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1. National Early Warning Alert and Response Surveillance (NEWARS) reporting status for Epidemiological Week 14-26, 2017

1.1 NEWARS reporting status for 14-26 Epidemiology weeks, 2017 from health centers under 20 Dzongkhags

Out of 3500 weekly reports expected during 14-26 epidemiology weeks from health centers in the country, only 3018 (86.2%) reports were received through NEWARS Information System (NEWARS). From total reports received in the system, 57.0% were timely reported, 29.3% were reported late and rest did not report (Figure 1).

Among dzongkhags Pemagatshel, Trashi-yangtse and Zhemgang have better timely reporting rate ranging from 75-85% compared to other dzongkhags. While Chhukha, Dagana, and Paro dzongkhags have poor timely reporting rate ranging from 24-29%. Most dzongkhags have significant number of health centers not reported.

1.2 Notifiable Diseases/Syndromes reported for 14-26 Epidemiological weeks, 2017

Among 24 weekly reportable diseases/syndromes, highest number of cases reported was acute respiratory illness (ARI) syndrome followed by acute watery diarrhea (AWD) syndrome, acute bloody diarrhea (ABD) syndrome, severe acute respiratory tract infection (SARI) syndrome and fever with rash syndrome (Table 1).

Table 1: Notifiable diseases/syndromes reported by dzongkhags for 14-26 epidemiological weeks, 2017

ANT: Anthrax; ABD: Acute Bloody Diarrhea; AWD: Acute Watery Diarrhea; AES: Acute Encephalitis Syndrome; AFP: Acute Flaccid Paralysis; AHF: Acute Haemorrhagic Fever Syndrome; AJS: Acute Jaundice Syndrome; ARI: Acute Respiratory Infection; SARI: Severe Acute Respiratory Infection; BMG: Bacterial Meningitis; DGF: Dengue Fever; DPT: Diphtheria; FDP: Food Poisoning; MAL: Malaria; PTS: Pertussis; RBH: Rabies (Human); MRT: Multi-drug Resistance TB; TTN: Tetanus; TPF: Typhoid/Paratyphoid Fever; RKS: Rickettioses; MUM: Mumps; FWR: Fever with Rash; UDE: Unusual Disease(s), Death(s) or Event.
1.2.1 Descriptive of Respiratory Illness (ARI and SARI) syndrome

Total of 46512 cases reported, 97.5% were ARI cases and 2.5% SARI cases. Compare to the same 1-13 epidemiology week, 2017 slight increase in number of cases was observed both ARI and SARI cases (Figure 2).

The high incidence of ARI and SARI was reported among children age-group 1-4 years and 5-9 years of age (Figure: 3).

Cases of Respiratory Illnesses 39809

Report of SARI cases in Second Quarter 567

The ARI and SARI cases were reported from all health centers across the country. During 14-26 epidemiology weeks, higher number of cases were reported from the southern and eastern dzongkhag, with maximum cases reported from Samtse, Chhukha, and Sarpang (Figure 4).
1.2.2 Diarrheal (Acute Watery and Bloody diarrhea) syndrome

A total of 9537 cases of diarrheal syndrome reported, 86.0% were acute watery diarrhea (AWD) syndrome and 14.0% acute bloody diarrhea (ABD) syndrome. Compare to 1-13 epidemiology week 2017, increase case of AWD was observed in 20 and 24 week while similar numbers of cases was observed for ABD (Figure 5).

![Figure 5: Number of Diarrheal syndrome (AWD and ABD) for 14-26 epidemiology weeks, 2017](image5)

The high incidences of AWD and ABD syndrome were observed in children age group 1-4 years of age (Figure 6).

![Figure 6: Distribution of Diarrheal syndrome (AWD and ABD) by age-group for 14-26 epidemiology weeks, 2017.](image6)

The incidence of diarrheal syndrome was reported from all the parts of the country. During 14-26 epidemiology weeks, high number of cases was reported from Paro followed by Samtse Bumthang Dzongkhag reported maximum cases of ABD compare with other dzongkhag (Figure 7).

![Figure 7: Distribution of Diarrheal syndrome (AWD and ABD) for 14-26 epidemiology weeks, 2017](image7)

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Immediately Reportable Notifiable Diseases

These diseases are of major public health importance as a single case may lead to an outbreak or public health threat that requires immediate action. Hence it requires immediate report.

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Weekly Reportable Notifiable Diseases

These diseases selected based on criteria such as potential to cause epidemic, vaccine preventable diseases, diseases that are aimed for elimination & disease with high morbidity and mortality.

The incidence of diarrheal syndrome was reported from all the parts of the country. During 14-26 epidemiology weeks, high number of cases was reported from Paro followed by Samtse Bumthang Dzongkhag reported maximum cases of ABD compare with other dzongkhag (Figure 7).
1.2.3 Descriptive of Fever with Rashes syndrome

Increase number of cases of Fever with Rashes (FWD) syndrome was reported during 14-26 epidemiology weeks. The increase was attributed due to several outbreaks of chickenpox and suspected measles reported from health centers across the country (Figure 8).

The high incidence of fever with rashes was reported in children age group 1-4 years of age (Figure: 9).

Maximum fever with rashes cases were reported from health centers under Dagana and Pemagatshel, (Figure: 10).

1.3 Immediately Notifiable Diseases/syndromes reported during 14-26 epidemiology weeks, 2017

Among immediately notifiable diseases/syndromes, maximum cases reported was suspected measles case followed by Bacterial meningitis and laboratory confirmed malaria cases (Figure 11).
1.4 Events of public health concerns reported during 14-26 epidemiology weeks, 2017

A total of 15 events were reported during 14-26 epidemiology week and majority of events were reported in schools. The common events reported were Chicken-pox, suspected Acute Respiratory Infection and Acute water diarrhea. Dengue fever outbreak was also reported. (Figure 12). A majority 66.0% of the events response was done by respective Health Centers as those events just require follow up action. as alone while Dzongkhag Rapid Response team investigated 26.0% of event and one event investigation was supported by RCDC as per the request of district health office.

1.4.2 Summary of Dengue outbreaks investigation

During 14-26 epidemiology weeks, unusual rise in numbers of Dengue cases in Samtse and Samdrupjongkhar were reported in the NEWARSIS. This was the first documented Dengue outbreak reported from the Samtse and Samdrupjongkhar Dzongkhag. A total 82 cases of Samtse and 102 cases from Samdrupjongkhar were reported following the outbreak. The outbreak investigation at Samtse was carried out jointly by RCDC, VDCP, and DRRT while the outbreak at Samdrupjongkhar was carried out by DRRT headed by one health specialist. No complication and no case fatality was reported from both the outbreaks.

1.4.3 Summary of Typhoid outbreaks associated with community water supply

During the month of June an outbreak of Salmonella Paratyphi B was reported by JDWNR Hospital. The outbreak was confined to one of the private apartment building in Changzamtog, Thimphu. A total of 66 patients were determined to be affected during the outbreak period. Of those 24 (36.4%) were positive for Salmonella. A joint investigation conducted by RCDC, JDWNRH, and Thimphu Dzongkhag Rapid Response team determined community water supply as the source of outbreak.

To prevent further spread of disease, the private water supply was stopped, the reservoirs in the affected buildings were cleaned thoroughly and chlorinated. Door to door health education on prevention and control measures was provided by the investigating team.

2. Surveillance of Drug Resistance Tuberculosis

The National Tuberculosis reference laboratory (NTRL) received 403 patient’s sample from 1st April 2017 to 20th June 2017. Among those, 189 were pulmonary cases, 38 were extra pulmonary, 159 were follow up samples for MDR-TB patients and 19 cases were for visa. The culture positive samples were subjected to identification test and then tested for drug sensitivity using liquid method and line probe assay (LPA).

From 83 DST completed, Multi drug resistance was seen in 15 new cases of pulmonary TB and 2 extra pulmonary TB. MDR-TB samples were received from 9 hospitals across the country and 52% of the cases were shipped from JDWNRH. 52% (n=9) of the MDR-TB cases were among the female patients (Table 2).
3. Influenza Sentinel Surveillance

3.1 Influenza Like-Illness (ILI)

Incidence of ILI during epidemiology week 14-26 was 433 per 10,000 hospital visits. Influenza virus subtype detected were influenza A/ Pdm09, influenza A/ H3 and influenza B. Influenza A/ Pdm 09 (38.3%) and Influenza A/ H3 (36.2%) were the predominant influenza virus subtypes circulating in the country followed by Influenza B (25.5%) (Figure 14 and 15). The most affected age group by ILI was in children of 5 to 14 years (Figure 14).

3.2 Severe Acute Respiratory Infection (SARI)

During epidemiology week 14-26, 2017, SARI incidence was 7 per 100 hospital admissions for week. Influenza B (36.8%), followed by influenza A/ Pdm 09 and A/ H3 (31.5% each) were the types of influenza viruses detected among SARI patients (Figure 18). Children of 0-1 years were the most commonly affected group, also having the highest laboratory detection of Influenza virus (Figure 17).
4. Measles & Rubella Surveillance

A total of 218 serum samples were received from hospitals across the country for anti-measles IgM and anti-rubella IgM serology. April has recorded the highest percentage of confirmed measles (23.4%) and rubella (4.26%) (Figure 19).

Figure 19: Measles and Rubella positive cases for 14-26 epidemiological weeks, 2017

5. HIV Confirmation

A total of 56 samples were received for HIV confirmations from various hospitals during 14-26 epidemiology weeks, 2017. 19 samples were confirmed as HIV positive. Most of samples were received from the JDWNRH (Figure 20).

Figure 20: HIV positive case for 14-26 epidemiology weeks, 2017

6. Acute Encephalitis Syndrome (AES) Sentinel Surveillance

During 14-26 epidemiology weeks, a total of 26 CSF and 17 serum samples were received to be tested of IgM against Japanese encephalitis. Only one Serum and a CSF tested positive for anti-JE antibody.

7. Diarrheal surveillance from surveillance sites

A total of 193 samples were collected from diarrheal surveillance sentinel sites and assayed to detect various bacterial and viral enteric pathogens. Majority of samples were obtained from Jigme Dorji Wangchuck National Referral (JDWNR) Hospital. Hence, this data may not represent the diarrheal infections for the whole country due low number of samples received from sentinel sites other than JDWNR Hospital.

The more diarrheal cases were observed among children under 5 years of age compared to other age-groups (Figure 21).

Figure 21: Distribution of diarrheal cases by age and sex

During 14-26 epidemiology weeks, 2017, it was observed that significant numbers of diarrhea was caused by parasites compared to bacteria (Table 3). Cryptosporidiosis and giardia lamblia together contributed to 50% of the infection while 28% of the infections were attributed to bacterial infection and rests were caused by viral infections.
Table 3: Enteric pathogens detected during 2nd quarter, 2017.

<table>
<thead>
<tr>
<th>Organisms</th>
<th>Numbers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenovirus</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Aeromonas spp</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Astrovirus</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Campylobacter spp</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Cryptosporidium spp</td>
<td>17</td>
<td>34</td>
</tr>
<tr>
<td>EAEC</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>EEEA</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>EIEC</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>EPEC</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Giardia lamblia</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Plesiomonas spp</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Salmonella typhi</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Shigella sonnie</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 4: Antibiotic susceptibility testing was performed on all bacterial pathogens isolated.

<table>
<thead>
<tr>
<th>Organisms</th>
<th>amp</th>
<th>amx</th>
<th>cip</th>
<th>sxt</th>
<th>nal</th>
<th>cro</th>
<th>gen</th>
<th>chl</th>
<th>czo</th>
<th>tcy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeromonas spp</td>
<td>ND</td>
<td>ND</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>EIEC (n=4)</td>
<td>R</td>
<td>ND</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>EAEC (n=1)</td>
<td>R</td>
<td>ND</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Plesiomonas spp</td>
<td>ND</td>
<td>ND</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Salmonella typhi</td>
<td>ND</td>
<td>ND</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Shigella sonnie</td>
<td>ND</td>
<td>ND</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

Amp=ampicillin, amx=amoxycillin, cip=ciprofloxacin, sxt=co-trimoxazole, nal=cephalexin, cro=ceftriaxone, gen=gentamicin, chl=chloramphenicol, czo=cephazolin, tcy=tetracycline, ND=not done, R=Resistant, S=Sensitive, I=Intermediate

Antibiotic susceptibility testing was performed on all bacterial pathogens isolated (Table 4). Salmonella typhi isolates were found susceptible to all standard panel of antibiotics while Plesiomonas was resistant to Nalidic acid, Cefixaione and Ampicillin. On the other hand, Shigella sonnie was found resistant to Ampicillin, Amoxycillin, Ciprofloxacin, Co-trimoxazole, Nalidixic acid and Cephalexin. All pathogenic entero-invasive E.coli (EIEC) isolates were found resistant to Chloramphenicol, Ceftriaxone, Tetracycline, Nalidixic acid and Ampicillin while enteroaggregative E. coli (EAEC) isolate was resistant to all antibiotics except Gentamicin and Chloramphenicol. Enteroaggregative E. coli (EPEC) was sensitive to all the antibiotics except for Ampicillin. Multi-drug resistant Aeromonas spp were also isolated from the patients which were resistant to all antibiotics except Chloramphenicol.

8. Acute Undifferentiated Fever Surveillance

During the second quarter, a total of 11 samples were collected from sentinel sites and tested for Leptospira antibody by Microscopic Agglutination Test (MAT) against 13 serovars. Of 11 samples 3 (27.27%) were positive; 2 (18%) against Australis and 1(9%) against Patoc-I. However, the testing is limited by availability of just 13 serovars at EIDL although all the samples were found positive for leptospirosis by ELISA method.

9. Urban Drinking Water Quality Monitoring (UDWQM)

9.1 Bacteriology test (Thermotolerant coliform) Report

A total of 776 samples were collected and tested for Thermotolerant coliform from 34 urban health centers in the country during 14-26 epidemiology weeks. Out of which 48.1% of water were found to be safe (0 CFU) and rest were found to be unsafe (>1CFU)* (Figure 22)
9.2 Chlorination Report

Currently only six urban health hospitals (BHU-1, Bajo, Bumthang, Gelephu, Phuntsholing, Samtse and Thimphu) have water treatment plant and chlorine level is monitored as one of the parameters. The result illustrates that out of 177 samples tested, only 22.6% were adequately chlorinated while the rest did not meet acceptable value (0.2-0.5mg/L)* (Figure 23).

RCDC Activities

The training was for 2 days from 5th to 6th June, 2017 at Punakha. The resource persons were staffs from National Water Reference Laboratory and ICT section, RCDC. A total of 32 laboratory staffs were trained. The training comprised of presentation and practical sessions.

During 1st day of the training, the participants were briefed on current scenario of water quality and burden to the society and were also informed on the water policy documents. In the afternoon session participants were given hands on training on water Microbiology. On the 2nd day the participants were trained on Physical testing (Turbidity, pH and Residual Chlorine) and in afternoon session they were trained on reporting through SMS and water quality monitoring information system.