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Introduction to Budget Impact Analysis

Part of HTA on Mammography Screening in West Bank
February 25th, 2021 | Guiding slides for meeting PNIPH NIPH

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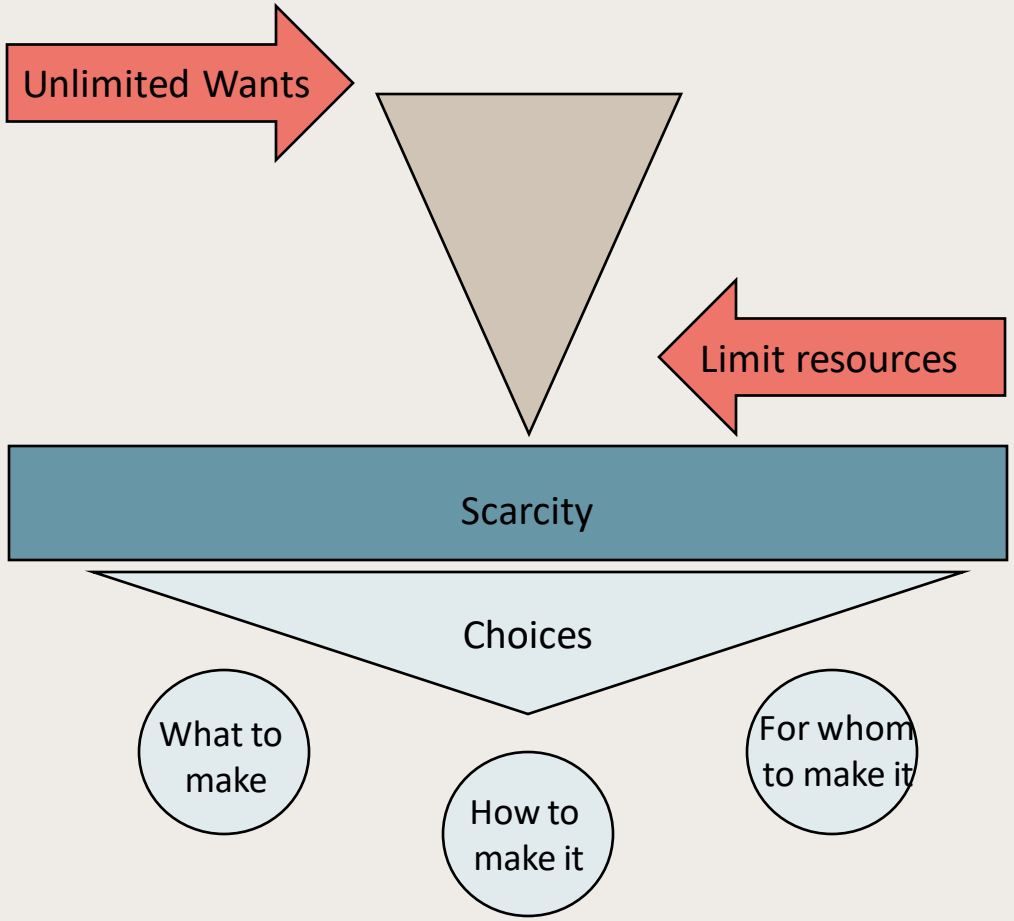
Outline

- Short recap on health economics
- What is a budget impact analysis (BIA)
  - ISPOR Framework
  - Three types of analysis
- Our analysis for Palestine
  - Preliminary results
  - Take-aways

The fundamental economic problem

Recap



Scarcity is the fundamental economic problem that forces consumers and producers to use resources wisely.

How does the concept of scarcity apply to healthcare?

The 'Health Economic' problem

Recap

- Unlimited healthcare "wants" with rapid growth in health expenditure.
- Insufficient health sector resources.
- Choosing between 'wants' we can 'afford' given our resource 'budget'.

Slide from: Chola L, Heupink LF, Peacocke E, Sæterdal I (2020). Economic evaluation of public health interventions [PowerPoint slides]. Norwegian Institute of Public Health, Oslo.

Slide from: Chola L, Heupink LF, Peacocke E, Sæterdal I (2020). Economic evaluation of public health interventions [PowerPoint slides]. Norwegian Institute of Public Health, Oslo.

* O'Rourke B, Oortwijn W, Schuller T; International Joint Task Group. The new definition of health technology assessment: A milestone in international collaboration. Int J Technol Assess Health Care. 2020 Jun;36(3):187-190. doi: 10.1017/S0266462320000215. Epub 2020 May 13. PMID: 32398176.

What is health technology assessment?

HTA can help to find solutions to the 'health economic problem'

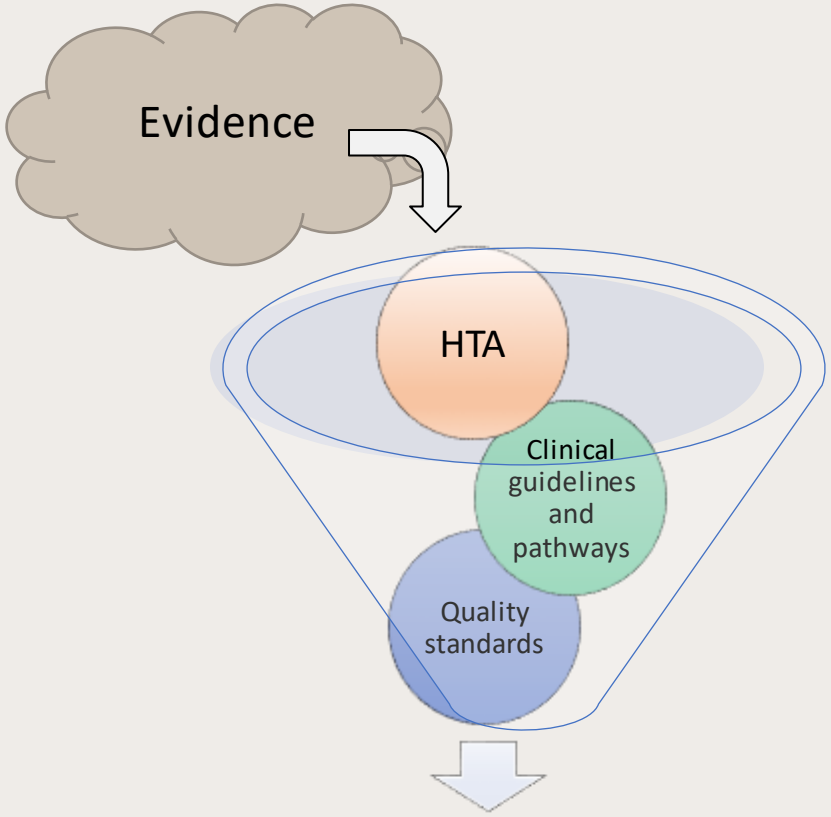
- "A multidisciplinary process that uses explicit methods to determine the value of a health technology at different points in its lifecycle. The purpose is to inform decision-making in order to promote an equitable, efficient, and high-quality health system."*

Steps of the HTA process	Topic selection, identification, prioritisation	HTA analysis	Appraisal and decision making	Implementation
NIPH's areas of support	• How it is organised and implemented • Principles, processes and prioritisation • Existing examples of relevant services, systems, initiatives, and networks • Consultation	• Assessment plans • Collecting evidence • Analysing and synthesising results • Technical collaboration • Discussing report recommendations	• The types of decisions to be taken, and by whom • Evidence review and appraisal • Guidelines or checklists for appraisal	• Modes of diffusion • Monitoring and evaluation

NIPH, 2020 - from https://www.fhi.no/en/qk/global-healt-collaboration/evidence-to-decisions/partnering-low-and-middle-income-countries-to-support-local-implementation--/

How HTA can inform policy and priorities

BIA can be a part of an HTA to inform on the financial impact of a 'new' intervention



Health technology assessment (HTA) to compare clinical and cost-effectiveness of different interventions

Clinical guidelines (STGs) and pathways distilled from HTA and other evidence

Quality standards and indicators from evidence-based guidelines

Health benefits plans (HBPs), pay-for-performance, other levers (regulation, accreditation, education…)

Source: International Decision Support Initiative (iDSI)

Budget impact analysis (BIA)

Definitions for BIA

- *"An evaluation of the financial impact of the introduction of a technology or service on the capital and operating budgets of a government or agency." **

- *ISPOR: A BIA addresses the expected changes in the expenditure of a health care system after the adoption of a new intervention* (pg. 6**)

* Source: http://htaglossary.net/budget-impact-analysis
** Source: Sullivan, S. D., Mauskopf, J. A., Augustovski, F., Caro, J. J., Lee, K. M., Minchin, M., ... & Shau, W. Y. (2014). Budget impact analysis—principles of good practice: report of the ISPOR 2012 Budget Impact Analysis Good Practice II Task Force. *Value in health*, *17*(1), 5-14.

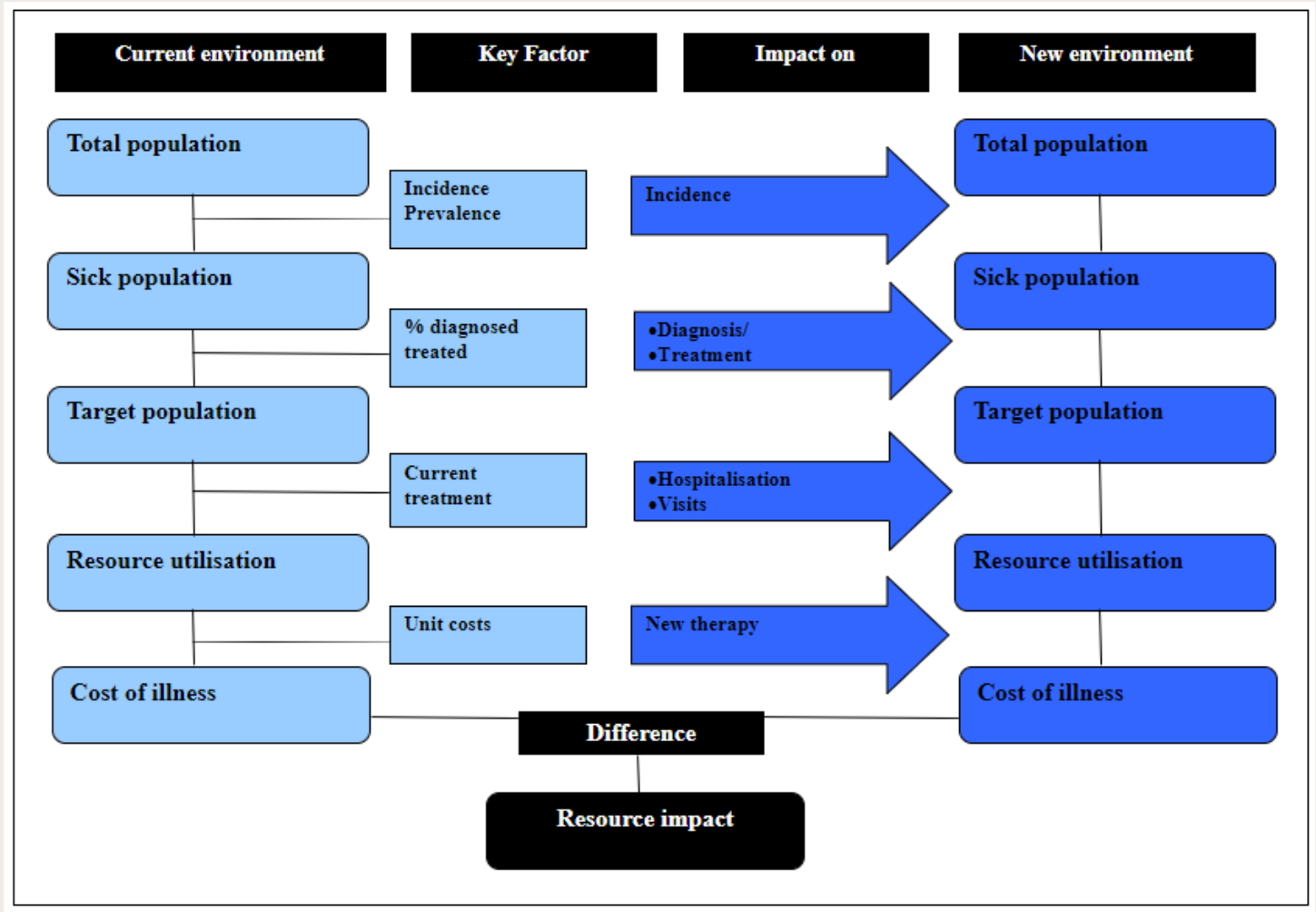
Slide from: Chola L, Heupink LF, Peacocke E, Sæterdal I (2020). Economic evaluation of public health interventions [PowerPoint slides]. Norwegian Institute of Public Health, Oslo.

What is a cost?

- In economics, the focus is on 'resource use'
  - Reflects the 'mission' of economics - maximize welfare with available resources; guiding choice
- Does 'cost' only involve things you pay $ for?
  - **In financial analysis — yes**
  - In economic analysis —no
- Economic cost (= 'opportunity cost') — what must be sacrificed in order to achieve a goal; the value of the resource in its next best use
  - If you do A, you cannot do B
  - Costs of doing A is the forgone value of doing B

ISPOR Framework for Budget Impact Analysis

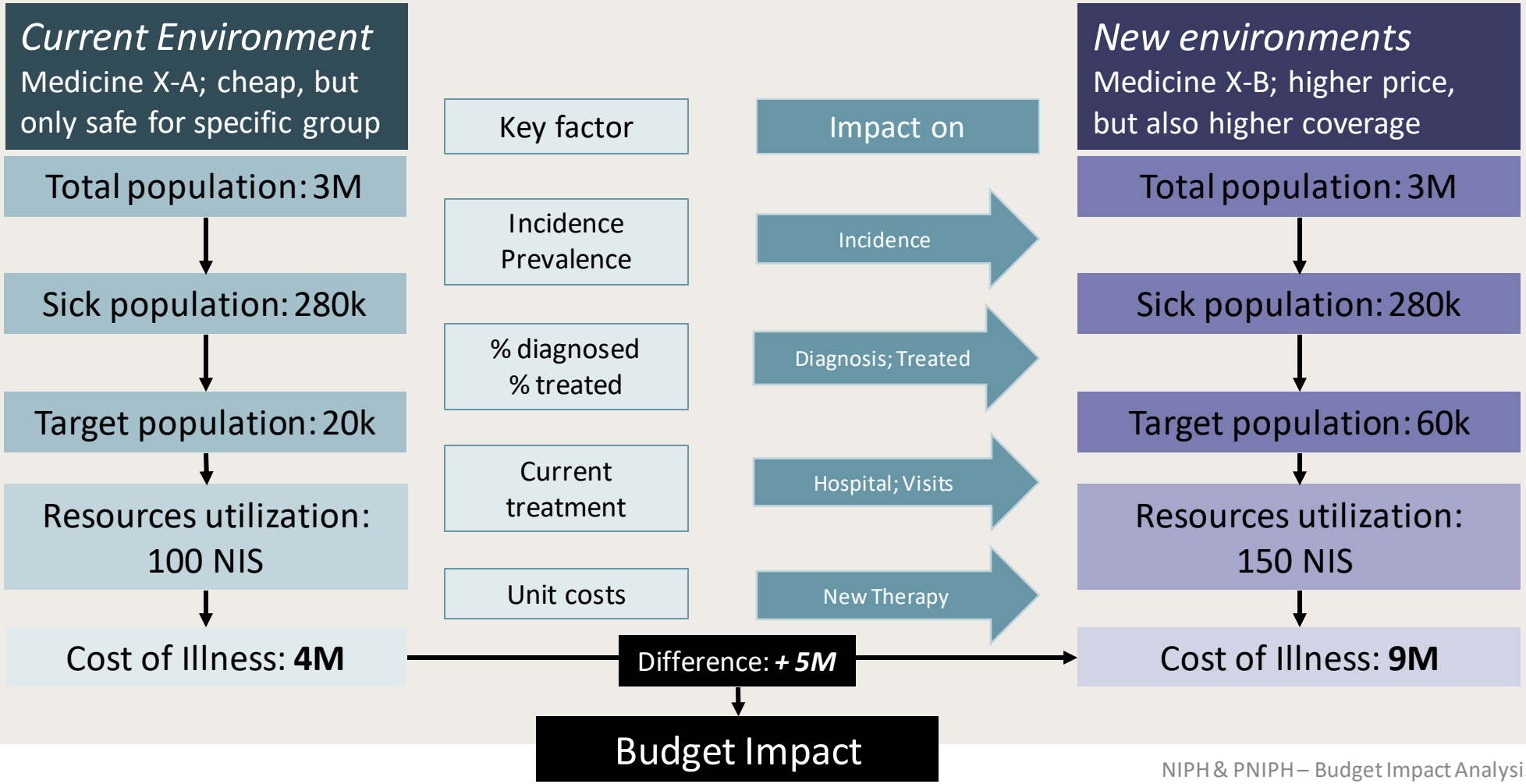
Adapted by L. Chola



Framework adapted from: Sullivan, S. D., Mauskopf, J. A., Augustovski, F., Caro, J. J., Lee, K. M., Minchin, M., ... & Shau, W. Y. (2014). Budget impact analysis—principles of good practice: report of the ISPOR 2012 Budget Impact Analysis Good Practice II Task Force. *Value in health*, *17*(1), 5-14.

Imagine a hypothetical situation…

There is an existing medicine on the market (X-A) for a certain disease. X-A works well, but it cannot be used by people with a high blood pressure. A new medicine for the same disease has entered the market (X-B), X-B can be used by all people. The Ministry of Health wants to add medicine X-B to the benefit package, but what is the financial impact?



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Aspects to consider when applying the design of the framework

Table 1 – Aspects to be considered in the design of a budget impact analysis.

- Features of the health care system
- Perspective
- Use and cost of current and new interventions
  - Eligible population
  - Current interventions
  - Uptake of new intervention and market effects
  - Off-label uses of the new intervention
  - Cost of the current or new intervention mix
- Impact on other costs
  - Condition-related costs
  - Indirect costs
- Time horizon
- Time dependencies and discounting
- Choice of computing framework
- Uncertainty and scenario analysis
- Validation

- Three analytical frameworks
  - Cost calculator (e.g. deterministic models)
  - Cohort analysis = follows a group of individuals (e.g. markov models)
  - Micro simulation = follows individual patients

Table from: Sullivan, S. D., Mauskopf, J. A., Augustovski, F., Caro, J. J., Lee, K. M., Minchin, M., ... & Shau, W. Y. (2014). Budget impact analysis—principles of good practice: report of the ISPOR 2012 Budget Impact Analysis Good Practice II Task Force. *Value in health*, *17*(1), 5-14.

The choice of the perspective affects costs

E.g., if payer perspective for BIA, 'solely' interested in direct medical cost

Cost		Perspective			
		Societal	Insurer/ Payer	Employer	Patient/ Client
	Direct medical	Yes	Yes	Yes	Yes
	Direct non-medical (e.g. transportation, day care)	Yes	No	No	Yes
	Indirect (e.g. time lost from work)	Yes	No	Yes	Yes
	Intangible (e.g. pain and suffering)	Yes	No	No	Yes

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Part 2: Methods & Preliminary Results

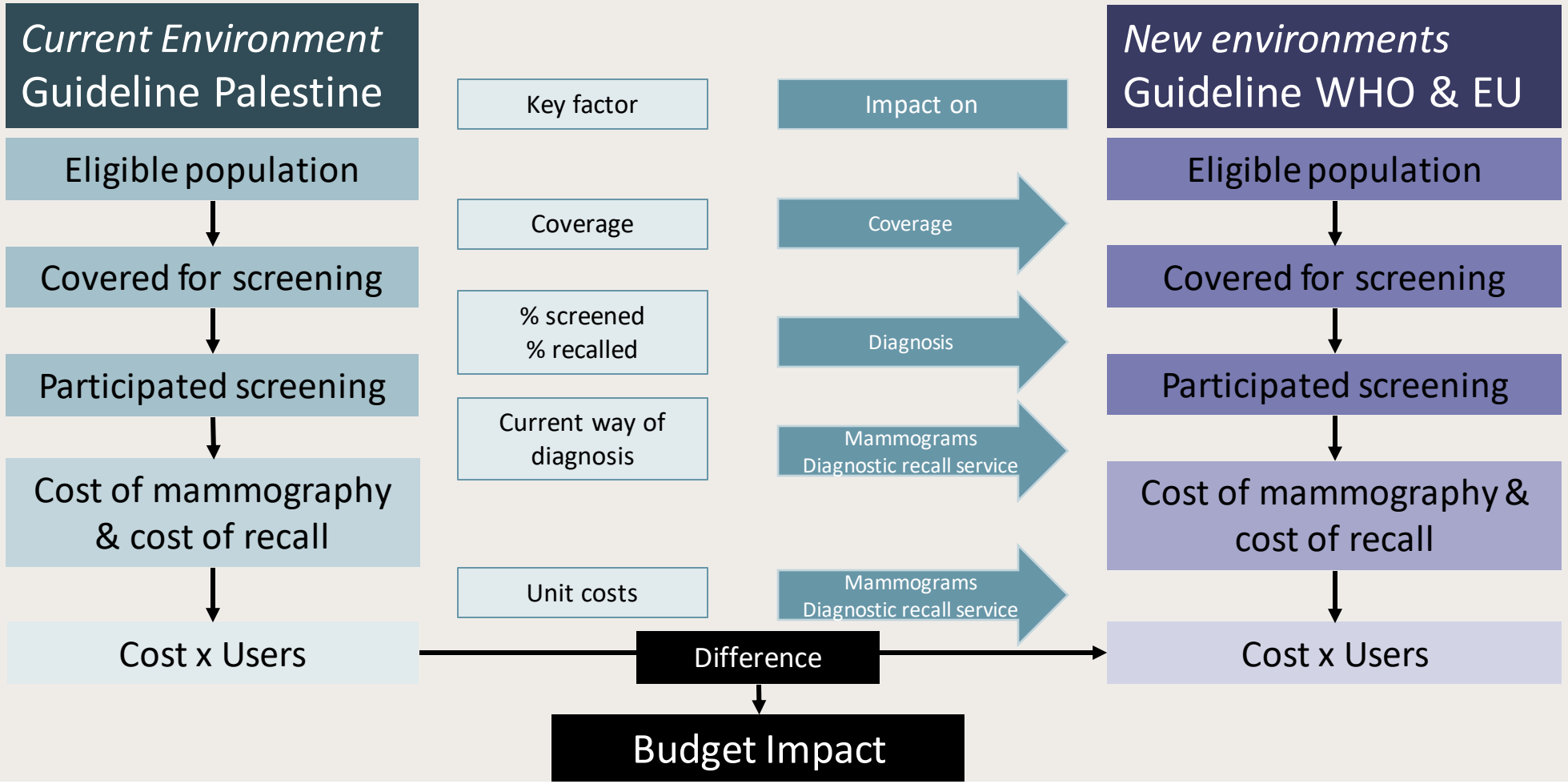
What if West Bank would adapt a certain guideline on BC Screening

Guidelines modeled

Age interval	*Eligible population (West Bank)*	Target population (those who are 'invited') (per guideline)				
		Base case	WHO well resource**	WHO limited resource**	EU	Palestine
40 - 44	*75,286*	Once per 1 year	Once per 2 years	-		Once per 1 years
45 - 49	*63,924*	Once per 1 year	Once per 2 years	-	Once per 2 years	Once per 1 years
50 - 54	*52,416*	Once per 1 year	Once per 2 years	Once per 2 years	Once per 2 years	*Once per 2 years*
55 - 59	*40,129*	Once per 1 year	Once per 2 years	Once per 2 years	Once per 2 years	-
60 - 64	*27,360*	Once per 1 year	Once per 2 years	Once per 2 years	Once per 2 years	-
65 - 69	*19,528*	Once per 1 year	Once per 2 years	Once per 2 years	Once per 2 years	-
70 - 74	*14,985*	Once per 1 year	Once per 2 years	-	*Once per 3 years*	-
> 75	*13,391*	Once per 1 year	Once per 2 years	-	*Once per 3 years*	-
Invited to screening*	*307,019*	**307,019**	**185,483**	**153,510**	**69,717**	**111,137**

- *The invited to screening row present the estimate of yearly women who are targeted/'invited' if an organized screening program was implemented according to a certain guideline.
- ***WHO well-resourced* refers to the recommendations made for well-resourced setting with strong health systems; *WHO limited resources* refers to the recommendations made for limited resources settings with a strong health system.

The methods for BIA on breast cancer screening in the West Bank



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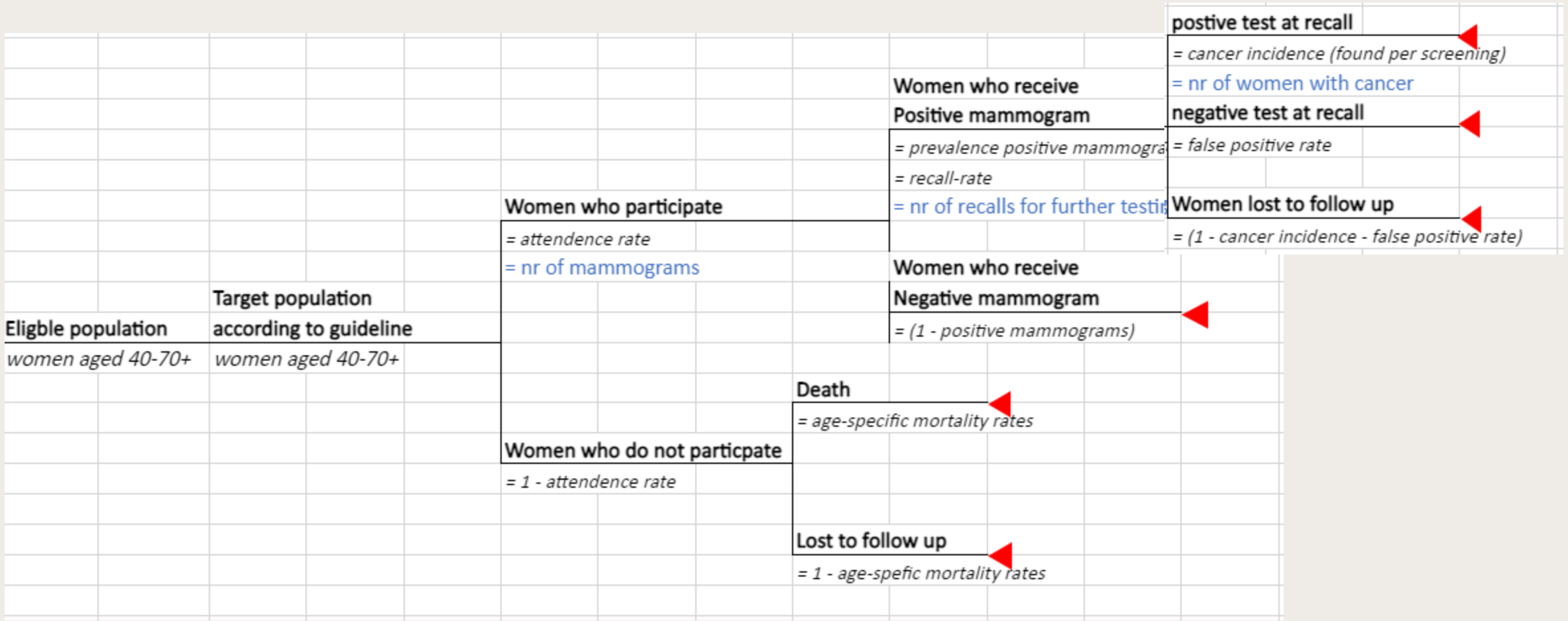
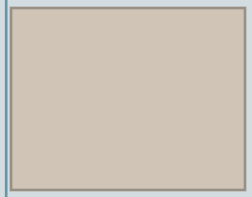
The model

- Adding following branches would find the nr. of cancers
  - But comes with new data requirements



The input parameters

Population data	**-**	**From Palestine**
All cause mortality females *(5 year age intervals)*	-	Estimates by IHME on Palestine (2019)
Assumed coverage	**20% 50% 80%**	**Varied coverage estimates in three scenarios**
Recall rate *assumes that all women with a positive mammogram would be recalled*	6.2%	From retrospective cohort study in Palestine
Annual Population growth rate	2.28%	From UN Department of Economic and Social Affairs, Population dynamics
Cost Of mammogram Of recall		Estimated from literature Average price charged by NGO and Private Estimate of average price following on proportion of use diagnostic service
Exchange rate	0,32	NIS to US Dollar
Inflation	5%	Standard assumption in BIA

The analysis in excel

Example EU protocol

Cost of illness = Participating women x Cost mammogram

= 21 052 x [redacted] NIS

Screening protocol		Eligble population	frequency of screening	population screened	Not participating in screening		praticipating in screening	testing positive (recall rate)	testing negative
5		EW			NP		PW	WP	WN
E6					death	lost follow up			
0	40 - 44	75 286	1	-	-	-	-	-	-
1	45 - 49	63 924	2	31 962	62	25 570	6 330	392	5 938
1	50 - 54	52 416	2	26 208	97	20 966	5 145	319	4 826
1	55 - 59	40 129	2	20 065	136	16 052	3 877	240	3 637
1	60 - 64	27 360	2	13 680	160	10 944	2 576	160	2 416
1	65 - 69	19 528	2	9 764	219	7 811	1 734	108	1 626
1	70 - 74	14 985	3	4 995	200	3 996	799	50	749
1	> 75	13 391	3	4 464	302	3 571	591	37	554
	total	**307 019**		**111 137**	**1 175**	**88 910**	**21 052**	**1 305**	**19 747**

Cost of illness = Testing postive x Cost Recall

= 1 305 x [redacted] NIS

Future projections

Time horizon: 5 years

x growth rate

scenarios

	2020	2021	2022	2023	2024	2025
target population						
40 - 44	0	0	0	0	0	0
45 - 49	31962	32691	33436	34198	34978	35776
50 - 54	26208	26806	27417	28042	28681	29335
55 - 59	20065	20522	20990	21468	21958	22459
60 - 64	13680	13992	14311	14637	14971	15312
65 - 69	9764	9987	10214	10447	10685	10929
70 - 74	4995	5109	5225	5345	5466	5591
> 75	4464	4565	4670	4776	4885	4996
participation in screening						
40 - 44	0	0	0	0	0	0
45 - 49	6330	6475	6622	6773	6928	7086
50 - 54	5145	5262	5382	5505	5630	5759
55 - 59	3877	3966	4056	4148	4243	4340

Why are most budget impact "5" years?

- BIA should reflect direct impact on the budget *payer wants to know what it cost now…*
- Many things can change which might affect the budget…
  - E.g. pandemic/recession
  - E.g. politics

Short term changes you might try to capture

- Exchange rates
- New technologies (joining in short term)

Screening protocol		Eligble population	frequency of screening	population screened	Not participating in screening		praticipating screening
5		EW			NP		PW
E6					death	lost follow up	
0	40 - 44	75 286	1	-	-	-	
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1	70 - 74	14 985	3	4 995	200	3 996	7
1	> 75	13 391	3	4 464	302	3 571	5
	total	**307 019**		**11 [illegible]37**	**1 175**	**88 910**	**21 0**

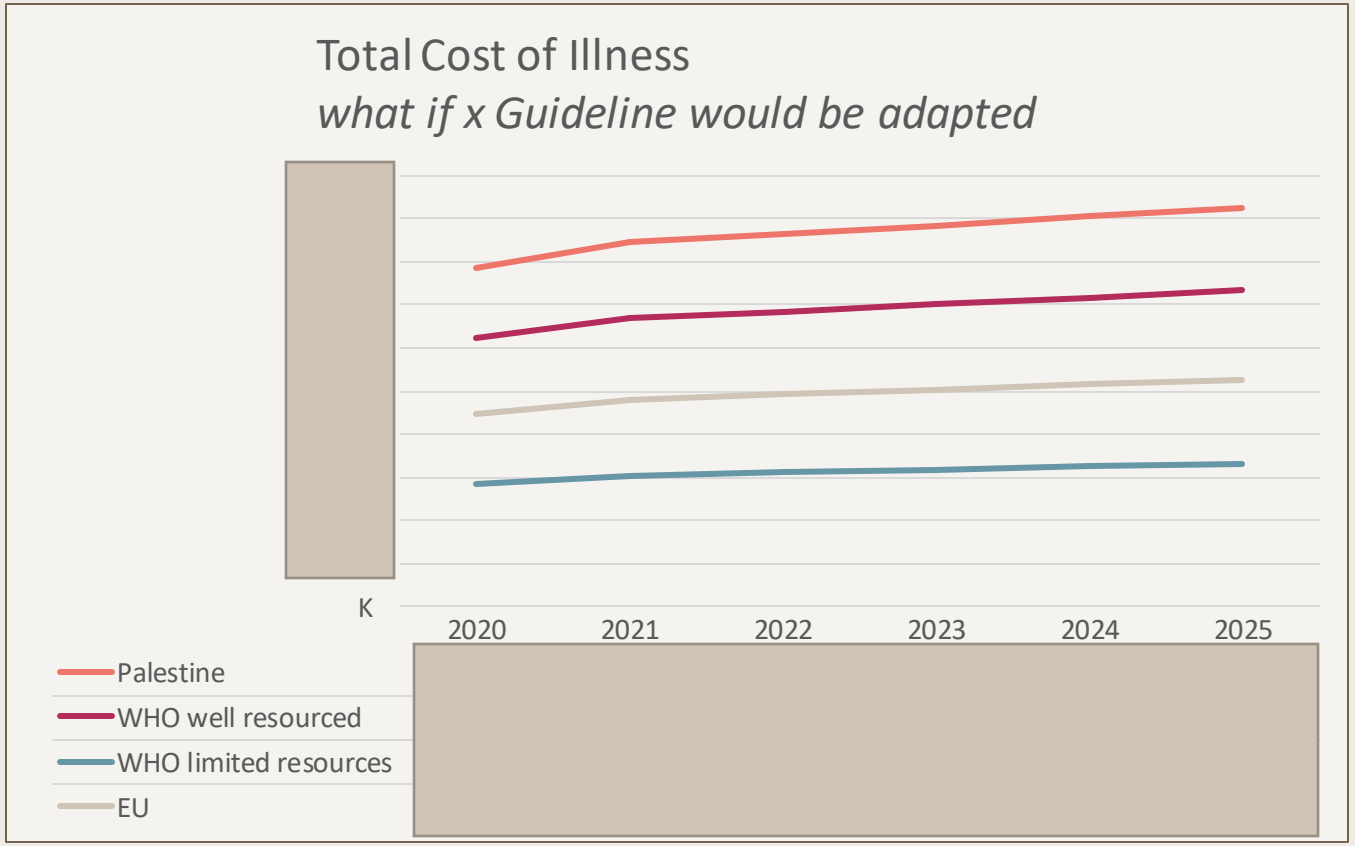
Preliminary results: EU guideline

What would happen with the *cost of illness* if Palestine would apply the EU guideline and 20% of the 'invited' population would be covered?

total cost, including 5% inflation	
cost of screening	
40-49	
50-69	
70+	
cost of further testing	
40-49	
50-69	
70+	
Total Cost x 1000	
cost of screening	
cost of further testing	
total cost	

Preliminary results (interpretation of results example)

Scenario: coverage of 20%, assumes 20% of the women 'invited' to mammography screening under the guideline are screened



The (preliminary) cost in the table present **total cost of illness** (= cost mammograms & cost tests at recall) if a certain guideline would be implemented in the West Bank.

Palestine guideline invites women 40-49 (screening once per 1 year) & 50-59 (screening once per 2 years)

Scenario: 20% coverage

= total cost of illness = million US dollars*

WHO limited resource recommendation invites women 50-69 (screening once per 2 years)

Scenario: 20% coverage

= total cost of illness = US dollars*

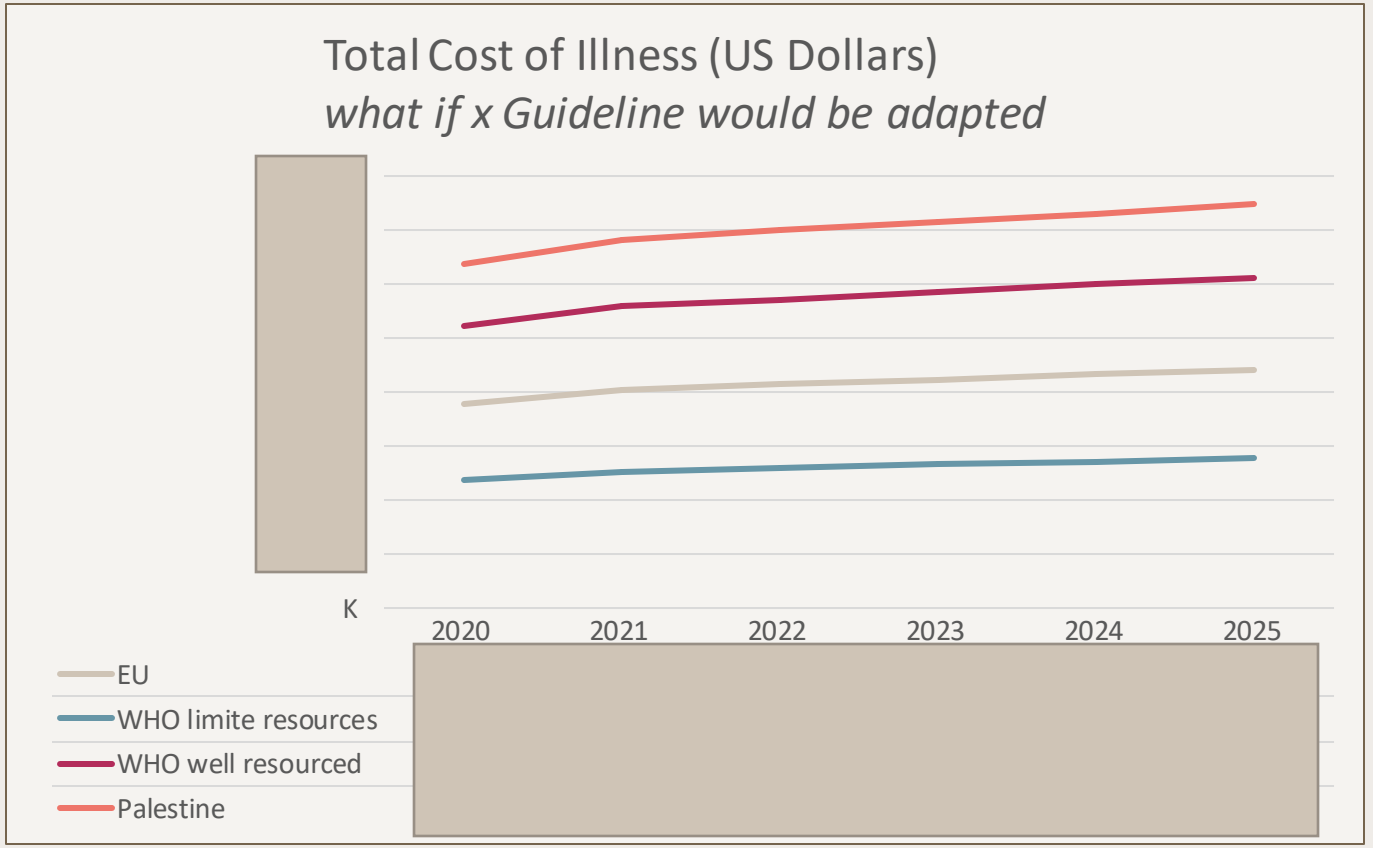
If Palestine would change their existing guideline to adopt WHO recommendation, budget impact =

million – = **US Dollars (savings)**

**Exchange rate 1 NIS = 0.32 US Dollar*

Preliminary results (interpretation of results example)

Scenario: coverage of 80%, assumes 80% of the women 'invited' to mammography screening under the guideline are screened



The (preliminary) cost in the table present **total cost of illness** (= cost mammograms & cost tests at recall) if a certain guideline would be implemented in the West Bank.

Palestine guideline invites women 40-49 (screening once per 1 year) & 50-59 (screening once per 2 years)

Scenario: 80% coverage

= total cost of illness = million US dollars*

WHO limited resource recommendation invites women 50-59 (screening once per 2 years)

Scenario: 80% coverage

= total cost of illness = illion US dollars*

If Palestine would change their existing guideline to adopt WHO recommendation, budget impact = million – **US Dollars (savings)**

**Exchange rate 1 NIS = 0.32 US Dollar*

The future is uncertain and other limitations

- BIA includes cost of screening, it does NOT take into account:
  - Promotion or sending of invitations
  - Higher detection of cancer = more expenses for treatment
  - Early detection of cancer = less expenses for treatment when done early
  - Increase in life expectancy (indirect social cost, pensions, care, etc.)

  →Cost are not in silo's if you spend somewhere, expensive might go up somewhere else

- Uncertainty
  - Not all scenarios are as likely, meaning the 80% coverage estimations are maybe less relevant than the 20% coverage (closer to the real world)
  - Utilizationa trend (coverage) is here assumed to be stable over the years, however, it is unlikely in the first year directly 80% will be covered. This migth be more gradual…

  →Considering, take-away propose a Review Point (e.g., when cost reach a limit, review is required)

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Appendix

Some slides with extra information incl.:

Cost of recall (estimation calculation)

Observed capacity						
Technology	Public	NGO	Private	**Total**	Percentage of total	Average estimated price (NIS)
Breast ultrasounds	47	84	88	**219**		
Fine needle biopsies	9	36	25	**70**		
MRI	10	5	15	**30**		
Tru cut biopsy	15	5	14	**34**		
Histopathology	7	4	71	**82**		
			Total	**435**	**100%**	**NIS ollar**

Acknowledgements

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