Rotavirus Surveillance in Tajikistan

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Outline

• Country information
• Rotavirus surveillance
• Rotavirus vaccine effectiveness (VE) evaluation
• Conclusions
Country information

**Tajikistan**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (2018)</td>
<td>9,046,501</td>
</tr>
<tr>
<td>Birth cohort (2018)</td>
<td>256,903</td>
</tr>
<tr>
<td>Surviving Infants (surviving to 1 year per year, 2018)</td>
<td>247,849</td>
</tr>
<tr>
<td>Infant mortality rate (deaths &lt; 1 year per 1000 births, 2015)</td>
<td>39/1000</td>
</tr>
<tr>
<td>Child mortality rate (deaths &lt; 5 years per 1000 births, 2015)</td>
<td>45/1000</td>
</tr>
<tr>
<td>World Bank Index, IDA (2015)</td>
<td>3.12</td>
</tr>
<tr>
<td>Gross Nation Income (per capita US$, 2015)</td>
<td>1,280</td>
</tr>
<tr>
<td>Co-financing group (2018)</td>
<td>Preparatory transition</td>
</tr>
<tr>
<td>No. of districts/territories (2017)</td>
<td>66</td>
</tr>
</tbody>
</table>

Source: [https://www.gavi.org/country/tajikistan/](https://www.gavi.org/country/tajikistan/)
## Rotavirus surveillance objectives

### Pre-vaccine introduction period
- To document the presence of disease, describe disease epidemiology and provide data for estimating disease burden
- To establish a system to measure impact *after* vaccine introduction
- To identify circulating strains and measure strain distribution

### Post-vaccine introduction period
- To assess disease trends over time
- To monitor vaccination program impact
- To monitor changes in circulating strains
- To use the platform for rotavirus vaccine effectiveness evaluation
Rotavirus surveillance background

• Rotavirus surveillance was established in Tajikistan
  – December 2006
  – The Children’s Clinical Infectious Disease Hospital in Dushanbe

• The Children’s Clinical Infectious Disease Hospital
  – 190 bed pediatric hospital in Dushanbe
  – Serves as primary referral center for children in Dushanbe
Rotavirus Milestones in Tajikistan

Dec 2006
Rotavirus surveillance began

Jan 2013
Consistent surveillance

Jan 2015
Rotavirus vaccine introduced

Jan 2017
Rotavirus vaccine effectiveness (VE) evaluation began

Jun 2017
Vaccination data collection for VE began
Rotavirus surveillance criteria - Tajikistan

Inclusion criteria
• Children aged <5 years, who were admitted and hospitalized overnight at the inpatient ward or intensive care unit due to AGE
• Defined as 3 liquid or semi-liquid stools/24 hours
• lasting no longer than 7 days

Exclusion criteria
• If transferred from another hospital
• Older than 5 years
Key findings from pre-vaccine rotavirus surveillance, 2013 – 2014

• 42% (1207/2860) of hospitalizations for acute diarrhea tested rotavirus positive

• 78% (939/1207) of rotavirus patients were 6-23 months with the median age being 9 months

• Rotavirus season: June – September

• 60% (133/222) of genotyped rotavirus positive specimens were G1P[8]

Introduction of rotavirus vaccine into the National Immunization Schedule

• Surveillance data were used to support rotavirus vaccine introduction
• Rotavirus vaccine was introduced into the National Immunization Schedule on 1 January 2015
• Children are vaccinated 2 and 3 months of age
Administrative Estimates of Immunization Coverage, 2017

- Rotavirus vaccine - 2
  - Tajikistan: 97.8
  - Dushanbe: 98.6
  - Rudaki: 98.1

- Pentavalent vaccine - 3
  - Tajikistan: 96.9
  - Dushanbe: 98
  - Rudaki: 94.7

- DHS-2017
  - Tajikistan: 78.7
  - Dushanbe: 65.9
  - Rudaki: 74.4

Diarrhea cases by rotavirus status and date of hospitalization among children under 5 years of age - Tajikistan, 2013 – 2017

Location A: Sentinel hospital
Location B: Sentinel hospital
RV vaccine introduced
Location A: Sentinel hospital

Number of samples tested

Month and year of hospital admission

RV+  RV-  % RV+

2013  2014  2015  2016  2017
Diarrhea cases by rotavirus status and date of hospitalization among children under 1 year of age - Tajikistan, 2013 – 2018

- Location A: Sentinel hospital
- Location B: Sentinel hospital
- RV vaccine introduced

Number of samples tested

Month and year of hospital admission

RV+  RV-  % RV+
Number and Percentage of Rotavirus Positive Children Enrolled in GRSN – Dushanbe, January 2013 to December 2017

<table>
<thead>
<tr>
<th>&lt; 1 Year of Age</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotavirus Positive</td>
<td>324/670 (48%)</td>
<td>513/1138 (45%)</td>
<td>346/829 (42%)</td>
<td>142/495 (29%)</td>
<td>195/686 (28%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt; 5 Year of Age</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotavirus Positive</td>
<td>523/1247 (42%)</td>
<td>685/1619 (42%)</td>
<td>620/1590 (39%)</td>
<td>295/1067 (28%)</td>
<td>374/1339 (28%)</td>
</tr>
<tr>
<td>Time period of admission</td>
<td>Median age (months)</td>
<td>Interquartile range (months)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------------------</td>
<td>----------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-vaccine years (2013 — 2014)</td>
<td>9</td>
<td>7-13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-vaccine years (2016 — 2017)</td>
<td>11</td>
<td>8-17</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Pre-vaccine years**:
  - G1 P[8] (50%)
  - G2 P[4] (30%)
  - G3 P[8] (10%)
  - G4 P[8] (10%)
  - G9 P[8]
  - G12 P[6]
  - Rare
  - Mix
  - Untypeable

- **Post-vaccine years**:
  - G1 P[8] (60%)
  - G2 P[4] (20%)
  - G3 P[8] (10%)
  - G4 P[8] (10%)
  - G9 P[8]
  - G12 P[6]
  - Rare
  - Mix
  - Untypeable
Genotype distribution pre- and post-rotavirus vaccine introduction, 2013-2017
Key Findings from post-vaccine rotavirus surveillance, 2016 – 2017

• Significant decrease in percentage of rotavirus related hospitalizations in children < 5 from 42% (1208/2866 children) to 28% (669/2406) after introduction

• In children < 1 year of age, the rotavirus-positive percentage decreased significantly from 46% (837/1808 children) to 29% (337/1181) after introduction

• Shift in median age from 9 months to 11 months

• Genotype G1P[8] is no longer predominant, genotypes G2P[4] and G4P[8] are taking over
Rotavirus vaccine effectiveness (VE) evaluation

Estimate the level of protection provided by rotavirus vaccine in Tajikistan

• Use information from children enrolled in rotavirus surveillance

• Use data from a subset of children

• Collect vaccination data on children by going to polyclinic and abstracting vaccination data for each child
| Inclusion Criteria | • Child < 5 years  
|                   | • Child admitted to the hospital for treatment of diarrhea (at least 1 night)  
|                   | • Diarrhea ≤ 7 days before admission  
|                   | • Child lives in Dushanbe OR receives immunizations in selected health facilities in Rudaki  
|                   | • Child born on or after November 1, 2014 (*eligible to have received rotavirus vaccine*)  
|                   | • Child is aged 5 months or older on day of admission (reported age) |
Rotavirus VE evaluation – data collection

<table>
<thead>
<tr>
<th>City/District</th>
<th>Number of VE eligible children</th>
<th>Number with vaccine record found</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dushanbe</td>
<td>1012</td>
<td>425</td>
<td>42</td>
</tr>
<tr>
<td>Rudaki</td>
<td>76</td>
<td>44</td>
<td>58</td>
</tr>
</tbody>
</table>
Conclusions

• Rotavirus vaccine has shown a notable impact on the burden of disease after introduction
• Proportion of rotavirus-positive hospitalizations has decreased
• Continued surveillance is important to monitor trends
• Rotavirus vaccine effectiveness evaluation is next step—data collection has begun
• Estimate of rotavirus VE is important as Tajikistan approaches Gavi graduation
Acknowledgements

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  – M. Mullojonova

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  – Zafar Hamidov

• CDC
  – Rachel Burke
  – Margaret Cortese

• RRL for rotavirus, Minks, Belarus
  – Elena Samoilovich
  – Galina Semeiko
  – All lab team
Thank you for your attention!!!
Vaccination Status Classification

Form 063 or Ambulatory Card Located
  → Copy information (Rota, Penta, OPV & dates of doses) → Review OPV
    → OPV 1 & 2 & 3 received
      → 1) “Complete record OK”
      → 2) Clinician advised against
      → 3) Parent refused
      → 4) Other reason
    → OPV 1 or 2 or 3 NOT received
      → 5) No reason listed, at least 2 visits
      → 6) No reason listed, fewer than 2 visits
      → 7) Form 112/24 not located (form 063 located)
      → 8) Record not located

Form 063 and Ambulatory Card NOT Located
  → Found with cards from children that moved away
    → Not found
      → No record of child in polyclinic
        → Child moved: new address not known or not Dushanbe
        → Child moved: new address known → Address