Drug resistant Salmonella infections in Pakistan: update

Pakistan is experiencing a continuous surge of extensively drug resistant (XDR) Salmonella enterica serovar Typhi (S. Typhi) cases since November 2016. Till the reporting week 34, 2019 a total of 10,365 cases were reported from different districts of province Sindh with no associated deaths.

Editorial note

Even though this was the first major upsurge of XDR Typhoid fever cases in Pakistan but it is not the first time the country has experienced an outbreak of drug resistant Salmonelllosis. Previous documented outbreaks of drug resistant Salmonelllosis occurred in 1989, and then 1994-95 in the country.

Typhoid fever is endemic in Pakistan but not reported regularly as its not one of the priority diseases, for this reason the true burden of the disease in the country include poor water and sanitation infrastructure.

Since November 2016, the emergence of extensively drug resistant (XDR) strain of Salmonella enterica serovar Typhi (S. Typhi) that acquired a plasmid resistant to multiple antibiotics including first-line antibiotics (i.e. chloramphenicol, ampicillin, and trimethoprim-sulfamethoxazole), fluoroquinolones and third-generation cephalosporins. The pathogen remained sensitive to azithromycin and carbapenems only.

During the last week of November 2016, the first few cases were laboratory confirmed from the Hyderabad district of Sindh province of Pakistan. In addition to these reported cases, there were cases diagnosed in US as XDR typhoid fever cases with the travel history from Pakistan. After these reports, typhoid fever laboratory confirmation through culture and drug sensitivity was reinforced in different hospitals of Hyderabad and Karachi districts.

As of August 2019, a total of 10,365 XDR typhoid cases were reported from 23 districts in Sindh province. The Karachi district is the most affected with 6,956 cases (67%), followed by Hyderabad district with 2,521 cases (24%). Furthermore, XDR typhoid cases were also reported from 21 other districts with in Sindh province.

In response to this current surge, the government has been implementing control measures, including health education focusing on the prevention and control strategies. A total of 116,000 children between 6 months to 10 years in Hyderabad high risk areas have been vaccinated against Typhoid. GAVI Alliance is working with the government to introduce typhoid conjugate vaccines (TCV) into the routine immunization schedule in response to an outbreak of typhoid.

Even though Typhoid vaccination can contribute to reduction of use of antibiotics and delay emergence of strains resistant to effective antibiotics such as azithromycin, a comprehensive multi-sectoral national action plan and its implementation, covering surveillance, appropriate data collection, enhanced laboratory diagnosis, case management, community engagement and as well as robust WASH interventions will be the key to control this continuous and devastating outbreak of XDR typhoid fever.

XDR cases reported from different districts of Sindh province:

<table>
<thead>
<tr>
<th>Year</th>
<th>Karachi</th>
<th>Hyderabad</th>
<th>Other districts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>2017</td>
<td>175</td>
<td>485</td>
<td>4</td>
<td>664</td>
</tr>
<tr>
<td>2018</td>
<td>3,712</td>
<td>891</td>
<td>207</td>
<td>4,810</td>
</tr>
<tr>
<td>2019</td>
<td>3,069</td>
<td>1,133</td>
<td>677</td>
<td>4,879</td>
</tr>
<tr>
<td>Grand Total</td>
<td>6,956</td>
<td>2,521</td>
<td>888</td>
<td>10,365</td>
</tr>
</tbody>
</table>

## Update on outbreaks in the Eastern Mediterranean Region

**MERS** in Saudi Arabia; cholera in Somalia; cholera in Yemen; dengue in Bangladesh

### Current public health events of concern (cumulative N of cases (deaths), CFR %)

- **Avian influenza:** 2006-2017
  - Egypt (A/H5N1) [359 (122), 33.98%]
  - Egypt (A/H9N2) [4 (0)]
- **Ebola virus disease (EVD):** 2018-2019
  - Democratic Republic of Congo (DRC) [2 968 (1 986), 66.91%]
  - Cholera: 2017-2019
    - Somalia [8 613 (46), 0.53%]
    - Yemen [2 020 489 (3 705), 0.18%]
  - Diphtheria: 2018-2019
    - Yemen [3 906 (218), 5.58%]
    - Bangladesh [8 720 (45), 0.52%]
  - **MERS:** 2012-2019
    - Saudi Arabia [2 070 (772), 37.25%]
  - Multidrug-resistant typhoid fever: 2016-2019
    - Pakistan [10 365 (0)]