Cost of immunization during the COVID-19 pandemic

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AGENDA

1. Overview
2. Campaigns
3. Routine
4. Routine outreach
5. Conclusions & discussion
1. Overview of the analyses
COVID-19: IMPLICATIONS ON IMMUNIZATION DELIVERY COSTS

COVID-19 pandemic is disrupting immunization services

Need to modify immunization services to optimize coverage while minimizing the risks of COVID-19 transmission

How much more does it cost to ensure continuation of immunization services during the COVID-19 pandemic?
COVID-19: IMPLICATIONS ON IMMUNIZATION DELIVERY COSTS

COVID-19 pandemic is disrupting immunization services.

Need to modify immunization services to optimize coverage while minimizing the risks of COVID-19 transmission.
SCENARIOS & ASSUMPTIONS

— We developed scenarios of potential delivery strategy changes based on:
  — WHO guidance
  — COVID-19 country protocols: Bangladesh, DRC, Guinea, India, Indonesia, Kenya, Philippines and Uganda
  — Review of experiences from the Ebola epidemic

— Source for price data:
  — WHO COVID-19 Essential Supplies Forecasting Tool
  — UNICEF Supply Catalogue
  — WASH study
OVERVIEW OF THE SCENARIOS

1. Personal protective equipment (PPE) & Infection Prevention and Control (IPC) measures for immunization sessions

2. Adding staff to ensure physical distance is maintained and for screening during immunization sessions

3. Context adjustments: changes in session sizes and frequency, hazard pay to compensate health workers

4. Other operational cost increases: additional social mobilization, communication, training, transport, etc.
2. Campaigns
CAMPAIGN ANALYSIS: OVERVIEW

— Data reported in **10 campaign costing studies** from low and middle income countries

— The majority of these were **pilot/feasibility studies (n=6)**, followed by costing of outbreak/reactive campaigns (n=3) and follow-up (n=1)

— The campaign strategies were predominantly **fixed-site** based, four studies also contained a mobile delivery element

— Calculated the additional **cost per dose in USD** and as a **percentage** increase
1. PPE & IPC

Median percentage increase in cost per dose

- **Masks**: 9%
  - IPC: 5%
  - PPE: 4%
- **Masks + goggles and gloves for vaccinators**: 20%
  - IPC: 8%
  - PPE: 11%
- **Advanced handwashing stations & hand sanitizer**:
  - IPC: 5%
  - PPE: 5%

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**Simple handwashing station & hand sanitizer**

**Hand washing stations & hand sanitizer**

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n= 9
2. PHYSICAL DISTANCING & SCREENING

Median percentage increase in cost per dose

- Per diem: 10%
- PPE: 2%
- Thermometer: 26%

- **One** additional crowd controller on each team
- Adding **two** crowd controllers on each team
- **1 infrared thermometer** per team
3. EXTENDED CAMPAIGN DURATION

Median percentage increase in cost per dose

Additional health worker per diems associated with a reduction to the daily target to 80% of the original achievement

Reducing to 50% of the daily target
An increase of 25% of all cost components potentially affected by COVID-19: social mobilization, training, transport, etc.

4. OPERATIONAL COST INCREASE

Median percentage increase in cost per dose

- Low: 10%
- Medium: 20%
- High: 40%

Increase of 50%
Increase of 100%
CUMULATIVE: ALL MEASURES COMBINED

1. Simple **handwashing station (no PPE)**
2. 1 additional **crowd controller**
3. 80% of daily target
4. 25% increase of operational components

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1. **Masks, gloves, goggles & advanced handwashing stations**
2. 2 additional crowd controllers + **infrared thermometer**
3. 50% of daily target
4. 100% increase of operational components
3. Routine
## ROUTINE SCENARIOS

Each category is presented as the incremental financial outlays required for the relevant adjustments.

<table>
<thead>
<tr>
<th></th>
<th>1. PPE</th>
<th>2. Physical distance</th>
<th>3. Hazard pay</th>
<th>4. Training/social mobilization*</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>• No PPE</td>
<td>• One additional team member</td>
<td>10% of salary hazard pay rate</td>
<td>50/100% of estimated costs required for COVID-19</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>• 1 x mask per health worker per day</td>
<td>• Hand washing station for facility waiting area (low: simple; medium: higher quality)</td>
<td>20% of salary hazard pay rate</td>
<td>100/200% of estimated costs required for COVID-19</td>
</tr>
<tr>
<td></td>
<td>• Hand sanitizer for vaccinators</td>
<td>• Tape; plexiglass barriers (medium only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIGH</td>
<td>• 1 x mask per health worker per day</td>
<td>• Two additional team members</td>
<td>30% of salary hazard pay rate</td>
<td>150/300% of estimated costs required for COVID-19</td>
</tr>
<tr>
<td></td>
<td>• Reusable goggles for vaccinators</td>
<td>• Hand washing station for facility waiting area</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1 x pair of gloves per client per day for vaccinators</td>
<td>• Tape; plexiglass barriers; one screening tent &amp; thermometer per facility</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 2 x pair of gloves for non-vaccinators per day</td>
<td></td>
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</tr>
</tbody>
</table>

*According to estimates from 11 IDCC studies inflated to 2018 USD.
TOTAL INCREASE IN ROUTINE COSTS PER FACILITY: STARTUP COSTS

<table>
<thead>
<tr>
<th>Category</th>
<th>PPE</th>
<th>Patient Intake</th>
<th>Hazard Pay</th>
<th>Social Mobilization</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>$12</td>
<td>$242</td>
<td>$496</td>
<td>$243</td>
<td>$145</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td>$485</td>
<td>$291</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td>$728</td>
<td>$436</td>
</tr>
</tbody>
</table>
TOTAL INCREASE IN ROUTINE COSTS PER FACILITY: MONTHLY RECURRENT COSTS

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<tr>
<td>Low</td>
<td>$24</td>
<td></td>
<td>$178</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td>$356</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>$271</td>
<td>$358</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category 1</td>
<td></td>
<td>Category 2</td>
<td>Category 3</td>
<td></td>
<td>Category 4</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td>$534</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td>$538</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>$277</td>
<td>$500</td>
<td></td>
<td></td>
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<tr>
<td>Low</td>
<td></td>
<td></td>
<td>$750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td>$500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
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<tr>
<td>LOW</td>
<td>No PPE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R:$0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEDIUM</td>
<td>• 1 x mask per health worker per day</td>
<td>• One additional team member</td>
<td>• 10% of salary hazard pay rate</td>
<td>• St:$145 estimated costs required for COVID-19</td>
</tr>
<tr>
<td></td>
<td>R:$24</td>
<td>S:$242</td>
<td>R:$271</td>
<td>R:$178</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ssm:$243</td>
</tr>
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<td>HIGH</td>
<td>• 1 x mask per health worker per day</td>
<td>• Two additional team members</td>
<td>• 30% of salary hazard pay rate</td>
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<td>R:$35</td>
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<td>R:$538</td>
<td>R:$538</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ssm:$485</td>
</tr>
</tbody>
</table>

*According to estimates from 11 IDCC studies inflated to 2018 USD.
AVERAGE PER-FACILITY COSTS OVER TIME, COST CATEGORIES COMBINED

- **Month 1 Low (Startup costs):** $850
- **Month 1 Medium (Startup costs):** $1,675
- **Month 1 High (Startup costs):** $2,767
- **Month 2+ Low (Startup costs):** $449
- **Month 2+ Medium (Startup costs):** $657
- **Month 2+ High (Startup costs):** $1,107

Legend:
- ■ Startup costs
- ■ Recurrent costs
CUMULATIVE PER-FACILITY COST OVER TIME, BY SCENARIO:
4. Routine outreach
ANALYSIS BASED OFF OF 2 EXISTING COSTING STUDIES ON ROUTINE OUTREACH

<table>
<thead>
<tr>
<th></th>
<th>Tanzania</th>
<th>Indonesia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schedule</strong></td>
<td>BCG, OPV, Penta, PCV, Rota, MR 2d</td>
<td>HepB birth, BCG, OPV, Penta, Measles 3d, DT, Td</td>
</tr>
<tr>
<td><strong>Baseline cost per dose in outreach (2020 USD)</strong></td>
<td>US$ 5.17</td>
<td>US$ 1.41</td>
</tr>
<tr>
<td><strong>Median % doses delivered in outreach</strong></td>
<td>14%</td>
<td>67%</td>
</tr>
<tr>
<td><strong>Sessions per month</strong></td>
<td>2.1</td>
<td>24</td>
</tr>
<tr>
<td><strong>Doses per session/day</strong></td>
<td>34</td>
<td>11</td>
</tr>
<tr>
<td><strong>Outreach per diem pp/d</strong></td>
<td>US$ 7.86</td>
<td>US$ 0.00</td>
</tr>
</tbody>
</table>
## PPE & IPC at Outreach Session Sites

<table>
<thead>
<tr>
<th>LOW</th>
<th>MEDIUM</th>
<th>HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>- No PPE</td>
<td>- Masks</td>
<td>- Masks</td>
</tr>
<tr>
<td>- Simple handwash. station</td>
<td>- Simple handwash. station</td>
<td>- Gloves</td>
</tr>
<tr>
<td>- Hand sanitizer</td>
<td>- Hand sanitizer</td>
<td>- Reusable goggles</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>- Advanced handwash. station</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>- Hand sanitizer</td>
</tr>
</tbody>
</table>

### Incremental Cost per Dose (USD 2020)

**Tanzania**
- Low: $0.65, $5.17
- Medium: $0.61, $5.17
- High: $0.87, $5.17

**Indonesia**
- Low: $0.20, $1.41
- Medium: $0.34, $1.41
- High: $0.40, $1.41

- Baseline
- PPE
- IPC
PHYSICAL DISTANCING AND SCREENING

Tanzania

Low:
- One crowd controller
- No PPE

Medium:
- One crowd controller
- Masks

High:
- Two crowd controllers
- Masks
- Gloves
- Infrared thermometer

Incremental cost per dose (USD 2020)

Low: $0.60, $0.65, $0.61
Medium: $5.17, $5.17, $5.17
High: $2.53, $2.66, $6.06

Indonesia

Low: $0.20, $0.20, $0.20
Medium: $1.41, $1.41, $1.41
High: $0.05, $0.23, $0.61

Incremental cost per dose (USD 2020)

Legend:
- Blue: Baseline
- Red: PPE
- Yellow: IPC
- Green: Distancing and screening
**COMPENSATING FOR A DROP IN ATTENDANCE AT FACILITY-BASED SESSIONS & CLOSING OF SCHOOLS**

<table>
<thead>
<tr>
<th>LOW</th>
<th>MEDIUM</th>
<th>HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Drop of 10% at facilities and 50% at schools</td>
<td>– Drop of 25% at facilities and 50% at schools</td>
<td>– Drop of 50% at facilities and 100% at schools</td>
</tr>
</tbody>
</table>

---

**Tanzania**

- **Low**
  - Drop of 10% at facilities and 50% at schools
  - Incremental cost per dose (USD 2020): $5.17

- **Medium**
  - Drop of 25% at facilities and 50% at schools
  - Incremental cost per dose (USD 2020): $2.45

- **High**
  - Drop of 50% at facilities and 100% at schools
  - Incremental cost per dose (USD 2020): $1.75

**Indonesia**

- **Low**
  - Drop of 10% at facilities and 50% at schools
  - Incremental cost per dose (USD 2020): $1.41

- **Medium**
  - Drop of 25% at facilities and 50% at schools
  - Incremental cost per dose (USD 2020): $0.27

- **High**
  - Drop of 50% at facilities and 100% at schools
  - Incremental cost per dose (USD 2020): $0.72

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Legend:
- Blue: Baseline
- Red: PPE
- Orange: IPC
- Green: Distancing and screening
- Brown: Additional sessions
COST OF OUTREACH BY GEOGRAPHIC AREA

Tanzania

- Urban: $2.32
- Rural: $8.87
- Nomadic: $5.90

- 81% Incremental cost: $1.88
- 42% Incremental cost: $3.70
- 32% Incremental cost: $1.91

Indonesia

- Urban: $1.08
- Rural: $2.37

- 56% Incremental cost: $0.21
- 46% Incremental cost: $0.64

Legend:
- Baseline
- PPE
- IPC
- Distancing and screening
- Additional sessions
ALTERNATIVE: CHANGES IN SESSION SIZE AND SESSION FREQUENCY

A: compensating for drop in facility-based/school-based coverage

- Indonesia

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per dose (USD 2020)</td>
<td>$1.41</td>
<td>$1.41</td>
</tr>
<tr>
<td>Cost per dose (USD 2020)</td>
<td>$0.04</td>
<td>$0.04</td>
</tr>
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<td>Drop of 10% at facilities and 50% at schools</td>
<td>Drop of 25% at facilities and 50% at schools</td>
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B: changes in frequency/size

- Indonesia

<table>
<thead>
<tr>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per dose (USD 2020)</td>
<td>$1.41</td>
<td>$1.41</td>
</tr>
<tr>
<td>Cost per dose (USD 2020)</td>
<td>$0.02</td>
<td>$0.25</td>
</tr>
<tr>
<td>Drop of 10% at facilities and 50% at schools</td>
<td>Drop of 25% at facilities and 50% at schools</td>
<td>Drop of 50% at facilities and 100% at schools</td>
</tr>
</tbody>
</table>

- Low: -2% frequency, $0.02
- Medium: 18% frequency, $0.25
- High: 65% frequency, $0.92

- Low: Half the frequency
- Medium: Double the frequency
- High: 4x as often
5. Conclusions & discussion
SUMMARY OF THE ANALYSES

— **Campaign** costs per dose could increase by 19%-174%, depending on the specific changes (PPE package provided, duration of the campaign, etc.)

— For **facility-based routine** delivery: labor costs, including hazard pay and hiring additional crowd controller personnel, account for approximately 95% of monthly recurrent costs (and 60–80% of all incremental costs)

  — Excluding these cost categories results in 12-month per-facility costs of $500–2,250 by scenario intensity

— Changes in the **outreach delivery costs** are highly dependent on the initial strategy: the volume delivered through outreach, session size and session frequency, remuneration for health workers specific to outreach

  — **PPE and IPC interventions** are the biggest driver of delivery cost increases in outreach

  — Outreach delivery costs in **rural areas** are high in the ‘status quo’, and the absolute USD change per dose is the largest here

**Incremental costs for maintaining essential immunization services will vary by context, according to the strategy used, and by level of intensity** – this requires country level determination
QUESTIONS FOR DISCUSSION

— How might you use this information in your program? Do these analyses give you the necessary budget information to support these increases?

— How are you thinking to restart/enhance your immunization services: through catch-up campaigns, additional outreach and/or strengthening routine?

— Would there be appetite for a calculator tool to evaluate the cost implications of alternative strategies and scenarios? Are you interested in piloting a calculator tool as we develop it?