



# Mortality and Morbidity Weekly Bulletin (MMWB)



World Health Organization  
Bangladesh

## Cox's Bazar, Bangladesh

Volume No 8: 26 November - 2 December 2017



Population

827,181



Consultations

598,815



ARI

75,271



AWD

63,750



Diphtheria

110



MR

323,940



Measles

1,743



Death

273



Photo Credit: WHO Bangladesh, Dr M. Zahidur Rahim

The data in this document are drawn from the Early Warning and Response System (EWARS), daily data received from the Ministry of Health and Family Welfare, and information gathered by WHO from health service providers in Forcibly Displaced Myanmar Nationals (FDMN) settlements and health care facilities in Cox's Bazar. Although the information is incomplete, it represents a first attempt to give health agencies in the field a reasonably accurate picture of morbidity and mortality in the refugee population. We thank all partners who are contributing to the EWARS.

The EWARS itself and the reports generated therefrom remain a work in progress. We welcome all comments and feedback to help us improve both the system and our joint understanding of the prevailing epidemiological situation, the ultimate aim being to prevent the spread of diseases and thereby help ensure better health outcomes for the population affected by this crisis.

### Contact Information:

Dr. Edwin Salvador, Deputy WHO Representative, [salvadore@who.int](mailto:salvadore@who.int)

Dr. Hammam El Sakka, Senior Medical Epidemiologist, Team Leader, HSE, [elsakkam@who.int](mailto:elsakkam@who.int)

WHO Bangladesh: <http://www.searo.who.int/bangladesh>



## 1. Population under Epidemiological Surveillance and Reporting Units

During epidemiological week **48** (26 November-2 December 2017), there was a **0.1%** decrease in the population<sup>1</sup> under EWARS compared to the previous epidemiological week (from 827,609 to 827,181). Overall, the settlement populations remained more or less stable.

The population of the settlements fluctuates daily due to movements between camps and new arrivals. For this reason, it was difficult to estimate the actual catchment population covered by the medical mobile teams working in camps and settlement areas.

EWARS reports were received from partner agencies active in all the FDMN makeshift settlements and new spontaneous camps namely: Kutupalong Expansion, Kutupalong registered camp, Leda registered camp, Nyapara registered camp, Shamlapur, Hakimpara, Thangkhali, Unchiprang, Jamtoli, and Moynarghona. In addition, EWARS data forms were collected from different departments (admission, emergency, surgery, paediatrics, gynaecology and internal medicine) of Cox's Bazar Sadar hospital and Teknaf and Ukha Health Complexes (catchment population of 100,400).

During epidemiological week **48**, the number of daily reports per camp/settlement in Cox's Bazar increased by **7%** compared to the previous week (452 vs 427 reports). Table 1 shows the population per camp and the daily number of EWARS reporting forms submitted from each of them.

Table 1: Number of EWARS reports by camp/settlement, Cox's Bazar, Bangladesh, 26 November-2 December 2017.

Camp/Settlement	W48 Population	Epidemiological Week 48							TOT
		26/11	27/11	28/11	29/11	30/11	1/12	2/12	
<b>Makeshift Settlements</b>									
Kutupalong Expansion <sup>2</sup>	442,275	32	32	34	36	37	11	28	210
Kutupalong RC	25,743	3	2	3	3	1		2	14
Leda MS	24,316	1	3	3	3	3	1	3	17
Nayapara RC	34,557	3	1	1	2	2		2	11
Shamlapur	26,850	1	1	2	2	2	1	2	11
<b>Sub-total</b>	<b>553,741</b>	<b>40</b>	<b>39</b>	<b>43</b>	<b>46</b>	<b>45</b>	<b>13</b>	<b>37</b>	<b>263</b>
<b>Registered Camps</b>									
Hakimpara	55,289	5	5	6	4	4	2	2	28
Thangkhali	29,965	4	4	4	7	5	1	4	29
Unchiprang	30,384	2	1	1	1	1	1	1	8
Jamtoli	33,542	6	7	7	3	3	2	3	31
Moynarghona	21,482	3	4	3	5	5	1	2	23
<b>Sub-total</b>	<b>170,662</b>	<b>20</b>	<b>21</b>	<b>21</b>	<b>20</b>	<b>18</b>	<b>7</b>	<b>12</b>	<b>119</b>
<b>Other Settlements</b>									
Host Community	102,778	5	4	4	4	4	3	4	28
Mobile Unit	NA	1	8	6	8	8	2	9	42
<b>Sub-total</b>	<b>102,778</b>	<b>6</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>12</b>	<b>5</b>	<b>13</b>	<b>70</b>
<b>TOTAL</b>	<b>827,181</b>	<b>66</b>	<b>72</b>	<b>74</b>	<b>78</b>	<b>75</b>	<b>25</b>	<b>62</b>	<b>452</b>

<sup>1</sup> Situation Report: Rohingya Refugee Crisis Cox's Bazar | 3 December 2017  
[https://reliefweb.int/sites/reliefweb.int/files/resources/171203\\_weekly\\_iscq\\_sitrep\\_final.doc.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/171203_weekly_iscq_sitrep_final.doc.pdf)

<sup>2</sup> Kutupalong-Balukhali expansion settlement includes the estimated population residing in the existing Kutupalong and Balukhali makeshift settlements, and their surrounding expansion zones.

Although the number of reports increased by 7%, the total number of consultations reported through EWARS in week 48 decreased by 12% compared to the previous week (81,379 vs 91,758). The weekly number of reporting and the number of consultations are shown in figure 1.

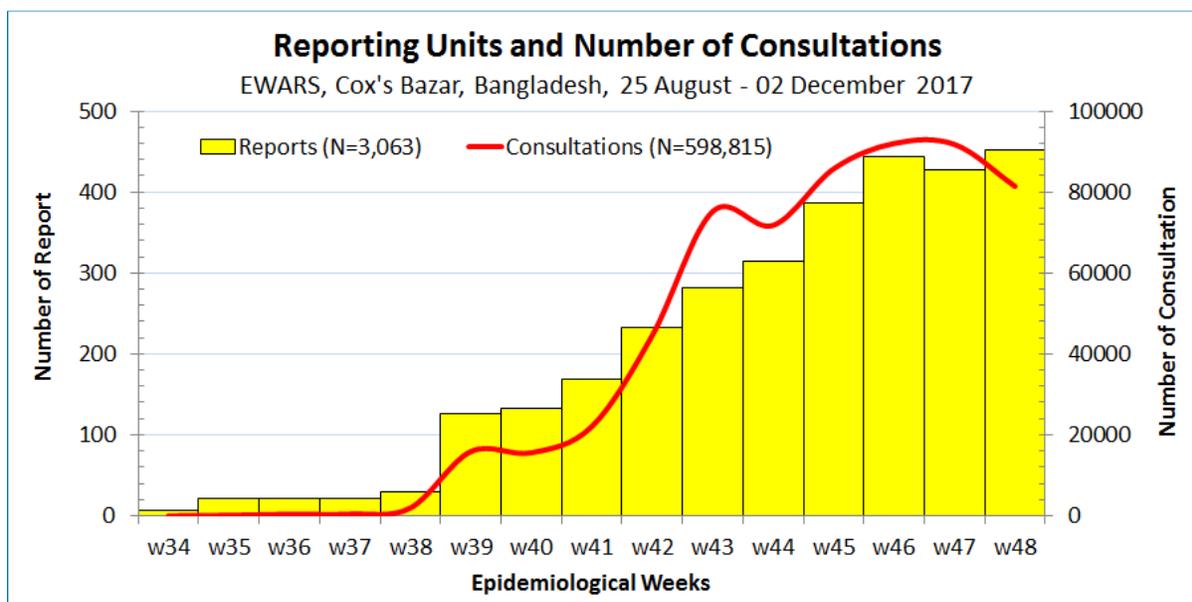


Figure 1: Number of EWARS reports and consultations, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

## 2. Identified Causes of Illness and Death

During the period of 25 August to 2 December 2017, a total of **516,097** consultations were reported through EWARS. Of these, **58%** (299,794/516,097) were events under surveillance; **51%** (151,743) were females. Fevers of unexplained origin accounted for **30%**, (90,329/299,794), followed by acute respiratory infections (**25%**, 75,271), acute watery diarrhoea (**21%**, 63,750), skin diseases (**10%**, 29,145), injuries (**3%**, 7,715), eye infections (**3%**, 7,345) and malaria (**2%**, 7,072). The remaining **6%** (19,167) were due to other causes including diphtheria, bloody diarrhoea, acute jaundice syndrome (AJS), meningitis like diseases and severe malnutrition.

For the under-5 age group, a total of **115,756** events under surveillance were reported through EWARS, constituting **39%** of the events under surveillance; **51%** (59,347) of them were males. A total of **32%** (36,532/115,756) of these cases were attributed to ARIs, while **26%** (30,730) were due to fevers of unexplained origin, **23%** (26,354) to acute watery diarrhoea (AWD), **6%** (7,114) skin diseases, **2%** (1,960) eye infections, **1%** (1,263) injuries, **1%** (830) malaria and the remaining **9%** (10,973) were due to other cases including diphtheria, bloody diarrhoea, neonatal diseases, acute jaundice syndrome, measles and severe malnutrition.

For the over-5 age group, a total number of **184,038** events under surveillance were reported through EWARS, constituting **61%** of the events under surveillance; **52%** (95,334) of them were females. A total of **32%** (59,599) of these cases were attributed to fevers of unexplained origin, while **21%** (38,739) were due to ARIs, **20%** (37,396) AWD, **12%** (22,031) skin diseases, **4%** (5,769) injuries, **3%** (6,452) malaria, **3%** (5,385) eye infections and the remaining **5%** (8,194) were due to other cases including, diphtheria, measles, bloody diarrhoea and acute jaundice syndrome. The proportion of primary causes of reported cases for both age groups are shown in figure 2.

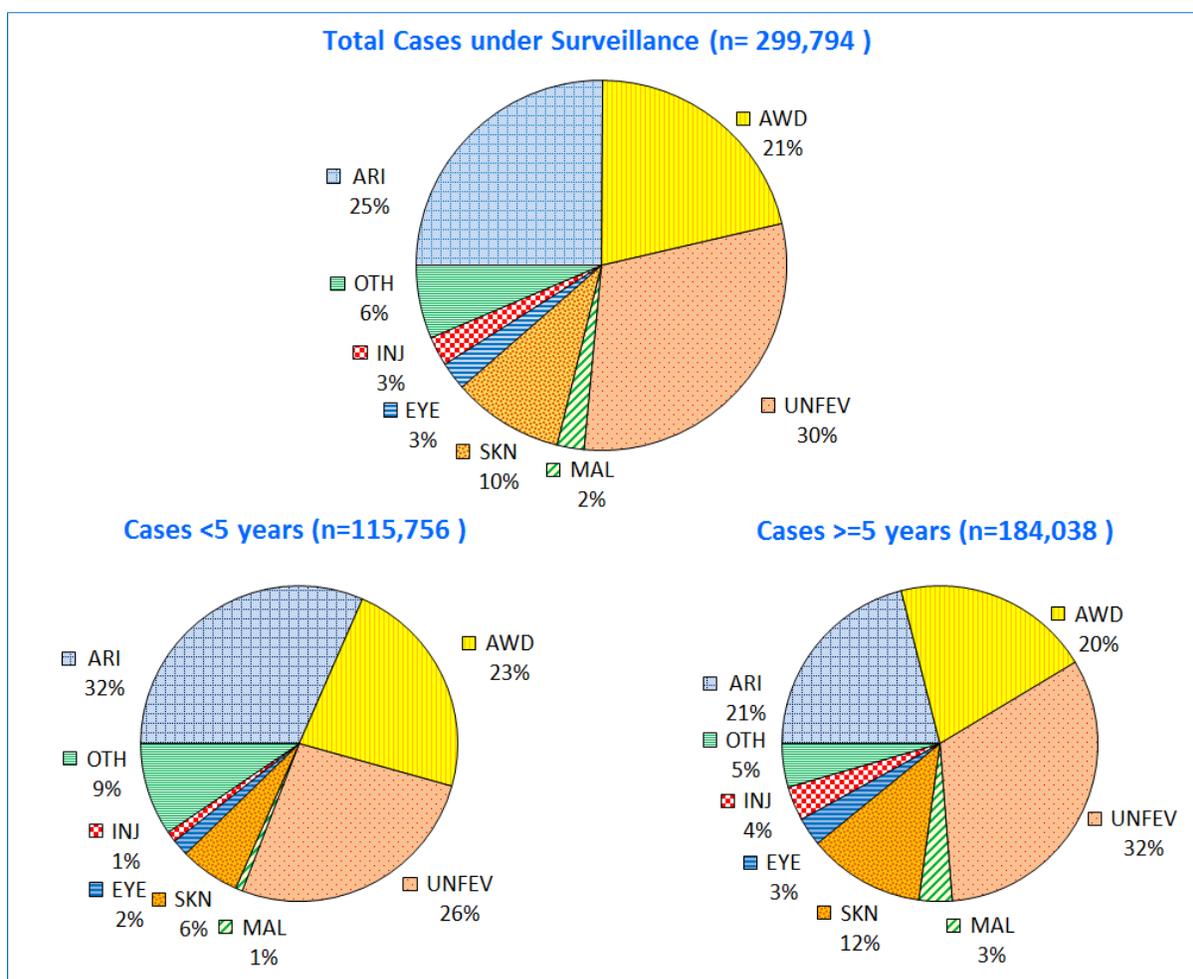


Figure 2: Proportion of primary causes for all reported cases under surveillance, Cox's Bazar, Bangladesh, 25 August-2 December 2017. (ARI: acute respiratory infection, AWD: acute watery diarrhoea, BD: bloody diarrhoea, INJ: injuries, MEN: meningitis-like disease, MAL: suspected malaria, ND: neonatal diseases, OTH: other diseases, SKN: skin diseases, UNFEV: fever of unexplained origin, EYE: eye infections and UNK: unknown causes).

During the same period, there were **273** reported deaths. Of these, **24%** (66) were due to ARIs, followed by INJ (**10%**, 26), cardiovascular disease (**7%**, 20), neonatal diseases (**7%**, 19), AWD (**5%**, 15), meningitis like diseases (**4%**, 11), and unknown causes (**11%**, 29). The remaining **32%** (87) were due to other causes including acute jaundice syndrome, malaria, measles, diphtheria and TB.

There were **105** reported deaths in the under-5 age group, representing **39%** of total deaths. Of these, **31%** (33) were ARI-related, followed by neonatal diseases (**18%**, 19), AWD (**10%**, 11), meningitis (**6%**, 6), INJ (**3%**, 3) and UNK (**8%**, 8). The remaining **24%** (25) were due to other causes including severe malnutrition (5) measles (2), acute jaundice syndrome (1), neonatal tetanus (1) and diphtheria (2).

There were **168** reported deaths in the over-5 age group, representing **62%** of total deaths. Of these, **20%** (33) were ARI-related, followed by INJ (**14%**, 23), cardiovascular disease (**12%**, 20), meningitis (**3%**, 5), AWD (**2%**, 4), and UNK (**13%**, 21). The remaining **37%** (62) were due to other causes including, diphtheria (3), acute jaundice syndrome (8), TB (3) and malaria (2). The weekly distribution of reported deaths is shown in figure 3.

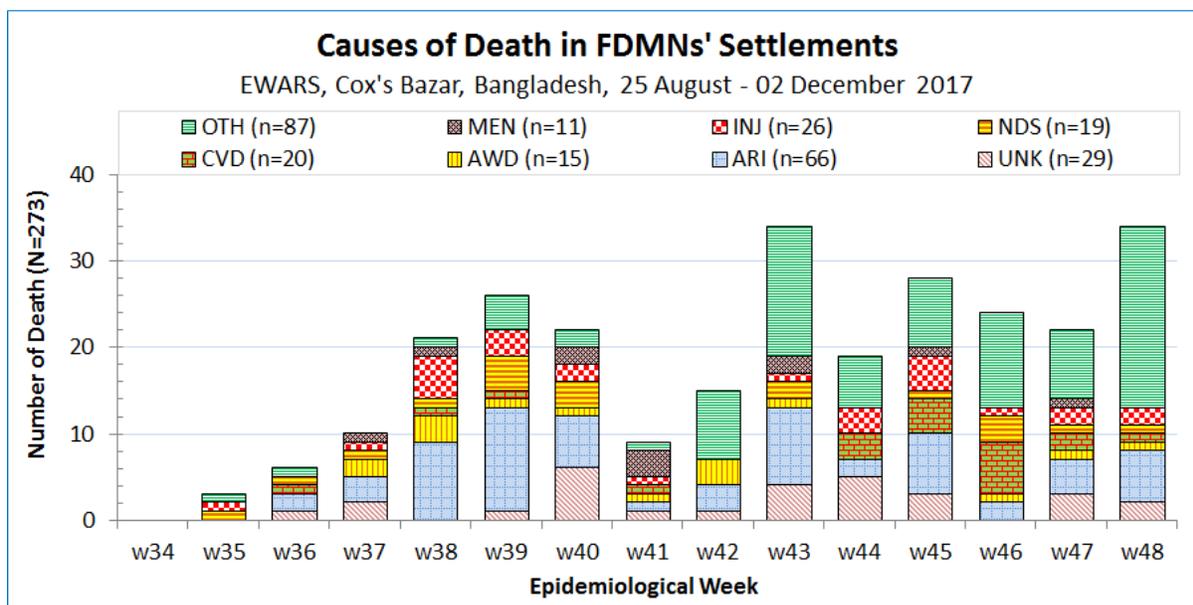


Figure 3: Weekly distribution of reported deaths, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

Acute respiratory infections, acute watery diarrhoea and fever of unexplained origin continue to contribute significantly to overall consultations in all reporting camps and settlements. The attack rates (AR) per 1000 population of the 3 syndromes showed slight decreases compared to last week. In comparison with the previous week (47), the ARI attack rate decreased from **13/1000** to **11/1,000**, the AWD attack rate from about **12/1,000** to **11/1,000** and the UNFEV attack rate from **18/1,000** to **16/1,000** population. The weekly attack rates of acute respiratory infections, acute watery diarrhoea and fever of unexplained origin are shown in figure 4.

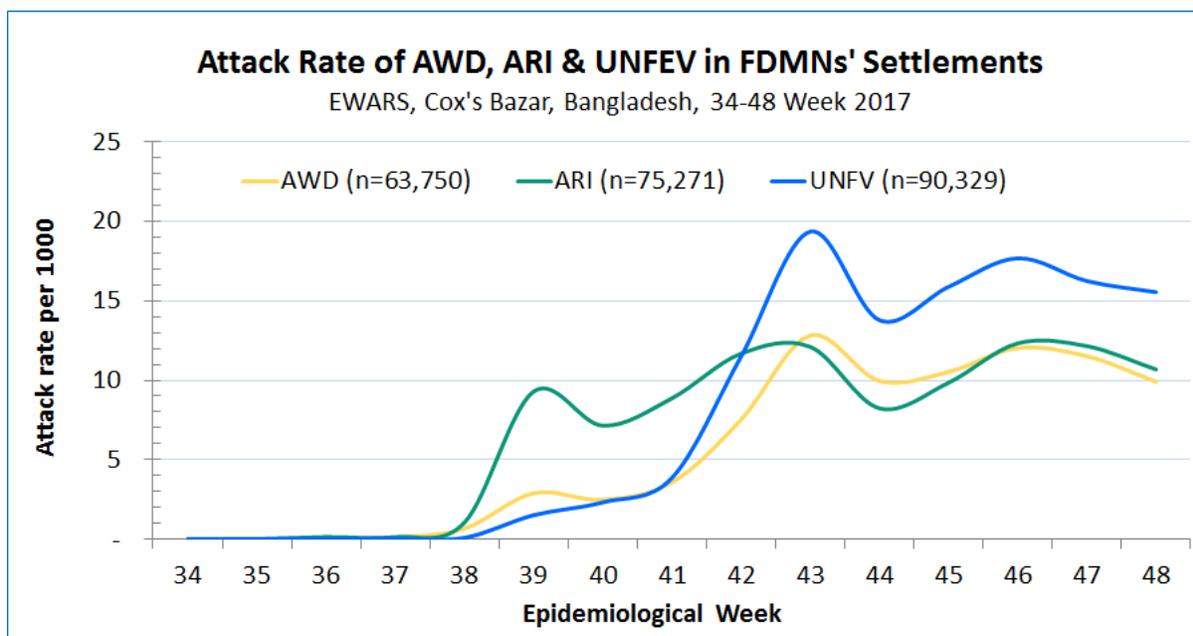


Figure 4: Weekly attack rates for Acute watery diarrhoea, acute respiratory infections and fever of unexplained origin reported cases, FDMN settlements, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

### 3. Acute Respiratory Infection

Between 25 August and 2 December 2017 (epidemiological weeks 34-48), a total of **75,271** ARI cases were reported. Of these, **49%** (36,532/75,271) occurred in the under-5 age group. There were **66** ARI related deaths (**CFR 0.09%**). The weekly distribution of ARI cases is shown in figure 5.

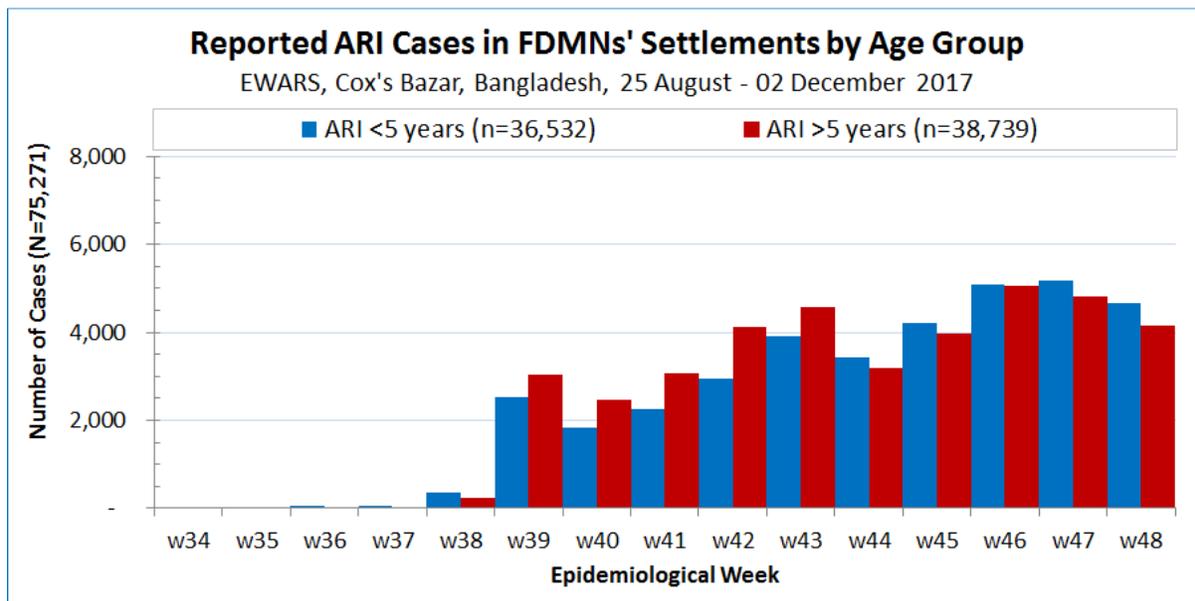


Figure 5: Weekly distribution of reported acute respiratory infections cases by age group, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

Ukhia upazila reported **83%** (63,144/75,271) of total ARI cases followed by Teknaf upazila with **16%** (12,019) and Cox's Bazar (**1%**, 108). The weekly distribution of ARI cases by upazila is shown in figure 6.

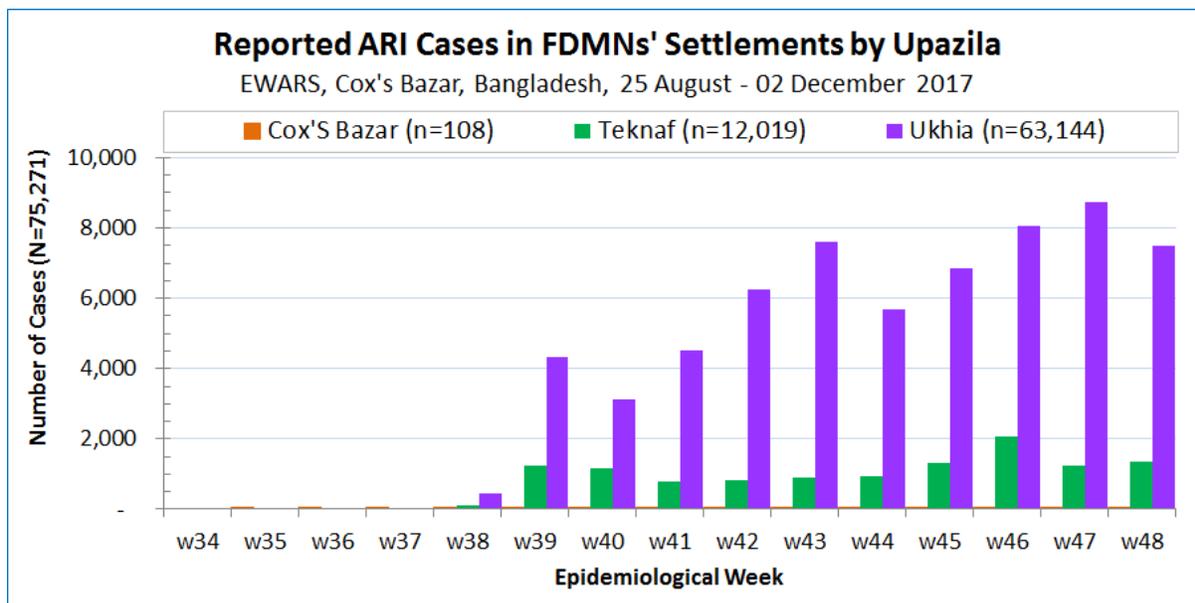


Figure 6: Weekly distribution of reported ARI cases by upazila, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

The highest ARI attack rate (AR) was reported from Moynarghna with **168/1,000** population followed by Kutupalong Registered camp (**118/1,000**), Jamtoli settlement (**101/1000**), Nayapara (89/1,000) and Hakimpara 58/1,000. The ARI attack rate in selected camps is shown in figure 7.

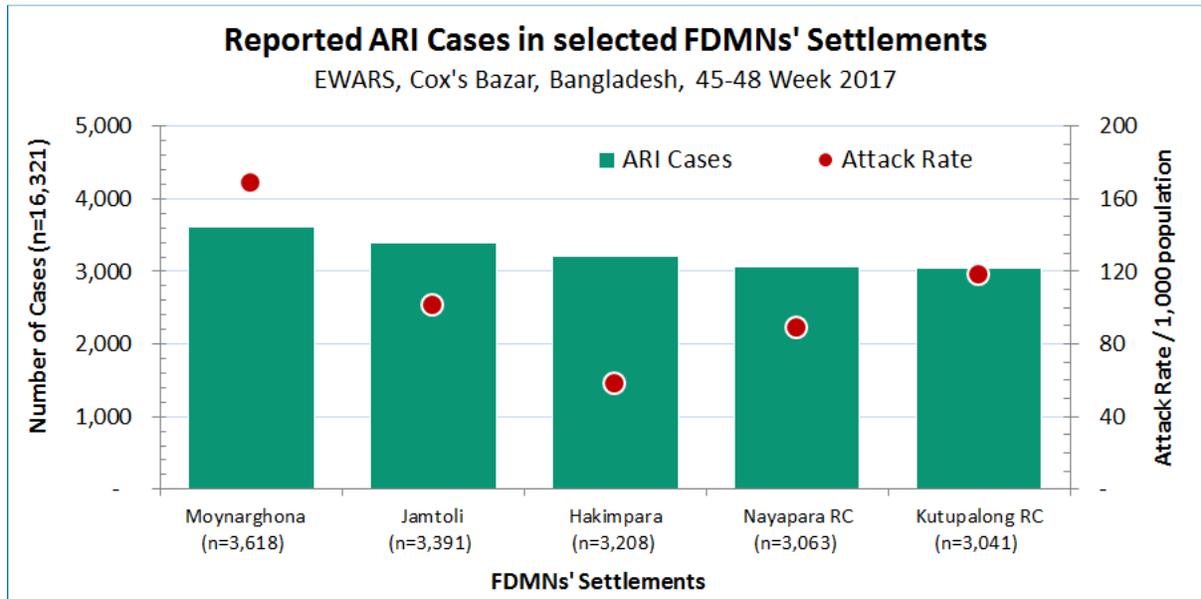


Figure 7: Acute respiratory infections attack rate per 1,000 population in selected camps, Cox's Bazar, Bangladesh, 5 November-2 December 2017.

In comparison to the previous epidemiological week (47), the attack rate in week 48 for ARI increased in Jamtoli (from 23 to 26/1,000) and Nayapara (from 16 to 19/1,000), but decreased in Moynarghna (from 52 to 42/1,000), Hakimpara (from 17 to 12/1,000) and Kutupalong registered camp (from 24 to 18/1000). The weekly acute respiratory infections attack rates in selected camps over the past four weeks (45-48) are shown in figure 8.

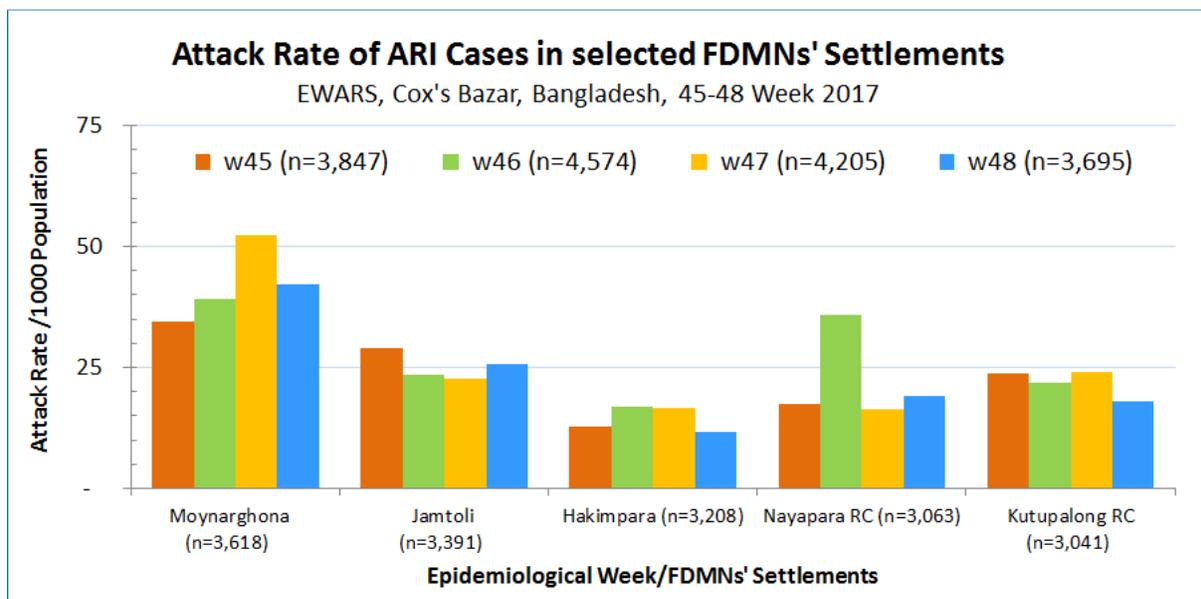


Figure 8: Weekly acute respiratory infections attack rate per 1,000 population, Cox's Bazar, Bangladesh, 5 November-2 December 2017.

### 4. Acute Watery Diarrhoea

Between 25 August and 2 December 2017 (epidemiological weeks 34-48), a total of **63,750** AWD cases were reported including **15** related deaths (**CFR 0.02%**). Of these, **59%** (37,396/63,750) were in the above-5 age group. There has been a decreasing trend in the number of reported cases over the last 2 epidemiological weeks (47-48) for all age groups. The weekly distribution of AWD cases by age group is shown in figure 9.

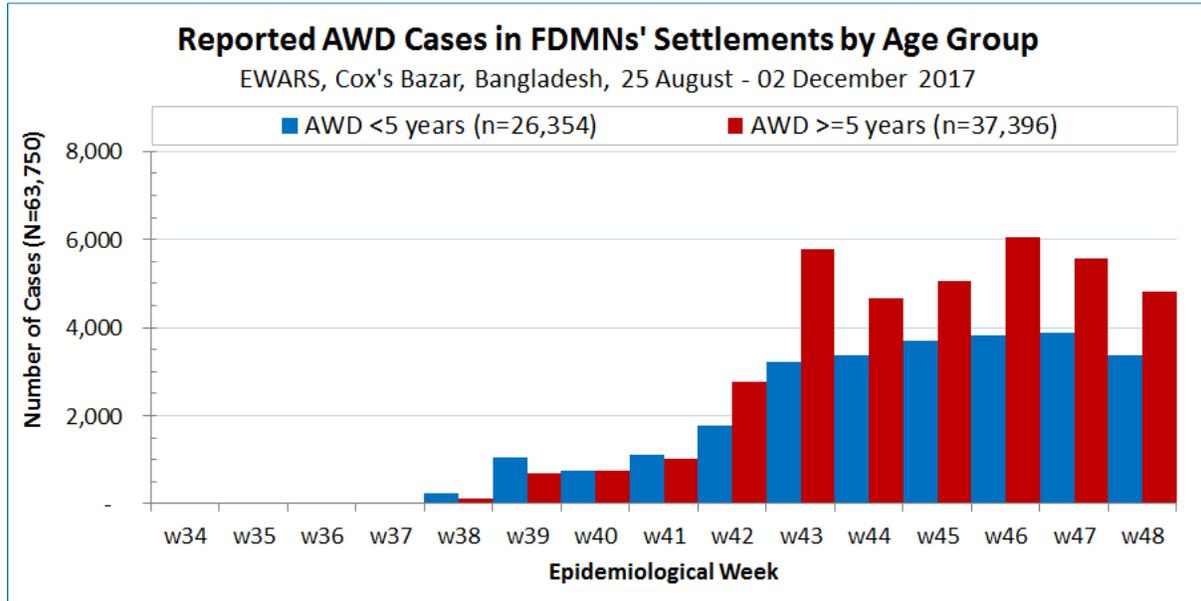


Figure 9: Weekly distribution of reported acute watery diarrhoea cases by age group, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

Ukhia upazila reported **88%** (56,135/63,750) of all AWD cases, followed by Teknaf with **11%** (7,485) and Cox's Bazar with **1%** (130). The weekly distribution of AWD cases by upazila is shown in Figure 10.

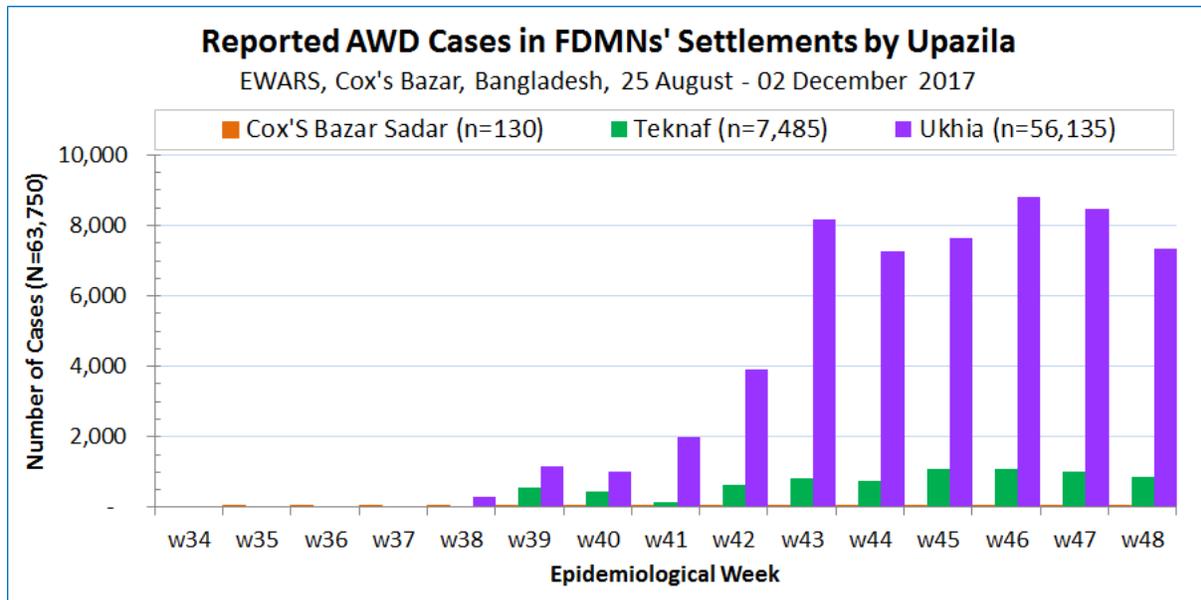


Figure 10: Weekly distribution of reported acute watery diarrhoea cases by upazila, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

The highest attack rate for AWD was reported from Moynarghna with **131/1,000** population followed by Jamtoli (**97**, 1,000), Unchiprang (**89/1,000**), Thangkhali (**79/1,000**) and Hakimpara (**45/1,000**). The AWD attack rates in selected camps are shown in figure 11.

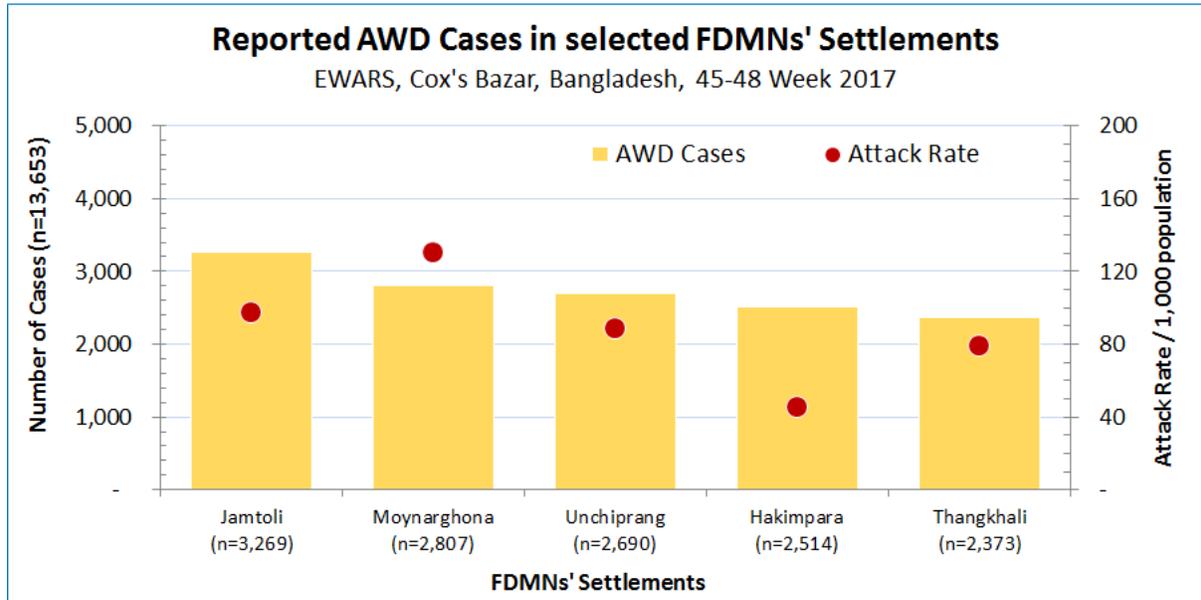


Figure 11: acute watery diarrhoea attack rates per 1,000 population in selected camps, Cox's Bazar, Bangladesh, 5 November-2 December 2017.

In comparison to the previous epidemiological week (47), the acute watery diarrhoea attack rate in week 48 increased in Moynarghna (from 34 to 40/1,000) and decreased in Jamtoli (from 31 to 23/1,000), Unchiprang registered camp (from 23 to 19/1,000), Hakimpara (from 12 to 10/1,000) and Thangkhali (from 24 to 11/1,000). The weekly acute watery diarrhoea attack rates in selected camps over the past four weeks (45-48) are shown in figure 12.

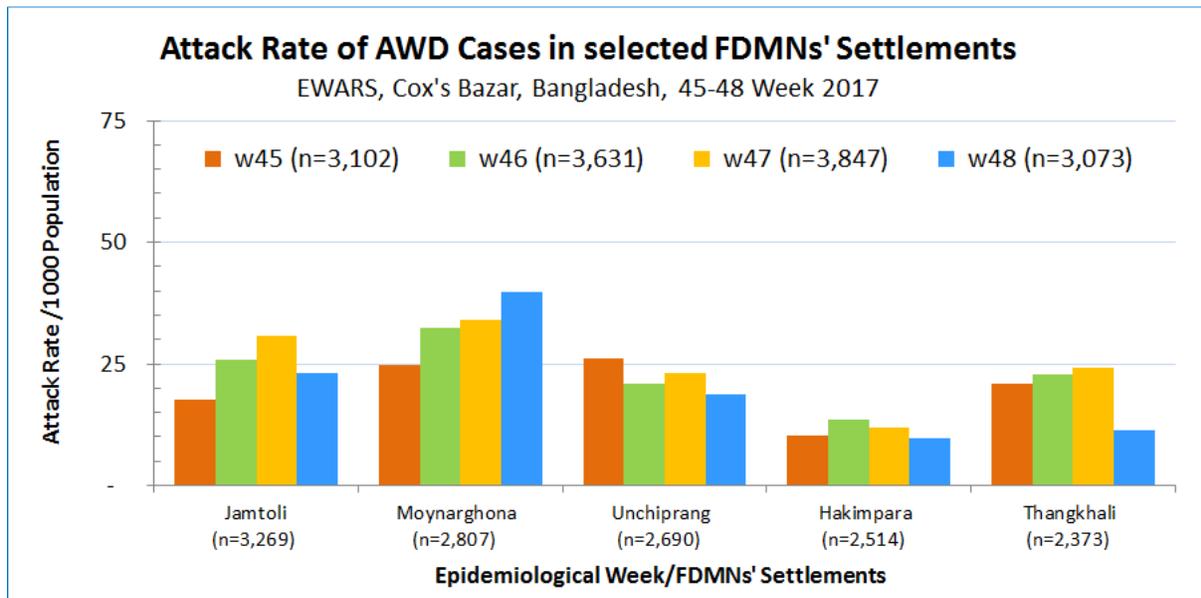


Figure 12: Weekly acute watery diarrhoea attack rates per 1,000 population in selected camps, Cox's Bazar, Bangladesh, 5 November-2 December 2017.

## 4.1 Drinking Water Situation

The collection and testing of water samples revealed that 91% of household and 60% of source samples were contaminated with *E. coli*. In addition to the water quality testing, WHO and the Department of Public Health Engineering (DPHE) performed sanitary inspections of households (2,266) and water points (1,133) in FDMN settlements. The sanitary inspections that were carried out between 18 September and 25 November 2017 showed that two thirds of all latrines are within 10 meters of a tube well. Due to the lack of a drainage system, stagnant water is present around a quarter (26%) of all tube wells; 14% of the tube wells have no or a broken platform.

Out of 33,211 emergency latrines installed by WASH partners, around 13,026 (39%) have become non-functional. Consequently, desludging and/or decommissioning of these latrines is an important priority. Preliminarily, more than 20 potential desludging sites have been identified by WASH partners, and efforts are continuing. Eight partners are known to have started the process of desludging and decommissioning of latrines. The detailed results are presented in figure 13.

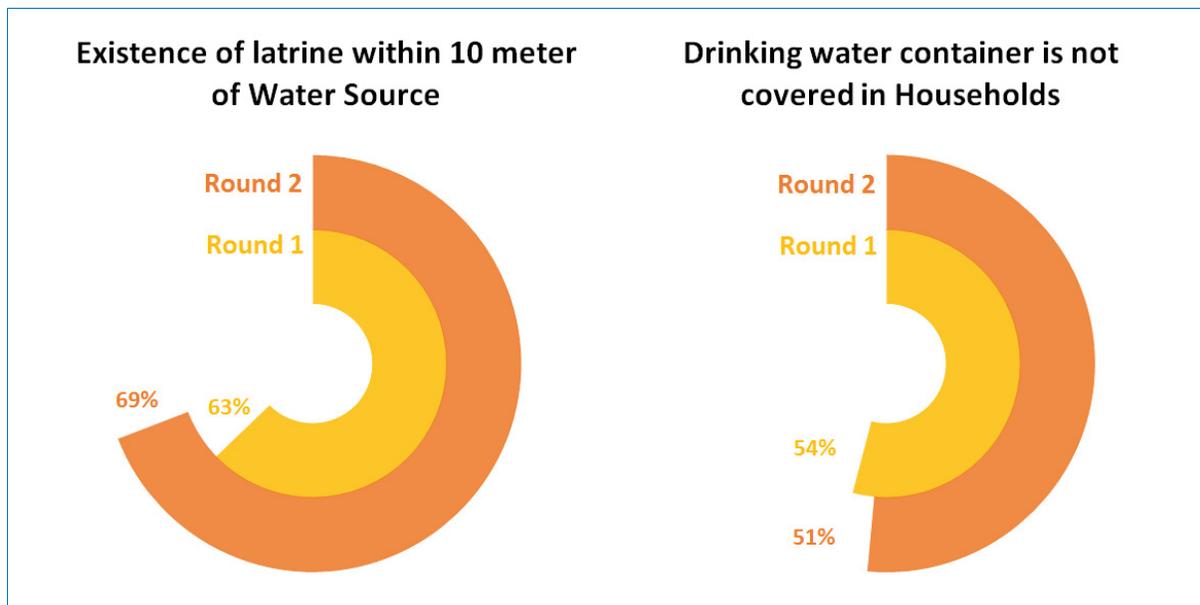


Figure 13: Sanitary inspection status of source (water points) and household water, FDMNs' settlements, Cox's Bazar, Bangladesh, 18 September-25 November 2017.

When comparing the two rounds of sanitary inspection, findings depict that in most settlements the proportion of latrines within 10 meters of a tube well has actually increased. The highest proportion was found in Chakmarkul with 81% and 84% in round 1 and 2, respectively.

The comparison of the two rounds of household sanitary inspection in FDMN settlements revealed a minor overall improvement in container coverage (3%). Only in Burmapara and Unchiprang the proportion of households that did not cover their water containers increased from 55% to 69% and 50% to 61%, respectively.

This situation calls for immediate hygiene promotion activities in the settlements. The WASH sector organized a 'Strategic alignment workshop for hygiene promotion' on 29 November 2017 with the objectives to align the approach and methodology that are to be used in hygiene promotion activities; and to develop key hygiene messages with specific focus on communication channels explicit for each target group. The outcomes of the workshop are being used by the sector to scale

up and improve hygiene promotion activities in the settlements and host communities. The results of the sanitary inspections are shown in figures 14 and 15.

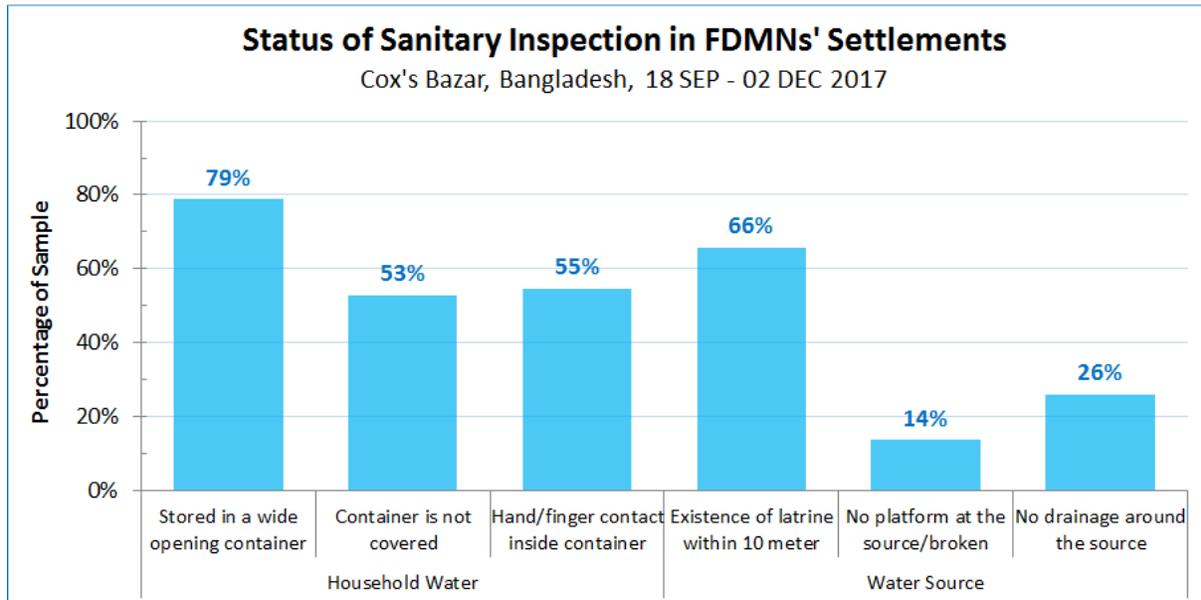


Figure 14: Sanitary inspection status results, FDMNs' settlements, Cox's Bazar, Bangladesh, 18 September-25 November 2017.

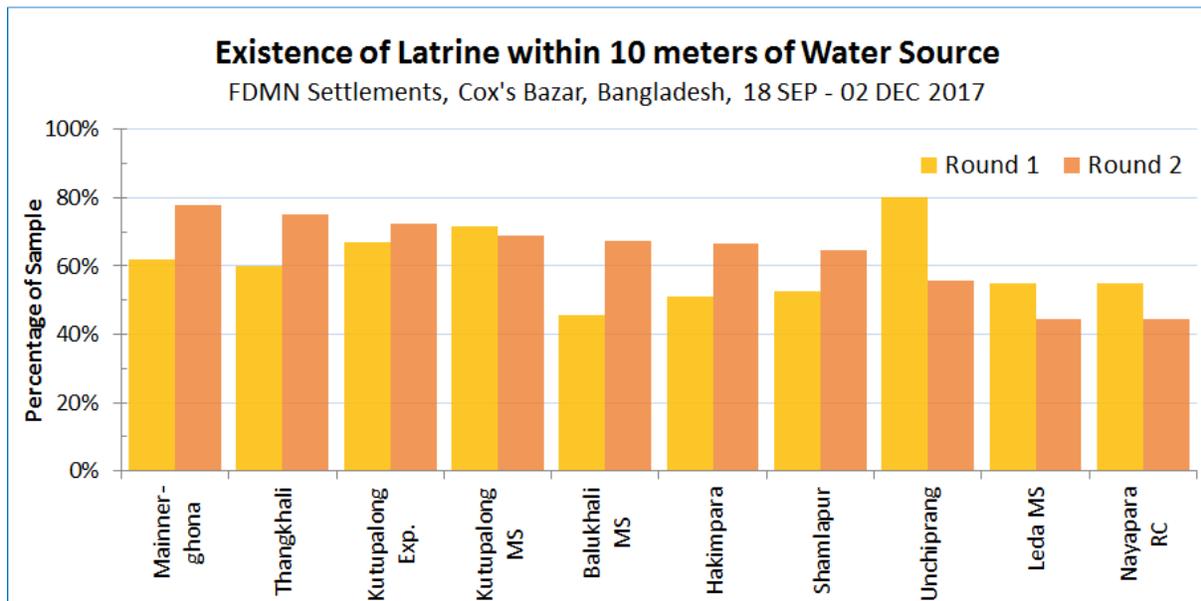


Figure 15: Sanitary inspection status of existing of latrine within 10 meters of tube-well, FDMNs' settlements, Cox's Bazar, Bangladesh, 18 September-25 November 2017.

### 5. Acute Jaundice Syndrome

Between 25 August and 2 December 2017 (epidemiological weeks 34-48), a total of **289** cases of acute jaundice syndrome (AJS) were reported through EWARS; of these, **86%** (209) were in the over-5 age group. The first case was reported on 6 September 2017, the number of reported cases has increased since early October 2017, reaching a peak on 11 November and showing gradual decrease afterwards.

On 2 December 2017, the MSF clinic reported that one (1) positive sample for Hepatitis E (HEV) was detected using Rapid Diagnostic Test (RDT). The daily and weekly distribution of the acute Jaundice syndrome cases are shown in figures 16 and 17.

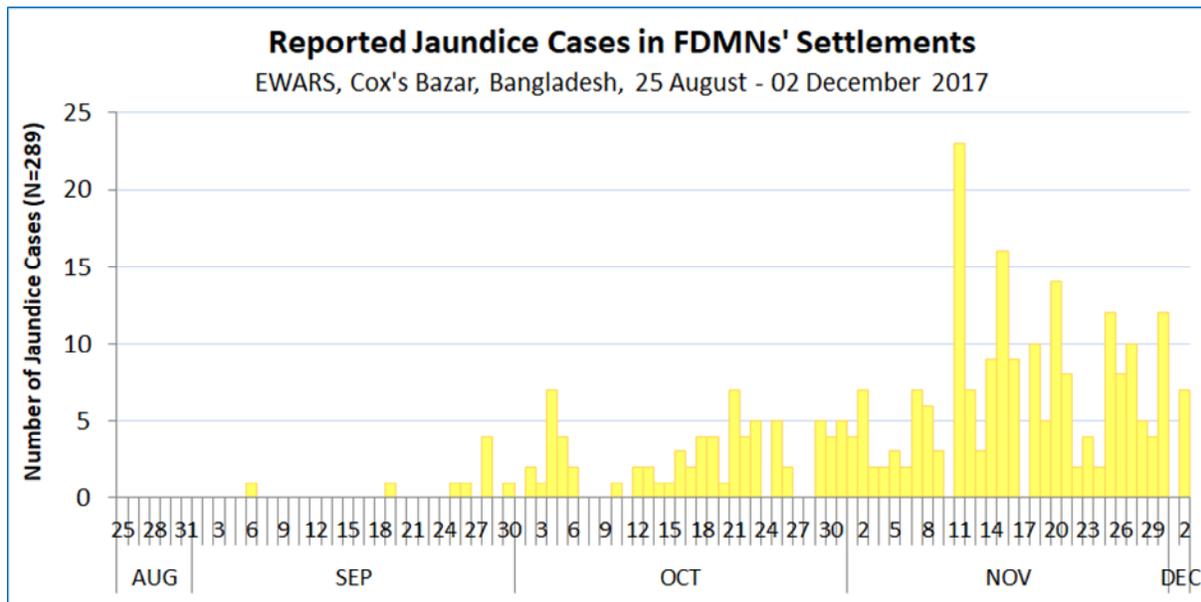


Figure 16: Daily distribution of reported AJS cases, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

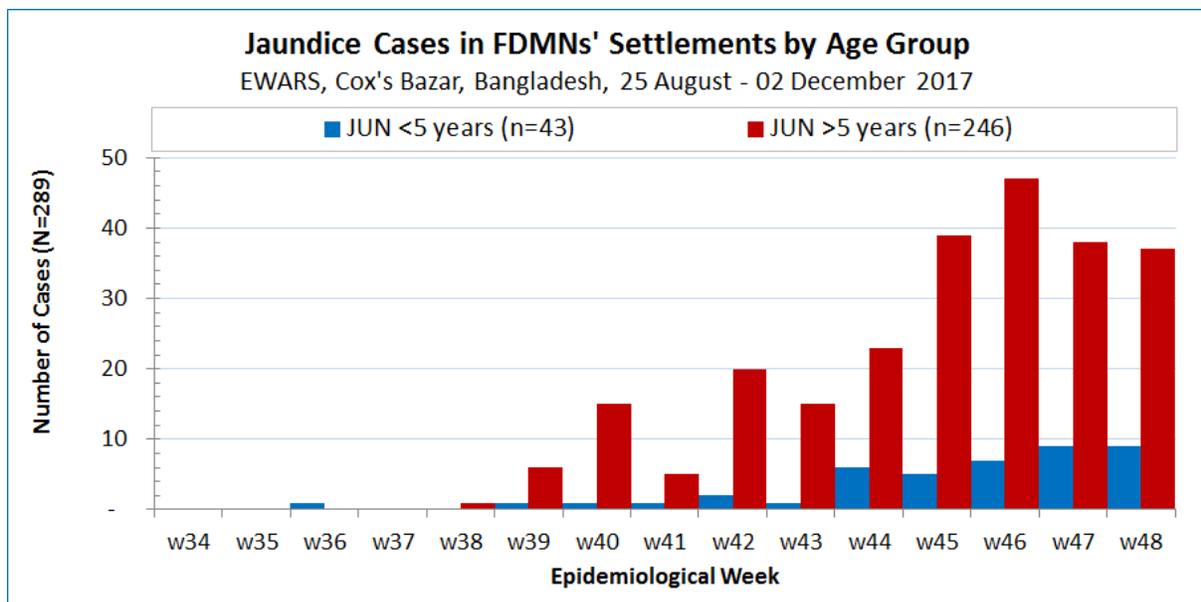


Figure 17: Weekly distribution of reported acute jaundice syndrome cases by age group, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

The highest attack rate for AJS was reported from Hakimpara with **0.56/1,000** population followed by Leda (**0.45/1,000**), Jamtoli (**0.38**, 1,000), Thangkhali (**0.26/1,000**) and Kutupalong (**0.18/1,000**). The acute Jaundice syndrome attack rates in selected camps are shown in figure 18.

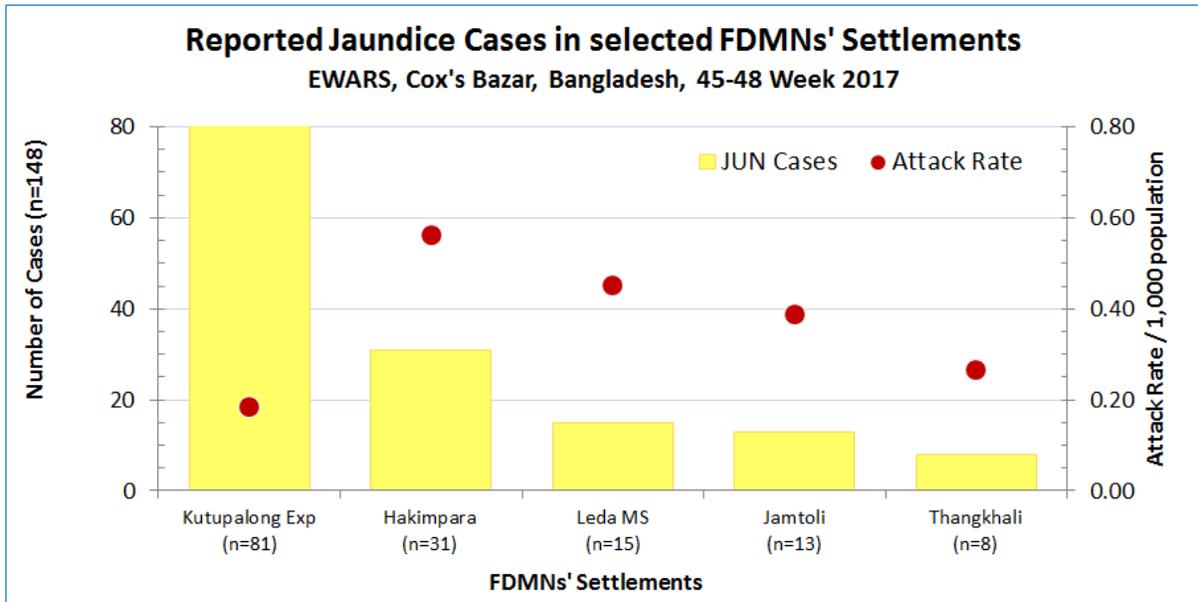


Figure 18: Acute Jaundice syndrome attack rate per 1,000 population in selected camps, Cox's Bazar, Bangladesh, 5 November-2 December 2017.

In comparison to the previous epidemiological week (47), the acute jaundice syndrome attack rate in week 48 increased in Kutupalong Extension (from 0.06 to 0.05/1,000) and Jamtoli (from 0.3 to 0.1/1,000), remained the same in Leda makeshift (0.1/1,000) and Thangkhali, (0.03/1,000), and decreased in Hakimpara (from 0.07 to 0.02/1,000). The weekly acute jaundice syndrome attack rates in selected camps are shown in figure 19.

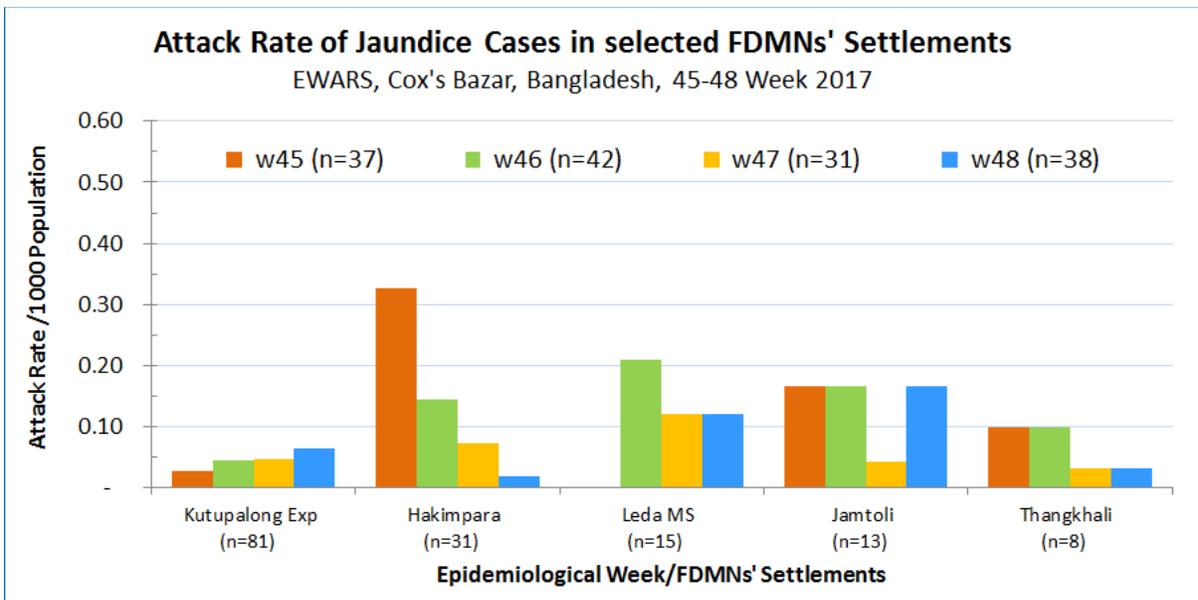


Figure 19: Weekly acute Jaundice syndrome attack rate per 1,000 population in selected camps, Cox's Bazar, Bangladesh, 5 November- 2 December 2017.

### 6. Fever of Unknown Origin

Between 25 August and 2 December 2017 (epidemiological weeks 34-48), a total of **90,329** cases of fever of unexplained origin (UNFEV) were reported through EWARS; of these, **66%** (59,599) were in the above-5 age group. The trend had continuously increased since the epidemiological week 44 but shows a steady decrease in the last 2 epidemiological weeks (46-47). The weekly distribution of fever of unexplained origin cases by age group is shown in figure 20.

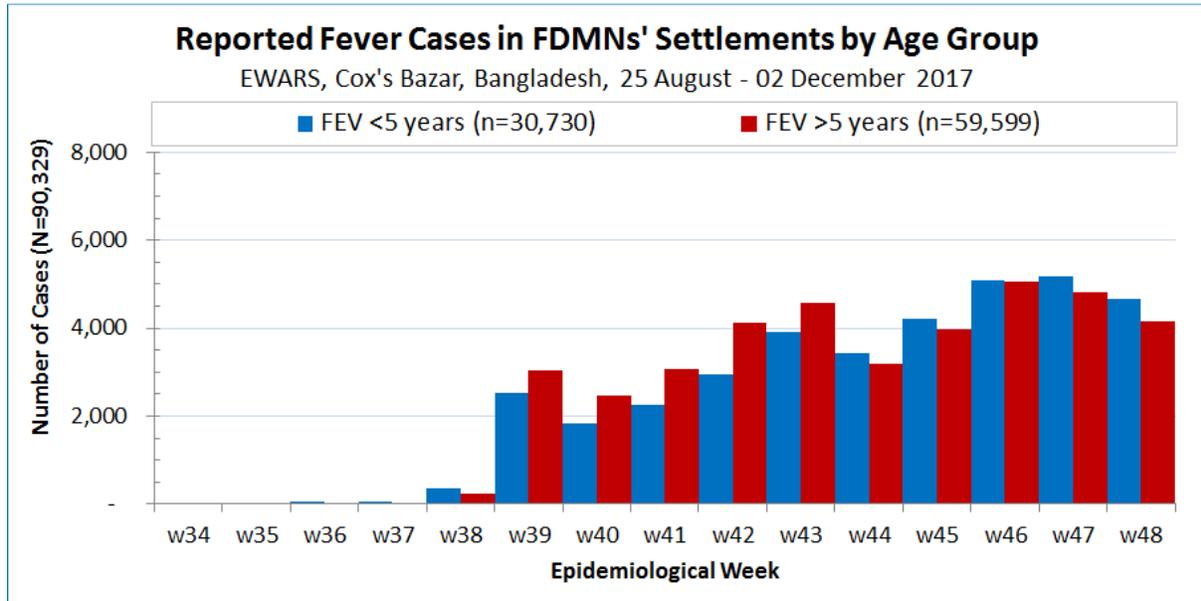


Figure 20: Weekly reported fever of unexplained origin cases by age, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

Ukhia upazila reported **88%** (79,886/90,329) of all UNFEV cases, followed by Teknaf with **11%** (10,381) and Cox's Bazar **1%** (62). The weekly distribution of UNFEV cases by upazila is shown in figure 21.

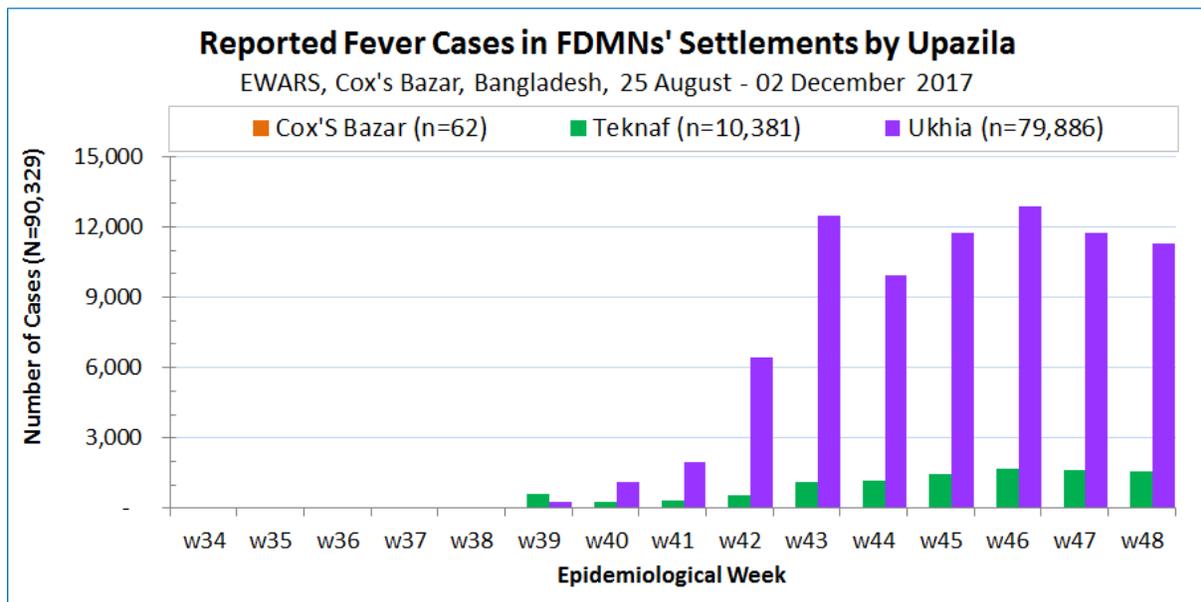


Figure 21: Weekly distribution of reported UNFEV cases by upazila, Cox's Bazar, Bangladesh, 25 August-2 December 2017.

The highest attack rate for UNFEV was reported from Jamtoli with **171/1,000** population followed by Moynarghna (**163/1,000**), Unchiprang (**133/1,000**), Thangkhali (**127/1,000**) and Hakimpara (57/1,000). The UNFEV attack rates in selected camps are shown in figure 22.

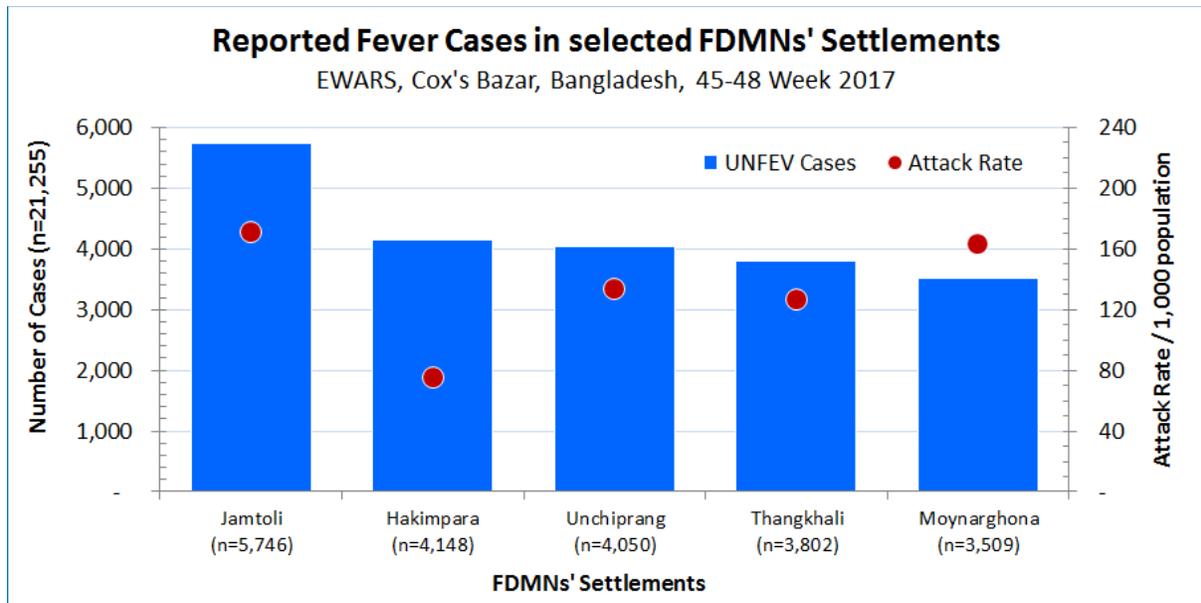


Figure 22: Fever of unexplained origin attack rate per 1,000 population in selected camps, Cox's Bazar, Bangladesh, 5 November- 2 December 2017.

In comparison to the previous epidemiological week (47), the attack rate of fever of unexplained origin in week 48 decreased in Jamtoli (from 50 to 41/1,000), Hakimpara (from 21 to 18/1,000), Unchiprang (from 37 to 30/1,000), Thangkhali (from 32 to 24/1,000), and Moynarghona (from 43 to 39/1,000). The weekly attack rates of fever of unexplained origin in selected camps are shown in figure 23.

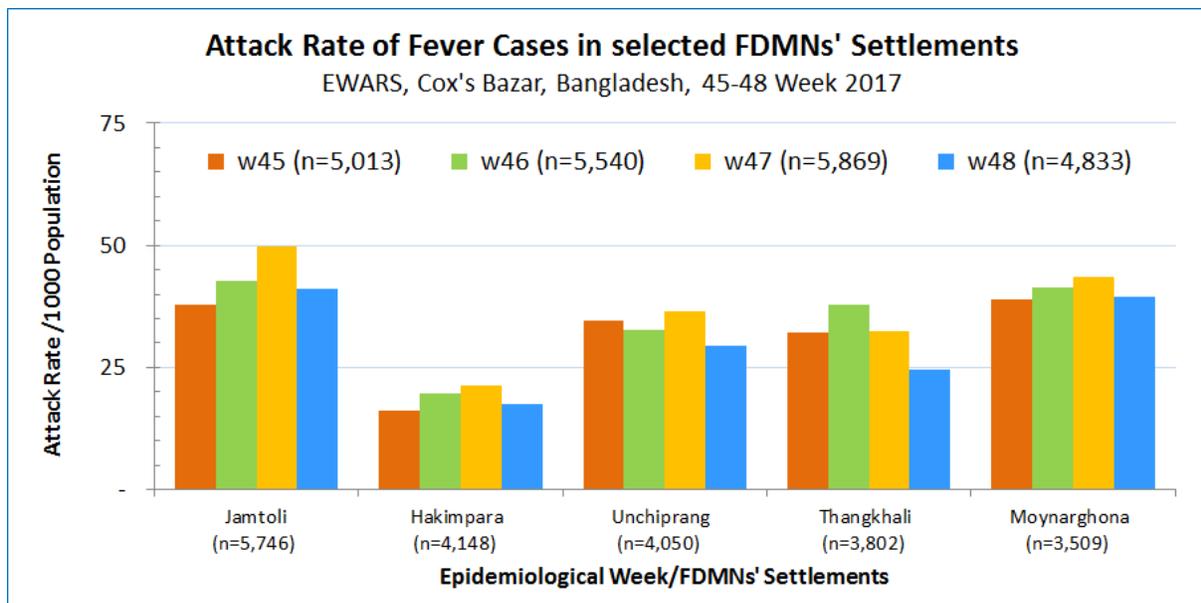


Figure 23: Weekly fever of unexplained origin attack rate per 1,000 population in selected camps, Cox's Bazar, Bangladesh, 5 November- 2 December 2017.

## 7. Measles Outbreak

Between 6 September and 18 November 2017, a total of **1,743** suspected cases of measles, including two related deaths (**CFR 0.11 %**), were reported from FDMN settlements. The first case was reported on 6 September 2017 from Kutupalong settlement through the ERWAS daily line listing reports received from different MSF clinics and the emergency hospital of the Norwegian-Finnish Red Cross.

During the current outbreak, a suspected measles case is defined<sup>3</sup> as any person with fever above 38 °C and a maculopapular rash accompanied by cough, coryza, or conjunctivitis. Suspected measles cases are confirmed in one of three ways: a laboratory-confirmed case is one that tests positive for measles-specific immunoglobulin M (IgM) antibodies using a diagnostic kit for IgM antibody to measles virus; an epidemiologically confirmed case is one who has evidence of exposure to a confirmed measles case within the incubation period (21 days); and a clinically confirmed case is one that meets the clinical case definition despite the absence of a blood test and a history of exposure.

Virtually all cases (**99%** 1,696/1,714) were from FDMNs and the remaining **1%** (18) occurred in the host community population. The median age of the patients was **2.0** years, ranging from **36** days to **44** years. The under-5 age group represented **83%** (1,423/1,714) of total cases. Males represented 54% of the cases. A total of **96%** (1,652) of the cases were from Ukhia, followed by **4%** (62) from Teknaf. The age distribution of reported measles cases is shown in figure 24.

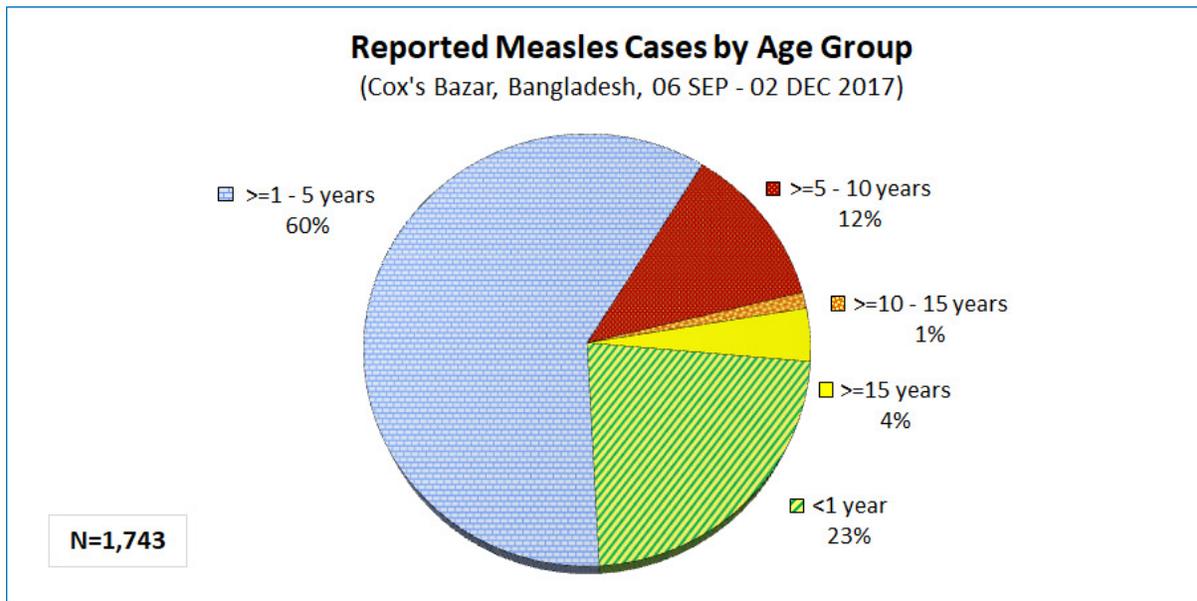


Figure 24: Reported measles cases by age, Cox's Bazar, Bangladesh, 6 September-2 December 2017.

At the beginning of the outbreak, blood samples were collected for laboratory confirmation (n=89). Of these, **84%** (75/89) were positive for measles-specific IgM, **15%** (13) were negative, and **1%** (1) was positive for rubella-specific IgM. If possible, all suspected measles cases should be tested for rubella-specific IgM if the measles-specific IgM is negative. Suspected cases with negative laboratory tests for measles-specific IgM or positive tests for rubella-specific IgM are discarded as

<sup>3</sup> WHO-recommended standards for surveillance of selected vaccine-preventable diseases, February 2014.  
[http://apps.who.int/iris/bitstream/10665/68334/1/WHO\\_V-B\\_03.01\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/68334/1/WHO_V-B_03.01_eng.pdf)

non-measles cases. The daily distribution of suspected measles cases by onset date and laboratory results is shown in figure 25.

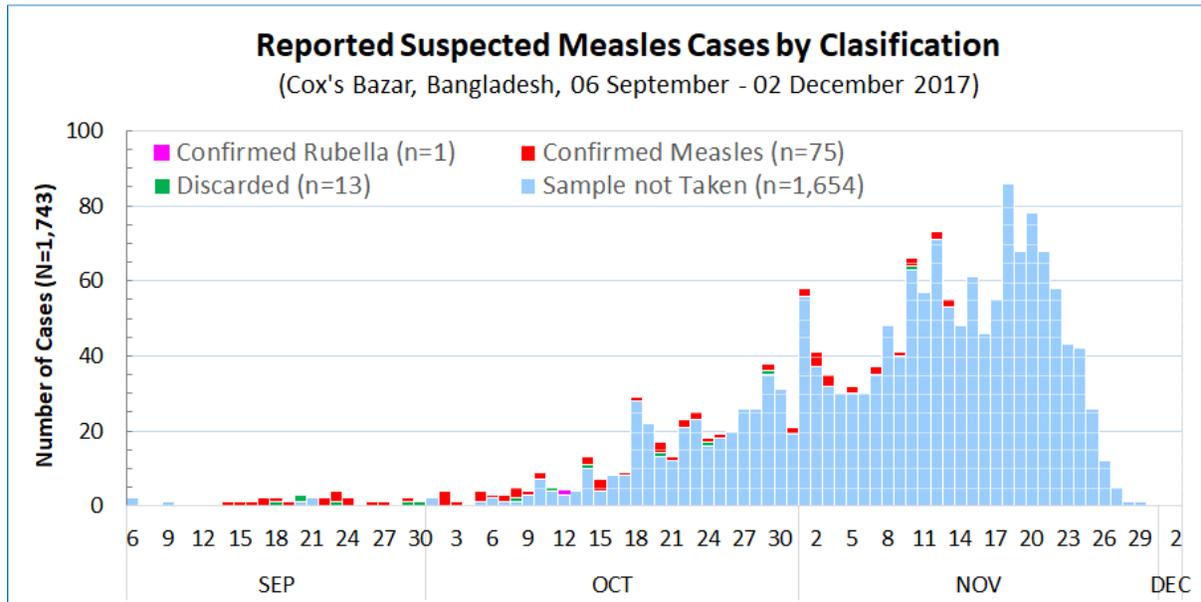


Figure 25: Daily distribution of reported measles cases by laboratory results, Cox's Bazar, Bangladesh, 6 September-2 December 2017.

Of all reported cases, **72%** (1,258/1,743) were not vaccinated against measles, **17%** (289) reported a history of at least one dose of measles vaccination (no evidence to validate due to absence of vaccination card) and **11%** (196) their vaccination status was unknown. The daily distribution of reported cases by vaccination status is shown in figure 26.

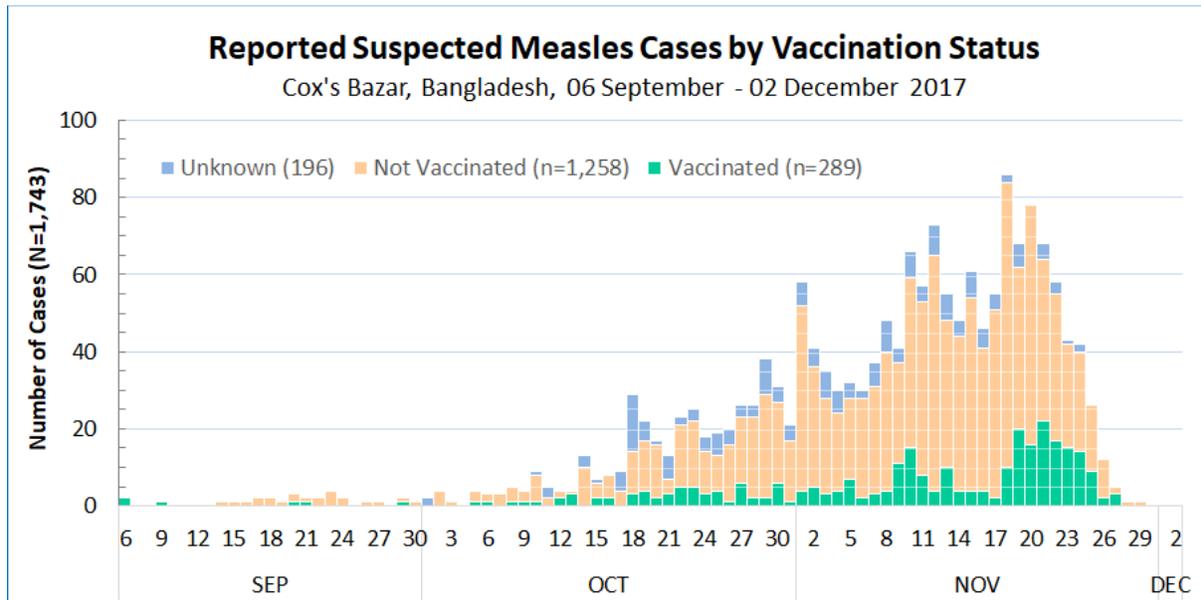


Figure 26: Daily distribution of reported measles cases by vaccination status, Cox's Bazar, Bangladesh, 6 September-2 December 2017.

### 7.1 Enhancing measles vaccination in response to the ongoing outbreak

WHO recognizes refugees as one of the high-risk groups for measles outbreaks. Several outbreaks have been reported among refugees and other emergency settings. Massive population displacements, overcrowding, high population density and low vaccination coverage are the main risk factors for such outbreaks. Mass “catch-up” measles immunization campaigns are recommended by the World Health Organization (WHO) as one of the main strategies to control or eliminate measles. The supplementary immunization campaign targeted **349,603** children between 6 months and 15 years.

Between 18 and 2 December 2017, a total **323,940** children were vaccinated, achieving **96%** coverage in both Ukhia and Teknaf upazilas. There was no Adverse Event Following Immunization (AEFI) associated with MR vaccination reported during the campaign. Measles vaccination coverage per FDMN settlements’ is shown in figure 27.

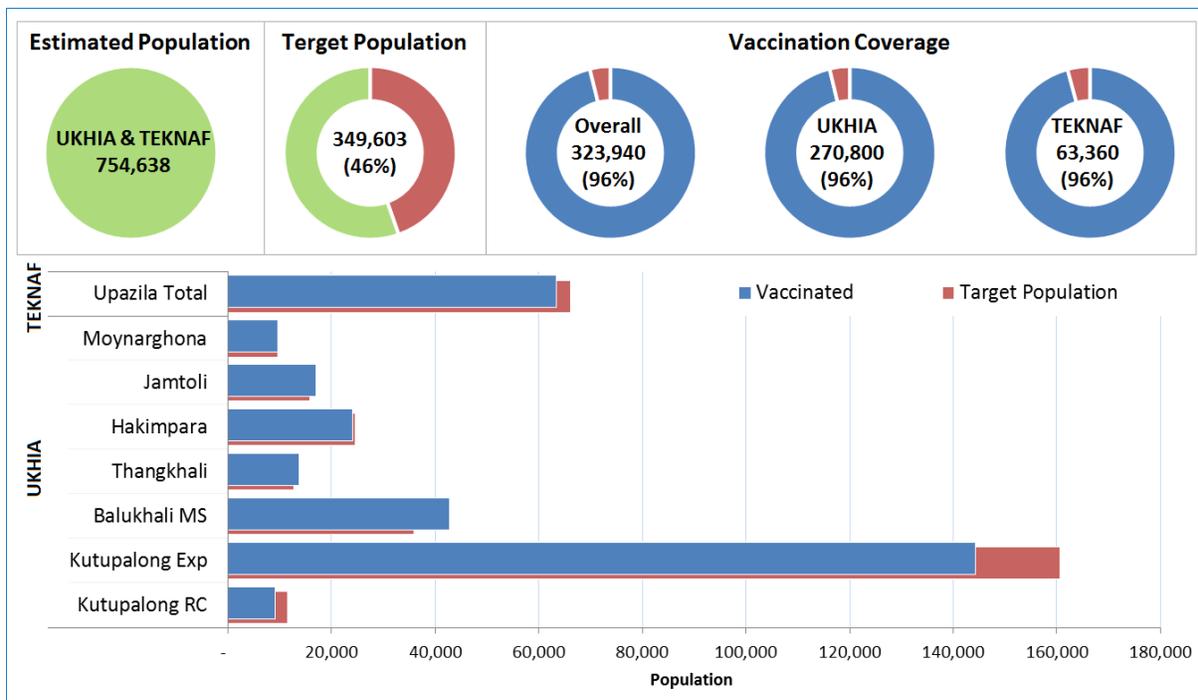


Figure 27: Measles vaccination campaign coverage by FDMN Settlements’, Cox’s Bazar, Bangladesh, 18 November-2 December 2017.

A number of lessons were learned from the measles “catch-up” vaccination campaign, which successfully vaccinated almost 350,000 children in Cox’s Bazar: The importance of government leadership; coordination with all health partners such as MSF, IFRC, IOM, UNHCR, UNICEF and other NGOs; advertising for the campaign through a variety of modalities to increase public awareness; the importance of adequately trained staff to work at **306** fixed sites and **910** outreach sites; and monitoring and supervision during the campaign helped to ensure high quality coverage.

Despite all efforts, some children remained unvaccinated. To maximize the coverage of measles vaccination, routine vaccination should be offered to all the children regardless of their residence status.

## 8. Diphtheria Outbreak

From 1996 through 2 December 2017, **1,279** cases of diphtheria were reported in Bangladesh, an average of 58 per year (range: 2-164 cases). Only two cases have been reported in 2016. However, since Bangladesh has maintained a childhood immunization coverage<sup>4</sup> of over 95%, there was no secondary transmission or local outbreaks. The annual distribution of reported diphtheria cases is shown in figure 28.

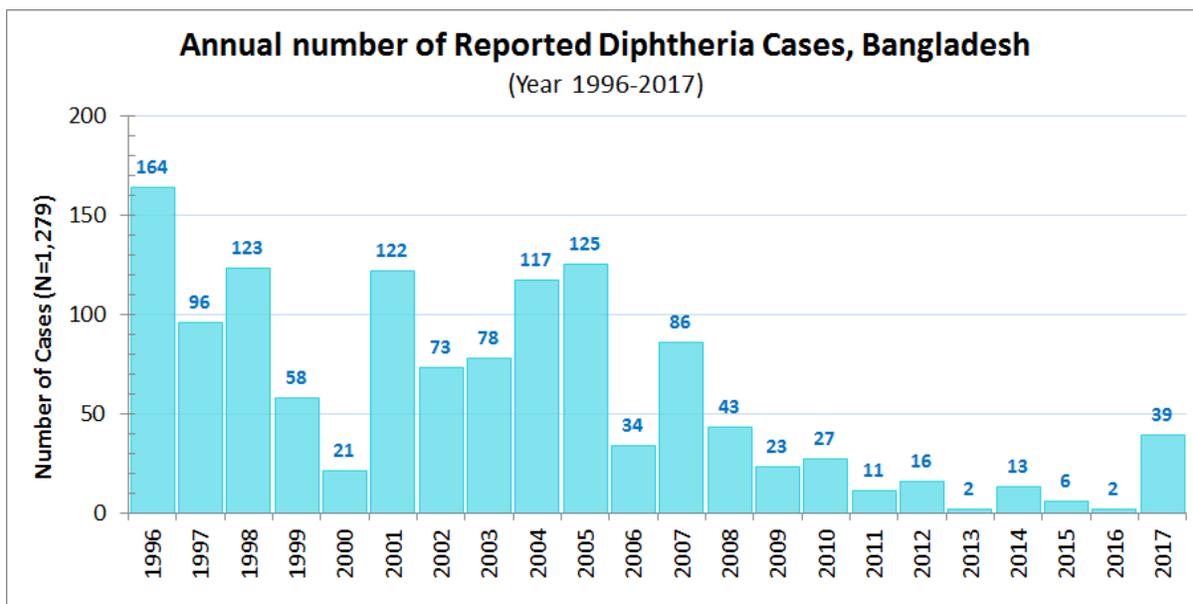


Figure 28: Annual distribution of reported diphtheria cases, Cox's Bazar, Bangladesh, 1996 - 2017.

Between 8 November and 6 December 2017, a total of 110 of diphtheria<sup>5</sup> cases including 6 related deaths (**CFR, 5.5%**) were reported from MSF and IFRC clinics in Cox's Bazar. Since 2 December 2017 (end of the epidemiological week 48), 39 cases were reported<sup>6</sup>. The median age of the reported cases was **9.0** years while the mean age was **10.8** years (**8.3** and **13.1** years for males and females respectively), ranging from 11 months to 44 years.

Females represented **51%** (20) of all reported cases. The highest proportion of cases was seen in the 5-10 years age group (**30%**, 12), followed by the >15 years age group (**23%** 9), 10-15 years of age (**23%**, 9), children aged 1-5 years (**21%**, 7) and infants under-1 years (**3%**, 1).

Of all the reported cases, 84% (33) were reported from Kutapalong Expansion, 7% (3) from Jamtoli and 7% (3) from Thangkhali. During case investigation, all efforts were made to identify close contacts, especially household members and other persons directly exposed to oral secretions of the patient. Through these measures, 123 contacts were identified, (average 7 and ranging from 1-21 contacts). For close contacts, especially household contacts, a diphtheria booster, appropriate for age, should be given. Contacts should also receive antibiotics – Benzadrine penicillin G (600,000 units for persons younger than 6 years old and 1,200,000 units for those 6 years old and

<sup>4</sup> WHO and UNICEF estimates of immunization coverage, 2016 revision

[https://data.unicef.org/wp-content/uploads/country\\_profiles/Bangladesh/immunization\\_country\\_profiles/immunization\\_bgd.pdf](https://data.unicef.org/wp-content/uploads/country_profiles/Bangladesh/immunization_country_profiles/immunization_bgd.pdf)

<sup>5</sup> **WHO-recommended surveillance standard of diphtheria:** Suspected: Not applicable, Probable: A case that meets the clinical description and Confirmed: A probable case that is laboratory confirmed or linked epidemiologically to a laboratory confirmed case [http://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/surveillance\\_type/passive/diphtheria\\_standards/en/](http://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/passive/diphtheria_standards/en/)

<sup>6</sup> **The data analysis in this volume included only 39 diphtheria cases which were reported between 8 November-2 December 2017 (end of the epidemiological week 48).**

older) or a 7- to 10-day course of oral erythromycin (40 mg/kg/day for children and 1 g/day for adults). For compliance reasons, if surveillance of contacts cannot be maintained, they should receive Benzathine Penicillin G. Identified carriers in the community should also receive antibiotics. Close surveillance should be maintained and antitoxin should be given at the first signs of illness<sup>7</sup>.

**Currently Diphtheria antitoxin is not available in Cox's Bazar, accordingly on 26 November 2017, WHO Bangladesh put an urgent request for the procurement of 1,000 DAT doses, expected to arrive in Cox's Bazar before 15 December 2017.** The distribution of reported cases by age groups and daily distribution with outcome are shown in figures 29 and 30.

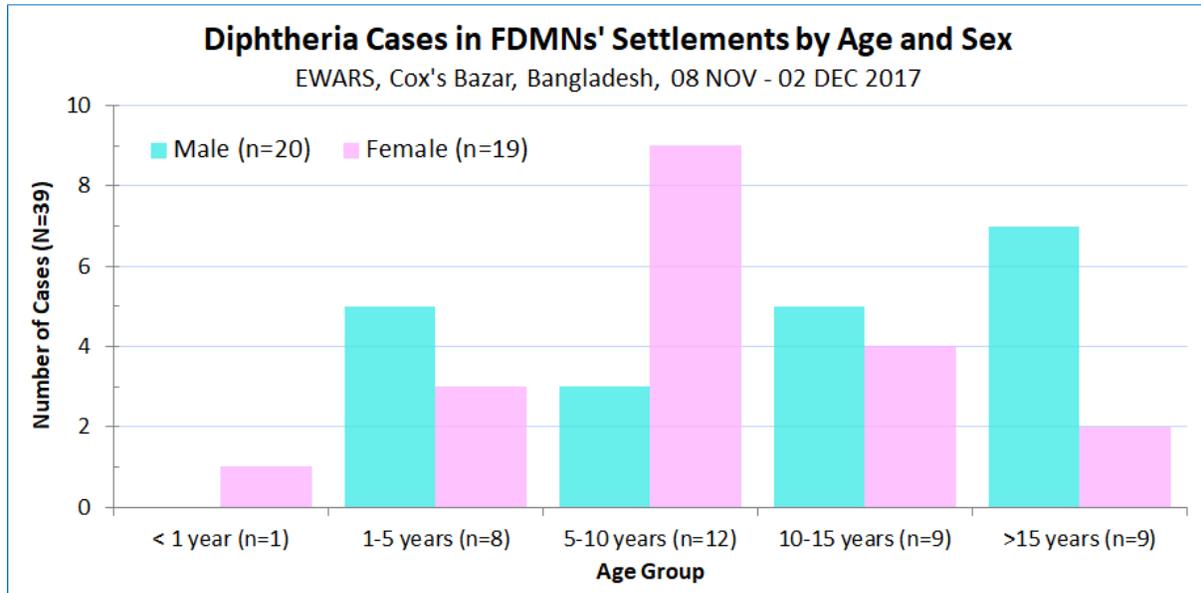


Figure 29: Reported clinical diphtheria cases by age group, Cox's Bazar, Bangladesh, 11 September-2 December 2017.

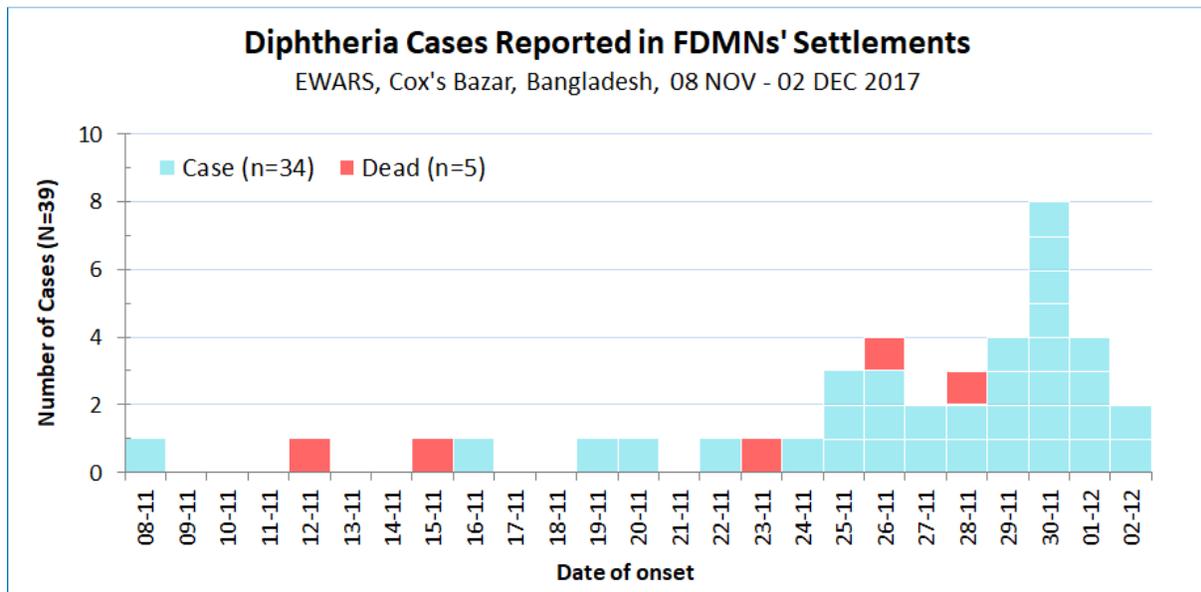


Figure 30: Daily distribution of reported clinical diphtheria cases by outcome, Cox's Bazar, Bangladesh, 11 September-2 December 2017.

<sup>7</sup> <https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/dip.pdf>

In addition, WHO is procuring Phenoxymethylpenicillin, Benzylpenicillin, Azithromycin, Procaine Benzylpenicillin, and Ampicillin which are required for proper case management of diphtheria cases and their contacts.

To diagnose diphtheria, the isolation of *Corynebacterium diphtheriae* in culture media is required. Diagnostic testing to isolate the bacterium requires obtaining swabs from nose and throat of individuals suspected to suffer from diphtheria.

On 15 November swabs were taken from one (1) clinical case and sent to IEDCR, Dhaka for confirmation; the sample was tested in the Infectious Disease Hospital (IDH) and United Hospital in Dhaka and the result was **negative** for *Corynebacterium diphtheria*. On 4 December 2017, MSF collected two additional throat swabs (8 and 18 year old male patients) and sent them to Square Hospital. Both samples were found **positive** for **Klebs loeffler bacilli (KLB)**.

A meeting was held with Directory IEDCR and it was agreed that all swabs taken from clinical cases should be submitted to IEDCR, Dhaka for culture of *Corynebacterium diphtheria*. **WHO is working closely with IEDCR to provide the necessary transport and culture media and to establish a laboratory capacity in Cox's Bazar Medical Collage laboratory to conduct the necessary test for *Corynebacterium diphtheria* confirmation.**

On 5 November 2017, the Bangladesh National Monitoring and Evaluation Committee held an emergency meeting to outline the response to the ongoing diphtheria outbreak in FDMN settlements in Cox's Bazar. Recommendations include: Assessment of the situation to be done jointly by WHO, UNICEF, FDMN co-ordination cell under the leadership of IEDCR; case management to be coordinated by the Communicable Disease Department, DGHS with support of WHO, UNICEF, MSF, IFRC and other relevant partners; establishment of isolation ward in Ukhia Health Complex with the support of MSF and IFRC; and outbreak prevention and control measures to be implemented under the leadership of DGHS with UNICEF and WHO support.

In addition, WHO is deploying IVD experts and additional epidemiologists to Cox's Bazar.

In general, the current diphtheria outbreak among FDMNs in Cox's Bazar demonstrated the potential for severe outbreaks when a community has both, a large population of non-immune adults and poor vaccination coverage among their children.