

Current major event

Knowledge gaps: Multiple drug-resistant typhoid fever in Pakistan

Cases of multiple drug -resistant *Salmonella* typhoid (MDR *S. Typhi*) fever continue to report from Pakistan. Between November 2016 to February 2019, a total of 5 853 MDR typhoid fever cases were reported from different districts of Sindh province. Currently, there are a number of knowledge gaps which is hindering effective control of this outbreak.

Editorial note

This multidrug resistance type of *S. Typhi* has been prevalent across South and Southeast Asia and parts of Africa as well. In Pakistan, the district of Hyderabad of Sindh province witnessed the emergence of MDR *S. Typhi* cases during November 2016. Currently, the outbreak has spread to a total of 19 districts in the province. The most affected district is Karachi which has reported 68% (3 994) of the total reported MDR cases till date (See table).

The national and provincial governments of Pakistan have been collaborating with multiple international partners to control this outbreak. In addition, a number of vaccination campaigns has also been conducted in hot spot areas of district Hyderabad and over 118,000 children aged 2 to 10 years have been vaccinated for *S. Typhi* with Typhoid Conjugated Vaccine (TCV) as well.

Despite the fact that the governments and the partners are putting their efforts to control this upsurge of cases, the number of reported MDR cases are increasing and also reported from areas other than initially affected. Currently a number of questions need to be answered urgently (Please see above) to better understand the extent and nature of this outbreak, as well as epidemiological and environmental risk factors associated with the transmission of *S. Typhi* fever cases. In situation like this where a number of knowledge gaps hinder effective control strategies for infectious diseases, there will be lot of uncoordinated actions from different agencies which will further complicate

Knowledge gaps on the nature and characteristics of the current MDR typhoid fever outbreak in Pakistan

- What is the epidemiological characteristic and geographic extension of the current outbreak?
- Is the epidemiology of the disease changing ?
- What are the clinical manifestations of the patients presenting with MDR typhoid fever?
- What are the probabilities of re-infection of typhoid fever or relapse?
- What are the genetic variations of the resistant strains of the currently circulating *S. Typhi*?
- What are the risk factors for this resistant typhoid fever cases?
- What is the clinical efficacy of the currently used drugs ?
- What are the drug sensitivity patterns ?
- What are the alternate options for effective treatment of *S. Typhi* cases?
- What are the clinical markers for the assessment of the severity?
- What is the effectiveness of the vaccination strategy to contain the outbreak?
- What is the actual burden of typhoid fever and MDR *S. Typhi* cases in Pakistan?
- Can environmental surveillance early detect any resistance pattern of *S. Typhi* fever cases?
- What are the cost implications for the long term control measures?

Districts of Sindh province reporting MDR *S. Typhi* cases since 2016

Districts	MDR typhoid fever
Karachi	3 994
Hyderabad	1 580
Tando Alha Yar	6
Badin	42
Dadu	10
Kashmore	5
Ghotki	3
Mirpurkhas	105
Sukkur	17
Tharparkar	2
Sanghar	30
Nau sheroferoz	7
Shikarpur	3
Tando M Khan	4
Jamshoro	35
Umar Kot	2
Jacobabad	2
SBA	1
Larkana	5

response to such health events. In such situations, as well, there will be added complexities when the academic communities would conduct research in an uncoordinated manner and publish their findings without understanding the public health value of such findings on control measures or without sharing these findings with the national health authorities that can effectively help in containing the spread.

While there is an urgent need to establish an oversight mechanism to better coordinate the research works for addressing knowledge gaps, it is also important to see that such research works are of public health value and effectively contribute to control measures that are evidence-informed and have the maximum impact on the understanding the “unknowns”.

Update on outbreaks

in the Eastern Mediterranean Region

MERS in Saudi Arabia; **MERS** in Oman; **cholera** in Somalia; **cholera** in Yemen; **Multidrug-resistant typhoid fever** in Pakistan.

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) [811 (510), 62.88%]

Cholera: 2017-2019

Somalia [6 761 (46), 0.68%]

Yemen [1 429 758 (2 777), 0.19%]

Diphtheria: 2018-2019

Yemen [3 340 (192), 5.74%]

Bangladesh [8 435 (45), 0.53%]

MERS: 2012-2019

Saudi Arabia [1 944 (738), 37.96%]

Oman [16 (5), 31.25%]

Multidrug-resistant typhoid fever: 2016-2019

Pakistan [5 853 (0)]