Strengthening evidence-based decision making for new vaccine introduction: PAHO’s ProVac Initiative

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Immunization, PAHO
Landscape for global, regional and national immunization policymaking

- **1985**: Regional technical advisory body is established to guide efforts towards polio elimination goals in the Region.
- **1999**: Global level body is established to provide evidence-based guidance on immunization policy (i.e. WHO vaccine position papers).
- **2000+**: In recognition of diverse national contexts and policymaking processes, national advisory bodies are established to adapt global and regional recommendations to local needs/contexts.

http://www.paho.org/provac
ProVac’s Goal: **strengthen national capacity to make informed, evidence-based decisions regarding vaccine introduction**

- BMGF Financing to PAHO for period 2009-2015
- Current focus on 4 vaccines:
  - Rotavirus
  - Pneumococcal conjugate
  - HPV
  - Influenza
  - (in the future: dengue, meningococcal, second generation & others)
Objectives of the ProVac Initiative

Objective 1: Strengthen infrastructure and processes for decision making
- NITAG strengthening
- Legal frameworks
- South-south academic network

Objective 2: Develop tools for EE and provide training to multidisciplinary teams
- Cost-effectiveness models
- Program costing model
- Regional training workshops

Objective 3: Collect data, perform analysis and gather the framework of evidence
- Direct country support
- Methodological guidelines

Objective 4: Advocate for evidence based decision-making
- Results presented to authorities
- Technical reports & policy briefs

Objective 5: Support an effective & sustainable NUVI
- Costing exercises to inform new vaccine intro
ProVac’s technical cooperation

Countries have requested technical support from PAHO to help integrate economic studies into the national decision-making process for immunization - 2006 Directing Council resolution (CD47.R10)
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Considerations for new vaccine policymaking at country-level

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Considerations for new vaccine policymaking at country-level

Step-wise calculations to estimate vaccine impact (effectiveness): Example childhood vaccine

Number of life-years in target population
x Incidence of cases in target population per 100,000 per year
x % of cases by age
x **Efficacy** by dose (dose + booster)
x **Vaccine Type Coverage & replacement effects**
x **Coverage** by dose (+booster)
x **Timeliness** by dose (+booster)
x **Relative coverage** (% of coverage reaching high risk children)
x Decrease in protection due to **Waning**
x **Herd Effect** multiplier
TRIVAC: Impact/CEA of Hib, RV and PCV

A model to evaluate the cost-effectiveness of Hib, Pneumococcal and Rotavirus vaccines

Pneumococcal, Colombia

<table>
<thead>
<tr>
<th>Instructions</th>
<th>Inputs</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1. Setup parameters</td>
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<tr>
<td>Step 2. Model structure</td>
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<tr>
<td>Step 3. Health system</td>
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<tr>
<td>Step 4. Vaccination schedule</td>
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<tr>
<td>Step 5. Demography</td>
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<td>Step 6. Burden of disease</td>
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<tr>
<td>Step 7. Vaccine coverage</td>
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<td>Step 8. Vaccine efficacy</td>
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<td>Step 9. Vaccine costs</td>
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<td>Step 10. Health services utilisation</td>
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<tr>
<td>Step 11. Health services costs</td>
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<td>Step 12. Override coverage of PCV</td>
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<td>Step 13. Override vaccine dose price</td>
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<tr>
<td>Step 14. Override extra system cost</td>
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</tr>
</tbody>
</table>

**Government perspective**
Future costs and health benefits discounted

<table>
<thead>
<tr>
<th>Cost per DALY averted</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x GDP per capita (2012)</td>
<td>$1,032</td>
</tr>
<tr>
<td>3 x GDP per capita (2012)</td>
<td>$3,095</td>
</tr>
</tbody>
</table>

**Deaths averted**
19,831

41.4% impact

<table>
<thead>
<tr>
<th>% of under five mortality averted</th>
<th>2.58%</th>
</tr>
</thead>
<tbody>
<tr>
<td>DALYs averted</td>
<td>1,276,736</td>
</tr>
<tr>
<td>Life years gained</td>
<td>1,274,112</td>
</tr>
</tbody>
</table>

**Total net costs (millions)**
63.83

| Incremental cost of vaccination (millions) | 69.02 |
| Number of fully immunized children | 10,276,836 |
| Incremental cost per fully immunized child | 6.72 |
| Treatment cost savings (millions) | 5.19 |
CERVIVAC: Model to evaluate the cost-effectiveness of strategies for cervical cancer prevention in Colombia.

<table>
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<tr>
<th>Instructions</th>
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<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter estimate, range and source:</td>
<td>Mid</td>
<td>Low</td>
</tr>
</tbody>
</table>

Common parameters:
- Step 1: Country and time horizon
- Step 2: Discounting, DALYs and age weighting
- Step 3: Disease burden
- Step 4: Cancer treatment utilisation
- Step 5: Cancer treatment costs (average cost per treated woman)

Vaccination program:
- Step 6: HPV vaccination program
- Step 7: Demography
- Step 8: Vaccine coverage
- Step 9: Vaccine costs
- Step 10: Vaccine impact

Screening program:
- Step 11: Cervical cancer screening program
- Step 12: Demography
- Step 13: Screening and lesion treatment
- Step 14: Screening and lesion treatment

CERVIVAC: Modelo para evaluar la costo-efectividad de estrategias de prevención del cáncer cervical en Colombia.

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<th>Resultados</th>
</tr>
</thead>
<tbody>
<tr>
<td>Futuros costos y beneficios discountados al 3%</td>
<td>Perspectiva del gobierno</td>
<td>Línea de</td>
</tr>
</tbody>
</table>

Resultados de la cohorte de niñas vacunadas:
- 1. Resumen de resultados (1 cohorte)
  - Costo por AVAD evitado: 1,474
  - 1 x PIB per capita (2009): $5,126
  - 3 x PIB per capita (2009): $15,378
  - Interpretación de la OMS: Altamente costo-efectivo
- Muertes evitadas: 571
- AVADs evitados: 12,272
- Años de vida ganados: 11,028
- Costos netos totales: 18,084,566
  - Costo incremental de vacunación: 25,223,293
  - Costos ahorro al sistema: 7,138,729
  - Costo del programa por mujer totalmente vacunada: 83
  - Número de mujeres totalmente vacunadas: 303,267
### Scenario 1
CEA/impact not considered (political decision)

### Scenario 2
Agency-led CEA/impact (Hib vaccine in India)
- TRIVAC model used
- Outside agency presented to NITAG
- Outside agency led publication of results
- No MoH training
- GAVI finance available but significant delays in adoption

### Scenario 3
MoH-led CEA/impact (ProVac) (PCV in Argentina)
- TRIVAC model used
- MoH presented to NITAG
- MoH-led publication of results
- MoH trained and led subsequent CEA of RV/HPV
- PCV quickly financed/adopted

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Slide courtesy of Andrew Clark, ProVac Modeller
ProVac in other regions of the world: the ProVac International Working Group

• To transfer ProVac tools and methods to other WHO Regions:
  o AFRO: 1 regional workshop & 3 country-led analyses
  o EMRO: 1 regional workshop & 2 country-led analyses
  o EURO: 1 regional workshop & 4 country-led analyses

• Two-year pilot phase (2012-13) funded by BMGF

• Partners:

[Logos for AMP, CDC, PATH, Sabin Vaccine Institute, World Health Organization]
ProVac supported country studies globally
Available online: http://www.sciencedirect.com/science/journal/0264410X/33/supp/S1

“...this supplement features country-led research to support real-time policy making, including, inter alia, cost-effectiveness, program costing, and analyses of financial flows. It highlights the work undertaken by partner organizations collaborating in the ProVac International Working Group, as well as the Bill and Melinda Gates Foundation-led Expanded Program on Immunization Costing and Financing (EPIC) project.”
What have we learned?

• Though cost-effectiveness data is not the only input to policymaking, the process of generating this data contributes to a framework for systematically reviewing other data considerations.

• With the reflection of decision makers preferences and local data in ProVac tools, country teams can better understand, use and defend evidence for informed policy making.

• There is a high demand from MICs and GAVI-graduating countries; greater need for weighing the economic and health benefits for NU VI decisions in resource constrained settings.

• Need to strengthen country capacity to link technical discussion to resource allocation decisions.
Future direction

• Further development of Univac
• Complement CEA and impact models with other tools to populate models (i.e. vaccine program costing, disease treatment costing, etc).
• Launch toolkit in March 2016
• Collaborate with partners to extend the lessons of ProVac to other Regions
How can I learn more about ProVac?

For general information, technical documents and articles go to:
www.paho.org/provac

To request for direct technical support contact:
provac@paho.org
10 years of supporting evidence based immunization policy in the Americas and beyond: PAHO’s ProVac Initiative

**2004**
- Mandate from PAHO Member States (CD47.R10)

**2005**
- 1st ProVac Workshop with key partners: Prevention effectiveness, WDC

**2006**
- 2nd ProVac Workshop: Cost-effectiveness of PCVs, Paraguay

**2007**
- Establishment of ProVac Network of Centers of Excellence

**2008**
- Country teams initiate studies: ARG, PAR, NIC

**2009**
- Multi year BMGF grant awarded to PAHO

**2010**
- 4th ProVac Workshop: Cost-effectiveness of HPVs, Colombia

**2011**
- Launch of the ProVac International Working Group, support to WHO AFR, EMR and EUR initiated
- More countries join the Initiative: ELS, GUT
- More PAHO demand: ECU, URU

**2013**
- More PAHO demand: BEL, BAH, HON
- 5th ProVac workshop: integrating immunization program costing and planning

**2014**
- More PAHO demand: BRA – support from immunization program costing launched
- BMGF commissioned external evaluation

**2015**
- More PAHO demand: ECU, URU

**2016**
- More PAHO demand: BEL, BAH, HON

**2017**
- More PAHO demand: BRA – support from immunization program costing launched

**2018**
- BMGF commissioned external evaluation

**2019**
- More PAHO demand: ECU, URU

**2020**
- More PAHO demand: BEL, BAH, HON

**2021**
- More PAHO demand: BRA – support from immunization program costing launched

**2022**
- BMGF commissioned external evaluation

**2023**
- More PAHO demand: ECU, URU

**2024**
- More PAHO demand: BEL, BAH, HON

**2025**
- More PAHO demand: BRA – support from immunization program costing launched

**2026**
- BMGF commissioned external evaluation

**2027**
- More PAHO demand: ECU, URU

**2028**
- More PAHO demand: BEL, BAH, HON

**2029**
- More PAHO demand: BRA – support from immunization program costing launched

**2030**
- BMGF commissioned external evaluation