



**ROYAL CENTERS FOR DISEASE CONTROL**

**QUARTERLY BULLETIN: Fourth Quarter 2024**

**Contents**

Highlights on NEWARS reports: ..... 3

1. National Early Warning Alert and Response Surveillance (NEWARS)..... 4

1.1 Reporting status of health centres under 20 Dzongkhag ..... 4

1.2 Status of Weekly Notifiable Diseases/Syndromes reported by health centres ..... 4

1.3 Descriptive analysis of most common notifiable diseases ..... 6

1.3.1 Respiratory Illness (ARI and SARI) syndrome..... 6

1.3.2 Diarrheal syndrome: Acute Watery Diarrhea (AWD) and Acute Bloody Diarrhea (ABD) 7

1.3.3 Fever with Rashes syndrome ..... 8

1.4 Immediately Notifiable Diseases/syndromes ..... 9

1.5 Events BI ..... 9

2. Laboratory Based Surveillance ..... 11

2.2 COVID-19 Integrated Influenza Surveillance..... 13

2.2.2 Laboratory Surveillance ..... 14

2.2.3 Epidemiology Surveillance ..... 16

2.3 Surveillance for Measles and rubella (MR) and Pertussis: ..... 17

2.4. Sentinel Surveillance for Diarrheal Etiologic Agents ..... 18

2.6 Blinded rechecking of malaria slides ..... 22

2.6.1 Reporting status of health centers..... 22

2.8 Urban Drinking Water Quality Monitoring (UDWQM) ..... 25

2.8.1 Bacteriology test (Thermotolerant coliform) Report:..... 25

2.9. Drug Quality Monitoring: ..... 28

2.10 National Toxic Exposure Surveillance Report..... 29

**Highlights on NEWARS reports:**

**Immediate reports:**

- a) Highest record (Seventy) of malaria cases were reported during the quarter, almost all were reported from Sarpang dzongkhag, except three from Chhukha dzongkhag.
- b) The Vaccine-Preventable and Venereal Disease Laboratory (VPVDL) received and analyzed 72 samples of suspected measles/rubella cases; none of the sample tested positive for measles or rubella.
- c) Two suspected bacterial meningitis and two suspected pertussis was reported from JDWNRH.
- d) Two severe dengue cases was reported from Sarpang dzongkhag

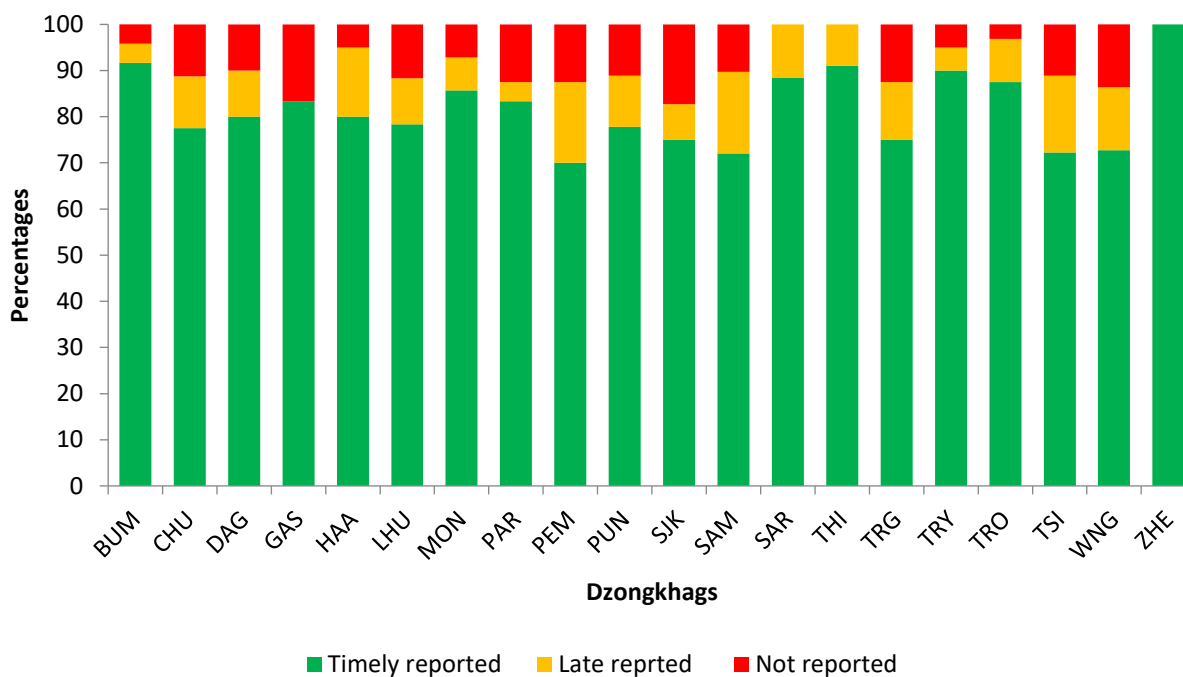
**Events reports:**

In total, 11 events/disease outbreaks were documented this quarter. Of those four were of Influenza-like illness, three events of Chicken pox, two Viral fever, one was of acute Gastro-enteritis and one of Glossitis. Local Health Centers responded to all outbreaks based on RCDC recommendation. Outbreaks are described in events under event-based surveillance.

## 1. National Early Warning Alert and Response Surveillance (NEWARS)

### 1.1 Reporting status of health centres under 20 Dzongkhag

In this quarter 2024, a total of 3740 weekly reports were expected from 265 health centers across the country. The reporting consistency was similar to the third quarter. Overall, 90.0% of reports were received in the NEWARS information system, of which 81.0% were reported on time, 10.0% were reported late and the rest 9.0% were not reported (**Figure 1**).



**Figure 1:** Dzongkhag-wise weekly reporting status for 4<sup>th</sup> Quarter 2024

### 1.2 Status of Weekly Notifiable Diseases/Syndromes reported by health centres

Among 11 weekly reportable diseases/syndromes, the highest number of cases reported were respiratory illnesses (ARI & SARI). In total, 30881 (82.0%) cases of respiratory illnesses and 5788 (14.5%) diarrheal cases were reported (**Table 1**). The total cases reported were lower than that of second quarter 2024.

**Table 1:** Notifiable diseases/syndromes reported by Dzonkhag

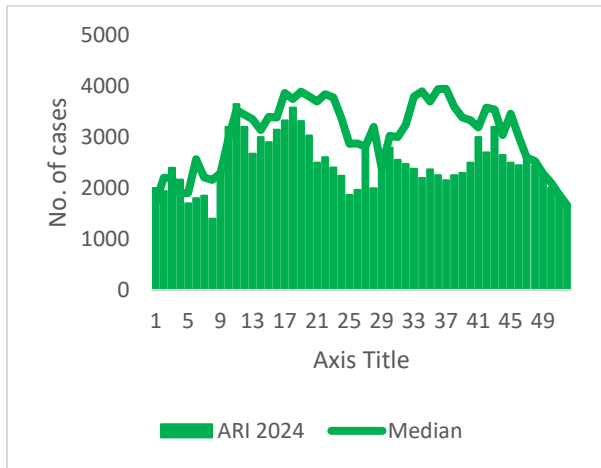
Dzongkhag	ABD	AWD	AJS	ARI	DGF	MUM	FWR	FDP	TPF	SAR	RKS
<b>BUM</b>	5	78	13	332	0	0	0	0	0	47	0
<b>CHU</b>	41	1506	18	4239	49	1	40	16	27	108	5
<b>DAG</b>	10	101	1	918	0	0	5	0	0	26	5
<b>GAS</b>	0	27	0	134	0	0	0	0	0	0	0
<b>HAA</b>	0	45	0	237	0	0	0	0	0	1	3
<b>LHU</b>	39	45	0	533	3	0	3	1	0	1	0
<b>MON</b>	14	250	18	1568	6	1	2	1	6	24	2
<b>PAR</b>	36	632	3	2401	0	0	0	0	0	0	0
<b>PEM</b>	6	175	3	1407	15	0	0	0	3	16	6
<b>PUN</b>	87	413	6	772	0	0	5	0	0	104	0
<b>SJK</b>	9	143	13	1301	8	0	0	2	0	16	1
<b>SAM</b>	24	401	4	2953	8	0	9	0	1	57	3
<b>SAR</b>	27	264	22	1989	3	2	31	3	15	12	6
<b>THI</b>	32	458	0	3806	30	0	9	0	0	102	0
<b>TRG</b>	9	147	0	660	0	0	4	0	141	11	33
<b>TRY</b>	17	53	9	1636	1	0	0	0	0	16	9
<b>TRO</b>	5	116	0	874	0	0	0	0	0	3	0
<b>TSI</b>	33	70	1	644	1	0	0	0	9	36	6
<b>WNG</b>	9	340	56	2668	11	3	1	0	0	41	0
<b>ZHE</b>	9	112	5	1181	0	0	3	0	12	7	9
<b>Total</b>	<b>412</b>	<b>5376</b>	<b>172</b>	<b>30253</b>	<b>135</b>	<b>7</b>	<b>112</b>	<b>23</b>	<b>214</b>	<b>628</b>	<b>88</b>

**Abbreviations:** ABD (Acute Bloody Diarrhea), AWD (Acute Watery Diarrhea), AJS (Acute Jaundice Syndrome), ARI (Acute Respiratory Infection), MUM (Mumps), FWR (Fever with Rash), FDP (Food borne Illness), TPF (Typhoid/Paratyphoid fever), SARI (Severe Acute Respiratory Infection), RKS (Rickettsioses).

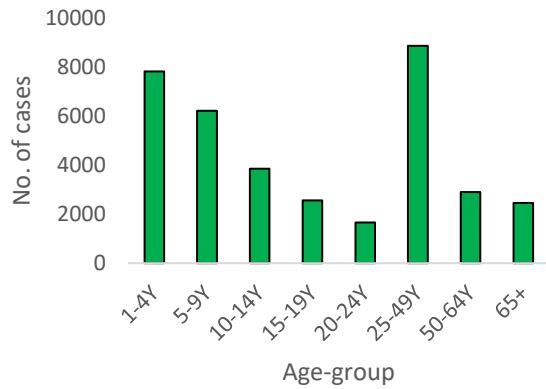
1.3 Descriptive analysis of most common notifiable diseases

1.3.1 Respiratory Illness (ARI and SARI) syndrome

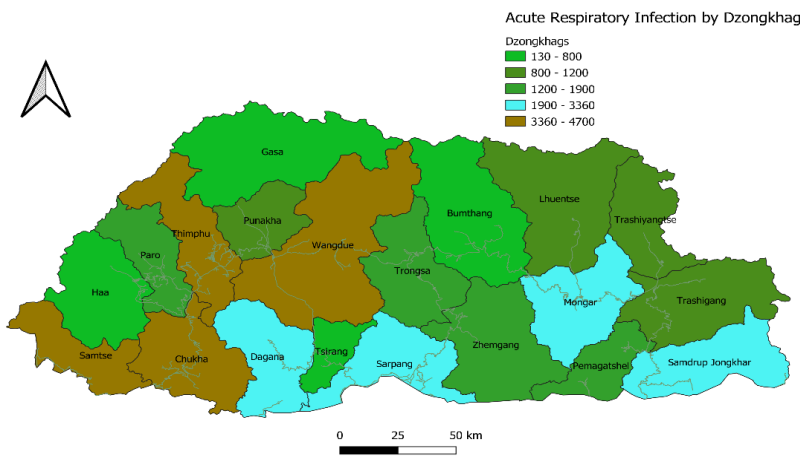
A total of 30881 cases of respiratory disease were reported, with 99.0% of those cases being ARI and the remaining cases being SARI. **Figure 2A** shows that the trend of ARI cases was inconsistent with the median of the previous three years in the same quarter. The younger age group was shown to be the most frequently affected by respiratory illnesses (**Figure 2B**). Chhukha, and Thimphu reported the more number of cases compared to the other dzongkhags (**Figure 2C**).



A: Cases by Epi-week



B: Incidence by age group

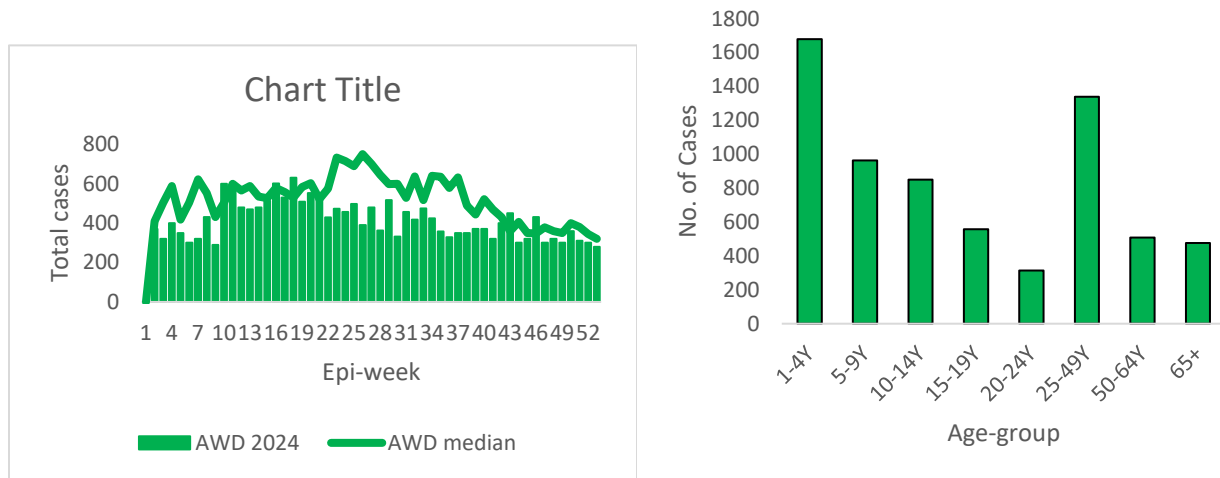


C: Respiratory illness cases by dzongkhag

**Figure 2:** Respiratory illness incidence by epidemiological weeks, age groups and place.

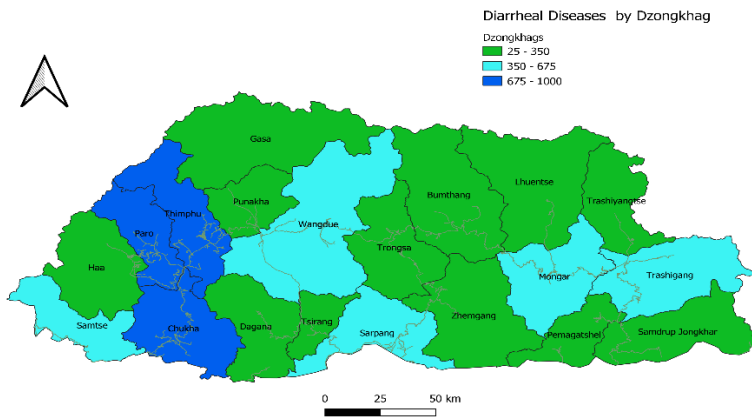
**1.3.2 Diarrheal syndrome: Acute Watery Diarrhea (AWD) and Acute Bloody Diarrhea (ABD)**

Of the total 5788 diarrheal cases reported, 92.0% were AWD and rest were ABD. Compared with the median for the last three years, the trend for AWD was found consistent (**Figure 3A**). As usual a high incidence of diarrheal diseases was observed in children <5 years (**Figure 3B**). By dzongkhag, Paro, Chhukha and Thimphu reported the more number of cases (**Figure 3C**).



A: Cases by Epi-week

B: Incidence by age group

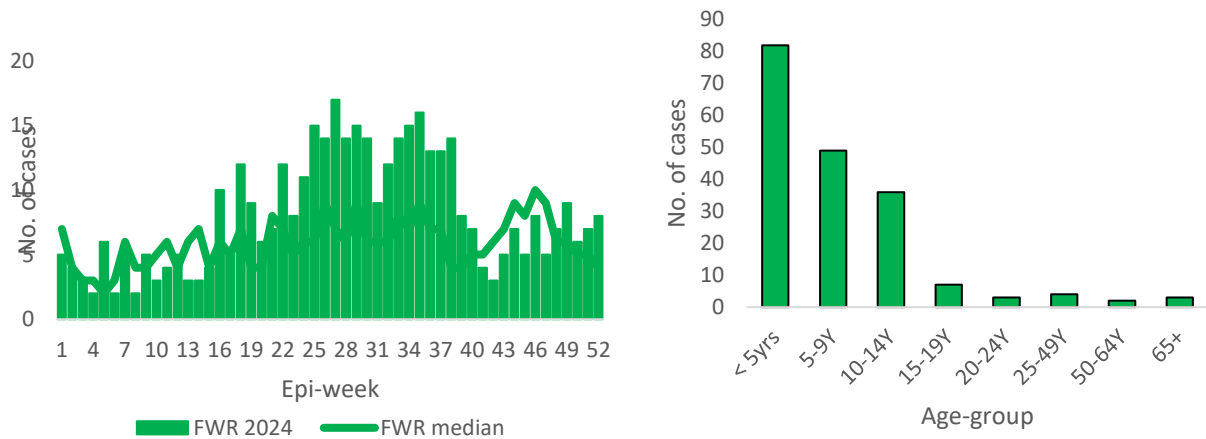


C: Diarrheal Cases by dzongkhag

**Figure 3:** Diarrheal disease incidence by epidemiological weeks, age groups and place.

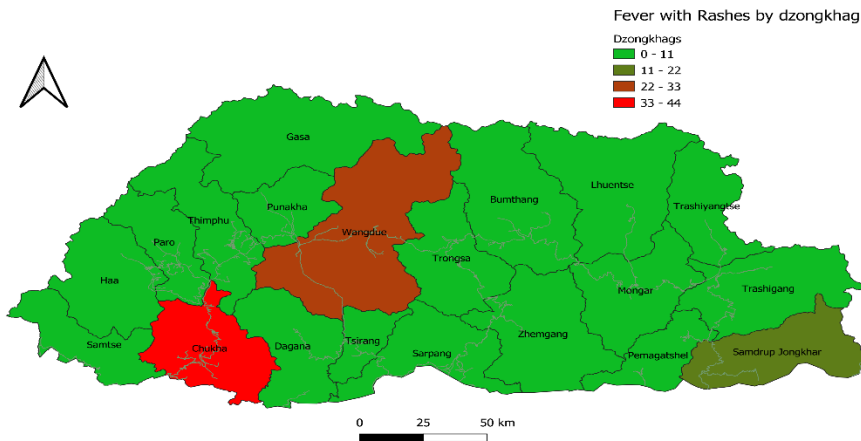
1.3.3 Fever with Rashes syndrome

A total of 112 cases of fever with rash (FWR) syndrome were reported in the quarter (Figure 4A). The trend was found higher compared to the median of last three years. A majority of FWR were reported in the younger age group < 14 years (Figure 4B). Chukha and Wangduephodrang dzongkhag reported the maximum number of the fever with rashes cases (Figure 4C).



A: Cases by Epi-week

B: Incidence by age group



C: Fever with rash cases by dzongkhag

Figure 4: Fever with rash incidence by epidemiological weeks, age groups and place



1.4 Immediately Notifiable Diseases/syndromes

A majority of the immediately notifiable diseases/syndromes reported were suspected measles/rubella cases. A total of 71 samples of suspected MR cases were tested, none tested positive for measles/rubella IgM. Second most common diseases reported was malaria, a total of 70 confirmed malaria cases were reported from Sarpang dzongkhag. Case-based investigation for each case was conducted by VDCP Gelephu. Two suspected pertussis, and two suspected bacterial meningitis were reported from JDWNRH.

1.5 Events

Of 11 diseases outbreaks reported, a majority were of Influenza-like illness mushroom poisoning, chickenpox (Figure 5). The events details are described below. Local Health Centers responded to all outbreaks based on RCDC recommendations.

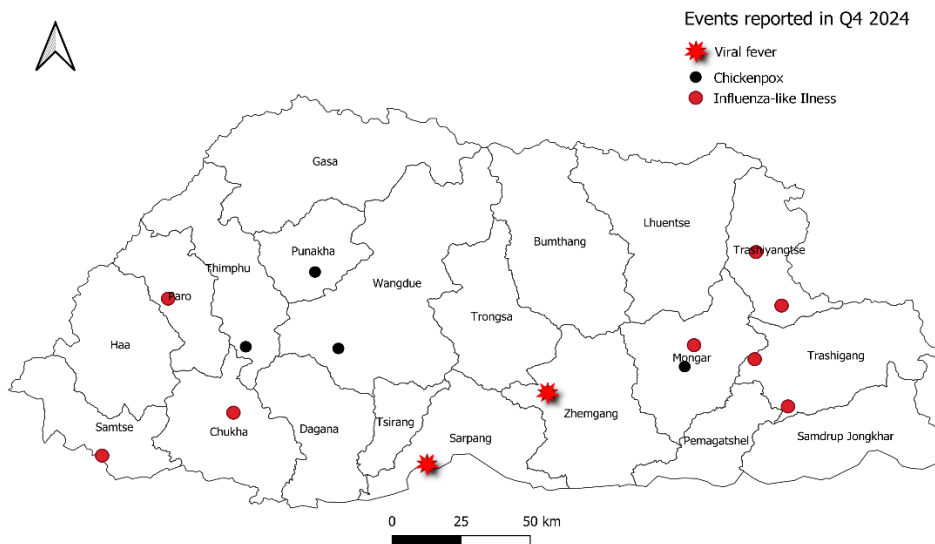


Figure 5: Diseases outbreak reported in 4<sup>th</sup> quarter, 2024

### 1.5.1 Influenza-like Illness:

Seven ILI events/outbreaks were recorded in the event-based monitoring NEWARS between Oct 1, 2024, and December 31, 2024. The cumulative number of cases affected was a total of 159 cases, with no ILI-related mortality. The National Influenza Center received a total of 35 samples for confirmation. The samples were tested and detected Influenza subtype A/H1pdm09 as well as a few with COVID-19.

A significant decrease in the number of ILI outbreak was observed, as compared to those reported in the previous quarter of 2024. Influenza like-illness is a seasonal illness and the district health authority in collaboration with district education authority should conduct awareness activities on the prevention of illness before influenza season in all schools and institutes. The concerned programme may create mass awareness on the prevention of /acute respiratory illness/influenza illness before the season through TV, radio, and social media platforms.

### 1.5.2 Chicken pox

A chicken pox outbreaks was reported from Mongar, Punakha and Wangduephodrang during the quarter. The cumulative number of students affected was 70 from affected sites. The samples could not be collected because of the lack of logistic and testing facilities. There was no any complication or mortality following the outbreaks.

### 1.5.3 Viral fever:

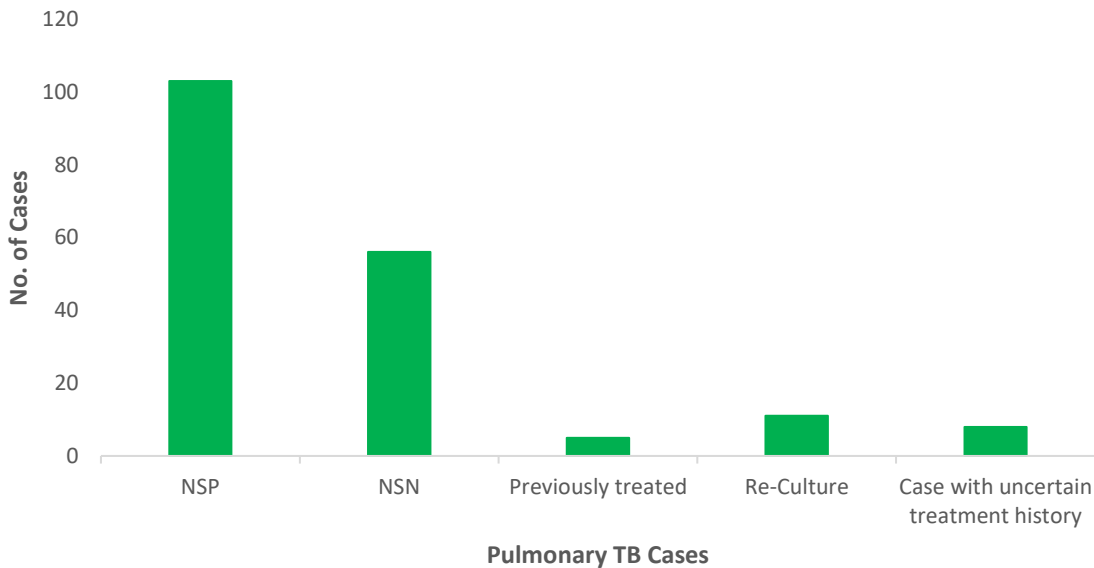
Two events of viral fever were reported on event-based surveillance, NEWARS. Altogether 86 persons were detected viral illness at Jigmeling Gelephu. The team from Sarpang Hospital investigated the cases. Clinical samples were tested for malaria, all tested negative. There was no any complication or mortality following the outbreaks.

**2. Laboratory Based Surveillance**

**2.1 Drug Resistant Surveillance for Tuberculosis**

A total of 378 suspected tuberculosis patient samples were received at the National Tuberculosis Reference Laboratory (NTRL) for culture and drug susceptibility testing for anti-tuberculosis drugs. Of those 183 (48.4%) were pulmonary tuberculosis (PTB) cases, 92 (24.4%) were culture follow-up samples from MDR-TB patients under treatment, 59 (15.6%) were pulmonary samples received for TB screening for VISA purposes and 44 (11.6%) were extra-pulmonary tuberculosis cases.

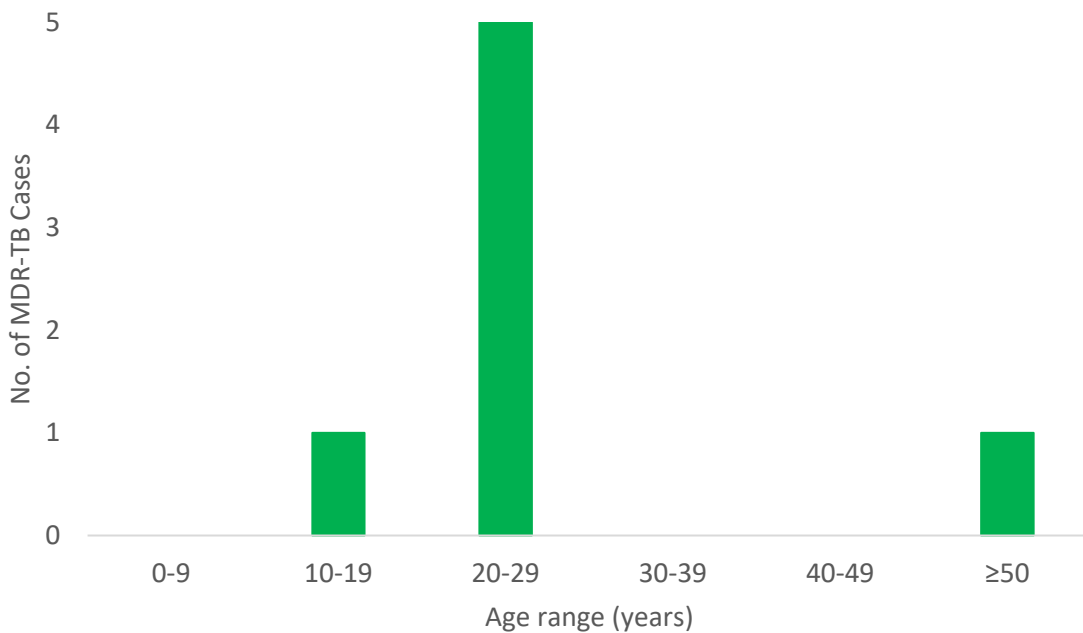
Among the PTB cases, new smear-negative (NSN) constituted 30.6% (n=56) of the cases, followed by 56.3% (n=103) of new smear-positive (NSP) cases, 4.3% (n=8) were cases with uncertain treatment history, 2.7% (n=5) with history of previous TB treatment and 6.0% (n=11) was received for re-culture (**Figure 1**).



**Figure 1:** Classification of Pulmonary TB samples

2.1.2 Drug Sensitivity Test

A total of 73 out of 378 (19.3%) patients had complete drug susceptibility testing (DST) reports using rapid molecular line probe assay. A total of seven multi-drug resistant tuberculosis (MDR-TB) cases were detected among patients with complete drug susceptibility reports. Among the MDR-TB cases, all seven were new cases. MDR-TB cases were highest in the age group of 20-29 years (**Figure 2**). Seven MDR-TB cases had 2<sup>nd</sup> line DST reports tested using rapid molecular line probe assay and all seven were sensitive to both Fluoroquinolones and aminoglycosides.

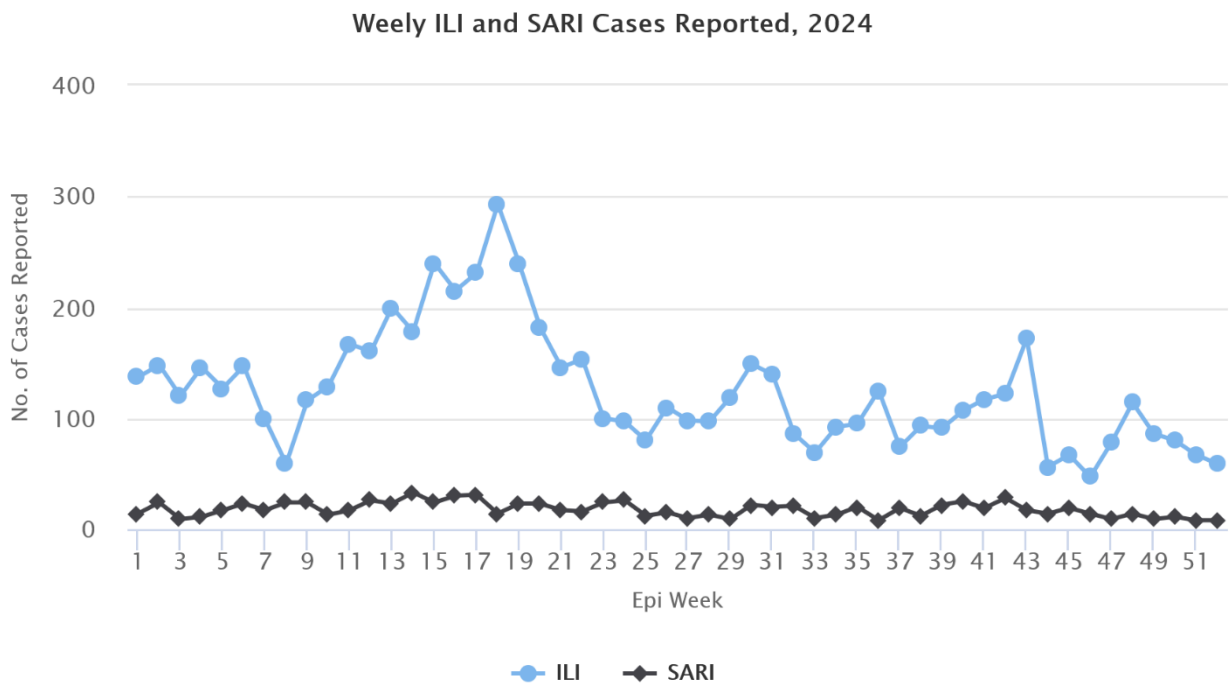


**Figure 2:** Distribution of MDR-TB cases by age group

2.2 COVID-19 Integrated Influenza Surveillance

2.2.1 Epidemiological Surveillance

The weekly influenza-like illness (ILI) and severe acute respiratory infection (SARI) aggregate cases are reported by seven ILI and eleven SARI sentinel hospitals respectively to the RCDC. A total of 1172 ILI cases and 195 SARI cases were reported in the fourth quarter from September to December 2024. The cases were reduced by 11.3% and 2.0% for ILI and SARI in the fourth quarter respectively (**Figure 1**). On average 90 ILI cases and 15 SARI cases were reported weekly in the fourth quarter.



**Figure 1:** Weekly ILI and SARI cases reported (Source: RCDC COVID-19 integrated flu surveillance system).

All the ILI and SARI sentinel hospitals have reported, however few departments have missed SARI reporting. Punakha (36) and Tsirang Hospitals (198) have reported more ILI cases;

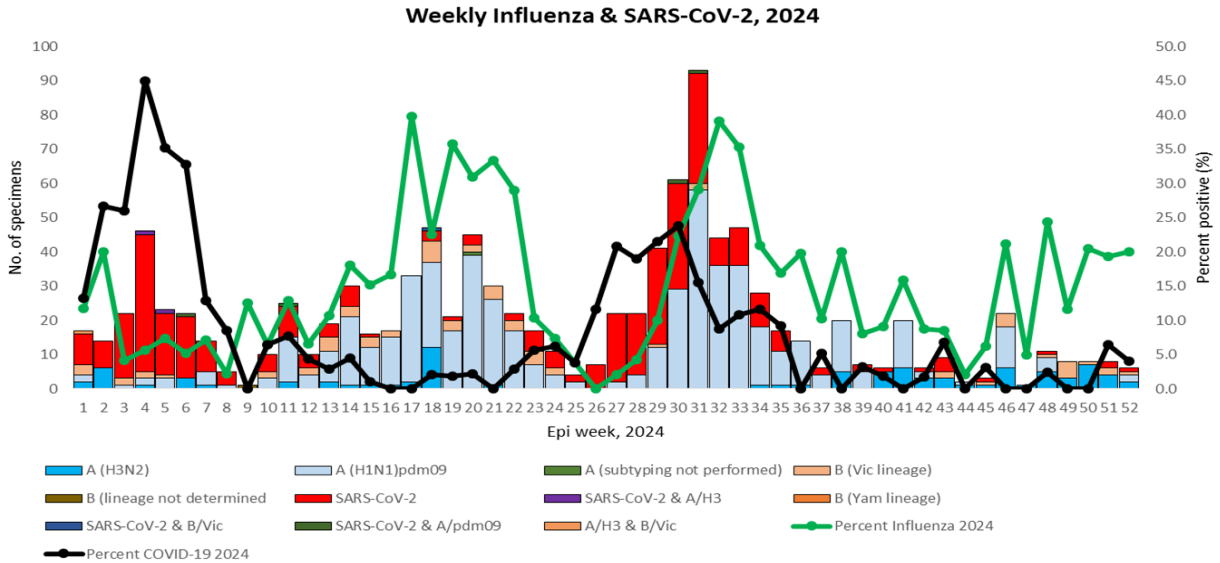
similarly, Phuentsholing (63) and Gelephu Hospitals (59) have reported more SARI cases compared to other sentinel hospitals during the quarter (**Table 1**).

**Table 1:** ILI and SARI cases reported by sentinel Hospitals in fourth quarter

Sentinel Hospitals	Sum of ILI	Sum of OPD	Sum of SARI	Sum of IPD
Gelephu CRRH	NA	NA	59	261
JDWNRH	NA	NA	13	975
Monggar ERRH	NA	NA	5	158
Phuentsholing Hospital	NA	NA	63	326
Paro Hospital	198	35195	11	463
Punakha Hospital	236	37877	2	217
Samdrup Jongkhar Hospital	113	9852	2	98
Samtse Hospital	131	22334	3	146
Trashigang Hospital	176	13814	0	475
Trongsa Hospital	120	5781	10	121
Tsirang Hospital	198	17030	27	145
<b>Grand Total</b>	<b>1172</b>	<b>141883</b>	<b>195</b>	<b>3385</b>

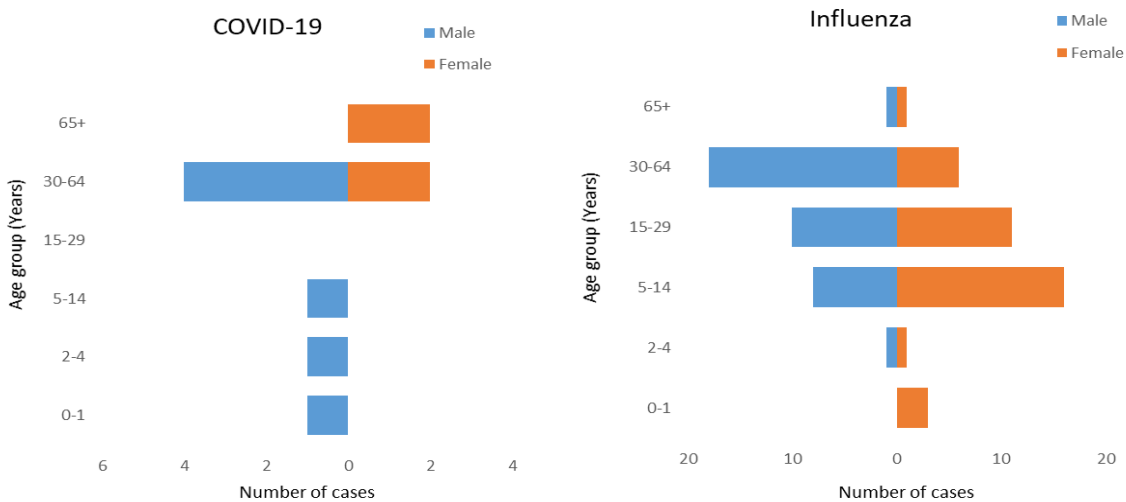
### 2.2.2 Laboratory Surveillance

Overall influenza positivity was 11.6% (76), and COVID-19 was 1.7% (11) in fourth quarter from October to December 2024. Flu positivity was reduced by 8.1% and COVID-19 by 11.4% compared to the previous third quarter. A total of 689 specimens (ILI- 539, SARI- 115, ARI outbreak- 35) were received and tested for Influenza and SARS-CoV-2 by multiplex RT-PCR (Flu SC2) assay. Influenza subtype A/H3 (52.9%) was the most predominant strain followed by Influenza B/Victoria (19.5%) and Influenza A/H1pdm09 (14.9%). SARS-CoV-2 was 12.6% among the positivity (**Figure 2**).



**Figure 2:** Weekly Influenza subtypes and SARS-CoV-2

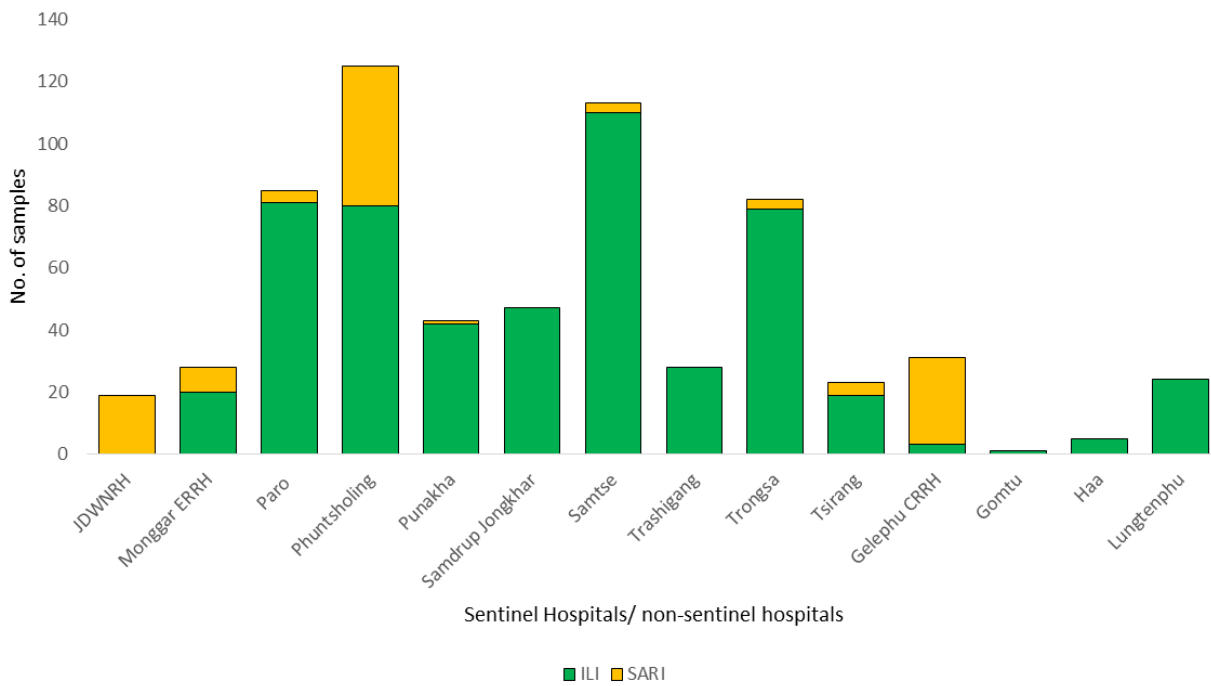
The median age for influenza was 20 years (IQR: 10 – 34 years), and the median age for COVID-19 was 47 years (IQR: 12 – 64 years). The most affected age group for Influenza was 5 – 14 years (31.6%) and 30 – 64 years (31.6%) followed by 15 – 29 years (27.6%), while the most affected age group for COVID-19 was 30 – 64 years (54.6%) followed by >65 years (18.2%). Males (50.0%) and females (50.0%) were equally affected by Influenza, while for COVID-19 males (63.6%) were more affected than females (36.4%) (**Figure 3**).



**Figure 3:** Influenza and SARS-CoV-2 by age group and sex

2.2.3 Epidemiology Surveillance

RCDC recommends 6 – 10 weekly ILI samples from each sentinel site, while all the SARI cases are recommended for sample collection. Samtse Hospital (110), Paro Hospital (81), and Phuntsholing Hospital (80) have collected more ILI samples compared to other sentinel hospitals. Likewise, Phuentsholing Hospital (45) and Gelephu Hospital (28) have collected more SARI samples than other sentinel hospitals (**Figure 4**).



**Figure 4:** Number of ILI and SARI specimens received in the fourth quarter of 2024



**2.3 Surveillance for Measles and rubella (MR) and Pertussis:**

Vaccine Preventable and Venereal Disease Laboratory (VPVDL) carries out nation-wide laboratory –based surveillance for some vaccine preventable diseases. In the third quarter of the year a total of 72 samples were received for testing of Measles and Rubella. All samples tested negative for IgM Measles and Rubella using IgM ELISA (**Table No 1**). Additionally 35 samples were subjected to RT-PCR for measles and rubella. All RT-PCR test for measles and rubella negative.

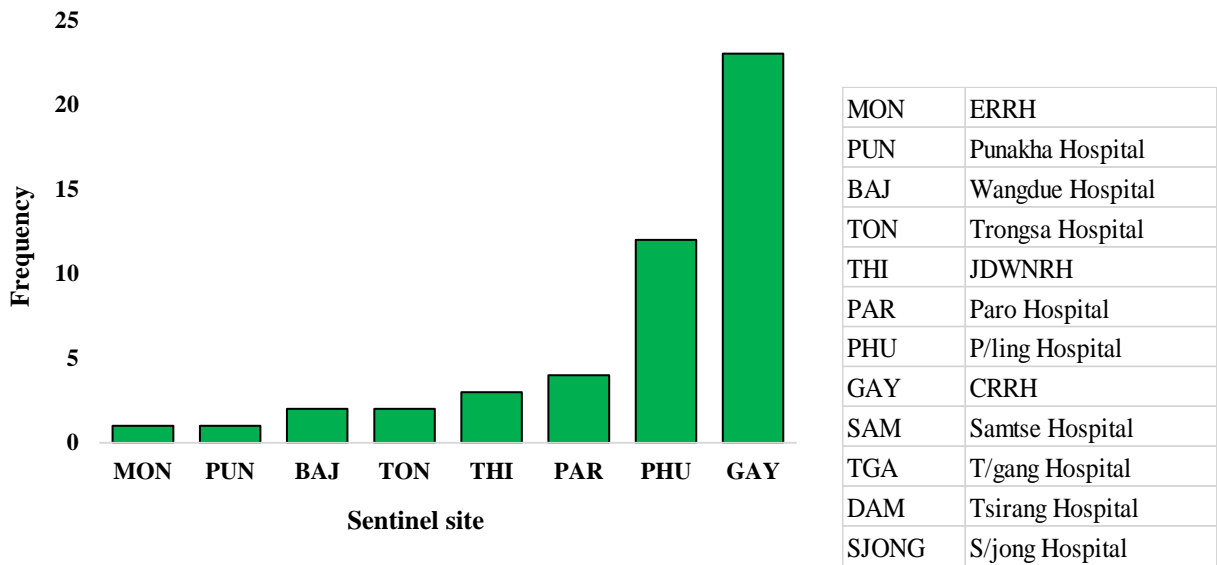
A total of 11 Pertussis samples (nine from JDWNRH and two from Phuntsholing Hospital) were received: all tested negative by IgM ELISA. Two stool samples suspected of Acute Flaccid Paralysis (AFP) were sent to the National Institute of Health (NIH) Thailand for confirmation and both were found to be negative.

**Table 1:** Total number of samples received from health center

SL.No	Reporting center	Samples
1	Dangdung Hospital	1
2	Gedu	2
3	CRRH	6
4	JDWNRH	24
5	ERRH	3
6	Paro	21
7	Pemagatshel	1
8	Pling	4
9	Punakha	1
10	Riserboo	1
11	Sarpang	1
12	Trashigang	2
13	Trongsa	4
14	Wangdicholing	1

**2.4. Sentinel Surveillance for Diarrheal Etiologic Agents**

During this quarter, a total of 48 samples were collected from ten sentinel sites, with the majority shipped from the Central Regional Referral Hospital (CRRH) in Gelephu and Phuntsholing Hospital. Of these, 27 (56.0%) were from males and 21 (44.0%) from females.

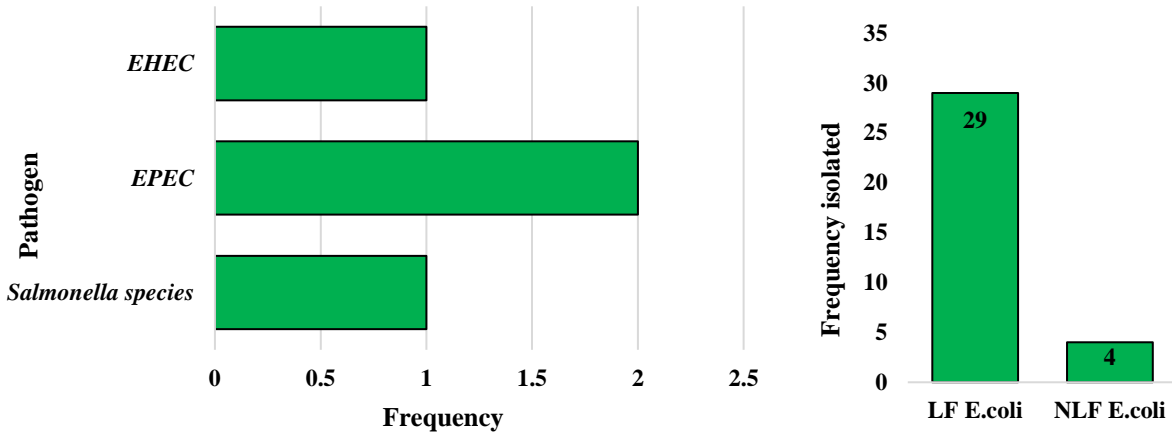


**Figure 1:** Number of specimens received/sites

In this sample, 30 (63.0%) individuals experienced loose stools, while 18 (37.0%) reported watery stools. The average age of participants was 39.5 years, with a mean duration of diarrhea lasting 42.8 hours. Notably, three (6.0%) of cases required hospitalization, while the rest were managed as outpatients. A single case of diarrhea was linked to consuming suspected foods such as ice cream with no history of recent travel taken.

In this study, the predominant enteropathogen identified was Diarrheagenic *E. coli*, accounting for three out of 33 *E. coli* isolates. *Salmonella* species were susceptible to all tested antibiotics (**Figure 2**). Both Enteropathogenic *E. coli* (EPEC) isolates exhibited resistance to ampicillin (AMP) and

cefazolin (CZO), with intermediate susceptibility to ciprofloxacin (CIP) and sulfamethoxazole-trimethoprim (SXT), and were susceptible to other antibiotics. The Enterohemorrhagic *E. coli* (EHEC) isolate was resistant to all tested antibiotics. Figure 3 provides a comprehensive overview of the antimicrobial resistance profiles of the bacterial pathogens.



**Figure 2:** Proportion of pathogens isolated

Enteric pathogen	Interpretation	Antibiotics									
		AMP	CZO	CRO	LEX	CHL	CIP	GEN	NAL	TCY	SXT
<i>Salmonella</i> species (n=1)	S	1		1			1			1	1
	I										
	R										
EPEC (n=2)	S	1		2		2		2	1	2	2
	I						2				
	R	1	2		2				1		
EHEC (n=1)	S					1		1		1	
	I										
	R	1	1	1	1		1		1		1

**Table 1:** Antibiotic susceptibility pattern for bacterial pathogens (n=4)

Note: AMP (Ampicillin), CZO (Cephazolin), CRO (Ceftriaxone), LEX (Cephalexin), CHL (Chloramphenicol), CIP (Ciprofloxacin), GEN (Gentamycin), NAL Nalidixic Acid, TCY (Tetracycline), SXT (Trimethoprim and sulfamethoxazole)

S – Susceptible, I – Intermediate, R – Resistant

Enterohemorrhagic *E. coli* (EHEC)

Enteropathogenic *E. coli* (EPEC)

### 2.5 Surveillance for Acute Undifferentiated Febrile Illness (AUI):

A total of 56 samples were received from the sentinel site for AUI testing. The AUI parameters include Dengue, Chikungunya, Scrub typhus, Japanese encephalitis, leptospirosis, and Brucellosis. All tests were conducted using the ELISA method. Out of the 56 samples, one samples tested positive for Dengue, three samples tested positive for Chikungunya, nine samples tested positive for scrub typhus, one samples tested positive for Japanese encephalins, 14 samples tested positive for leptospirosis and four sample tested positive for Brucellosis. These samples were obtained for the purpose of surveillance through independent testing. (Table 1)

Surveillance site	Total samples	DEN (-)	DEN (+)	CKG (-)	CKG (+)	ST (-)	ST (+)	JE (-)	JE (+)	LPS (-)	LPS (+)	BRU (-)	BRU (+)
<b>Phuntsholing Hospital</b>	19	18	1	17	2	18	1	19	0	18	1	17	2
<b>Samdrup Jongkhar Hospital</b>	9	9	0	9	0	8	1	9	0	5	4	8	1
<b>Tsirang Hospital</b>	7	7	0	7	0	5	2	7	0	3	4	7	0
<b>Samtse Hospital</b>	4	4	0	4	0	4	0	4	0	2	2	4	0
<b>Wangdue Hospital</b>	4	4	0	3	1	4	0	4	0	4	0	3	1
<b>Mongar ERRH</b>	13	13	0	13	0	8	5	12	1	10	3	13	0
<b>Total</b>	56	55	1	53	3	47	9	55	1	42	14	52	4

**Note:** **DEN:** Dengue, **CKG:** Chikungunya, **ST:** Scrub typhus, **JE:** Japanese encephalitis, **LPS:** Leptospirosis; **Br:** Brucellosis.

RCDC SURVEILLANCE BULLETIN

---

In addition, during the fourth quarter, 41 serum samples were received from district hospital confirmation. From the samples tested, three samples tested positive for Dengue, two samples tested positive for chikungunya. All the samples for leptospirosis were tested negative. **(Table 2)**

During the fourth quarter, four samples were received for AES testing. All the samples tested negative to Japanese encephalitis.

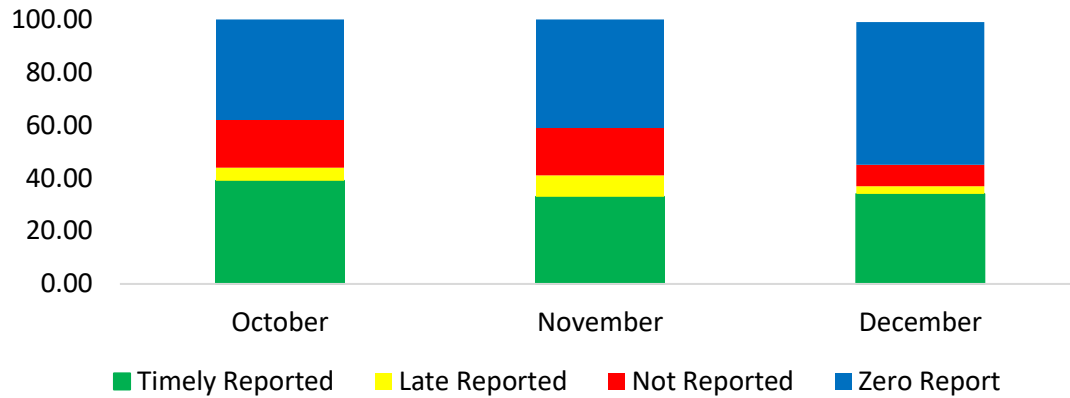
Test	Total samples	DE N (-)	DE N (+)	CK G (-)	CK G (+)	S T (-)	S T (+)	JE (-)	JE (+)	LP S (-)	LP S (+)	BR U (-)	BR U (+)
<b>Dengue</b>	33	30	3 NS 1										
<b>Scrub Typhus</b>	0												
<b>Leptospirosis</b>	3									3	0		
<b>Brucellosis</b>	0												
<b>Japanese encephalitis</b>	4							4	0				
<b>Chikungunya</b>	5			2	3								
<b>Total</b>	<b>45</b>	<b>30</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Note:** **DEN:** Dengue, **CKG:** Chikungunya, **ST:** Scrub typhus, **JE:** Japanese encephalitis, **LPS:** Leptospirosis; **Bru:** Brucellosis.

## 2.6 Blinded rechecking of malaria slides

### 2.6.1 Reporting status of health centers

A total of 163 health centers have participated in malaria blinded rechecking. The overall average reporting rate with 35.33% were reported on time, 44.33% were zero reported, 5.33% were reported late and the rest 14.67 were not reported (Figure 1)



**Figure 1:** Monthly reporting status for 4th quarter 2024

### 2.6.2 Blinded rechecking status.

A total of 837 malaria slides were received at the National Malaria Reference Laboratory for blinded rechecking. From the total slides examined, 89 malaria-positive slides are detected (10.63%)

All the slides received were evaluated on the following parameters and their performance score on sensitivity was 100.0%, specificity was 100.0%, malaria detection was 100.0%, species identification was 100.0%, stages identification was 77.64%, parasite density determination was 69.89%, quality of blood film was 92.23% and quality of stain was 68.48% (Table 1 and 2)

**Table 1:** Report on Malaria Blinded rechecking for 4th quarter 2024

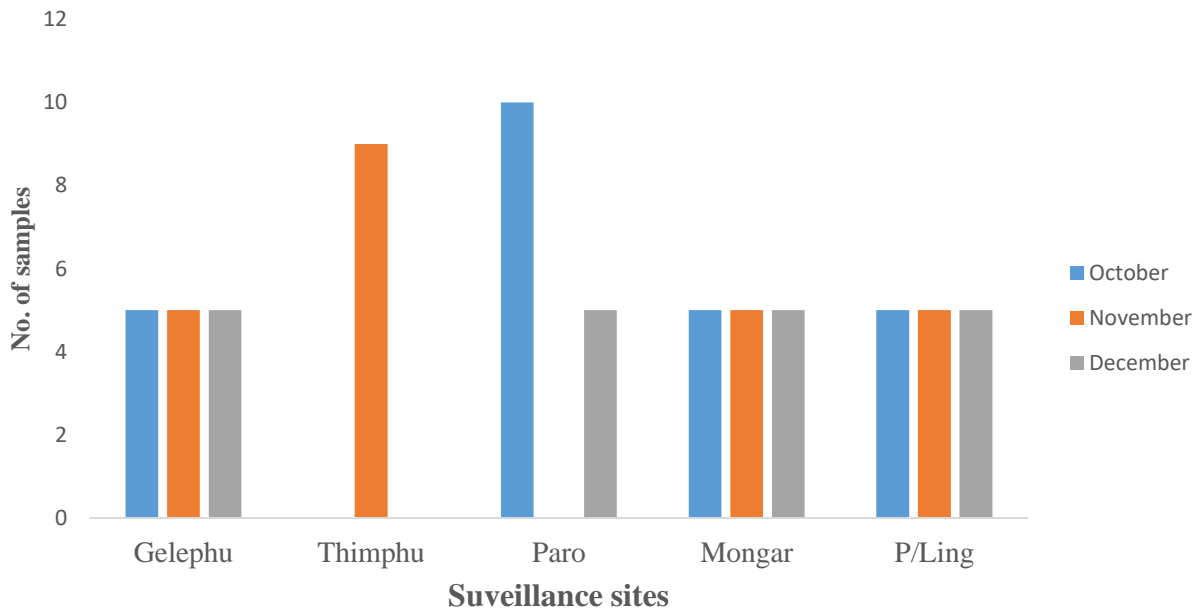
Quarterly report on Malaria Blinded Rechecking 2024				
Month	October	November	December	Total
Health center participated in blinded rechecking	52	53	58	163
Total slides received for blinded rechecking	300	267	270	837
Total positive detected	32	34	23	89
Total Nmpps detected	268	233	246	747
	<b>Total slide Examine</b>			1836

**Table 2:** Report on performance score for Blinded rechecking

Performance score on blinded rechecking				
Month	October	November	December	Quarterly Score
Sensitivity (True positive detection)	100	100	100	100
Specificity (True negative detection)	100	100	100	100
Malaria parasite detection	100	100	100	100
Mp Species Identification	100	100	100	100
Mp Stages Identification	79.64	78.68	74.59	77.64
Mp Parasite density	74.84	76.24	58	69.69
Stain Quality	63.17	69.05	73.23	68.48
Blood film Quality	92.54	89.57	94.58	92.23

**2.7 Food safety surveillance**

Total of 69 ready to eat food samples were received from October to December 2024 from five food safety surveillance sites (**Figure 1**).



**Figure 1.** Number of food safety surveillance samples received from surveillance sites (Q4 2024)

The food samples were tested for physical parameters, indicator organisms and pathogenic organisms. The total plate count and *E. coli* counts are the two commonly used as indicator test for the foods assessing food safety and surrogacy for hygiene practice. During the current period 4.3% (n=3) of food samples had been contaminated with pathogenic organisms and 13.0% (n=9) with indicator organisms. The common pathogen isolated is *Staphylococcus aureus* (4.3%) followed by *Bacillus cereus* (1.4%). There was no event of foodborne disease outbreak reported during the sampling period.

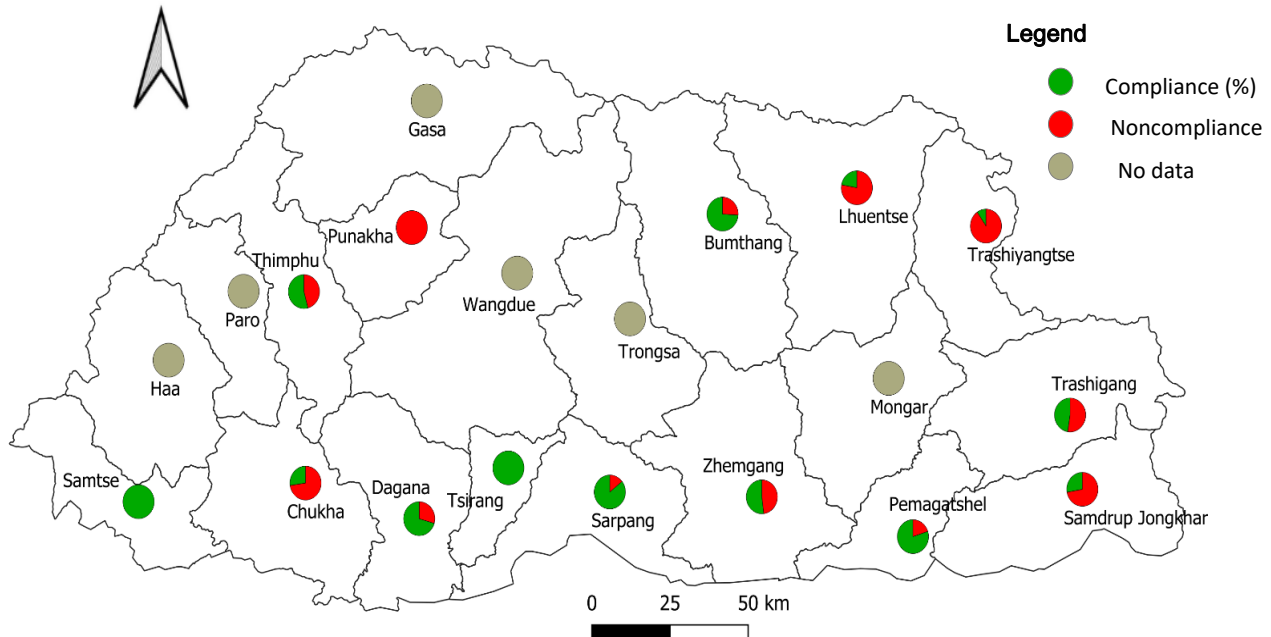


## 2.8 Urban Drinking Water Quality Monitoring (UDWQM)

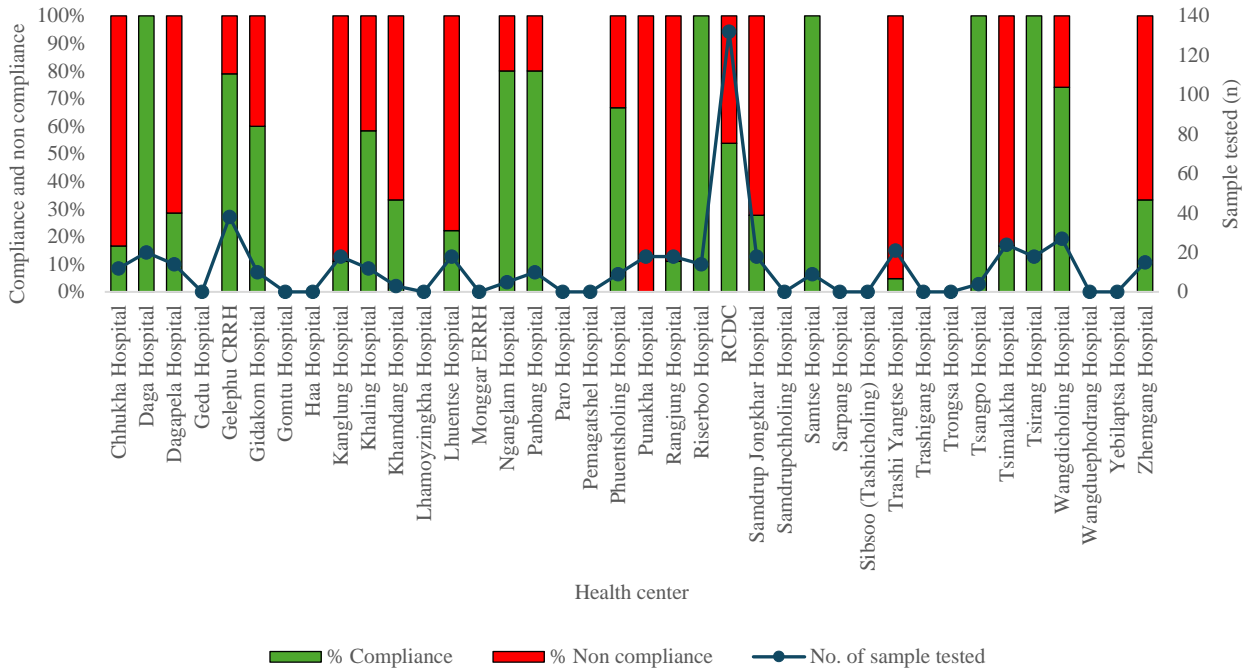
### 2.8.1 Bacteriology test (Thermotolerant coliform) Report:

A total of 475 samples were collected and tested for *E. coli* from urban health centers for the 4<sup>th</sup> quarter 2024. Samples with no *E. coli* contamination (0 CFU/100mL) are considered compliant with the standard. The result showed that the mean compliance rate across the health centers was 53.64% which is quite higher than previous quarter of 27.32% (quarter 3) and 43.68% (quarter 2). Figure 1 shows the *E. coli* compliance for 20 districts. Figure 2 shows compliance rate for various quarters over the past 10 quarters. Figure 3 presents a breakdown of compliance data from all the reporting centers.

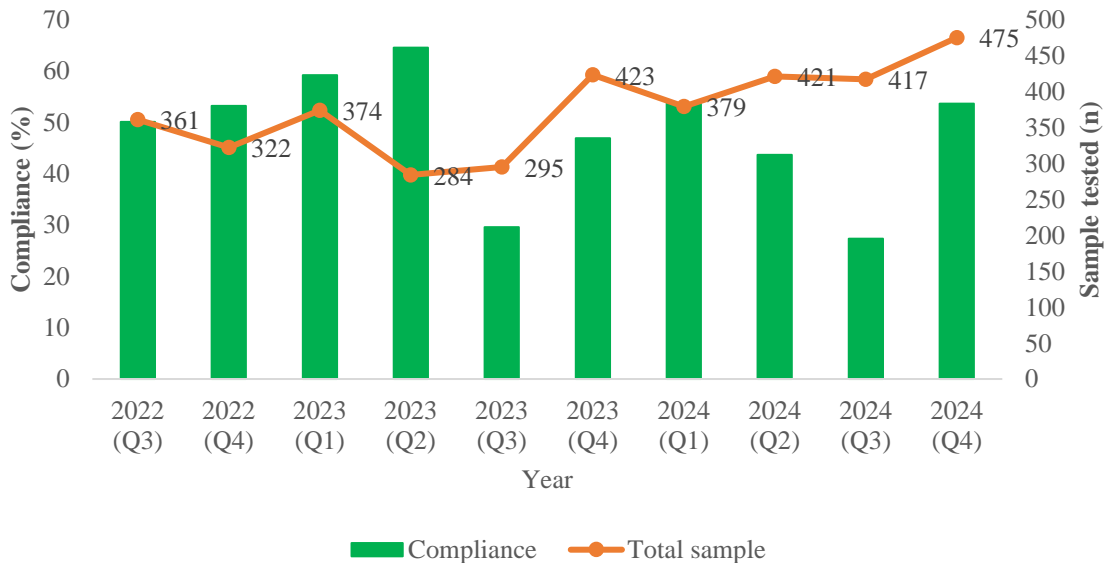
As shown in the figure, some urban water surveillance sites including Gomptu, Haa, Lhamoizingkha, Mongar, Paro, Pemagatshel, Samdrupchholing, Sarpang, Sibsoo, Trashigang, Trongsa, Wangdiphodrang and Yebilaptsa Hospital failed to report for this quarter.



**Figure 1.** *E. coli* compliance for 20 districts.



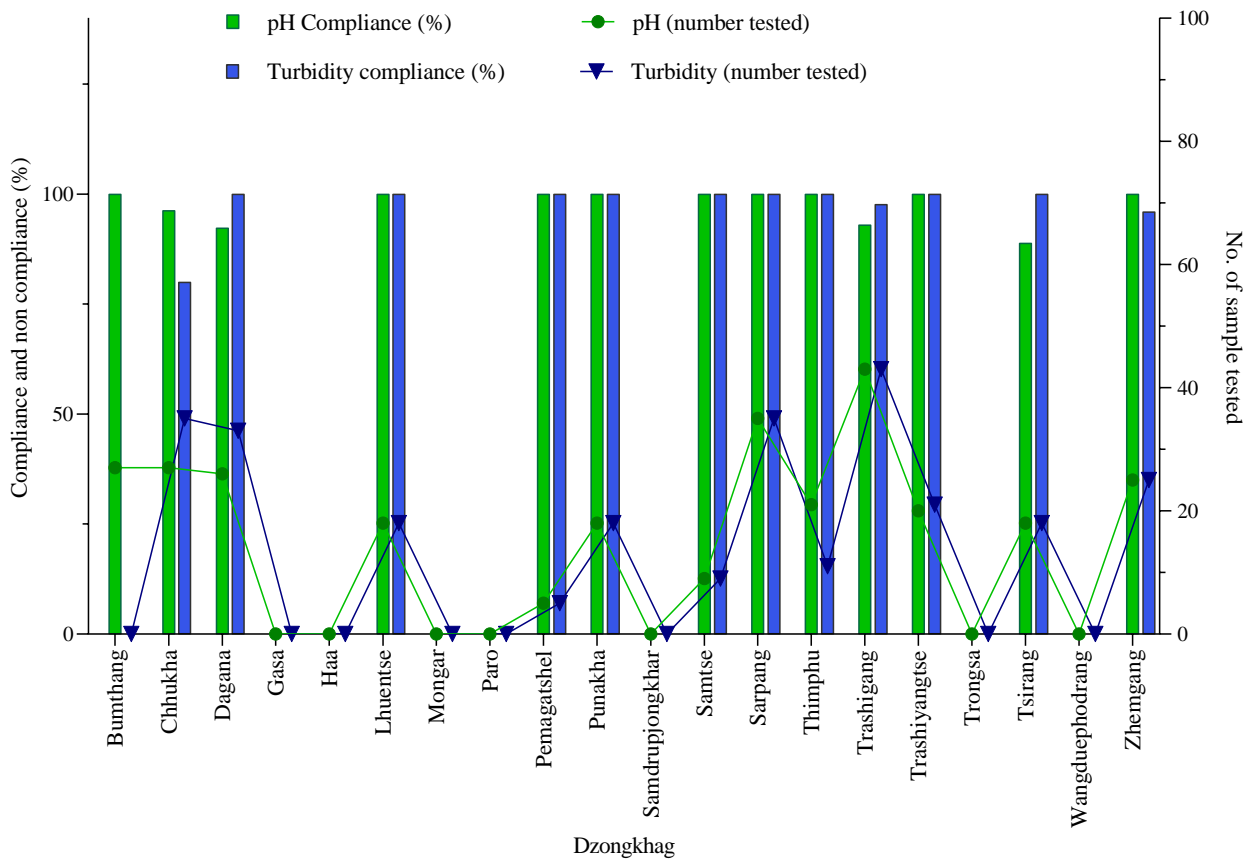
**Figure 2:** Microbial test result compliance for urban health centers



**Figure 3:** Microbial test result compliance of in urban area of 20 dzongkhags

**Physical test**

In regard to the physical test parameters, including pH and turbidity, data was received and analyzed from 13 dzongkhags (Figure 4). The compliance rate for physical parameter shows a comparatively better when compared with the microbial parameters, with the mean compliance rate of 97.73% and 97.81% for pH (recommended value; 6.5-8.5) and turbidity (recommended value; <5NTU), respectively.



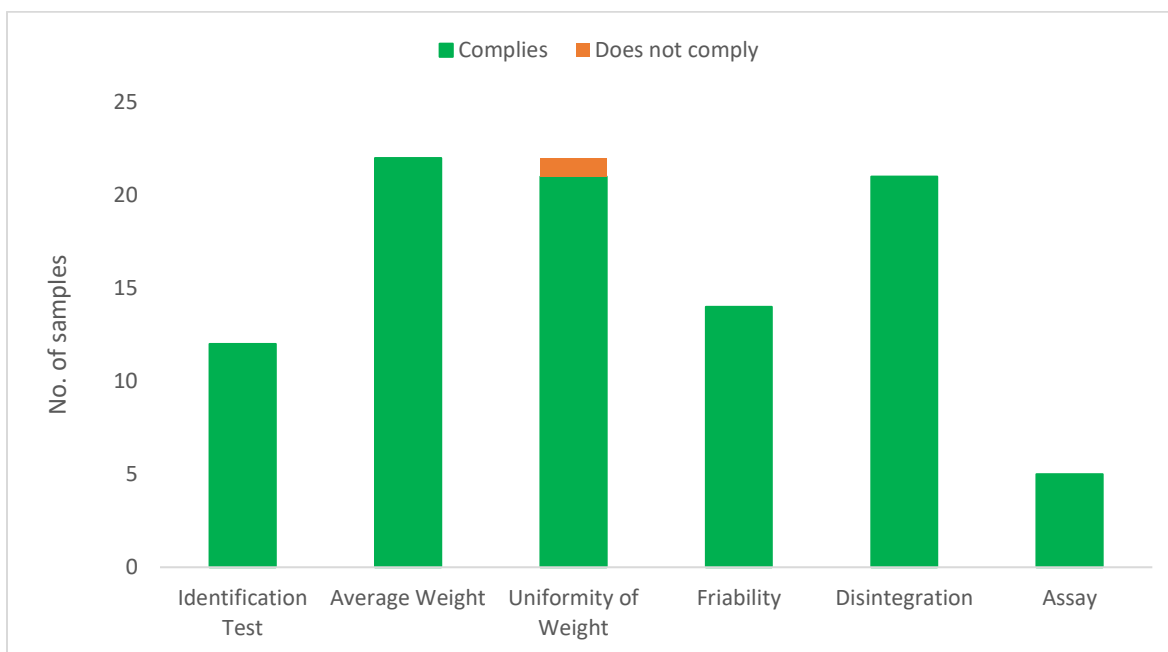
**Figure 4:** Physical test compliance rate from 20 dzongkhags

**2.9. Drug Quality Monitoring:**

A total of 24 samples were tested at the National Medical Product Testing Laboratory in the 4<sup>th</sup> quarter of 2024. The samples were tested as per their pharmacopeial claim. From the 24 tested, one sample failed the test (**Table 1 and Figure 1**).

**Table 1:** Types of sample tested

Category of sample	Complies	Does not comply	Total
Complain	1	0	1
Surveillance	22	1	23
<b>Total</b>	<b>24</b>	<b>1</b>	<b>24</b>



**Figure 1:** List of test parameters analyzed

## 2.10 National Toxic Exposure Surveillance Report

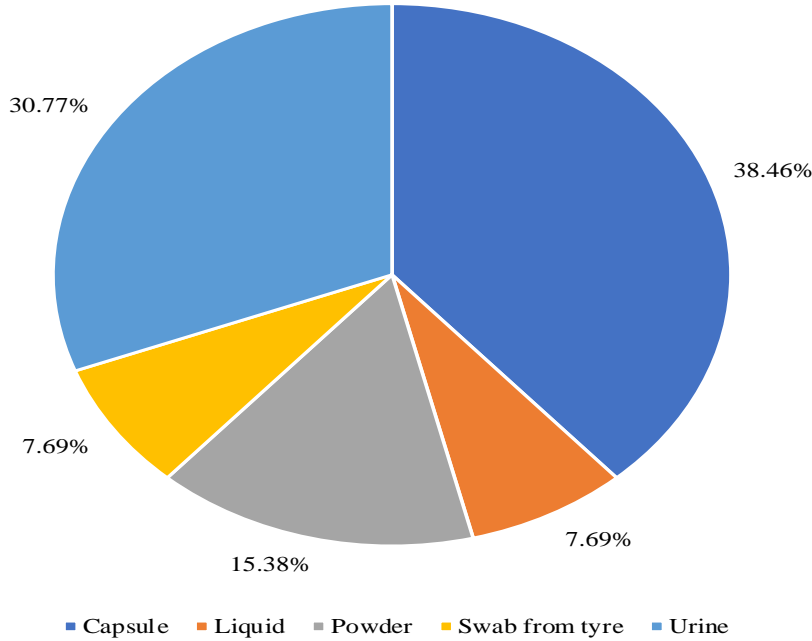
The Poison Information Toxicology Laboratory (PITL) operates a real-time online web-based poisoning surveillance information system called the National Toxic Exposure Surveillance Information System (NTESIS). It collects toxic exposure cases from all the health centers across Bhutan with the help of focal health professionals appointed in each health center. The report provided here outlines the types of toxic exposures reported from the health centers during the months of October till December, 2024. A total of four poisoning cases were reported in the NTESIS/NEWARS from four health centers (**Table 1**). The agents of exposure included paraquet, snake bites, food and wild plants.

**Table 1:** Types of toxic exposure cases from October to December 2024.

Sl. no.	Case Date	Health Facility	Agent	Dzongkhag
1	17/10/2024	Samtse hospital	Paraquet	Samtse
2	02/11/2024	Chhukha hospital	Snake bite	Chhukha
3	17/12/2024	Zhemgang hospital	Food	Zhemgang
4	25/12/2024	Bitekha PHC	Wild plants	Paro

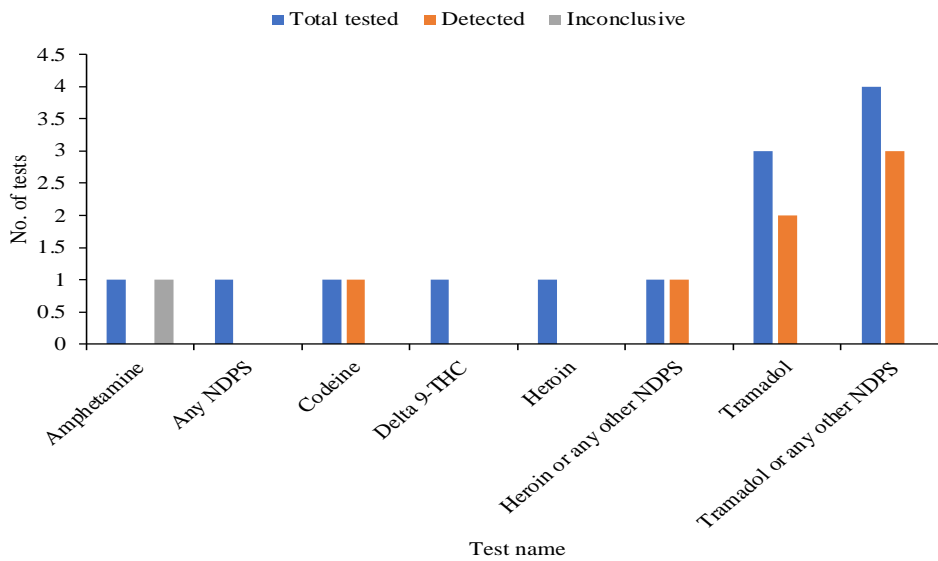
### Confirmation tests for drugs of abuse from October till December 2024

The PITL also provide the service as a National Reference Laboratory for the confirmation of drugs of abuse. From October till December, 2024, a total of 13 samples (consisting of 18 tests) were received in this quarter for confirmation of Amphetamine, Benzodiazepines, Codeine, Delta-9-THC, Heroin, Opioids, Tramadol and other narcotics, in both biological and non-biological samples namely capsules, liquids, powders, swabs and urine (**Figure 1**). The main methods used for testing were Gas Chromatography coupled with Mass Spectrometry (GC-MS) and Fourier Transform Infrared Spectroscopy (FTIR).



**Figure 1:** Different types of samples.

The positive detection rate of the samples tested was 53.85%, n=7. The top two agents with the highest frequency of testing were Tramadol or any other NDPS (30.77%, n=4), followed by Tramadol alone (23.08%, n=3). One test (Amphetamine) could not be confirmed as either positive or negative (**Figure 2**).



**Figure 2.** Types of tests and results