IMMUNIZATION COSTING

what have we learned, can we do better ?

~ workshop report ~

- NEW ANALYSES OF POOLED EPIC DATA
- IMMUNIZATION COSTING, FINANCING, AND EFFICIENCY
- COUNTRY-LEVEL USE OF IMMUNIZATION PROGRAM COST DATA
- IMPROVING FUTURE IMMUNIZATION COSTING STUDIES
- STAKEHOLDER PERSPECTIVES ON IMMUNIZATION COSTING RESEARCH

Workshop materials can be accessed at:
immunizationcosting.org

BILL & MELINDA GATES foundation

HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH
Center for Health Decision Science

Executive Summary

On May 17-18, 2016, over 70 policy-makers, academic researchers and global health organization representatives filled the Westin D.C. City Center ballroom in Washington, D.C. to attend the workshop "Immunization Costing: what have we learned, can we do better" – sponsored by the Bill & Melinda Gates Foundation. The workshop aimed to bring together experts in immunization costing, financing, and efficiency from different backgrounds to share new knowledge on the subject and provoke conversations to improve immunization delivery and future immunization costing studies.

The EPIC project collected immunization costing and financing data at central, subnational, and facility-level in Benin, Ghana, Uganda, Zambia, Honduras, and Moldova and was notable for its rigor in sample design and comprehensiveness of resource use measurement. The study involved over 300 healthcare facilities in the six countries, the largest immunization costing study of its kind.

In addition to the new analyses from the EPIC study, the workshop also featured new knowledge from studies across the globe, evaluation of country usage of immunization program cost data, identifying opportunities to improve the design of future studies, and specific focus groups and panel discussions to better understand the need of stakeholders in implementing and expanding immunization programs. Workshop materials available at www.immunizationcosting.org.

Meeting summary

On May 17-18, 2016, a workshop to disseminate novel findings of the Bill & Melinda Gates Foundation-sponsored EPIC project was conducted in Washington, D.C. The workshop was entitled "*Immunization Costing: what have we learned, can we do better*" and assembled over 70 policy-makers, academic researchers and global health organization representatives from five continents in the Westin D.C. City Center.

The workshop brought together experts in immunization costing, financing, and efficiency to share new knowledge on the subject and provoke conversations to improve immunization delivery and future immunization costing studies. The participants included representatives from the following backgrounds:

- **Key stakeholders** from Africa, Asia, Central and South America and Eastern Europe, including several from Ministries of Health.
- **Global health organization** representatives from the World Health Organization, the World Bank, Gavi, the Centers for Disease Control and Prevention, CDDEP, Curatio, Path, JSI, Abt Associates, Think Well, Curatio International Foundation, Sabin, Health Affairs, Results for Development Institute, Clinton Health Access Initiative, and the Bill & Melinda Gates Foundation.
- **Academic researchers** from Harvard University (Boston, USA), Johns Hopkins (Baltimore, USA), Brandeis University (Waltham, USA), the London School of Hygiene & Tropical Medicine (London, United Kingdom), the University of Health and Allied Sciences (Ho, Ghana), Nnamdi Azikiwe University (Awka, Nigeria), Addis Ababa University (Addis Ababa, Ethiopia), Federal University of Goiás (Jataí, Brazil), and Imperial College (London, United Kingdom).

An introduction to the workshop was given by Logan Brenzel, Senior Program Officer of the Bill & Melinda Gates Foundation and Stephen Resch, Deputy Director of the Harvard Center for Health Decision Science and principal investigator of the second phase of the Expanded Program on Immunization Costing and Financing (EPIC-2) project. The workshop consisted of four sessions, a focus group discussion and two panels. A summary of each workshop component is provided below:

Session I- New Analysis of pooled EPIC data

This session was chaired by Wu Zeng and provided an overview of the EPIC project and presented results from recent analyses of EPIC Phase 2 data. Stephen Resch described how the EPIC project collected immunization costing and financing data at central, subnational, and facility-level in six countries (Benin, Ghana, Uganda, Zambia, Honduras, and Moldova). The project is notable for its rigor in terms of sample design and comprehensiveness of resource use measurement. This study

involved over 300 healthcare facilities in six countries, the largest immunization costing study of its kind.

Nick Menzies and Fangli Geng, both from Harvard, then presented on unit costs, variation, cost determinants and efficiency comparison results from the EPIC 2 pooled data. Their talks explored the relationship between costs and service volume (which proved to be the major cost determinant) and the model's capacity to predict site-level costs. Breaking down costs by budget and programmatic categories demonstrated the sizeable contribution of labor costs to total costs, though there was variation by country. More efficient facilities tended to have lower proportion of labor costs than lower efficiency facilities. Differences in contextual factors present challenges for using EPIC data to estimate the marginal costs of scale-up. Many sites do not reach the "efficient frontier" of an optimal cost to doses-delivered ratio, though the implications of these findings for a management context still remain to be discussed.

Logan Brenzel continued with a presentation on resource tracking, finding that on average over 50% of the costs for routine immunization were accounted for by government sources in the six EPIC countries. The financial analysis confirmed that labor costs accounted for the largest share of expenditures in most countries, while emphasizing the need for higher quality expenditure data.

Focus group discussion- summary

The focus group discussions consisted of academics - researchers, country representatives - EPI managers (implementation perspectives), and global health organizations. The focus groups, given their perspectives, discussed the following questions:

- What have we learned from these new EPIC studies, what surprised you?
- What are the strengths and limitations?
- Any lessons learned and policy implications of these new studies?

The discussion concluded with reports from each focus groups to the floor

Country representatives / EPI managers: reports by Francis Mwanza and Jessica Gu

- Many of the results from EPIC confirmed what participants knew on a practical level, and these results form a strong baseline for future studies.
- Rigorous analyses were done but the results were difficult to understand. We need simpler ways of presenting the results to stakeholders. Additionally, it's hard to know how to translate the information into planning processes.
- How can information be extrapolated to other countries and regions which may not have been directly represented in EPIC 2?
- Human resource contribution to immunization costs is quite large—how should the primary health care system approach this?

Academics & researchers: reports by Diane Coraggio and Meghan O'Connell

- Surprised about the substantial variation between and within countries, particularly with regard to salaries.
- Surprised that it was not possible to evaluate rigorously the costs of scaling up EPI from the EPIC data. Even poor quality data may have been worth presenting.
- We now have a function to predict unit costs, which is useful.
- Would countries be surprised about where specific facilities fell on the efficiency curve, and could that information be used for advocacy efforts?
- Missed opportunity to gather more qualitative information on country-specific contextual details. Should aim to gather that information in the future.
- As we integrate immunization into broader primary health care, may need to consider other outputs besides DTP3 coverage.
- Coverage estimates >100% make it difficult to plan at the facility level; need to investigate deeper and use antigen testing to verify actual coverage rates
- Need to consider the sustainability of new vaccines and countries' ability to pay for those.
- Would like to see a costing study done alongside a coverage study.

Global health organizations: reports by Zach Ward and Cristina Munk

- Most results weren't surprising; they confirmed what we thought was true.
- Surprising that we don't have data to show increasing marginal costs for the last mile. Maybe increasing marginal costs show up at the aggregate level but not the facility level.
- One limitation was the lumping of labor costs: should disaggregate those further.
- Coverage was another limitation. More broadly, there was significant variation within countries so how much can we really extrapolate within countries?
- These data have been a useful tool for advocating for immunization programs. However, what is the cost of getting these data compared to the value?
- Importance of having clear, definitive takeaway points for policy makers.
- Sustainability of costing studies: would it be possible to pick a handful of indicators to be collected routinely that would explain most of the variation?
- Need to explore how to crosswalk between the different values obtained through economic vs. budgeting costing perspectives.

Session II- New studies on immunization program costing, financing and delivery

Session II was chaired by Charlotte Zikusooka and comprised presentations from five countries. Cristiana Toscano from the Federal University of Goias in Brazil shared how immunization costing tools from the ProVac initiative were used to estimate the economic cost of the national immunization program, including labor costs per dose and breakdowns by input and organizational level. The tools used were both standardized yet adaptable and involved a strong degree of collaboration with the Ministry of Health.

Susmita Chatterjee from the Public Health Foundation of India spoke of a seven-state survey

conducted to explore routine immunization variation at the facility, district and state level in India's Universal Immunization Programme. Facility level unit costs varied widely by state and even by sub-centres within a given state. In nearly all states, human resource-related costs comprised a large share of routine immunization delivery costs.

Professor Damen Haile Mariam (Addis Ababa University) described cost findings from three districts in Ethiopia. Corroborating findings of other studies, personnel costs and transport formed the largest share of non-vaccine costs. Facilities in pastoralist regions had higher average costs compared to those in agrarian regions.

Florence Sibeudu from the University of Nigeria presented results from a household survey investigating the role of socioeconomic status in accessing routine immunization services in Anambra state. Expenditure on routine immunization and transportation was relatively constant across SES groups, indicating that public facilities may be charging informal payments for RI.

Ann Levin, of Levin & Morgan, LLC, concluded the Session II presentations by detailing three costing tools designed to estimate the cost of introducing new vaccines. The tools were designed to be transparent, customizable and accessible and provided economic and financial costs for three vaccines rolled out in Rwanda.

Session III- Country-level usage of immunization program cost data

Sarah Pallas chaired Session III, which began with a presentation by Anthony Kinghorn of SDC on incorporating costing study results into district-level planning. Despite constraints in systemic factors that affect immunization performance, some district managers were proactively using costing results (particularly unit cost data) to improve coverage in their facilities. Responsive and peer-to-peer instruction proved useful for knowledge transfer. There is a need to ensure results of costing studies reach managers at the national, provincial and district levels.

Nassor Mohamed from JSI described how a micro-planning tool was used to address immunization funding gaps in Tanzania. The tool was accompanied by discussions with councils and facility staff which helped strengthen the planning process for local level decision-makers. The tool provides user-friendly guidance in estimating budgetary and logistical requirements for immunization programs at the facility level.

Jessica Gu of CHAI shared examples from three countries' implementation of immunization financing strategies. In Tanzania, a checklist helped guide districts in budgeting for 16 immunization activities, though its use was not consistent across all districts. In Kenya, costed annual work plans helped county health officers advocate for funding for specific EPI activities. Finally, a fund tracking process improved accountability of resource disbursement and use in Nigeria. All three countries demonstrated the need for working with existing systems, building

complexity over time and strengthening finance capacity at the sub-national level.

Ulla Griffiths from the London School of Hygiene & Tropical Medicine presented findings from a feasibility assessment of implementing a routine unit cost system in Kenya. The study explored the cost accounting system landscape, and found that four routine HMIS's were already in place with varying degrees of quality. It is likely that implementation of a cost-accounting system in Kenya would be a long-term investment requiring substantial political support, incentives and infrastructure.

Donald Shepard from Brandeis University discussed the implications of Results-Based Financing (RBF) for immunization programs. RBF had positive effects on some immunization measures in a Zimbabwe study, though a post-presentation discussion highlighted the need for additional evidence on RBF's effectiveness. Mead Over of the Center for Global Development built on the RBF discussion by presenting on the use of contractible indicators and cost functions for immunization results.

Panel Discussion

Stephen Resch moderated the first panel discussion, entitled "Sustainable institutional linkage and improving immunization program implementation." The panelists were Lora Shimp, Collins Chansa, Charlotte Zikusooka, George Gotsadze, Frank Nyonator and Penelope Kalesha. Some of the key messages discussed included:

- It is vital to translate these findings into clear messages that will be useful to the implementing governments who want to use it for programming.
- This information is useful for resource mobilization by identifying what gaps exist in terms of financial resources. In Zambia, the Ministry of Finance and partners both drew on the data during their financial planning processes.
- It is crucial to look at the government environments that the EPI programs are operating within. In Uganda, there are many unspoken rules operating in the Ministry of Health that sometimes lead to the program managers' hands being tied.
- Many of the EPIC analyses that were done were at the cross-country level, but governments want to know about specific results that pertain to their country.
- If results (like unit costs, etc.) cannot be collected regularly at the country level, their usefulness to governments is diminished.
- We must consider the long-term financial implications of introducing new vaccines into a country.
- Often a single person in the government is trained by donors to give technical assistance (TA) but they are just one person and the need for TA is much greater than they are able to provide. This approach also tends to create a crutch—everyone relies on this single person for assistance and if the donor stops funding that position, the program collapses. Instead, we should think of more creative approaches to providing TA.

- Any tool development needs to be contextualized with a specific country in mind – which would capture the structure, function, and operations in that specific country. However this requires strong participation from receptive governments – which might pose a challenge for certain countries.

Session IV- Improving future immunization costing studies

Session IV was chaired by Melanie Bertram and began with Sebastien Haneuse of Harvard posing opportunities for improvement of sampling methodologies in future costing studies. He highlighted the need for quantification of uncertainty and the possible impact of uncertainty on decisions. Improved estimation by incorporating contextual factors can calibrate models and help reduce uncertainty. Moving forward, study design decisions may consider having a means of evaluating uncertainty and using simulation to explore different possible designs.

Sachiko Ozawa of Johns Hopkins Bloomberg School of Public Health called in to present on survey tools used in the Decade of Vaccine Economics initiatives. The fourth phase of the project will gather data on immunization treatment utilization and costs in Uganda in order to estimate the economic impact of four vaccine preventable diseases.

The second panel was moderated by Ulla Griffiths and included Stephen Resch, Mercy Mvundura, Logan Brenzel and Cara Janusz. Key points raised included:

- Need to develop and validate better methods for measuring labor utilization at the facility level and for measuring wastage. Also need more information on the demand side and more indicators on quality of programs.
- We don't know what it takes to reach the last child. How do you routinely use cost information to inform best practices for management?
- How often should this type of costing data be collected? What is the question we are trying to get at by doing these studies and how can we make sure the data is useful for countries?
- Finding ways to routinize the collection of key costing indicators and translate our findings in a way that is useful for country decision-makers.
- We did a costing study not a cost-effectiveness study, but is there a way to marry the EPIC data with other data to get cost effectiveness information?

Conclusion

The workshop was concluded by Stephen Resch and Logan Brenzel who expressed their gratitude for the active participation of the audience. The deliberations will be considered in prioritizing future investments in this area. Participants were encouraged to become a member of the Community of Practice (now numbering 221) and to visit www.immunizationcosting.org for workshop materials.

For further questions, please contact: epic@hsph.harvard.edu

Immunization Costing: what have we learned, can we do better?
May 17-18, 2016 - Washington DC
Location: The Westin Washington D.C. City Center
1400 M Street Northwest, Washington, District of Columbia 20005

Time	Day 1 schedule	Day 2 schedule
09:00 - 09:30	Registration and coffee	Registration and coffee
09:30 - 10:00	**Opening remarks** Presenter: Stephen Resch, Logan Brenzel	Introduction to day-2 agenda (Stephen Resch)
	SESSION I: **New analysis of pooled EPIC data**	**SESSION III:** **Country-level usage of imm. program cost data**
10:00 - 10:30	**Introduction to EPIC immunization costing studies, methods, resources, and community of practice** Presenter: Stephen Resch	**Incorporating costing study results to enhance program performance: a Zambian case study** Presenter: Carl Schutte, Anthony Kinghorn
10:30 - 11:00	**The costs of providing routine immunization services in six countries: variation and cost determinants** Presenter: Nick Menzies	**Using Reaching Every Child (REC) Micro-Planning Tool to Estimate Immunization Budgets in Tanzania** Presenter: Nassor S. Mohamed
11:00 - 11:30	**Cost shares analysis of routine immunization programs in six countries** Presenter: Fangli Geng **Discussion: Estimating the cost of scaling up immunization** (Nick Menzies)	**Implementation lessons from Nigeria, Kenya, and Tanzania: budget allocation to expenditure tracking** Presenter: Jessica Gu **Feasibility of routine cost monitoring system in Kenya** Presenter: Ulla Griffiths
11:30 - 12:00	**The efficient production of immunization services: results from the EPIC study** Presenter: Nick Menzies **Consolidated financing analysis of EPIC countries** Presenter: Logan Brenzel	**Provider payment mechanisms and implications for sustaining the provision of quality services** Presenter: Donald Shepard **Rewarding immunization coverage and completion: From cost function to contract design** Presenter: Mead Over
12:00 - 12:30	**Summary and cross-cutting dialogue**	**Summary and cross-cutting dialogue**
12:30 - 1:00 1:00 - 1:30	Lunch break	Lunch break
1:30 - 2:00 2:00 - 2:30	**Focus group discussions: Making sense of EPIC Data** Group A: Academics, researchers Group B: Country representatives, EPI managers Group C: Global health organizations	**Panel Discussion: Sustainable institutional linkage and improving immunization program implementation** Moderator: Stephen Resch Panelist: Lora Shimp, Collins Chansa, Charlotte Zikusooka, George Gotsadze, Frank Nyonator, Penelope Kalesha
	SESSION II: **New studies on immunization program costing, financing, and delivery**	**SESSION IV:** **Improving future immunization costing studies**
2:30 - 3:00	**Cost of routine immunization in Brazil** Presenter: Cristiana Toscano	**On the design and analysis of costing studies in low-and-middle income countries** Presenter: Claudia Rivera, Sebastian Haneuse
3:00 - 3:30	**Cost of delivering routine immunization services in India** Presenter: Susmita Chatterjee Coffee break	**Survey tools to estimate cost of treatment and productivity loss for vaccine preventable diseases** Presenter: Diane Coraggio, Morgan G, Sachiko Ozawa Coffee break
3:30 - 4:00	**Immunization costing exercise in three districts on Ethiopia** Presenter: Damen Haile Mariam **Socioeconomic inequity in access to and expenditures on immunization services in Anambra, Nigeria** Presenter: Florence Sibeudu	**Panel discussion: The future of immunization costing and efficiency studies: where do we go next?** Moderator: Ulla Griffiths Panelist: Stephen Resch (EPIC), Mercy Mvundura: (PATH), Logan Brenzel (BMGF), Cara Janusz (PAHO)
4:00 - 4:30	**Cost comparison of introducing new vaccines in Rwanda, take-aways in costing tools implementation** Presenter: Ann Levin	
4:30 - 5:00	**Summary and cross-cutting dialogue** Announcements and close of the day	**Summary and cross-cutting dialogue** Closing remarks (Stephen Resch)
7:00 - 9:00	**Reception:** The Hamilton 600 14th St NW, Washingotn DC 20005 (13 minute walk / 8 minute car ride from Westin)	

Participant List

#	Name	Institution
1	Stephen Resch	Harvard School of Public Health
2	Nick Menzies	Harvard School of Public Health
3	Sebastien Haneuse	Harvard School of Public Health
4	Christian Suharlim	Harvard School of Public Health
5	Fangli Geng	Harvard School of Public Health
6	Zach Ward	Harvard School of Public Health
7	Cristina Munk	Harvard School of Public Health
8	Logan Brenzel	Bill and Melinda Gates Foundation
9	Melanie Bertram	World Health Organization
10	Mead Over	Center for Global Development
11	Jean-Bernard	Agence de Médecine Préventive
12	Frank Nyonator	Univ Health Sciences
13	Carl Schutte	Strategic Development Consultants
14	Anthony Kinghorn	Strategic Development Consultants
15	Charlotte Zikusooka	HealthNet Consult
16	Collins Chansa	The World Bank
17	Francis Dien Mwansa	Zambia Ministry of Health
18	Penelope Kalesha Masumbu	World Health Organization
19	George Gotsadze	Curatio International Foundation
20	Ketevan Goguadze	Curatio International Foundation
21	Veaceslav Gutu	Moldova CNSP
22	Cara Bess Janusz	Pan American Health Organization, ProVac Initiative
23	Sarah Pallas	CDC/Global Immunization Division
24	Wu Zeng	Brandeis University
25	Mercy Mvundura	PATH
26	Sibeudu,Florence Tochukwu	Nnamdi Azikiwe University, Awka, Nigeria
27	Cristiana Toscano	Institute of Tropical Pathology and Public Health, Federal University of Goiás
28	Nassor S. Mohamed	John Snow, Inc
29	Susmita Chatterjee	Public Health Foundation of India
30	Damen Haile Mariam	JSI, Addis Ababa University, registered consultant with the Federal Ministry of Health of Ethiopia
31	Don Shepard	Brandeis
32	Diane Coraggio	Johns Hopkins Bloomberg School of Public Health
33	Grace Morgan	Johns Hopkins Bloomberg School of Public Health
34	Sachiko Ozawa	Johns Hopkins Bloomberg School of Public Health
35	Lesong Conteh	Imperial College
36	Anais Colombini	-

37	Xiao Xian Huang	World Health Organization
38	Stephane Verguet	Harvard School of Public Health
39	Ulla Griffiths	London School of Hygiene & Tropical Medicine
40	Ann Levin	Levin & Morgan LLC
41	Angela Shen	US Dept of Health and Human Services
42	Asnakew Tsega	John Snow, Inc
43	Marcia Weaver	University of Washington
44	Lora Shimp	John Snow, Inc
45	Daniel Arias	Results for Development Institute
46	Craig Burgess	John Snow Research and Training Institute
47	Dagna Constenla	Johns Hopkins Bloomberg School of Public Health
48	Laura Di Giorgio	PATH
49	Helen Saxenian	Independent consultant
50	Heather Randall	John Snow, Inc
51	Meghan O'Connell	Results for Development Institute
52	Gabriela Felix	Pan American Health Organization
53	Gatien de Broucker	International Vaccine Access Center at Johns Hopkins University
54	Samantha Clark	Johns Hopkins Bloomberg School of Public Health
55	Nelson Alvis Guzman	Universidad de Cartagena
56	Jessica Gu	Clinton Health Access Initiative
57	Jessica Crawford	VillageReach
58	Anna Z. Jin	Applied Strategies / SDG
59	Arindam Ray	Bill and Melinda Gates Foundation
60	Alice Abou Nader	MCSP/JSI
61	Rachel Sanders	Avenir Health
62	Fatuma Manzi	Ifakara Health Institute
63	Arindam Nandi	Center for Disease Dynamics, Economics & Policy, Washington DC
64	Benjamin Johns	Abt Associates
65	Sophie	Abt Associates
66	Molly Miller-Petrie	Center for Disease Dynamics, Economics & Policy
67	Hellen Gelband	Center for Disease Dynamics, Economics & Policy
68	Gatien de Broucker	International Vaccine Access Center
69	Suraj Pant	Center for Disease Dynamics, Economics & Policy
70	Sangay Phuntsho	Pan American Health Organization
71	Yogesh Rajkotia	ThinkWell
72	Ana F. Carvalho	Sabin
73	Sarah Alkenbreck	World Bank
74	Margaret Saunders	Health Affairs
75	Marcela Contreras	Pan American Health Organization