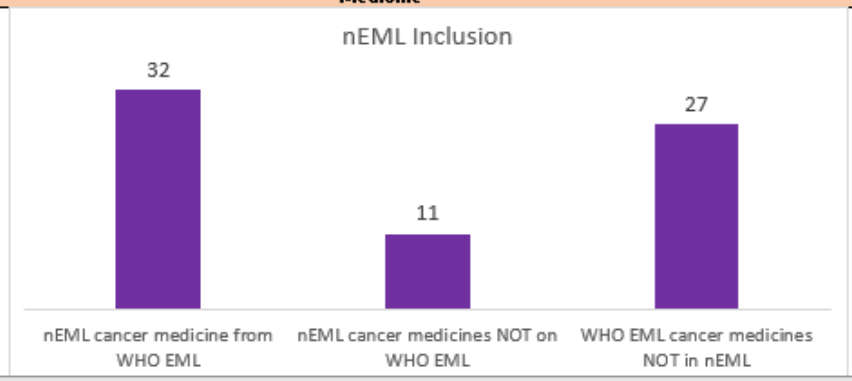
Palliation		Target
Palliative care in PHC (available)	generally not available	
Palliative care, home based (avail	generally not available	
Untreated death in pain	37,593	
Oral morphine	generally not available	
Consumption of narcotics	25	0 - 88

Health workforce			Financing		Range
# radiation oncologist	-	# of radiation oncologist per 10,0(n/a 0 - 1	CHE as %GDP	3.97	3 - 17
# medical physicists	4.0	# medical physicists per 10,000 0.6 0 - 13	CHE per capita	27.52	8 - 86
# of licensed surgeons	349	# of surgeons per 10,000 51.6 11 - 2,351	Domestic GGE on NCDs	5.39	1 - 86
# of radiologists	160.0	# of radiologists per 10,000 23.7 0 - 69	Domestic GGE as % CHE	27.62	5 - 53
Nuclear medicine physician	1.0	Nuclear medicine physician per 10, 0.1 0 - 4	Domestic GGE per capita	7.60	2 - 17
# medical doctors	10,496.0	Medical doctors per 10,000 1.0 0 - 37	Dedicated funding (primary prev)	yes	
Nurses & midwives	88,164.0		Dedicated funding (health promoti	yes	
Pharmacists	632.0	# of pathology/lab scientist per 10 n/a 18 - 858	Dedicated funding (capacity buildi	yes	
Anatomic pathologist	67.2	Anatomic pathologist per 10,000 10.0	Dedicated funding (palliative care)	yes	
Clinical oncologist	10.0	Clinical oncologist per 10,000 1.2	Dedicated funding (research)	no	
Dosimetrist	-	Dosimetrist per 10,000 -			
Medical oncologist	-	Medical oncologist per 10,000 -			
Medical physicist	-	Medical physicist per 10,000 -			
Oncology nurse	-	Oncology nurse per 10,000 -			
Pediatric oncologist	-	Pediatric oncologist per 10,000 -			
Radiation oncologist	-	Radiation oncologist per 10,000 -			
Radiation therapy technician	-	Radiation therapy technician per 1(-			
Surgical oncologist	-	Surgical oncologist per 10,000 -			

Infrastructure		Range
Mobile telephone subscript	-	
Fixed-broadband subscript	-	
% houses with internet	0.2	0.3% - 26.5%
% popul using internet	0.2	0.0% - 34.3%

Medicine

Total WHO EML	59
nEML cancer medicine from WHO	32
nEML cancer medicines NOT on \	11
WHO EML cancer medicines NOT	27



Sample Scenarios: Significant Findings

Tobacco control

- Maximal prevention
  - 1000-2000+ cases per year
  - Beginning in ~2040 and extending beyond
  - *(oral cancer not included)*
- Cost estimate:
  - $150,000 for legislative/regulatory programme
  - $100,000 for awareness/cessation programme

Reducing Harmful Use of Alcohol

- Maximal prevention
  - 1000 cases per year
  - Beginning in ~2040 and extending beyond
- Cost estimate:
  - $100,000 for legislative/regulatory programme
  - $140,000 for public health outreach

Sample Scenarios: Significant Findings

Low Quality Care

- Cost
  - 5-10% ↑ per cancer intervention
  - Overall cost: $100,000
- Impact
  - *TBD – initial focus on childhood cancer*
  - ? 20-30% treatment abandonment
  - ~10% loss of healthy life-years gained

Increase salaries to UMIC level

- 4-5x ↑salaries
  - E.g. physician $15,000 / yr; nurse $7,500 /yr
- HR costs ↑$3mil / yr; now ~45% of total costs
- *No associated change in outcomes*
  - *? Attrition rates*
  - *? Quality / performance*

Sample Scenarios: Significant Findings

New Radiotherapy Machine

- Marginal value depends on # of existing machines & optimal use
- If 2 machines exist:
  - Adding #3, saves ~5-10 lives

What would you do?

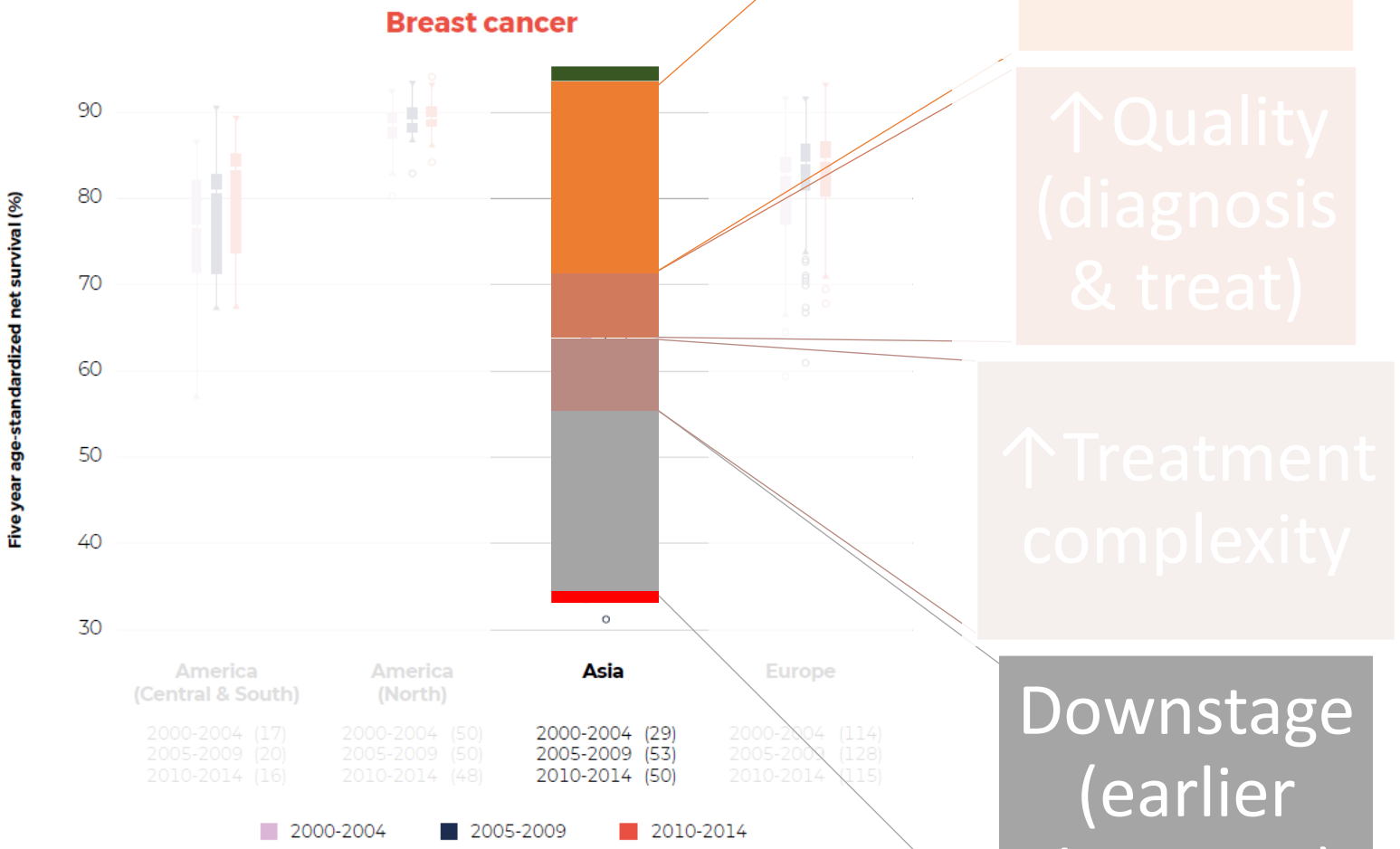
Breast cancer screening programme

- Cost:
  - Approx $1-2 mil per year
  - ↑ Mammography machines from 3 to 50
  - ↑ radiologist by 3 FTE & pathologists (minor)
- Impact
  - 200-500 lives saved

Breast cancer early diagnosis

- Cost:
  - Approx $250,000 per year
  - *Elements*: awareness programme, PHC training, referral & patient navigator
  - Minor ↑health system needs
- Impact
  - 30% downstaging
  - 200-400 lives saved

Prioritized response



↑ Service coverage

↑Quality (diagnosis & treat)

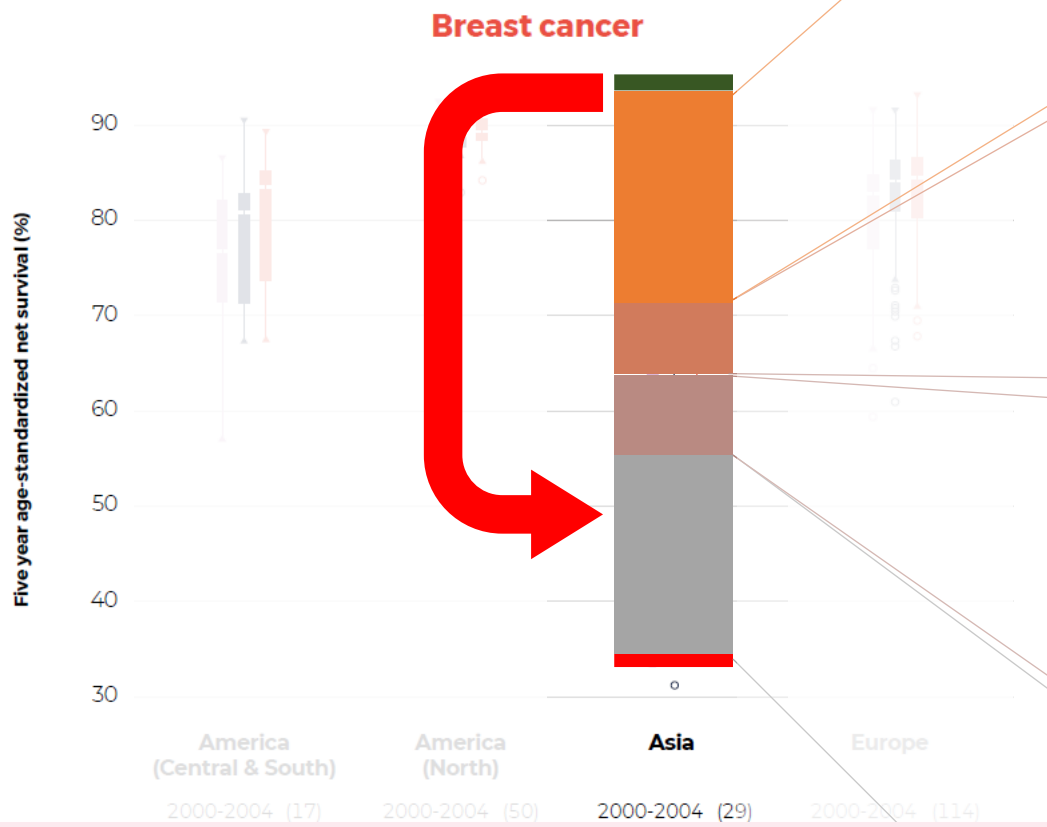
↑Treatment complexity

Downstage (earlier diagnosis)

↑ Service coverage as part of UHC is priority to ↑ outcomes

Early diagnosis should be prioritized over screening (except cervical)

Building capacity → Resilient systems against COVID



↑ Service coverage

↑Quality (diagnosis & treat)

↑Treatment complexity

Downstage (earlier diagnosis)

Unable to access care

Untreated (abandon)

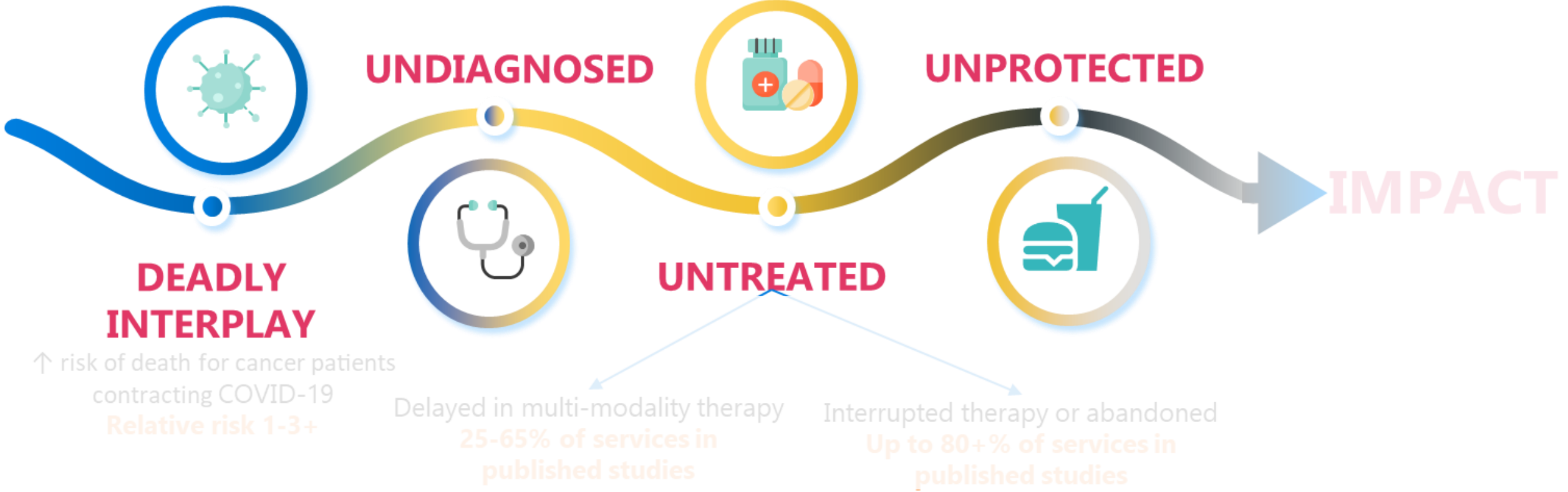
Untreated (delays)

Substandard treatment

Undiagnosed (delays)

Deadly interplay: cancer patients at higher risk of COVID-related deaths

COVID-19 impact on cancer: WHO systematic review



Source: World Health Organization, #NextGenNCD Department

World Health Organization

But, cancer generally not covered in COVID response plans: The clock is ticking and people are dying.

NCDs in EHS

38%

33/87 countries have included NCDs in EHS

with $

3%

3/87 countries have a budget line for NCDs є EHS

NCD management

10%

9/87 countries have who provided guidance on how and when to access care and treatment

Source: World Health Organization, #NextGenNCD Department, Review of COVID-19 Preparedness and Response Plans through an NCD Lens