EARLY WARNING AND REPORTING SYSTEM (EWARS) ANNUAL REPORT 2022 & 2023

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Ministry of Health and Population
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Preface

It is my great pleasure to present the "Annual Report of the Early Warning and Reporting System (EWARS) for the years 2022 and 2023," prepared by the Epidemiology and Disease Control Division, Department of Health Services. Since its inception in 1997, EWARS has served as a cornerstone of our public health surveillance framework, playing a crucial role in outbreak detection, response, and monitoring across the country. Currently, this vital system operates through 118 strategically located hospitals nationwide, which act as sentinel sites, reporting cases immediately during outbreaks and/or every week.

Over the years, EWARS has expanded its surveillance to cover approximately 26 disease entities and is planning further expansion to include more diseases with outbreak potential, as identified in the recent list of 52 diseases of public health importance. To enhance the sensitivity of the system, we are also planning to ensure timely alerts and efficient information flow, enabling rapid outbreak responses through the Rapid Response Team (RRT) at the central, provincial (including districts), and local levels.

This report provides a comprehensive overview of the diseases and syndromes reported through the EWARS network at the national and provincial levels during 2022 and 2023. It also highlights the issues that need to be addressed to improve the system further. I believe this report will be instrumental in identifying areas for enhancement.

I extend my sincere appreciation to the staff of the Epidemiology and Disease Control Division for their dedicated efforts in producing this report.

Dr. Sangeeta Kaushal Mishra
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Foreword

The Early Warning and Reporting System (EWARS) is foundational and crucial for the effective functioning of our surveillance system. It is an essential component of our public health infrastructure, enabling early detection and rapid response to infectious disease outbreaks. EWARS plays a crucial role in supporting public health planning and response by continuously monitoring disease trends and patterns.

Established in 1997 in Nepal, EWARS initially operated with selected sentinel sites to improve information flow on outbreak-prone infectious diseases. As a hospital-based sentinel surveillance system, it is designed to do the surveillance of six priority diseases with outbreak potential: acute gastroenteritis (AGE), cholera, severe acute respiratory illness (SARI), dengue, kala-azar, and malaria. This indicator-based surveillance system operates through 118 strategically located hospitals nationwide, which serve as sentinel sites reporting cases immediately in the event of outbreaks or weekly during non-outbreak periods.

In addition to these six priority diseases, EWARS also monitors other communicable diseases prone to outbreaks, such as influenza-like illness (ILI), scrub typhus, and enteric fever. The system has expanded its surveillance capabilities with additional sentinel sites and now covers approximately 26 disease entities, including emerging infectious diseases and other health threats, ensuring a comprehensive approach to disease detection and monitoring across the country.

This Annual Report offers a detailed overview of the diseases and syndromes reported through the EWARS network during these two years (2022 and 2023). I extend my heartfelt appreciation to the entire team of the Disease Surveillance Research Section for their unwavering efforts in preparing this report

Director

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Acknowledgement

It is our great pleasure to present the "Annual Report of the Early Warning and Reporting System (EWARS) for 2022 and 2023." This report offers an in-depth analysis of the disease surveillance data collected through EWARS, providing a detailed examination of disease epidemiology and the system's performance over the past two years.

EWARS has been envisioned as an outbreak intelligence system with a scope that extends beyond the six priority diseases and has expanded its surveillance to encompass around 26 disease entities, including emerging infectious diseases and other health threats, ensuring a comprehensive approach to disease detection and monitoring across the country. For this report, nine specific infectious diseases/syndromes have been highlighted: dengue, acute gastroenteritis (AGE), severe acute respiratory illness (SARI), scrub typhus, enteric fever, influenza-like illness (ILI), kala-azar, malaria, and cholera. These were selected for detailed presentation based on their impact and significance in the context of outbreak monitoring and response.

The findings presented in this report underscore the critical role of EWARS in the early detection and management of disease outbreaks. The contributions from sentinel sites across the country have been invaluable, providing essential data that supports timely and effective public health interventions.

We acknowledge the vital support of our partners, including WHO Nepal and GIZ, whose collaboration has significantly enriched us in efficient operations of EWARS. The dedication and expertise of the Disease Surveillance and Research Section team are also recognized for their pivotal role in preparing this report and advancing our disease monitoring efforts. We further extend our gratitude to everyone who contributed to the preparation of this report.

As we reflect on the achievements of EWARS in 2022 and 2023, this report not only reviews past performance but also lays the groundwork for future enhancements in our disease surveillance and response strategies, aiming to ensure a healthier future for all.

Sagar Dahal
Chief
Disease Surveillance & Research Section, EDCD

Executive Summary

The Early Warning and Reporting System (EWARS) in Nepal is a crucial tool for monitoring and responding to communicable diseases, supporting early detection and timely response to potential outbreaks. Established in 1997, EWARS was designed as a hospital-based sentinel surveillance system to monitor six priority diseases with outbreak potential, including Acute Gastroenteritis (AGE), cholera, Severe Acute Respiratory Infection (SARI), dengue, kala-azar, and malaria. In addition to the primary six diseases, EWARS also includes reporting on other communicable diseases prone to outbreaks, such as influenza-like illness (ILI), scrub typhus, and enteric fever, with 118 strategically located sentinel hospitals across the country reporting cases weekly or immediately in the event of an outbreak.

This report analyzes EWARS data from 2022 and 2023, highlighting key trends, seasonal disease patterns, and the performance of the reporting system. In 2022, dengue was the most frequently reported disease nationwide, followed by AGE and SARI. However, provincial variations were observed: SARI was most reported in Koshi, AGE in Madhesh and Lumbini, ILI in Karnali, and scrub typhus in Sudurpaschim. In 2023, dengue remained the most reported disease, with AGE leading in Madhesh, Lumbini, and Karnali, while SARI was the most reported in Sudurpaschim. A comparison of data from both years shows a notable increase in reported cases overall, with significant rises in AGE and SARI, although the proportion of dengue cases slightly decreased.

Seasonal trends reveal that AGE and SARI peaked in the first half of both 2022 and 2023, while dengue, enteric fever, and scrub typhus reached their highest levels in the latter half of the year. Provinces such as Madhesh and Karnali showed patterns that diverged from national trends, with SARI cases in Madhesh peaking in the second half of 2022 and ILI cases in Karnali peaking earlier in 2023.

Reporting performance improved markedly in 2022 and 2023. The national reporting rate increased from 52.9% in 2021 to 72.2% in 2022, and further to 81.7% in 2023. In 2022, Sudurpaschim Province had the highest reporting rate at 85.8%, while Karnali Province had the lowest at 53.1%. By 2023, Lumbini Province achieved the highest reporting rate at 92.0%, with Karnali Province once again having the lowest, though improved, reporting rate at 60.8%. This indicates a significant enhancement in surveillance and reporting capabilities throughout

2023. The report acknowledges sentinel sites with complete reporting and identifies sites that need further improvements.

This report's analysis of disease trends, seasonal patterns, and reporting completeness provides critical insights for enhancing Nepal's surveillance capacity. It underscores the need for continued efforts to strengthen EWARS, improve data validation, and ensure robust disease reporting systems across all provinces. These efforts will be essential in safeguarding public health through timely detection and response to outbreaks.

Contents

Abbreviations

AGE: Acute Gastro Enteritis

EDCD: Epidemiology and Disease Control Division

EWARS: Early Warning and Reporting System

HMIS: Health Management Information System

ILI: Influenza like Illness

RRT: Rapid Response Team

SARI: Severe Acute Respiratory Infection

SOP: Standard Operating Procedure

WHO: World Health Organization

GIZ: Gesellschaft für Internationale Zusammenarbeit

Chapter 1. Introduction

Early Warning and Reporting System (EWARS) is a hospital-based sentinel surveillance system established in 1997. Its primary objective is to enhance the flow of information for the early detection of outbreak signals related to six priority vector-borne, waterborne, and foodborne diseases or syndromes with outbreak potential. Since its inception, EWARS has evolved and expanded from 8 to 118 sentinel sites across all provinces and districts of Nepal with highest concentration of EWARS sites (19%) located in the Kathmandu Valley. Both the public and private sectors are represented in the EWARS network. Additionally, there are 28 reporting sites apart from the sentinel sites reporting in the EWARS system, and there are plans to further expand to include them as sentinel sites. (Annex 1)

EWARS is designed as an outbreak intelligence system, focused on capturing signals of disease outbreaks through immediate and weekly reporting of cases and deaths. The system monitors six priority disease entities, (1) **three vector-borne diseases**: Malaria, Kala-azar, and Dengue (2) **three epidemic-prone diseases/syndrome**: Acute Gastroenteritis (AGE), Cholera and Severe Acute Respiratory Infection (SARI). In addition to the primary six diseases, EWARS also includes reporting on other communicable diseases prone to outbreaks, such as Influenza-like Illness (ILI), Scrub Typhus, and Enteric fever. The system also practices zero reporting to document instances when no cases are reported.

EWARS Guideline facilitates immediate reporting (within 24 hours of diagnosis) in case of one confirmed case of cholera, one case of severe and complicated malaria, one confirmed case of Kala-azar and five or more confirmed dengue cases reported from a localized cluster/ area under the sentinel site within 24 hours [1] as well as five or more cases of AGE and SARI from the same geographical locality in one week[2]. Data collected in EWARS are compiled as a line list with 33 pre-identified variables. While the system primarily focuses to report on the enlisted set of diseases, many reporting sites also register other communicable diseases. EWARS has thus expanded its surveillance to encompass around 26 disease entities, including emerging infectious diseases and other health threats, ensuring a comprehensive approach to disease detection and monitoring across the country.

This report presents a comprehensive analysis of the data reported to EWARS for the years 2022 and 2023. The last report was published in 2021, and since then, no further reports have

been issued. As the analysis of the 2022 data was underway, the timeline extended to include data for 2023. Consequently, a decision was made to combine the data for both years into a single report. This combined report aims to provide a thorough review of the disease trends and EWARS system performance over the two-year period, acknowledging that the data reported is not validated, which may limit the analysis and interpretation of the findings.

Chapter 2. Methodology

The data set reported through the Early Warning and Reporting System (EWARS) in 2022 and 2023 was analyzed to examine and assess the disease epidemiology and EWARS system performance. This analysis encompassed the examination of weekly trends, geographical distribution at the national and provincial levels, and demographic characteristics such as age and gender. Out of all, nine infectious diseases or syndromes -Dengue, Acute Gastroenteritis (AGE), Severe Acute Respiratory Illness (SARI), Scrub Typhus, Enteric Fever, Influenza-Like Illness (ILI), Kala-azar, Malaria and Cholera were taken into consideration for further presentation in the result section of this report based on public health significance at the national and international level, and also considering epidemiological importance under International Health Regulation (IHR) 2005[3].

In Nepal's context, an **epidemiological week** is defined in EWARS guidelines as a week starting on Sunday and ending on Saturday[2]. It's important to note that COVID-19 was excluded from this analysis to focus on non-COVID-19 diseases and syndromes.

The reporting status of the sentinel sites was assessed at institutional, provincial and national level using two indicators: (1) average number of weeks reported and (2) the percentage of reporting out of total number of weeks (52 weeks) to be reported.

Chapter 3. EWARS report 2022

A total of 68,329 cases belonging to more than twenty diseases/syndromes were reported in EWARS during 2022, of which nine diseases/syndromes were included in this analysis.

National overview

Among all disease entities reported, the highest number of cases was reported for dengue (n=25,424; 37.2%), followed by Acute Gastroenteritis (AGE) (n=14,033; 20.0%), Severe Acute Respiratory Infection (SARI) (n=11,951; 17.5%), COVID-19 (n=11,951; 8.4%), scrub typhus (n=3,391; 5.0%), enteric fever (n=3,389; 5.0%), and Influenza-Like Illness (ILI) (n=2207; 3.2%). It is important to note that the system was also used to report non-infectious events such as snake bites and other animal bites, which hold significant public health importance (Table 1.1).

Table 1.1: Frequency of reported diseases, syndromes and events at the national level in EWARS, 2022

Disease/Syndrome/Event	Number	Percentage
Dengue	25,424	37.2%
Acute Gastroenteritis (AGE)	14,033	20.5%
Severe Acute Respiratory Infection (SARI)	11,951	17.5%
COVID-19	5,738	8.4%
Scrub Typhus	3,391	5.0%
Enteric Fever	3,389	5.0%
Influenza-Like Illness (ILI)	2,207	3.2%
Snake Bite	773	1.1%
Other*	327	0.6%
Kala azar	308	0.5%
Hepatitis-Acute Jaundice	165	0.2%
Animal Bite	165	0.2%
Encephalitis	139	0.2%
Meningococcal Meningitis	115	0.2%
Malaria	84	0.1%
Cholera	44	0.1%
Leptospirosis	34	<0.1%
Viral Hemorrhagic Fever	18	<0.1%
Whooping Cough	11	<0.1%
Suspected measles like illness	9	<0.1%
Diphtheria	4	<0.1%
Grand Total	**68,329**	**100.0%**
***Other consists of fever under evaluation, poisoning, and others**		

Most of the cases in EWARS were reported from Bagmati province (39%), followed by *Lumbini* (15%) and *Koshi* (15%) (Table 1.2).

Table 1.2: Distribution of disease entities reported in EWARS by province, 2022

Province	All disease entities		Selected 9 diseases/syndromes	
	Number	Percentage	Number	Percentage
Koshi	10,067	14.7%	9,151	15.0%
Madhesh	6,461	9.5%	6,203	10.2%
Bagmati	26,764	39.2%	22,093	36.3%
Gandaki	4,347	6.4%	3,909	6.4%
Lumbini	10,160	14.9%	9,620	15.8%
Karnali	4,657	6.8%	4,595	7.6%
Sudurpaschim	5,873	8.6%	5,253	8.6%
Nepal	**68,329**	**100.0%**	**60,824**	**100.0%**

The analysis of weekly burden of selected nine diseases/syndromes at national level revealed that AGE cases reached their highest proportion during weeks 19 and 20 but decreased significantly by week 39. SARI cases had the highest proportion up until week 7, followed by a decrease, reaching a minimum around week 38. In contrast, dengue cases had their maximum proportion during week 37 to 41. Other diseases/syndromes consistently maintained a relatively minimum proportion throughout all the weeks (Figure 1.1) in 2022.

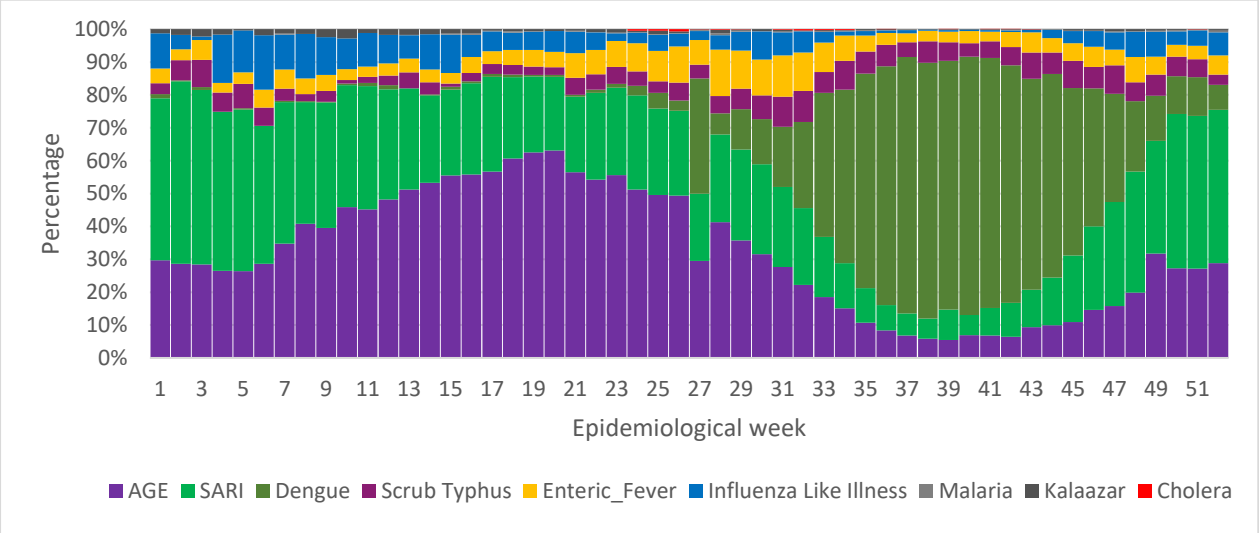


Figure 1.1: Weekly burden of nine selected diseases/syndromes reported at the national level, 2022

The weekly analysis on burden of nine selected diseases/syndromes at national level showed a seasonal variation mainly in acute gastroenteritis (AGE), dengue, enteric fever, and scrub typhus (Figure 1.2). AGE and Severe Acute Respiratory Infection (SARI) cases were reported more in the first half of the year, while dengue, enteric fever, and scrub typhus were reported

more in the latter half of the year, peaking in during weeks 27-41. The peak of SARI was observed in winter (week 51–52), while the peak of AGE was observed in weeks 18-21.

Kala-azar cases peaked in week 10 with a total of 13 cases, while AGE cases peaked in week 20 with a total of 521 cases. Similarly, cholera registered its highest count in weeks 26 and 32 with 6 cases each, while malaria case reporting peaked in week 28 with a total of 6 cases. Influenza-Like Illness (ILI) reached its maximum case count in week 30 with 97 cases, enteric fever cases at week 32 with a total of 158 cases, dengue peaked in week 37 with 2956 cases, scrub typhus in week 38 with 236 cases, and SARI reached its highest count in week 52 with 368 cases. (Figure 1.1 and 1.2)

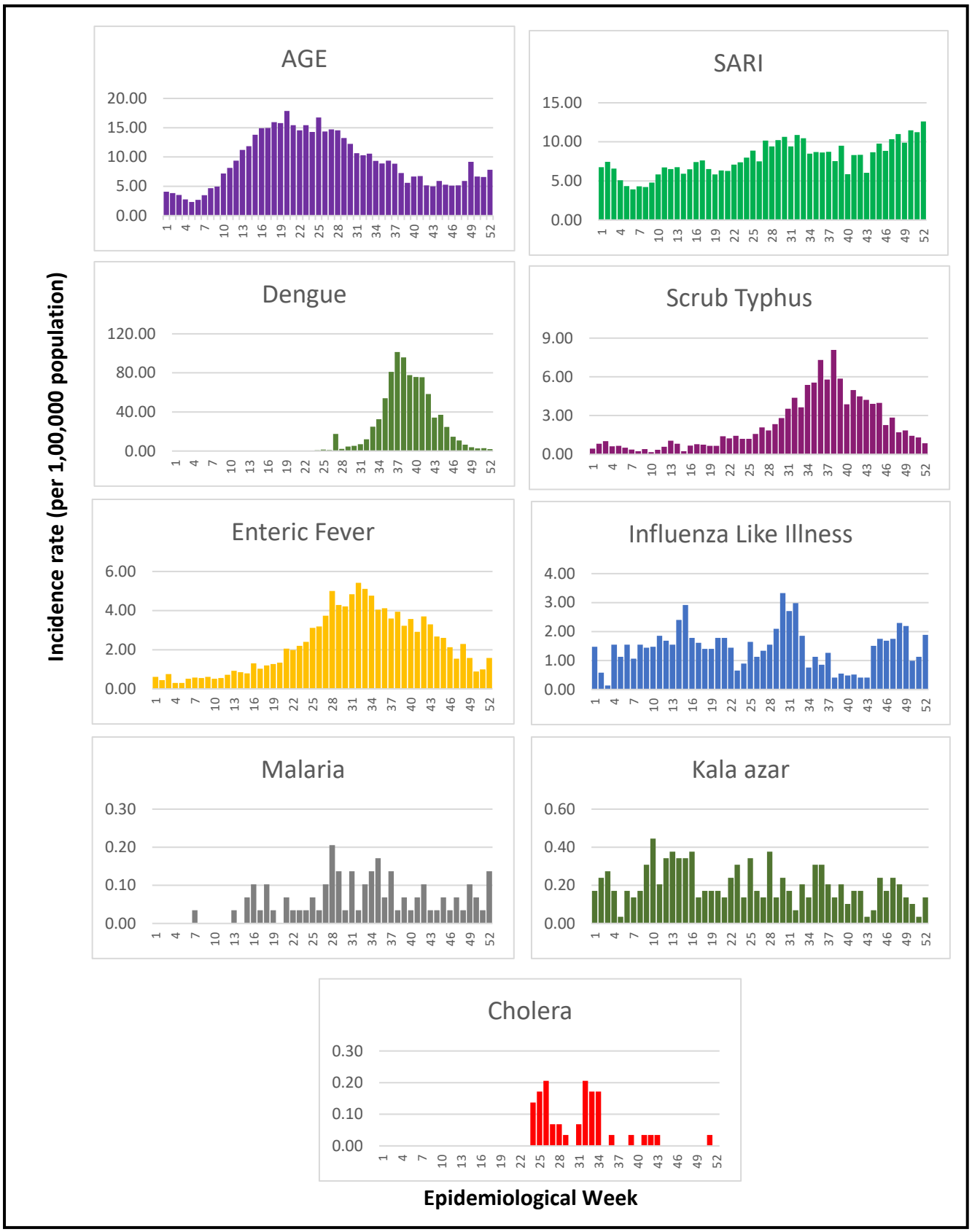


Figure 1.2: Weekly trend of nine selected diseases/syndromes at the national level, 2022

It is important to study the disease burden distribution among age groups (Table 1.3). When considering Acute Gastro Enteritis (AGE), the age group 1-4 significantly stands out, bearing almost one fifth of the disease burden (18.1%) while none of the other age group exceeds 7%. Cholera was confined to the 10-69 age group while more patients were from age group 25-64. Enteric fever appeared to be universally distributed with high proportions in the 10-14 (14.8%) and 60-64 (12.4%) age groups compared to other age groups. Dengue disease burden was also distributed across all age groups, ranging from 0.2% (age group <1) to 12.7% (age group 20-24). More than 50% of reported cases in 2022 belonged to age group 15 to 39 years. Influenza-Like Illness (ILI) and Severe Acute Respiratory Infection (SARI), considered as separate disease entities were mainly confined to children less than 9 years old. Of the total reported ILI and SARI cases, 46.1% of ILI and 59.1% of SARI cases were reported in this age group. According to reported cases in 2022, Kala-azar affected all the age groups, except infants. Approximately 21% of the disease burden was attributed to age group 1-4. The prevalence of Kala-azar gradually declined with advancing age. Scrub typhus affected all age groups almost equally, except extreme age groups (very young and very old). Malaria showed an irregular age distribution pattern, which is expected as it nears elimination.

Table 1.3: Age distribution of nine selected diseases/syndromes reported at the national level

Age Group	AGE	Cholera	Dengue	Enteric Fever	ILI	Kala azar	Malaria	SARI	Scrub Typhus	Total
<1	522 (3.7%)	0 (0.0%)	62 (0.2%)	65 (1.9%)	221 (10.0%)	0 (0.0%)	0 (0.0%)	2313 (19.4%)	10 (0.3%)	3193 (5.2%)
1-4	2538 (18.1%)	0 (0.0%)	787 (3.1%)	45 (1.3%)	584 (26.5%)	64 (20.8%)	1 (1.2%)	4021 (33.6%)	175 (5.2%)	8215 (13.5%)
5-9	966 (6.9%)	0 (0.0%)	1063 (4.2%)	237 (7.0%)	224 (10.1%)	27 (8.8%)	2 (2.4%)	725 (6.1%)	207 (6.1%)	3451 (5.7%)
10-14	695 (5.0%)	2 (4.5%)	1203 (4.7%)	503 (14.8%)	116 (5.3%)	19 (6.2%)	1 (1.2%)	252 (2.1%)	190 (5.6%)	2981 (4.9%)
15-19	710 (5.1%)	4 (9.1%)	2165 (8.5%)	276 (8.1%)	115 (5.2%)	20 (6.5%)	6 (7.1%)	127 (1.1%)	196 (5.8%)	3619 (5.9%)
20-24	959 (6.8%)	4 (9.1%)	3228 (12.7%)	281 (8.2%)	119 (5.4%)	22 (7.1%)	15 (17.9%)	143 (1.2%)	252 (7.4%)	5023 (8.3%)
25-29	971 (6.9%)	7 (15.9%)	2842 (11.2%)	269 (7.9%)	116 (5.3%)	29 (9.4%)	9 (10.7%)	140 (1.2%)	217 (6.4%)	4600 (7.6%)
30-34	865 (6.2%)	6 (13.6%)	2820 (11.1%)	197 (5.9%)	104 (4.7%)	26 (8.4%)	7 (8.3%)	153 (1.3%)	200 (5.9%)	4378 (7.2%)
35-39	802 (5.7%)	3 (6.8%)	2378 (9.4%)	191 (5.7%)	86 (3.9%)	24 (7.8%)	18 (21.4%)	138 (1.2%)	200 (5.9%)	3840 (6.3%)
40-44	703 (5.0%)	1 (2.3%)	2054 (8.1%)	156 (4.6%)	78 (3.5%)	16 (5.2%)	4 (4.8%)	162 (1.4%)	224 (6.6%)	3398 (5.6%)
45-49	686 (4.9%)	6 (13.6%)	1577 (6.2%)	143 (4.2%)	55 (2.5%)	13 (4.2%)	2 (2.4%)	177 (1.5%)	184 (5.4%)	2843 (4.7%)
50-54	687 (4.9%)	3 (6.8%)	1367 (5.4%)	157 (4.6%)	79 (3.6%)	12 (3.9%)	6 (7.1%)	262 (2.2%)	248 (7.3%)	2821 (4.6%)
55-59	593 (4.2%)	2 (4.5%)	1022 (4.0%)	101 (2.9%)	54 (2.4%)	10 (3.2%)	5 (6.0%)	287 (2.4%)	235 (6.9%)	2309 (3.8%)
60-64	593 (4.2%)	5 (11.4%)	839 (3.3%)	417 (12.4%)	75 (3.4%)	7 (2.3%)	3 (3.6%)	490 (4.1%)	220 (6.5%)	2649 (4.4%)
65-69	478	1	643	112	56	9	1	542	187	2029

	(3.4%)	(2.3%)	(2.5%)	(3.3%)	(2.5%)	(2.9%)	(1.2%)	(4.5%)	(5.5%)	(3.3%)
70-74	559 (4.0%)	0 (0.0%)	568 (2.2%)	84 (2.5%)	44 (2.0%)	3 (1.0%)	1 (1.2%)	776 (6.5%)	177 (5.2%)	2212 (3.6%)
75-79	324 (2.3%)	0 (0.0%)	376 (1.5%)	105 (3.1%)	44 (2.0%)	4 (1.3%)	2 (2.4%)	632 (5.3%)	131 (3.9%)	1618 (2.7%)
≥80	382 (2.7%)	0 (0.0%)	430 (1.7%)	50 (1.5%)	37 (1.7%)	3 (1.0%)	1 (1.2%)	611 (5.1%)	138 (4.1%)	1652 (2.7%)
Total	**14033**	**44**	**25424**	**3389**	**2207**	**308**	**84**	**11951**	**3391**	60831

Most of the diseases included in this analysis shows a near equal distribution between male and female groups except malaria and Kala-azar which show a male preponderance while scrub typhus is skewed towards female. It is important to note there were missing information on sex for AGE (n=58), Dengue (n=57), Enteric fever (n=8), ILI (n=3), Kala azar (n=1), SARI (n=57) and Scrub typhus (n=8). (Figure 1.3)

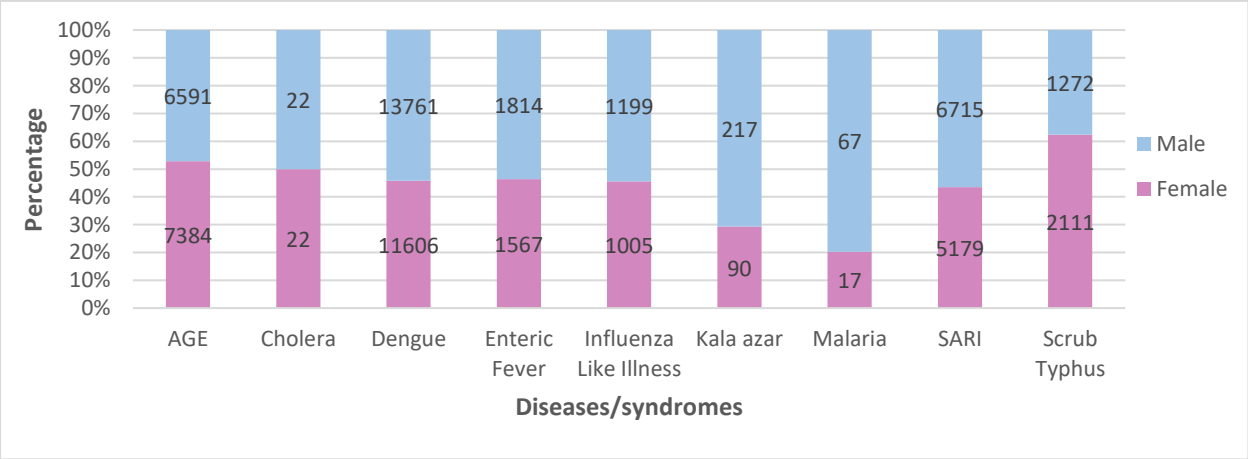


Figure 1.3: Distribution of nine selected diseases/syndromes by sex at the national level, 2022

Figure 1.4 provides a visual representation of the distribution of the nine selected diseases/syndromes reported in EWARS across Nepal in the year 2022. The geographic spread is depicted through a mapping of case incidences per 100,000 population for each of the nine selected diseases/syndrome across various districts. This graphical representation is a valuable tool for assessing the regional prevalence and understanding the epidemiological landscape, facilitating targeted public health interventions and resource allocation. Acute Gastroenteritis (AGE) was highly prevalent in Manang, Mustang, Jumla, and Rukum West, while Severe Acute Respiratory Infection (SARI) cases were predominantly reported in Dhankuta, Mustang, Palpa, Surkhet, and Jumla. Dengue had a high incidence in Kathmandu, Lalitpur, Dhading, Darchula, and Sankhuwasabha. Scrub typhus was notably present in Darchula, Dadeldhura, Sankhuwasabha, Baitadi, Bhojpur, and Palpa. Enteric fever showed significant cases in Parsa and Bajhang. Influenza-like Illness (ILI) was concentrated in Rukum West, Surkhet, Baitadi, and Jajarkot. Malaria was prevalent in Achham, Rukum East, Nawalparasi West, and Palpa. Kala-azar was reported in Kalikot, and Cholera was detected in Dolakha, Kathmandu, Lalitpur, Bhaktapur, Nuwakot, Dhading, Achham, Parsa, and Morang.

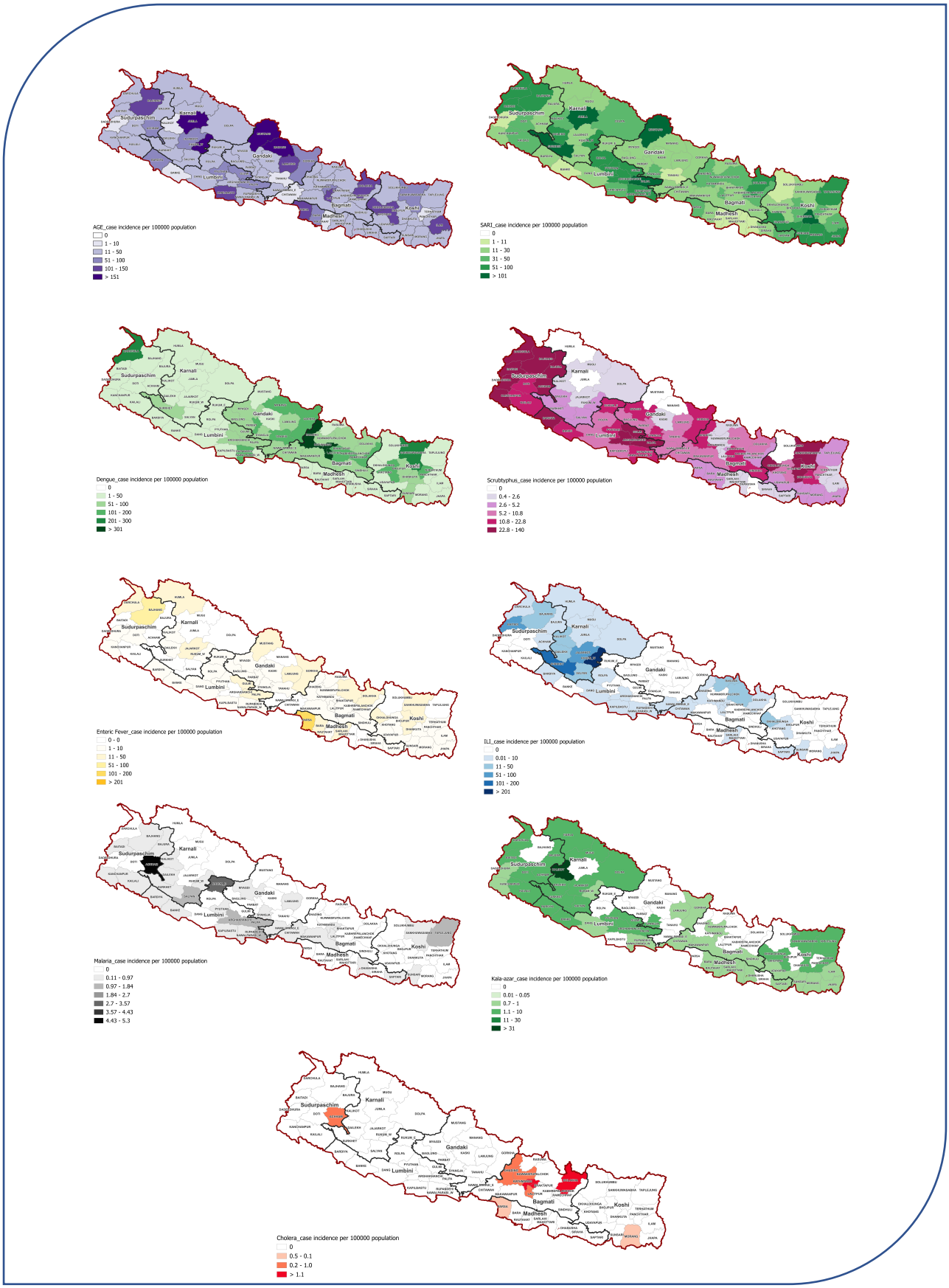


Figure 1.4: Distributions of cases of nine selected diseases/syndromes in Nepal, 2022

EWARS Reporting status: National

In 2022, there were 118 officially registered sentinel sites in EWARS. At the national level, the average number of weeks a sentinel site reported was 38 (72.2%), an increase from 28 (52.9%) in 2021, representing a 36.5% improvement. Eighteen sentinel sites (15.3%) achieved 100% reporting in EWARS in 2022, covering all seven provinces, compared to 15 (12.7%) sentinel sites reaching 100% reporting completeness in 2021. In 2022, three sentinel sites, all located in the Bagmati province, did not report in any epidemiological week. This marks a significant decrease from 19 non-reporting sentinel sites in 2021.

Compared to 2021, 82 sentinel sites (69.5%) showed improvement in reporting completeness in 2022. The most notable improvement was observed at Provincial Hospital Bara, which increased its reporting rate from 1.9% in 2021 to 100% in 2022. Conversely, reporting completeness remained constant for 13 sentinel sites (11%), while it decreased for 23 sentinel sites (19.5%). The most significant drop was seen at District Hospital Rasuwa, which decreased from 88.7% in 2021 to 26.9% in 2022.

Koshi Province

Koshi Province reported a total of 9,151 cases of nine selected diseases/syndromes to EWARS. This is 15% of the national caseload reported in 2022 (Table 1.2). Table 1.4 presents disease distribution, with SARI being the most reported (36.7%, n=3361), followed by dengue (27.8%, n=2541) and AGE (24.9%, n=2278).

Table 1.4: Frequency of nine selected diseases/syndromes reported in Koshi Province, 2022

Disease	Number	Percentage
Severe acute respiratory infection	3,361	36.7
Dengue	2,541	27.8
AGE	2,278	24.9
Scrub Typhus	459	5.0
Enteric Fever	365	4.0
ILI	90	1.0
Kala azar	50	0.5
Malaria	6	0.1
Cholera	1	0.0
Total	9,151	100.0

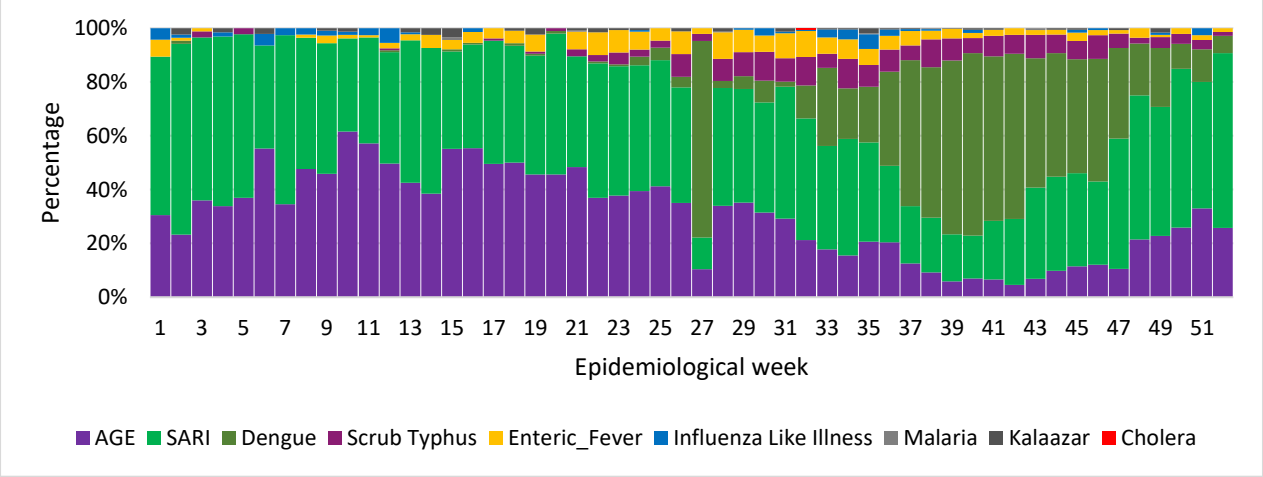


Figure 1.5: Weekly burden of nine selected diseases/syndromes reported in Koshi Province, 2022 (n=9,151)

Seasonal variation in reporting was observed for dengue, enteric fever, ILI, and scrub typhus, as illustrated in Figure 1.5 and 1.6. This pattern closely follows the national trend and provides valuable insights into the epidemiological dynamics important for disease control and prevention.

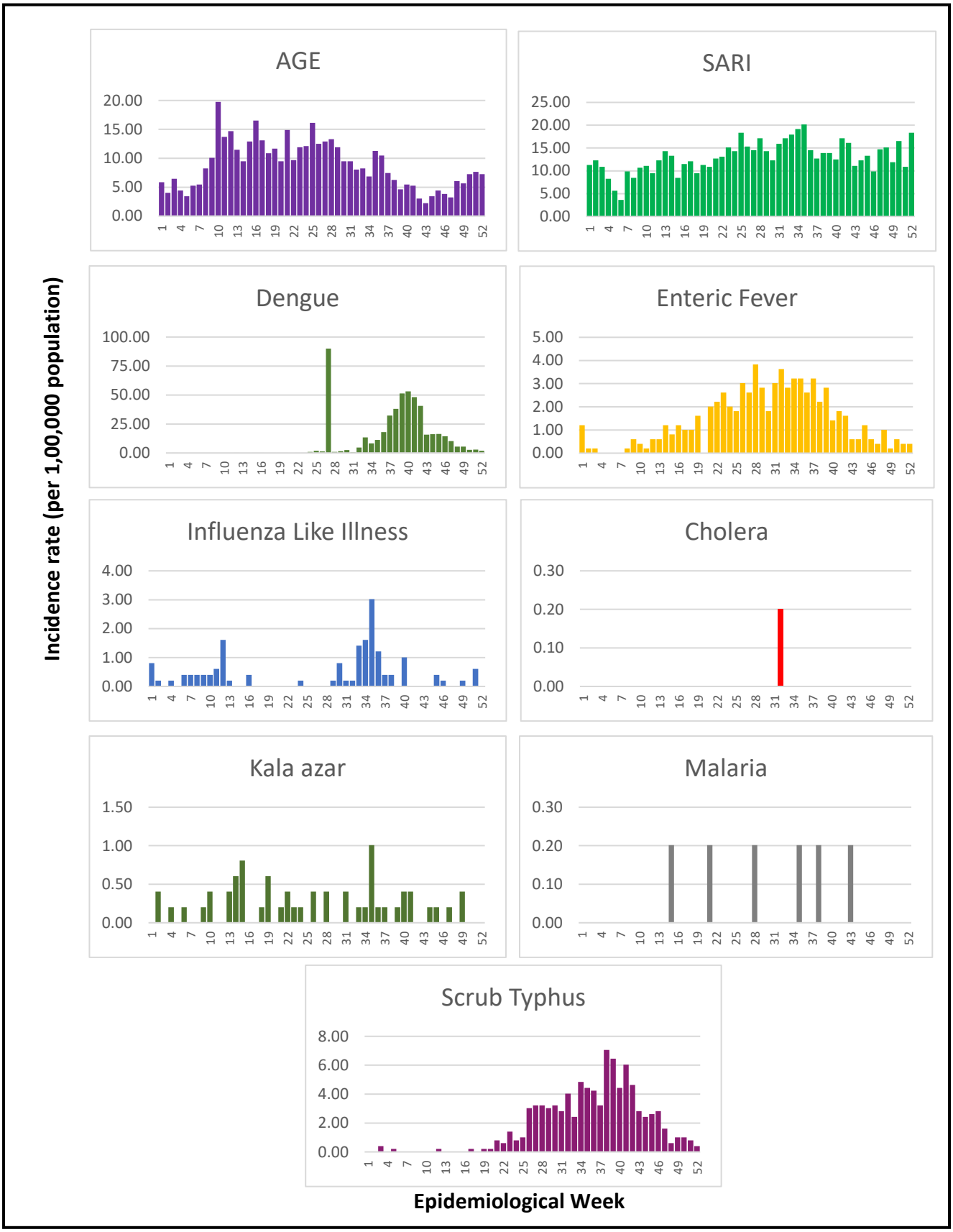


Figure 1.6: Weekly trend of nine selected diseases/syndromes reported in Koshi Province, 2022

Caseloads were generally higher in males compared to females. Higher caseloads among males were observed for dengue, enteric fever, ILI, kala-azar, malaria, and SARI, whereas females were more affected by AGE, cholera, and scrub typhus. It is important to note there were missing information on sex for AGE (n=4), Dengue (n=2), SARI (n=2) and Scrub Typhus (n=1). (Figure 1.7)

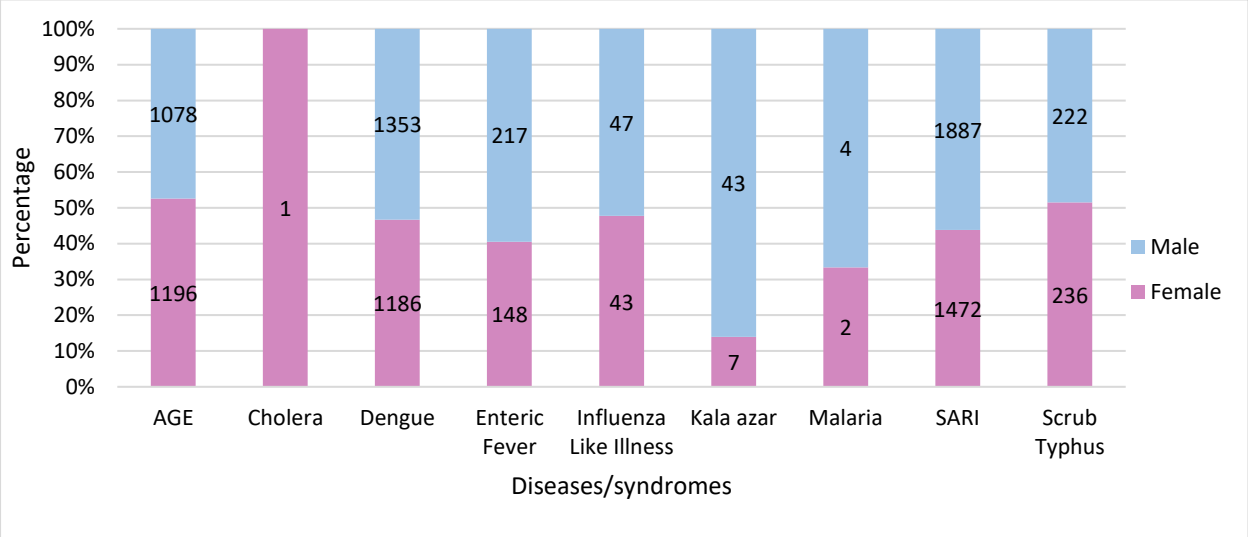


Figure 1.7: Distribution of nine selected diseases/syndromes by sex in Koshi Province, 2022

EWARS Reporting status: Koshi province

In 2022, there were 18 officially registered sentinel sites in the EWARS, belonging to the Koshi province. The average number of weeks a sentinel site reported in EWARS was 43 compared to 35 in 2021, a 27.9% increment. The average reporting completeness increased to 83.5% in 2022 from 65.3% in 2021. Out of 18 sentinel sites in the province, five sites (27.8%) reported in all epidemiological weeks in 2022. Fourteen sentinel sites (77.8%) improved reporting completeness in 2022, while four sites (22.2%) did not improve. The highest improvement was recorded by the District Hospital Sunsari (from 15.1% in 2021 to 94.2% in 2022). (Figure 1.8)

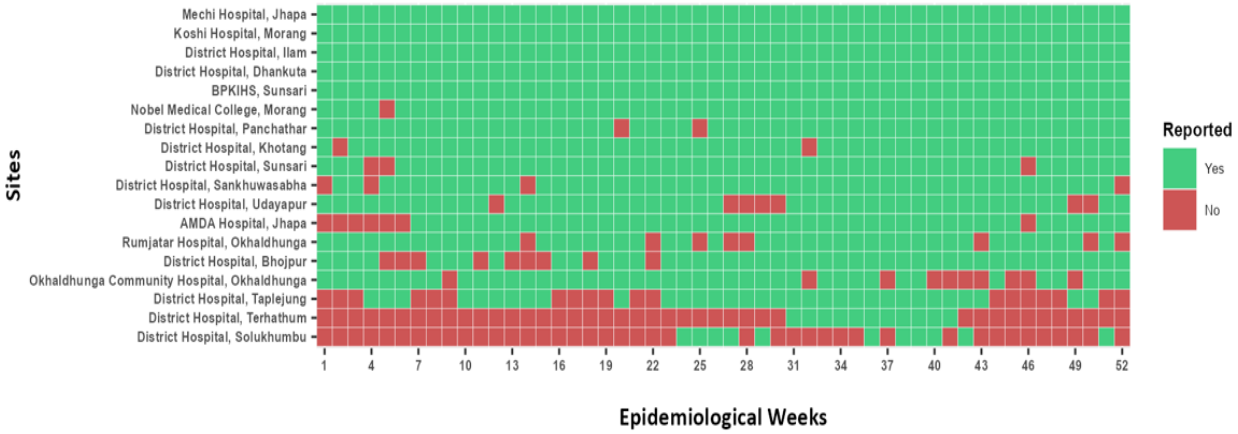


Figure 1.8: Weekly reporting status of sentinel sites in Koshi Province, 2022

Madhesh Province

Madhesh province reported a total of 6,203 cases of nine selected diseases/syndromes to EWARS. This is 10% of the national caseload reported in 2022 (Table 1.2). The highest disease burden was caused by AGE, followed by enteric fever and dengue (Table 1.5).

Table 1.5: Frequency of nine selected diseases/syndromes reported in Madhesh Province, 2022

Disease	Number	Percentage
AGE	2,404	38.8
Enteric fever	1,684	27.1
Dengue	1,055	17.0
SARI	916	14.8
Scrub Typhus	121	2.0
Kala azar	18	0.3
Malaria	2	0.0
ILI	2	0.0
Cholera	1	0.0
Total	**6,203**	**100.0**

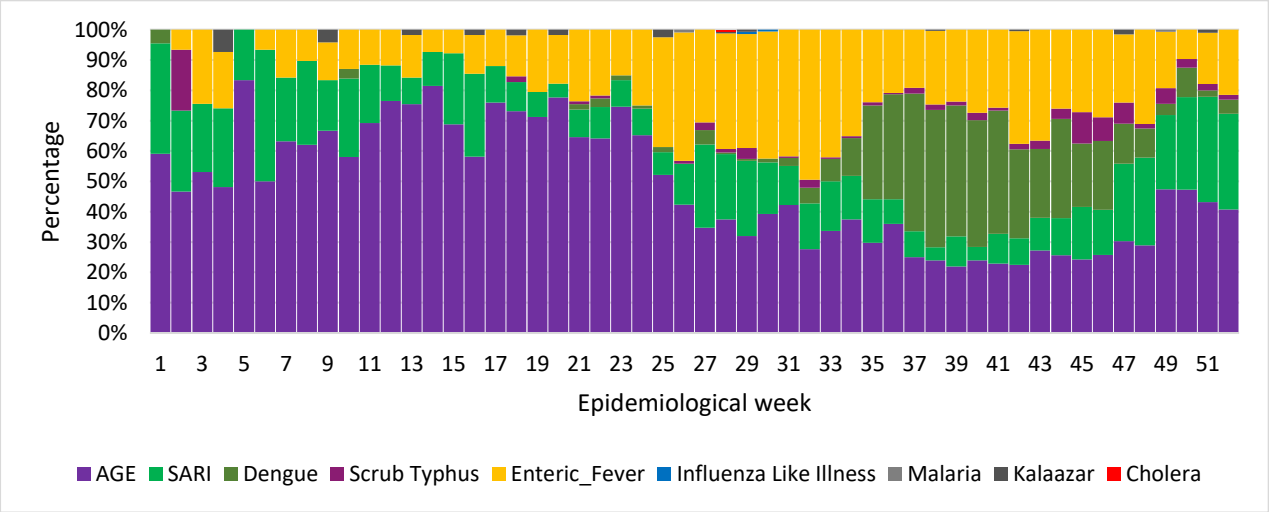


Figure 1.9: Weekly burden of nine selected diseases/syndromes reported in Madhesh Province

Seasonal variation in reporting was observed for dengue and enteric fever (Figure 1.9 and 1.10). The higher caseload among male were observed for dengue, enteric fever, kala azar, malaria, and SARI whereas females were more affected by AGE, and scrub typhus. It is important to note there were missing information on sex for AGE (n=9), Dengue (n=3), Enteric fever (n=4), and SARI (n=3). (Figure 1.11)

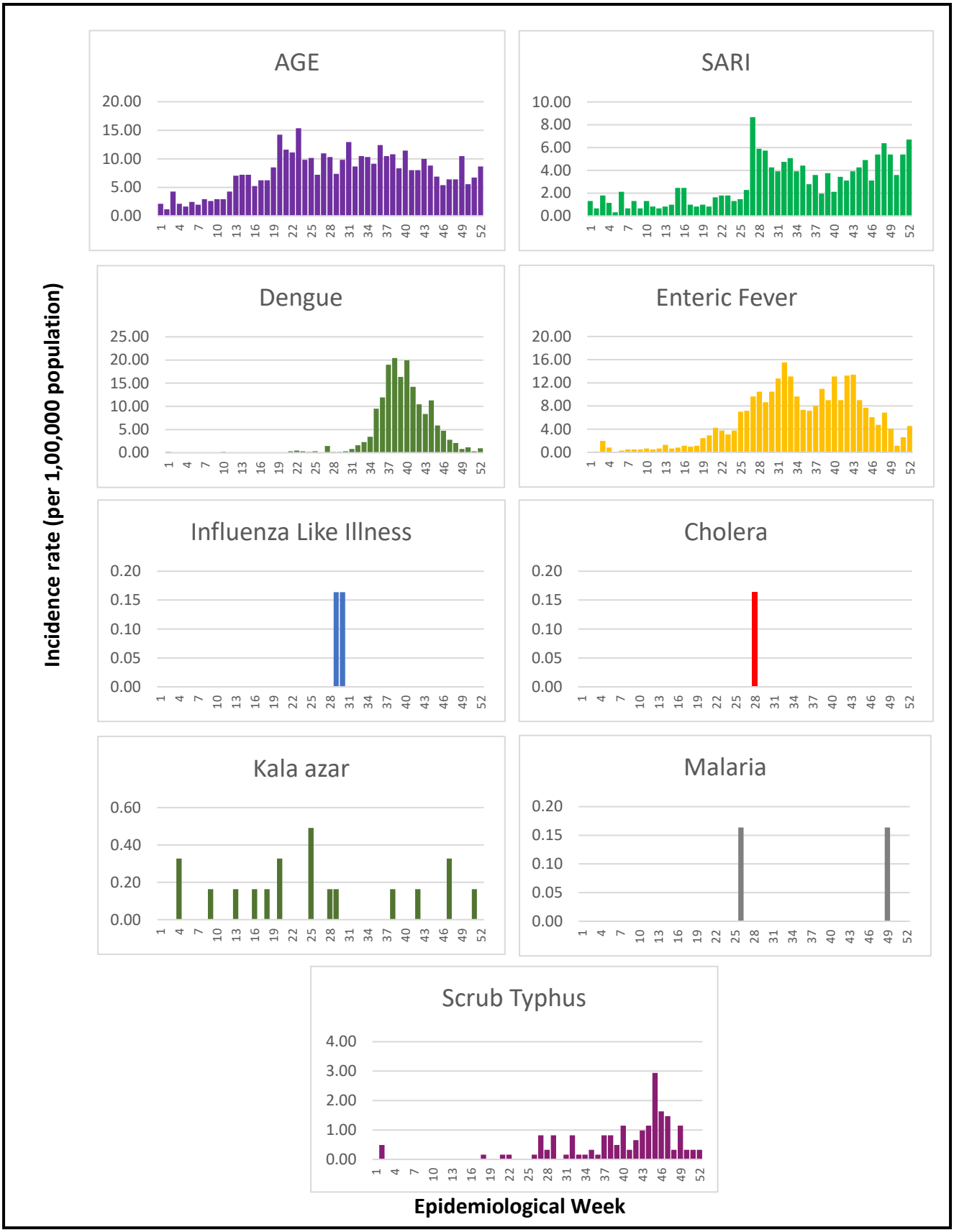


Figure 1.10: Weekly trend of nine selected diseases/syndromes reported in Madhesh Province

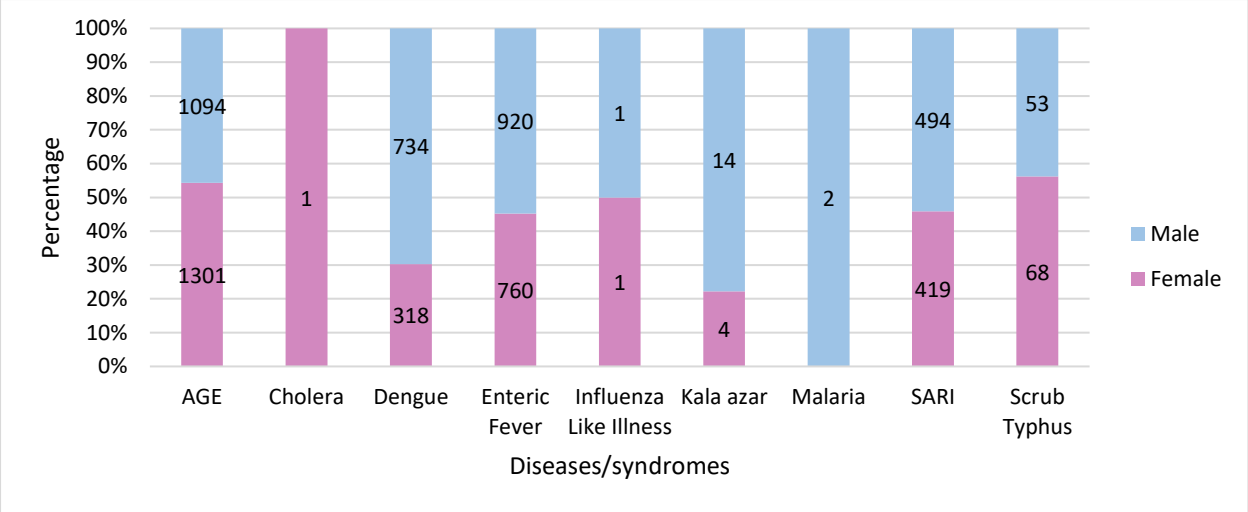


Figure 1.11: Sex distribution of selected diseases/syndromes reported in Madhesh Province, 2022

EWARS Reporting status: Madhesh province

In 2022, there were 11 registered and officially recognized sentinels in the EWARS, belonging to the Madhesh province. The average number of weeks a sentinel site reported in EWARS was 38, compared to 29 in 2021, reflecting a 34.5% increment. The average reporting completeness increased to 73.6% in 2022 from 54.7% in 2021. No sites fell into the zero-reporting completeness category. Only one sentinel site (Provincial Hospital Bara) managed to report in all epidemiological weeks in 2022. Seven sentinel sites (63.6%) showed improved reporting completeness in 2022, while four sites (36.4%) did not show improvement. (Figure 1.12)

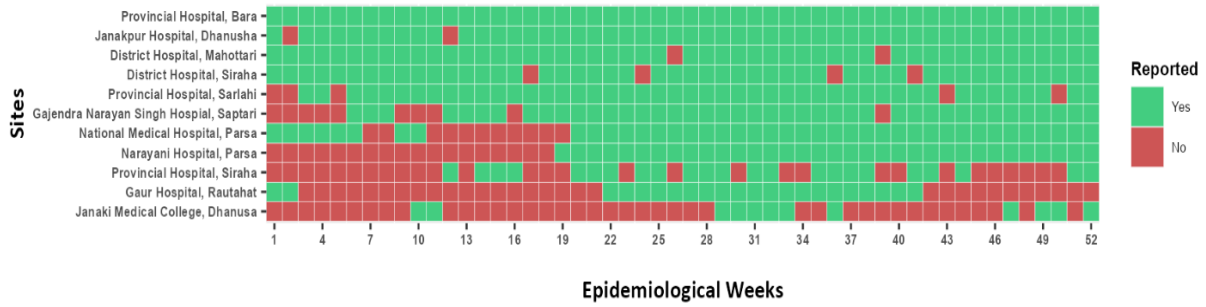


Figure 1.12: Weekly reporting status of sentinel sites in Madhesh Province

Bagmati Province

The Bagmati province reported a total of 22,093 cases of nine selected diseases/syndromes to EWARS. This is 36% of the national caseload reported in 2022 (Table 1.2). The disease-wise data disaggregation shows that dengue bears the highest-burden followed by AGE and SARI (Table 1.6).

Table 1.6: Frequency of nine selected diseases/syndromes reported in Bagmati Province

Disease	Number	Percentage
Dengue	15,725	71.2
AGE	3,268	14.8
SARI	1,918	8.7
Enteric Fever	455	2.1
Scrub Typhus	427	1.9
ILI	243	1.1
Cholera	41	0.2
Kala azar	15	0.1
Malaria	1	0.0
Total	**22,093**	**100.0**

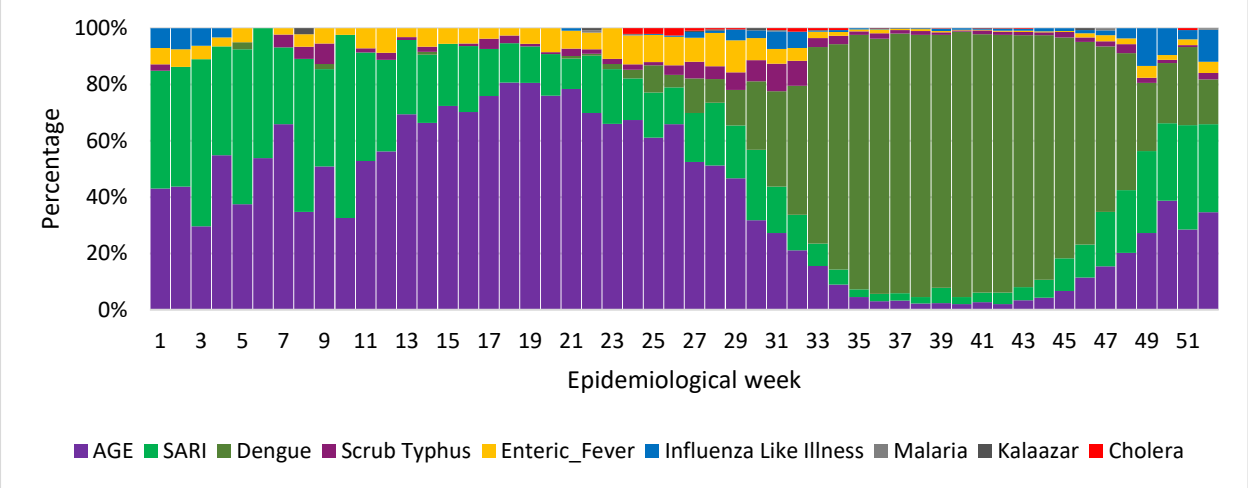


Figure 1.13: Weekly burden of nine selected diseases/syndromes reported in Bagmati Province, 2022

Seasonal variation in reporting was observed for dengue, cholera, enteric fever, ILI, and scrub typhus (Figure 1.13 and 1.14). The seasonality pattern variation did not deviate significantly from the national variation. Higher caseloads among males were observed for cholera, dengue, enteric fever, ILI, kala-azar, malaria, and SARI, whereas females were more affected by AGE and scrub typhus. It is important to note there were missing information on sex for AGE (n=14), Dengue (n=36), Enteric fever (n=2), and SARI (n=2). (Figure 1.15).

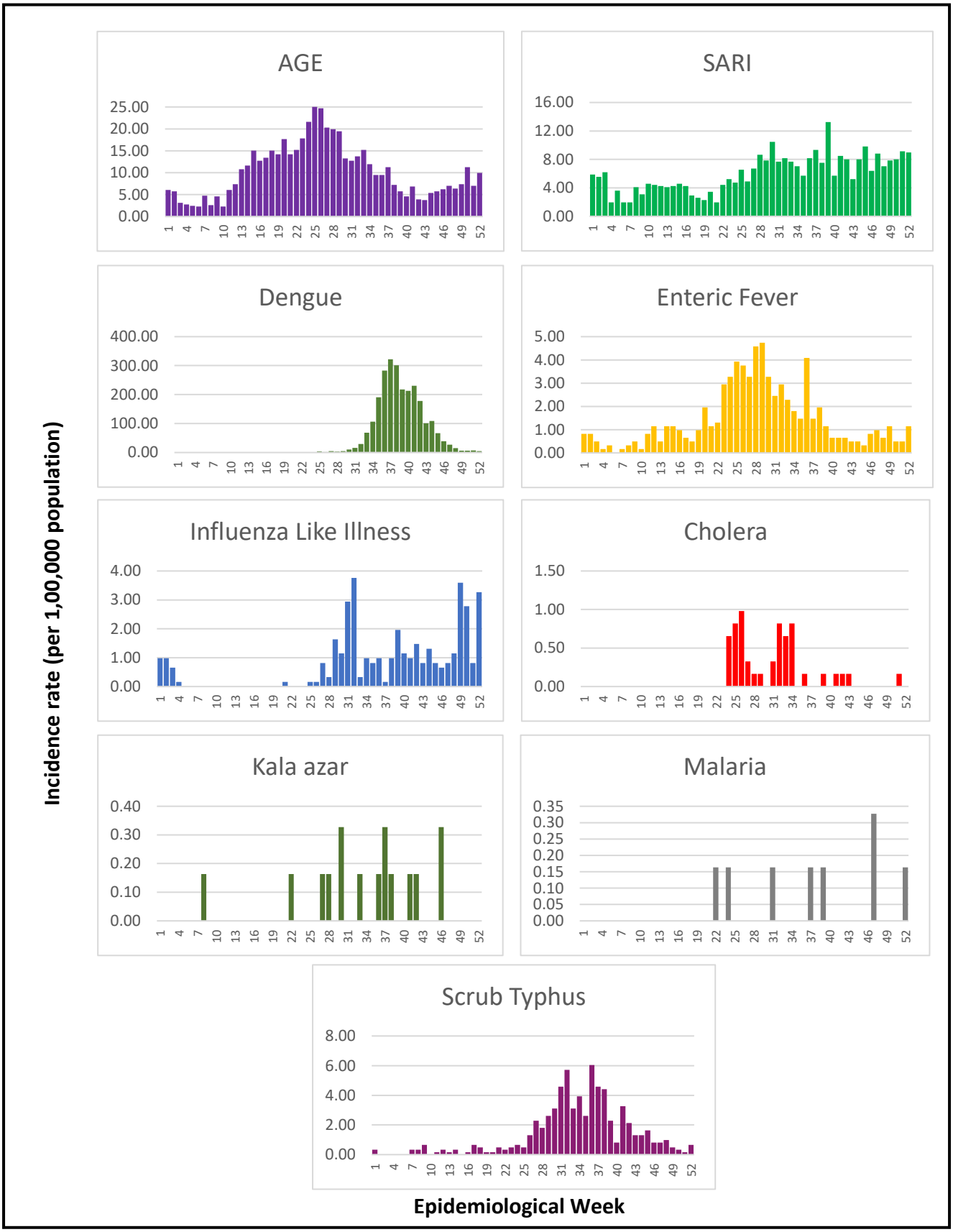


Figure 1.14: Weekly trend of nine selected diseases and syndromes reported in Bagmati Province, 2022

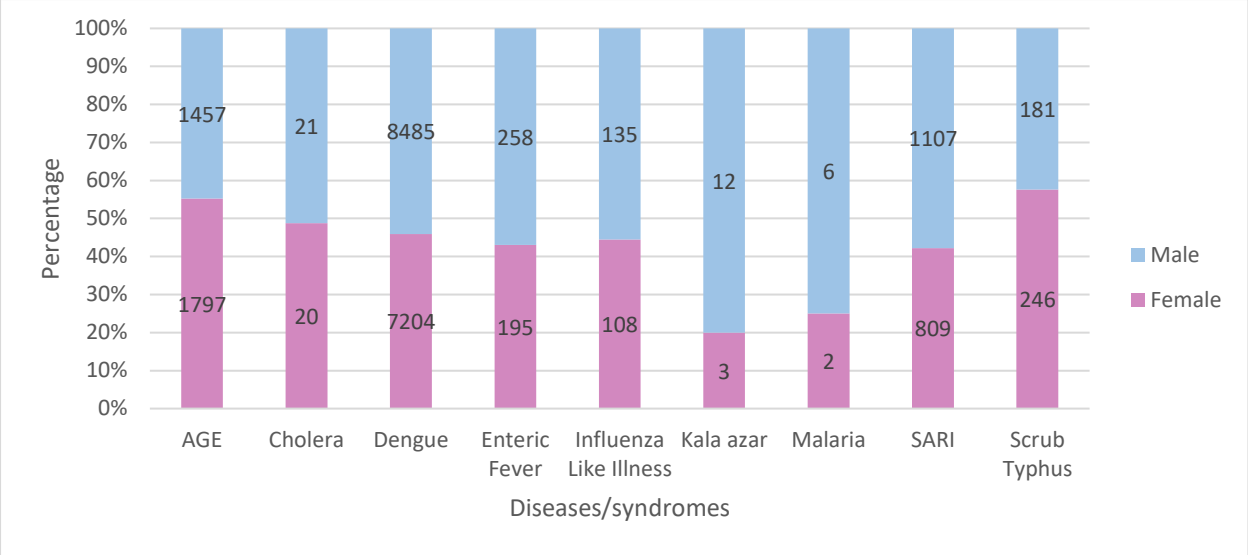


Figure 1.15: Distribution of nine selected diseases/syndromes by sex in Bagmati Province, 2022

EWARS Reporting status: Bagmati province

In 2022, there were 36 officially registered sentinel sites in the EWARS, all affiliated with the Bagmati province. The average number of weeks a sentinel site reported in EWARS was 34, a significant increase from 24 in 2021, marking an 46.4% increment. The average reporting completeness also demonstrated an improvement, rising to 65.8% in 2022 from 45.0% in 2021. Three sentinel sites (8.3%) fell into the zero-reporting completeness category, while four sites (11.1%) managed to report in all epidemiological weeks in 2022. Dhulikhel Hospital, Kavre, also demonstrated significant progress, improving from 20.8% in 2021 to 78.8% in 2022. Reporting completeness remained constant in six sentinel sites (16.7%). However, five reporting sites (13.9%) did not improve reporting status in 2022 compared to 2021, with the highest drop noted in District Hospital Rasuwa (from 88.7% in 2021 to 26.9% in 2022). (Figure 1.16)

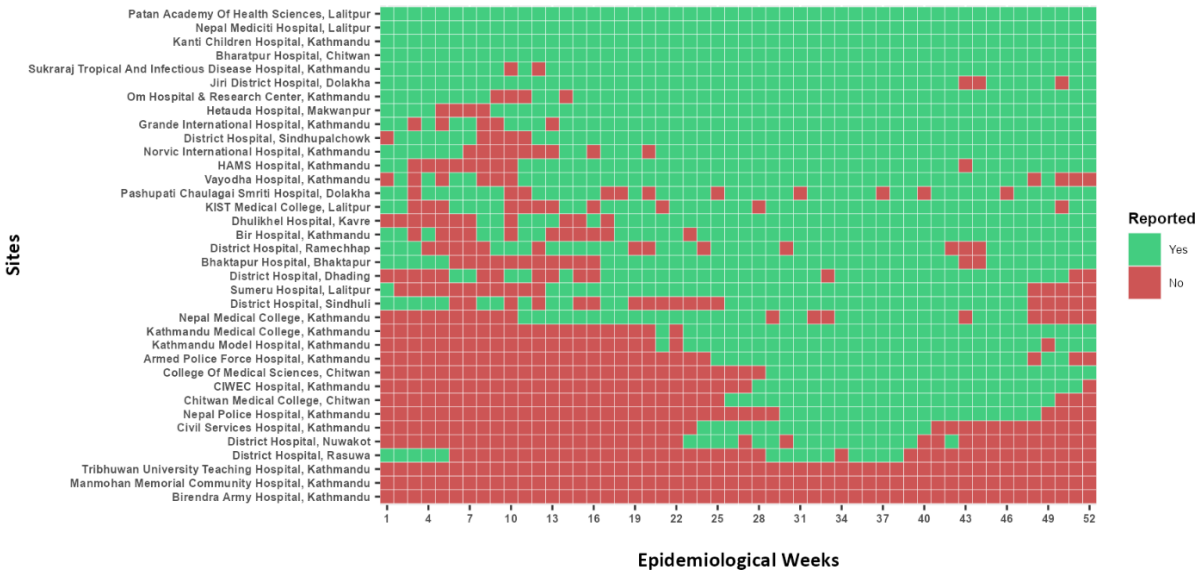


Figure 1.16: Weekly reporting status of sentinel sites in Bagmati Province, 2022

Gandaki Province

Gandaki province reported 3,909 cases of nine selected diseases/syndromes to EWARS. This is 6% of the national caseload reported in 2022 (Table 1.2). Table 1.7 presents selected disease and syndrome data, with dengue being the most reported disease, followed by AGE and SARI.

Table 1.7: Frequency of nine selected diseases/syndromes reported in Gandaki Province

Disease	Number	Percentage
Dengue	1,967	50.3
AGE	1,038	26.6
SARI	509	13.0
Scrub Typhus	232	5.9
Enteric Fever	151	3.9
Kala azar	6	0.2
Malaria	5	0.1
ILI	1	0.0
Cholera	0	0.0
Total	**3,909**	**100.0**

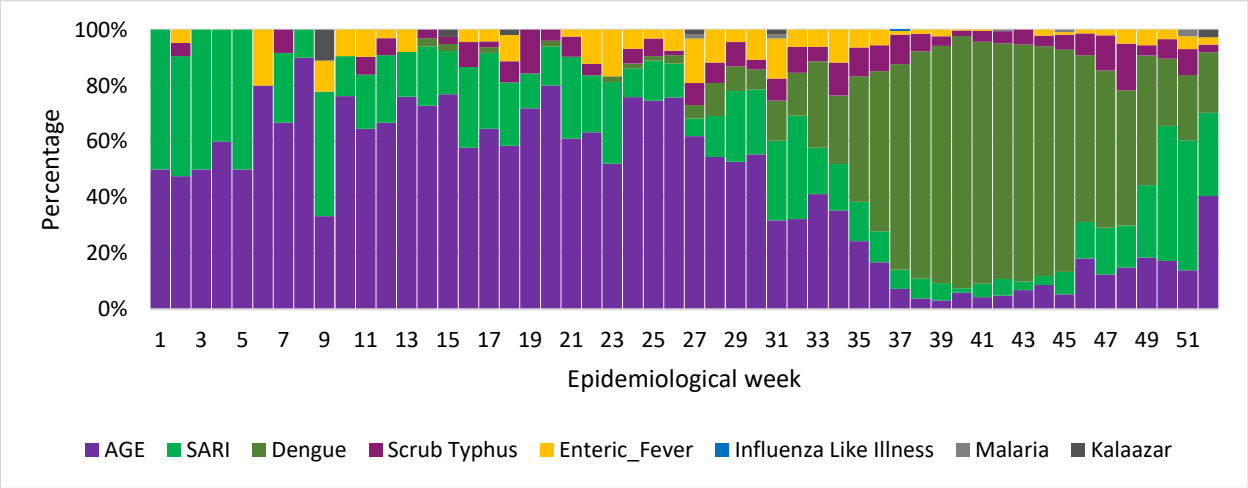


Figure 1.17: Weekly burden of nine selected diseases/syndromes reported in Gandaki Province, 2022

Seasonal variation in reporting was observed for SARI, enteric fever and dengue (Figure 1.17 and 1.18). The caseload was higher in males compared to females. Higher caseloads among males were observed for dengue, ILI, kala-azar, malaria, and SARI, whereas females were more affected by AGE, enteric fever, and scrub typhus. It is important to note there were missing information on sex for AGE (n=5), Dengue (n=3), and SARI (n=1). (Figure 1.19).

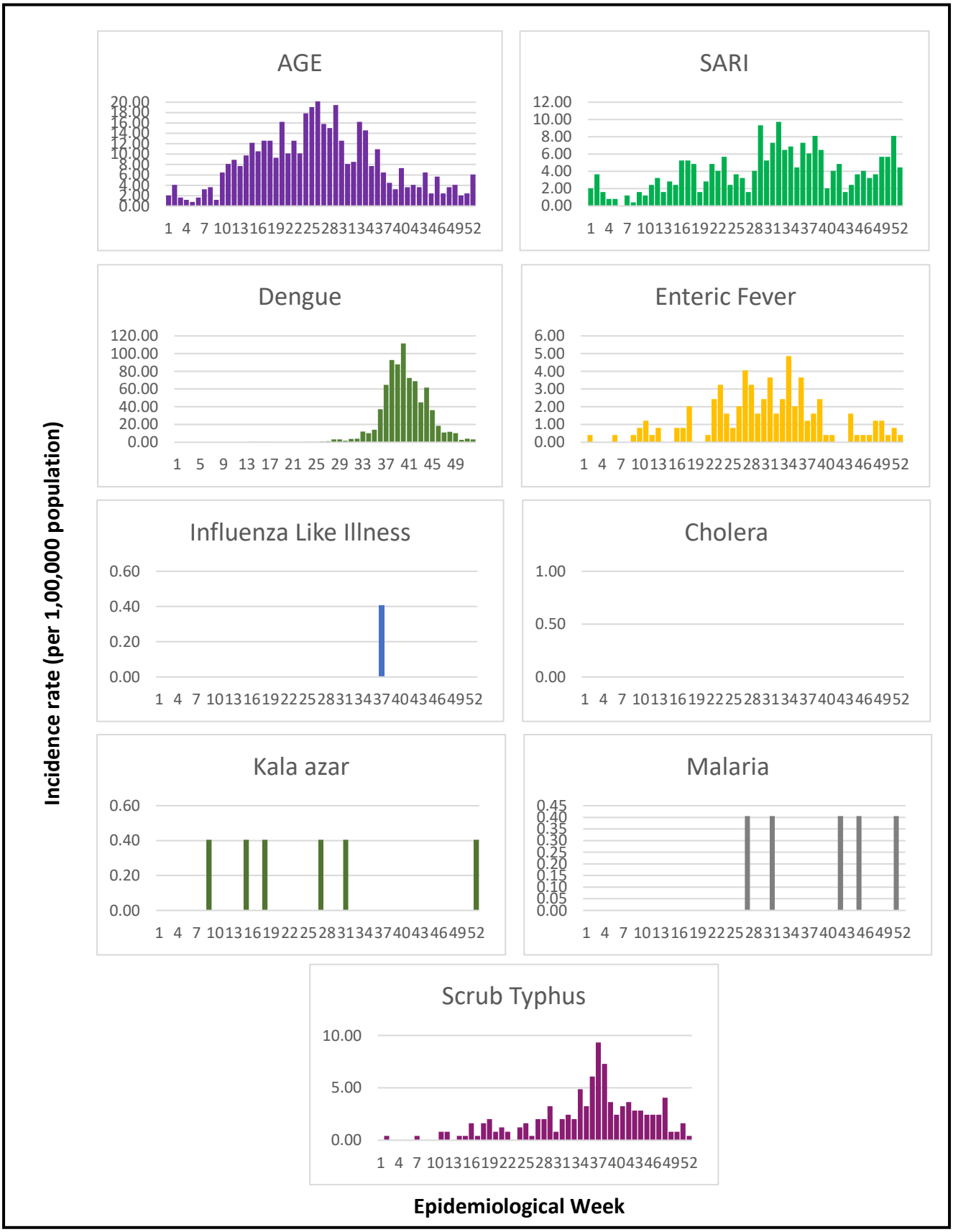


Figure 1.18: Weekly trend of nine selected diseases and syndromes reported in Gandaki Province, 2022

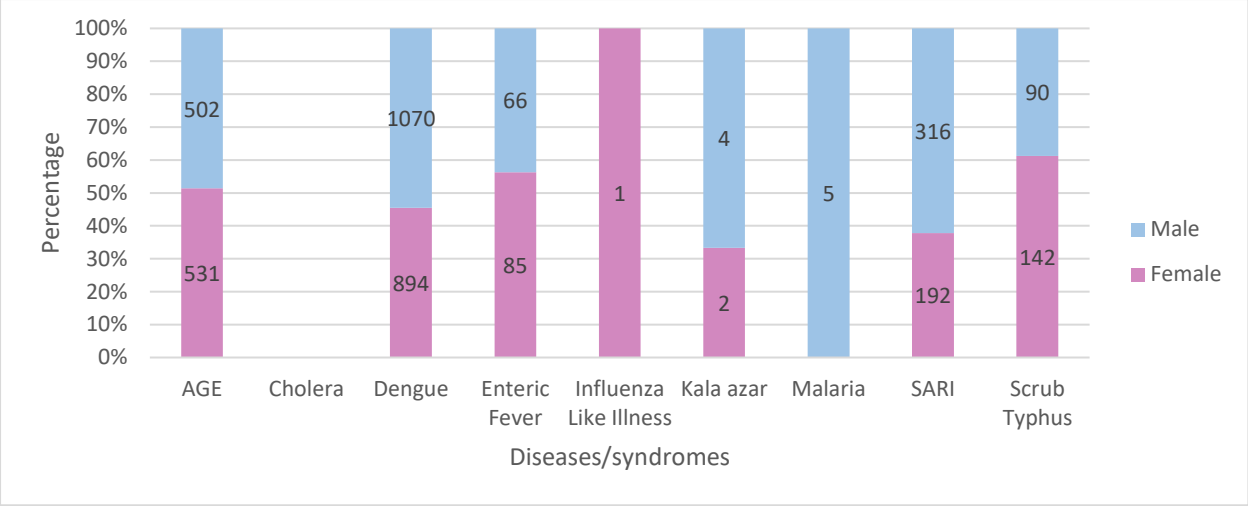


Figure 1.19: Distribution of nine selected diseases/syndromes by sex in Gandaki Province, 2022

EWARS Reporting status: Gandaki province

In 2022, there were 13 officially registered sentinel sites in the EWARS, belonging to the Gandaki province. The average number of weeks a sentinel site reported in EWARS was 34 compared to 21 in 2021, an 69.4% increment. Average reporting completeness increased to 66.1% in 2022 from 39.0% in 2021. None of the sites fell into the zero-reporting completeness category. Only one site (Lamjung Community Hospital) managed to report in all epidemiological weeks in 2022. An improvement in reporting status was observed in 10 sentinel sites (76.9%). The highest improvement was recorded by Dhaulagiri Hospital, Baglung (from 13.2 % in 2021 to 76.9% in 2022). Two reporting sites (15.4%) did not improve their reporting status in 2022 compared to 2021. The highest drop was in District Hospital Manang (from 64.2% in 2021 to 51.9% in 2022). (Figure 1.20)

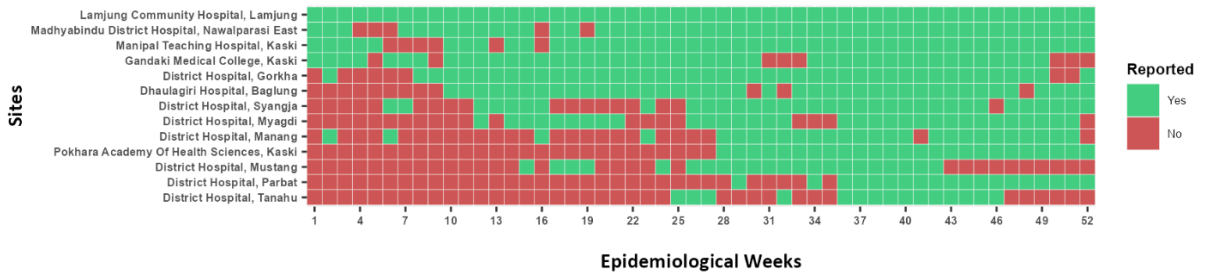


Figure 1.20: Weekly reporting status of sentinel sites in Gandaki Province, 2022

Lumbini Province

Lumbini province reported a total of 9,620 cases of nine selected diseases/syndromes to EWARS. This is 16% of the national caseload reported in 2022 (Table 1.2). Table 1.8 presents disease and syndrome wise data with AGE (29.6%) being the most reported disease, followed by SARI (29.5%) and dengue (26.7%).

Table 1.8: Frequency of nine selected diseases/syndromes reported in Lumbini Province, 2022

Disease	Number	Percentage
AGE	2,846	29.6
SARI	2,840	29.5
Dengue	2,565	26.7
Scrub Typus	906	9.4
Enteric Fever	350	3.6
ILI	41	0.4
Kala azar	40	0.4
Malaria	32	0.3
Cholera	0	0.0
Total	**9,620**	**100.0**

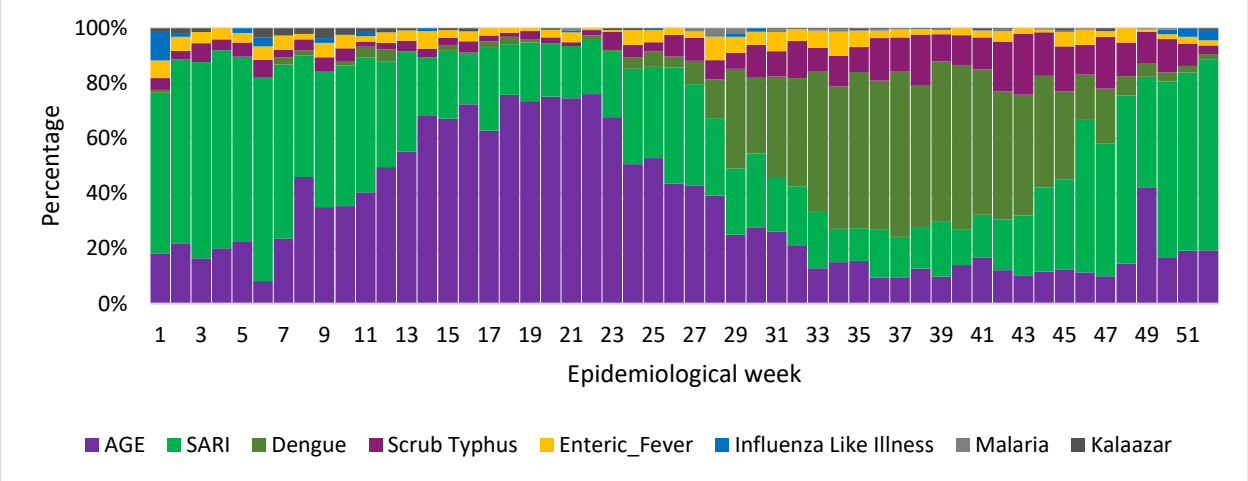


Figure 1.21: Weekly burden of nine selected diseases/syndromes reported in Lumbini Province, 2022

Seasonal variation of the reported diseases/syndromes closely matched with the patterns observed at the national level (Figure 1.21 and 1.22). Higher caseloads among males were observed in dengue, enteric fever, ILI, kala-azar, malaria, and SARI, whereas females were more affected by AGE and scrub typhus. It is important to note there were missing information on sex for AGE (n=16), Dengue (n=12), Enteric fever (n=1), ILI (n=1), Kala azar (n=1), SARI (n=43) and Scrub typhus (n=2). (Figure 1.23).

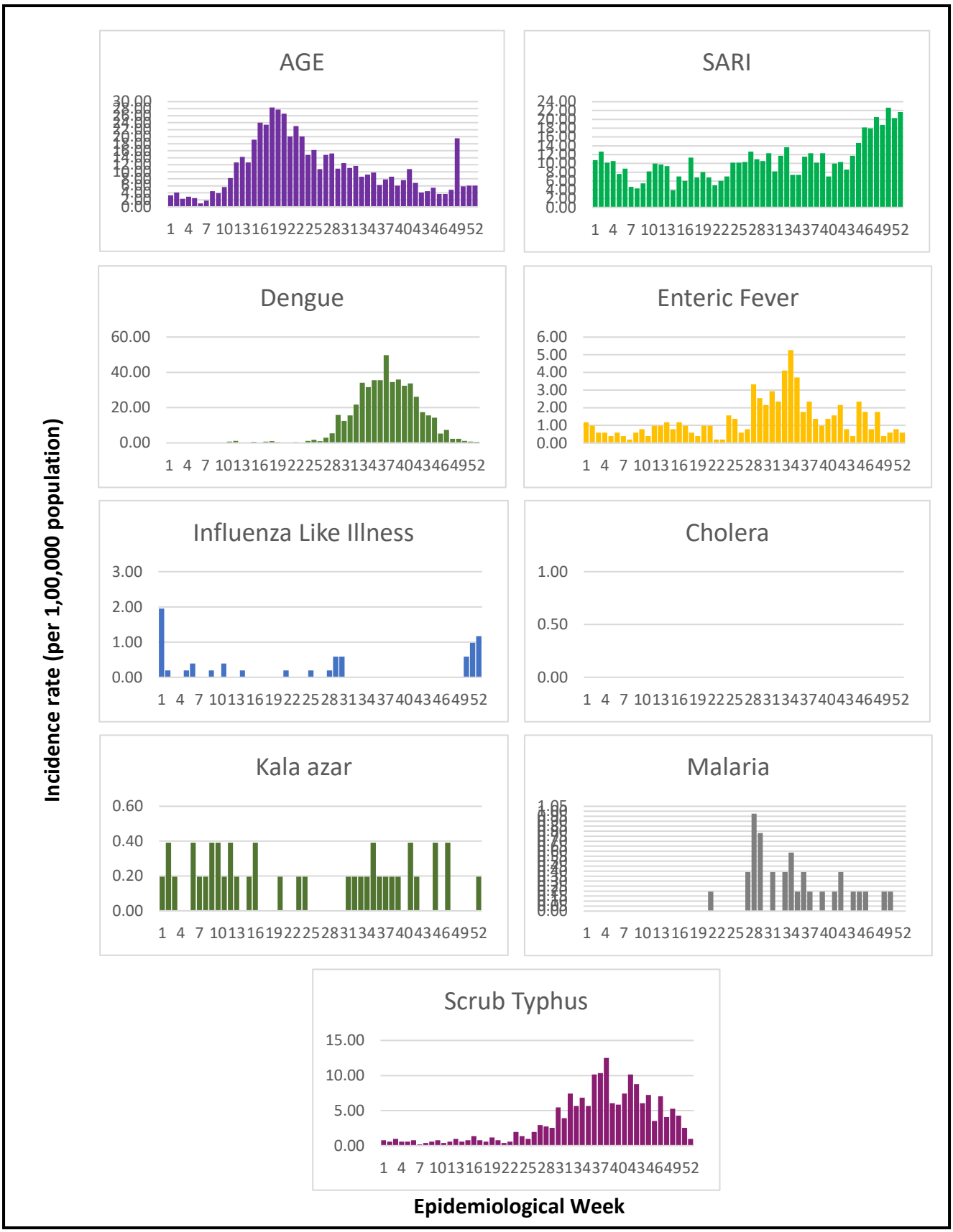


Figure 1.22: Weekly trend of nine selected diseases/syndromes reported in Lumbini Province

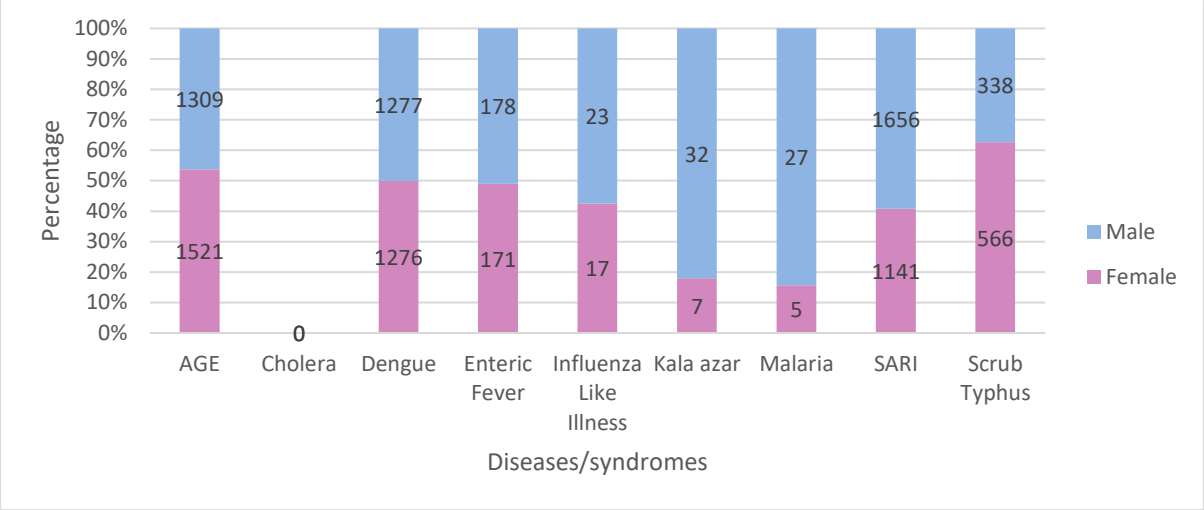


Figure 1.23: Distribution of nine selected diseases/syndromes by sex in Lumbini Province, 2022

EWARS Reporting status: Lumbini province

In 2022, there were 18 registered and officially recognized sentinels in the EWARS, belonging to the Lumbini province. The average number of weeks a sentinel site reported in EWARS was 42 compared to 33 in 2021, a 29.3% increment. Average reporting completeness increased to 80.8% in 2022 from 62.5% in 2021. None of the sites fell into the zero-reporting completeness category. Three sentinel sites (16.7%) were managed to report in all epidemiological weeks in 2022. An improvement in reporting status was observed in 11 sentinel sites (61.1%). The highest improvement was recorded by Gulmi Hospital (from 22.6 % in 2021 to 92.3% in 2022). Reporting completeness was constant in two sentinel sites (11.1%). Five reporting sites (27.8%) did not improve their reporting status in 2022 compared to 2021. The highest drop in Bheri Hospital, Banke (from 98.1% in 2021 to 82.7% in 2022). (Figure 1.24)

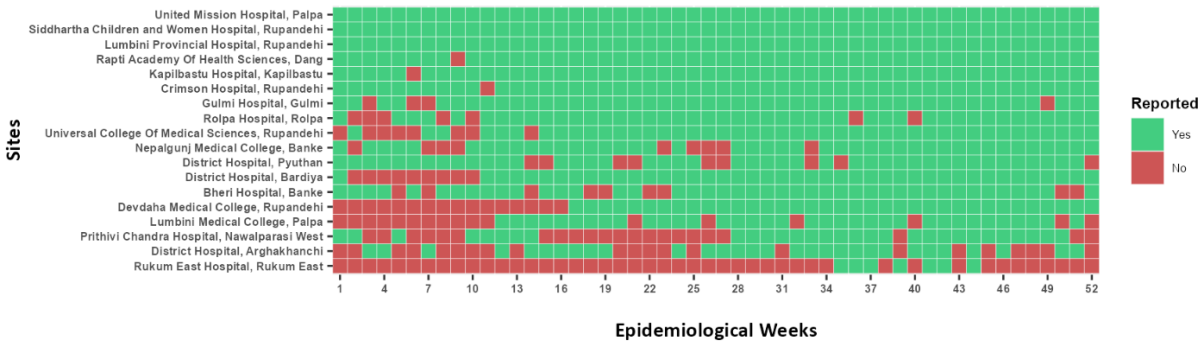


Figure 1.24: Weekly reporting status of sentinel sites in Lumbini Province, 2022

Karnali Province

The Karnali province reported a total of 4,595 cases of nine selected diseases/syndromes to EWARS. This is 8% of the national caseload reported in 2022 (Table 1.2). Table 1.9 presents disease and syndrome wise data, with ILI being the most reported disease, followed by SARI and AGE.

Table 1.9: Frequency of nine selected diseases/syndromes reported in Karnali Province, 2022

Disease	Number	Percentage
ILI	1,550	33.7
SARI	1,260	27.4
AGE	1,041	22.7
Dengue	492	10.7
Kala azar	115	2.5
Enteric Fever	73	1.6
Scrub Typhus	56	1.2
Malaria	8	0.2
Cholera	0	0.0
Total	**4,595**	**100.0**

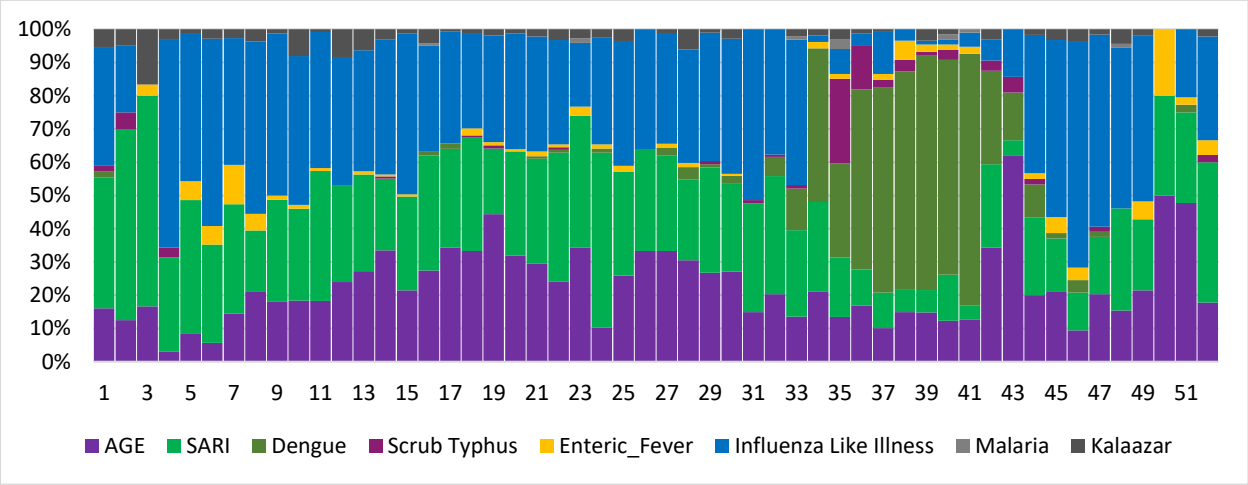


Figure 1.25: Weekly burden of nine selected diseases/syndromes reported in Karnali Province, 2022

Seasonal variation in reporting was observed for dengue, enteric fever, kala azar, scrub typhus and ILI (Figure 1.25 and 1.26). Higher case load among male were observed for AGE, dengue, ILI, kala azar, malaria and whereas females were more affected by enteric fever, SARI and scrub typhus. It is important to note there were missing information on sex for AGE (n=5), Enteric fever (n=1), ILI (n=2), and SARI (n=2). (Figure 1.27)

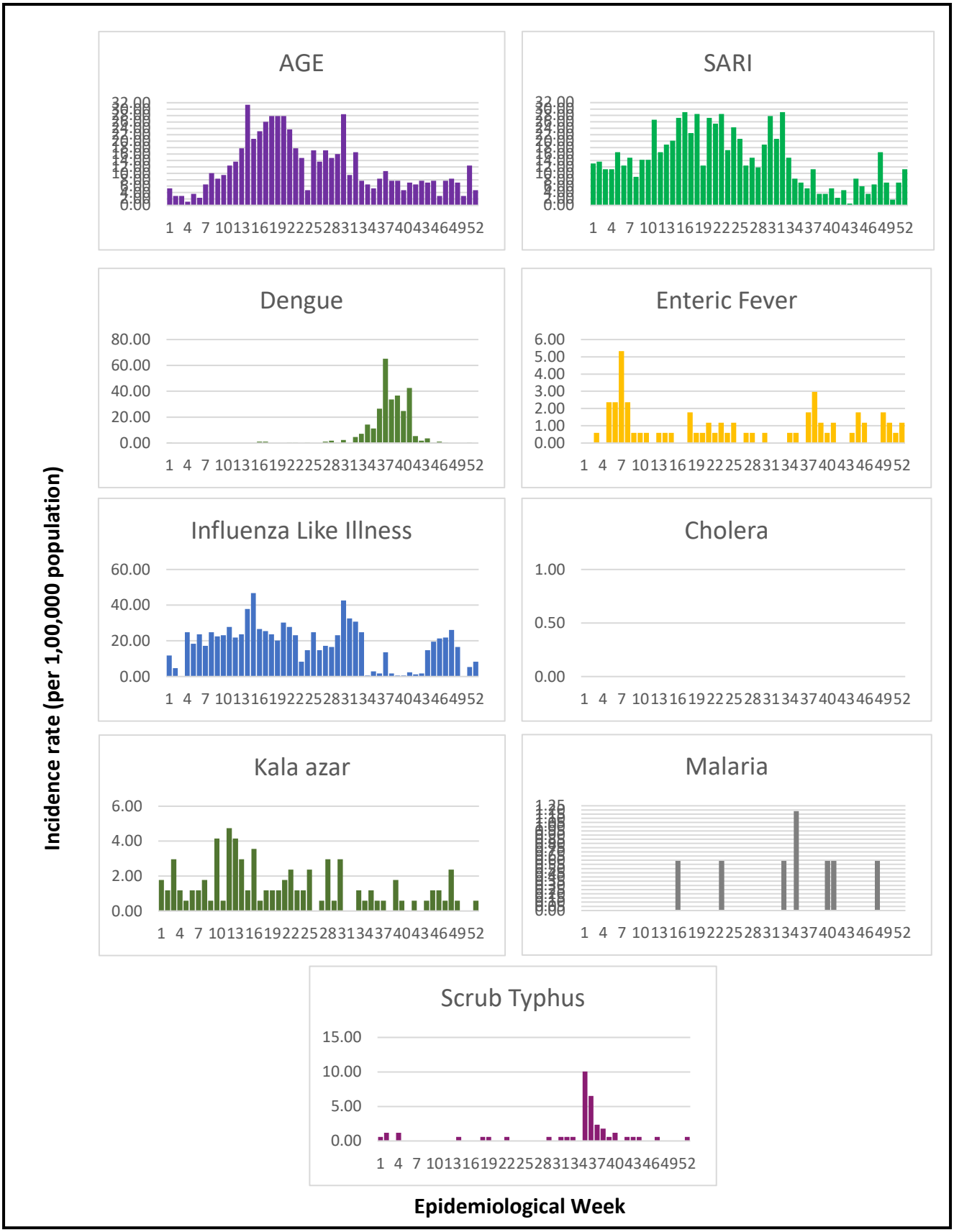


Figure 1.26: Weekly trend of nine selected diseases and syndromes reported in Karnali Province, 2022

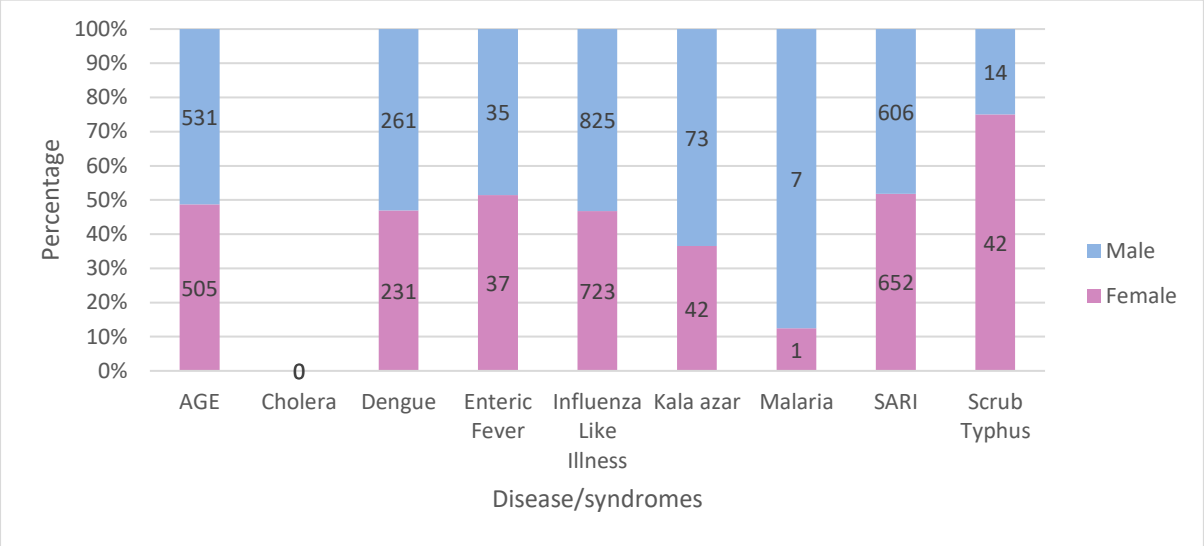


Figure 1.27: Distribution of nine selected diseases/syndromes by sex in Karnali Province, 2022

EWARS Reporting status: Karnali province

In 2022, there were 11 registered and officially recognized sentinels in the EWARS, belonging to the Karnali province. The average number of weeks a sentinel site reported in EWARS was 28 compared to 21 in 2021, a 35.9% increment. Average reporting completeness increased to 53.1% in 2022 from 39.1% in 2021. None of the sites fell into the zero-reporting completeness category. One sentinel site (Karnali Academy of Health Sciences, Jumla) managed to report in all epidemiological weeks in 2022. An improvement in reporting status was observed in 8 sentinel sites (72.7%). The highest improvement was recorded by District Hospital Rukum West (from 1.9 % in 2021 to 53.8% in 2022). Three reporting sites (27.3%) did not improve their reporting status in 2022 compared to 2021. The highest reporting drop was observed District Hospital, Dailekh (from 71.7% in 2021 to 55.8% in 2022). (Figure 1.28)

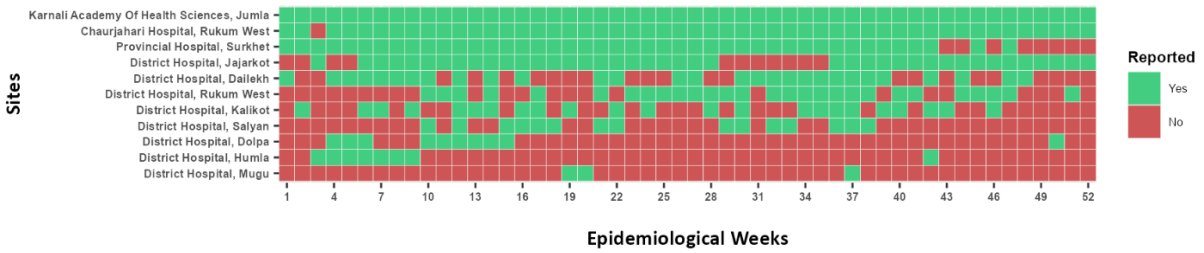


Figure 1.28: Weekly reporting status of sentinel sites in Karnali Province, 2022

Sudurpaschim Province

Sudurpaschim province reported a total of 5,253 cases of nine selected diseases/syndromes to EWARS. This is 9% of the national caseload reported in 2022 (Table 1.2). Table 1.10 presents disease and syndrome data reported with scrub typhus being the most reported disease, followed by AGE and SARI.

Table 1.10: Frequency of nine selected diseases/syndromes reported in Sudurpaschim province

Disease	Number	Percentage
Scrub Typhus	1,190	22.7
AGE	1,158	22.0
SARI	1,147	21.8
Dengue	1,079	20.5
Enteric Fever	311	5.9
ILI	280	5.3
Kala azar	64	1.2
Malaria	23	0.4
Cholera	1	0.0
Total	**5,253**	**100.0**

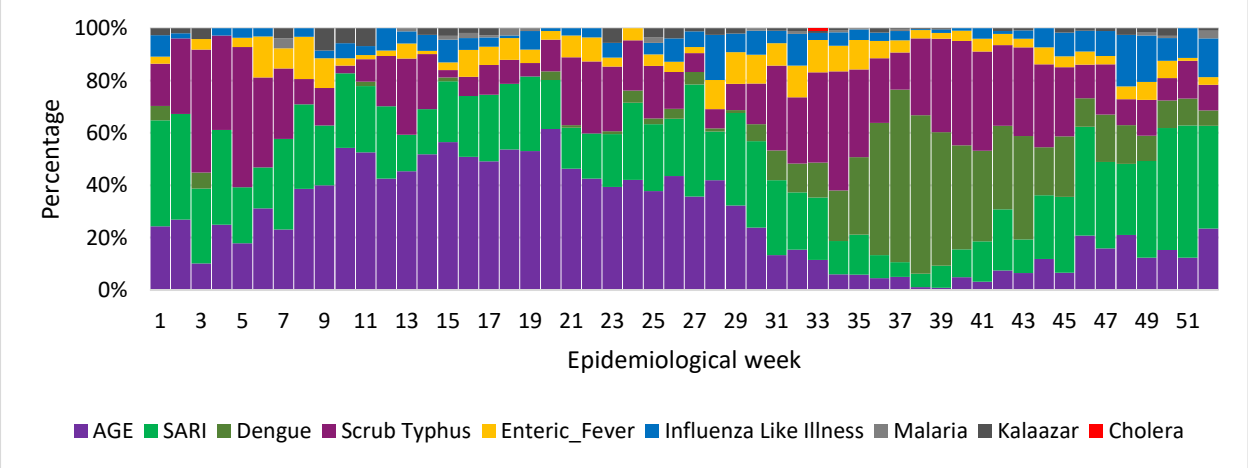


Figure 1.29: Weekly burden of nine selected diseases/syndromes reported in Sudurpaschim Province, 2022

Seasonal variation in reporting was observed for dengue, enteric fever, malaria, ILI and kala azar (Figure 1.29 and 1.30) and closely followed the national trends. Higher caseloads among female were observed for enteric fever and scrub typhus whereas males were more affected by AGE, dengue, enteric fever, ILI, kala azar, malaria and SARI. It is important to note there were missing information on sex for AGE (n=5), Dengue (n=1), SARI (n=4) and Scrub typhus (n=5). (Figure 1.31)

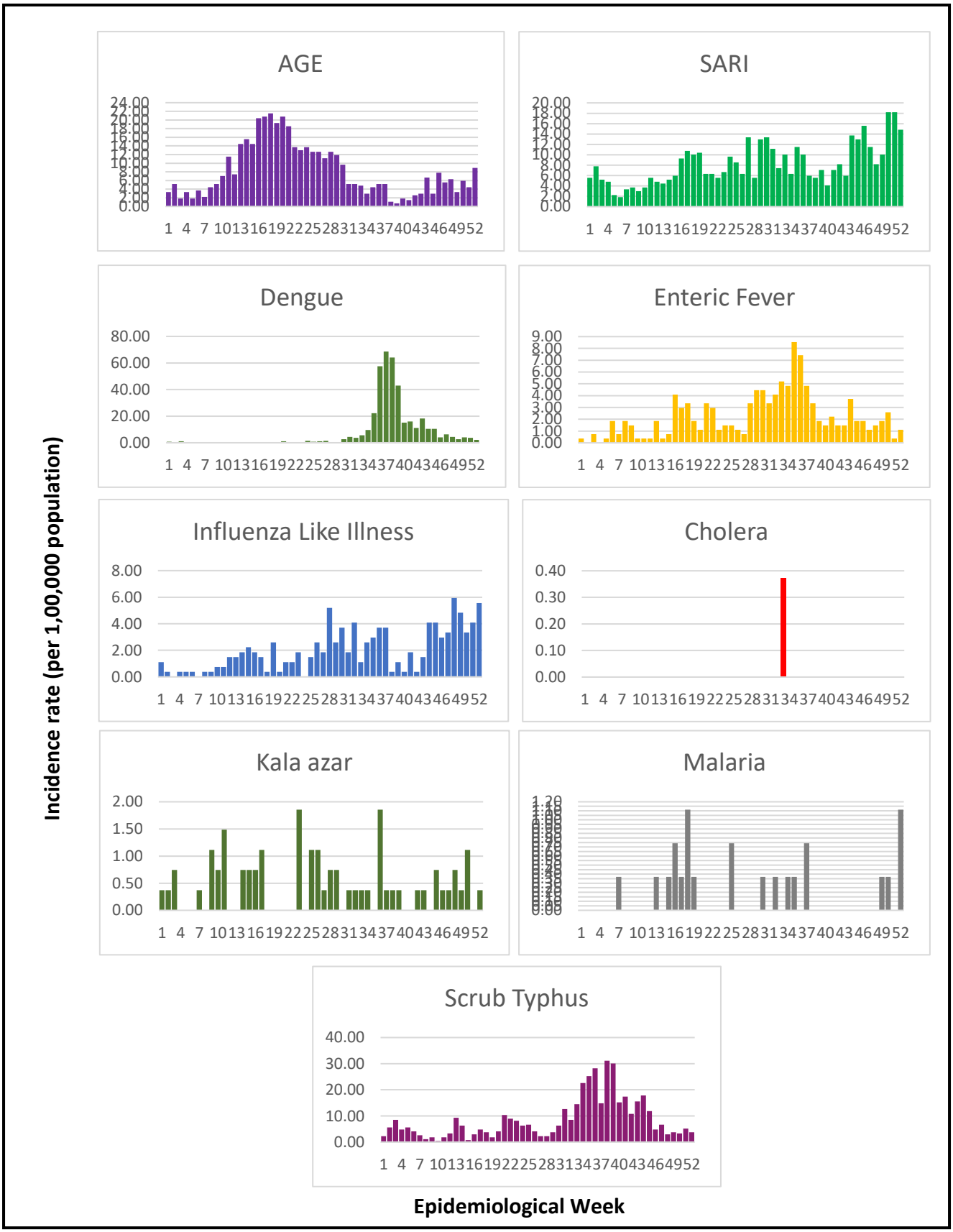


Figure 1.30: Weekly trend of nine selected diseases/syndromes reported in Sudurpaschim Province, 2022

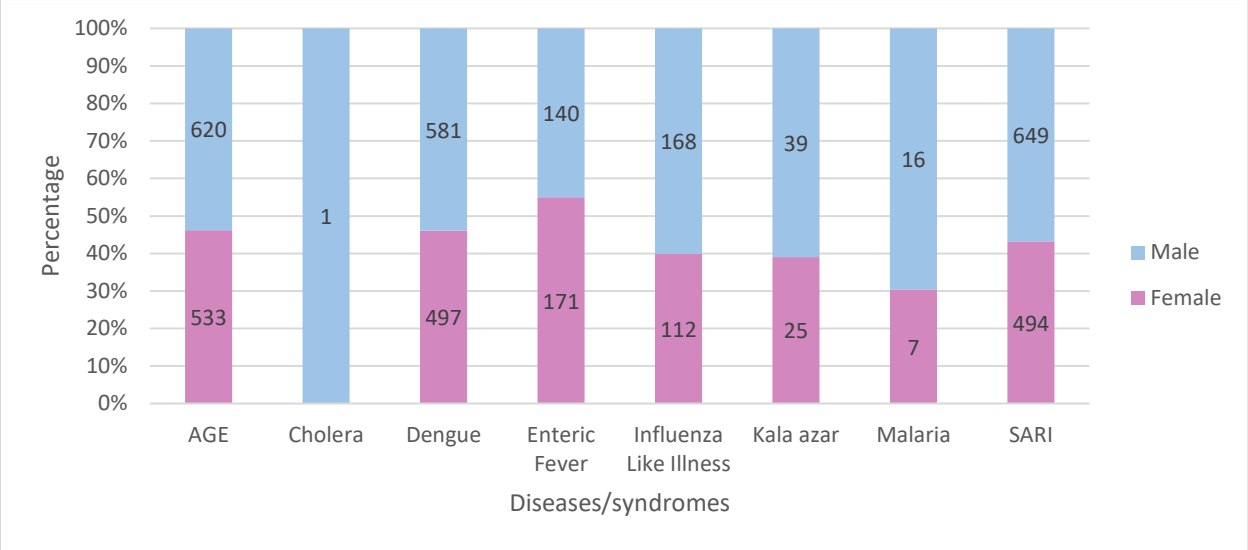


Figure 1.31: Sex distribution of nine selected diseases/syndromes reported in Sudurpaschim Province, 2022

EWARS Reporting status: Sudurpaschim province

In 2022, there were 11 registered and officially recognized sentinels in the EWARS, belonging to the Sudurpaschim province. The average number of weeks a sentinel site reported in EWARS was 45 compared to 38 in 2021, a 20.0% increment. Average reporting completeness increased to 85.8% in 2022 from 71.5% in 2021. None of the sites fell into the zero-reporting completeness category. Three sentinel sites (27.3%) managed to report in all epidemiological weeks in 2022. An improvement in reporting status was observed in 7 sentinel sites (63.6%). The highest improvement was recorded by District Hospital Baitadi (from 24.5 % in 2021 to 80.8% in 2022). Reporting completeness was constant in two sentinel sites (18.2%). Two reporting sites (18.2%) did not improve their reporting status in 2022 compared to 2021. The highest drop in Dadeldhura Hospital (from 75.5% in 2021 to 71.2% in 2022). (Figure 1.32)

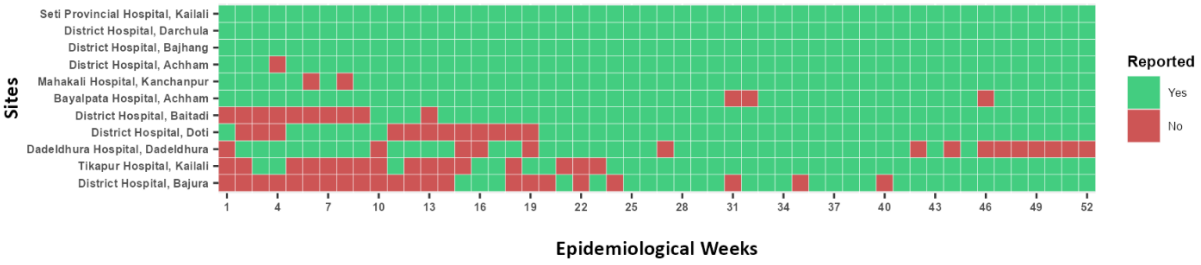


Figure 1.32: Weekly reporting status of sentinel sites in Sudurpaschim Province, 2022

Chapter 4. EWARS report 2023

A total of 79,803 cases belonging to more than twenty diseases/syndromes were reported in EWARS during 2023, of which nine diseases/syndromes were included in this analysis.

National overview

Among all disease entities reported, the highest number of cases was reported for dengue (n=27,270; 34.2%), followed by Acute Gastroenteritis (AGE) (n=18,730; 23.5%), Severe Acute Respiratory Infection (SARI) (n=16,393; 20.5%), scrub typhus (n=5,301; 6.6%), enteric fever (n=4,460; 5.6%), and Influenza-Like Illness (ILI) (n=4,027; 5.0%). It is important to note that the system was also used to report non-infectious events such as snake bite and other animal bites, which hold significant public health importance (Table 2.1).

Table 2.1: Frequency of reported diseases, syndromes and events at national level in EWARS, 2023

Disease/Syndrome/Event	Number	Percentage
Dengue	27,270	34.2%
Acute Gastroenteritis (AGE)	18,730	23.5%
Severe Acute Respiratory Infection (SARI)	16,393	20.5%
Scrub Typhus	5,301	6.6%
Enteric Fever	4,460	5.6%
Influenza-Like Illness (ILI)	4,027	5.0%
Snake Bite	721	0.9%
COVID-19	544	0.7%
Animal bite	533	0.7%
Viral Hemorrhagic Fever	355	0.4%
Other*	244	0.3%
Kala azar	201	0.3%
Hepatitis-Acute Jaundice	195	0.2%
Mumps	135	0.2%
SHAPU	134	0.2%
Suspected measles like illness	116	0.1%
Meningitis	113	0.1%
Encephalitis	107	0.1%
Malaria	104	0.1%
Chicken pox	33	<0.1%
Tuberculosis	21	<0.1%
Brucellosis	20	<0.1%
Leptospirosis	16	<0.1%
Cholera	13	<0.1%
Whooping Cough	12	<0.1%
Diphtheria	5	<0.1%
Grand Total	**79,803**	**100.0%**
***Other consists of fever under evaluation, poisoning, and others**		

Most of the cases in EWARS were reported from Bagmati province (24.0%), followed by Koshi (22.9%) and Lumbini (13.9%) (Table 2.2).

Table 2.2: Distribution of reported diseases/syndromes in EWARS by province, 2023

Province	All disease entities		Selected 9 diseases/syndromes	
	Number	Percentage	Number	Percentage
Koshi	18,265	22.9%	17,846	23.3%
Madhesh	9,119	11.4%	9,030	11.8%
Bagmati	19,136	24.0%	17,881	23.4%
Gandaki	10,427	13.1%	10,110	13.2%
Lumbini	11,123	13.9%	10,680	14.0%
Karnali	4,364	5.5%	3,948	5.2%
Sudurpaschim	7,369	9.2%	7,004	9.2%
Nepal	**79,803**	**100.0%**	**76,499**	**100.0%**

The analysis of weekly burden of selected diseases/syndromes at national level revealed that AGE cases reached their highest proportion during weeks 16 and 22 but decreased significantly by week 40. SARI cases had the highest proportion up until week 7, followed by a decrease, reaching a minimum around week 30. In contrast, dengue cases had their maximum proportion during week 30 to 43. Other diseases/syndromes consistently maintained a relatively minimum proportion throughout all the weeks in 2023. (Figure 2.1)

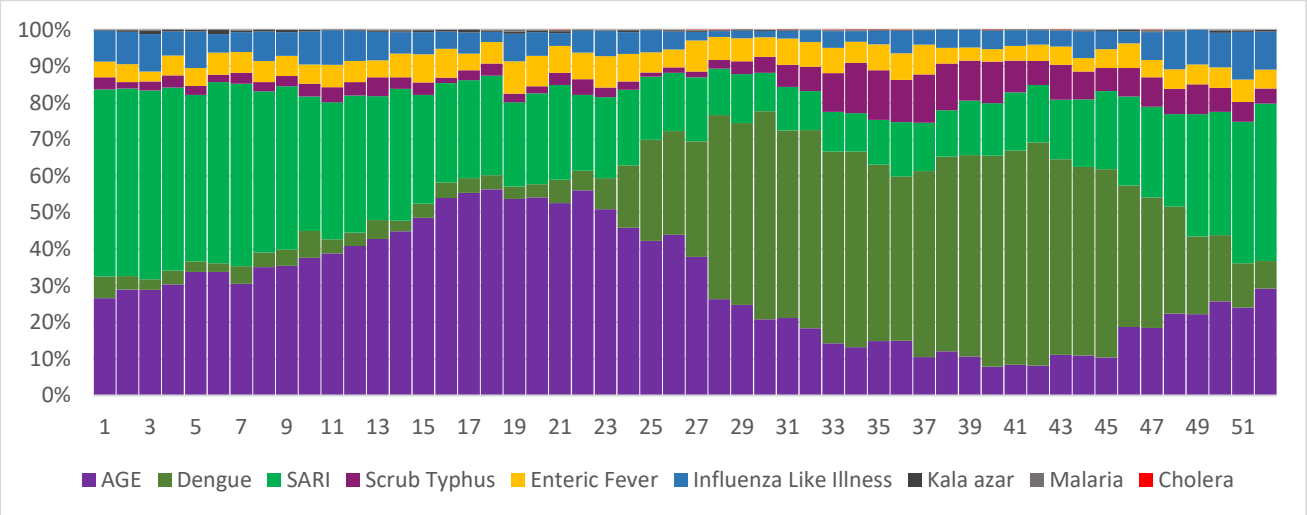


Figure 2.1: Weekly burden of nine selected diseases/syndromes reported at the national level, 2023

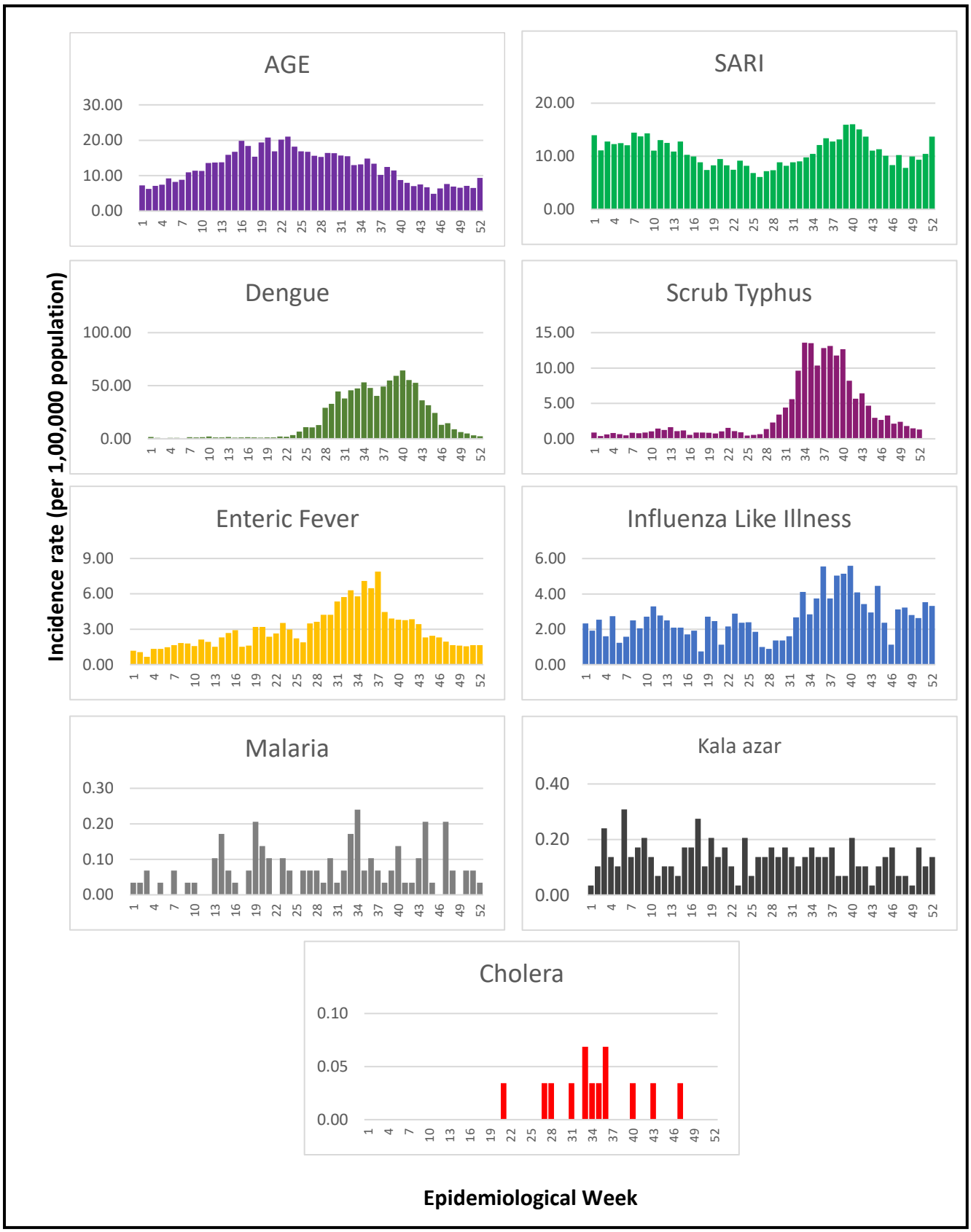


Figure 2.2: Weekly trend of nine selected diseases/syndromes at the national level, 2023

The weekly analysis on burden of selected diseases/syndromes at national level showed a seasonal variation mainly in acute gastroenteritis (AGE), dengue, enteric fever, and scrub typhus (Figure 2.2). AGE and Severe Acute Respiratory Infection (SARI) cases were reported more in the first half of the year, while dengue, enteric fever, and scrub typhus were reported more in the latter half of the year, peaking in during weeks 31-40. The peak of SARI and ILI was observed around week 40 while the peak of AGE was observed in weeks 16-23.

Kala-azar cases peaked in week 6, while AGE cases peaked in week 20. Similarly, cholera registered its highest count in weeks 33 and 36, while malaria case reporting peaked in week 34. Influenza-Like Illness (ILI) reached its maximum case count in week 40, enteric fever cases at week 37, dengue peaked in week 40, scrub typhus in week 34, and SARI reached its highest count in week 40.

Table 2.3: Age distribution of nine selected diseases/syndromes reported at the national level

Age Group	AGE	Cholera	Dengue	Enteric Fever	Kala azar	Malaria	SARI	Scrub Typhus	ILI	Total
<1	1676 (8.95%)	0 (0.00%)	630 (2.31%)	154 (3.45%)	6 (2.99%)	0 (0.00%)	4931 (30.08%)	40 (0.75%)	487 (12.09%)	7924 (10.36%)
1-4	3268 (17.45%)	0 (0.00%)	1063 (3.90%)	518 (11.61%)	26 (12.94%)	4 (3.85%)	3653 (22.28%)	237 (4.47%)	905 (22.47%)	9674 (12.65%)
5-9	1473 (7.86%)	0 (0.00%)	1592 (5.84%)	620 (13.90%)	17 (8.46%)	2 (1.92%)	1047 (6.39%)	351 (6.62%)	492 (12.22%)	5594 (7.31%)
10-14	980 (5.23%)	0 (0.00%)	1775 (6.51%)	384 (8.61%)	12 (5.97%)	4 (3.85%)	414 (2.53%)	335 (6.32%)	233 (5.79%)	4137 (5.41%)
15-19	898 (4.79%)	2 (15.38%)	2354 (8.63%)	350 (7.85%)	13 (6.47%)	7 (6.73%)	197 (1.20%)	311 (5.87%)	208 (5.17%)	4340 (5.67%)
20-24	1186 (6.33%)	0 (0.00%)	2932 (10.75%)	350 (7.85%)	18 (8.96%)	18 (17.31%)	162 (0.99%)	369 (6.96%)	201 (4.99%)	5236 (6.84%)
25-29	1097 (5.86%)	1 (7.69%)	2671 (9.79%)	331 (7.42%)	14 (6.97%)	13 (12.50%)	194 (1.18%)	330 (6.23%)	230 (5.71%)	4881 (6.38%)
30-34	1022 (5.46%)	2 (15.38%)	2711 (9.94%)	236 (5.29%)	15 (7.46%)	15 (14.42%)	177 (1.08%)	383 (7.23%)	191 (4.74%)	4752 (6.21%)
35-39	874 (4.67%)	0 (0.00%)	2403 (8.81%)	250 (5.61%)	14 (6.97%)	14 (13.46%)	183 (1.12%)	377 (7.11%)	164 (4.07%)	4279 (5.59%)
40-44	855 (4.56%)	2 (15.38%)	2117 (7.76%)	241 (5.40%)	8 (3.98%)	9 (8.65%)	207 (1.26%)	356 (6.72%)	139 (3.45%)	3934 (5.14%)
45-49	802 (4.28%)	0 (0.00%)	1575 (5.78%)	182 (4.08%)	14 (6.97%)	3 (2.88%)	225 (1.37%)	291 (5.49%)	92 (2.28%)	3184 (4.16%)
50-54	825 (4.40%)	1 (7.69%)	1458 (5.35%)	189 (4.24%)	12 (5.97%)	6 (5.77%)	402 (2.45%)	344 (6.49%)	143 (3.55%)	3380 (4.42%)
55-59	710 (3.79%)	0 (0.00%)	1058 (3.88%)	154 (3.45%)	15 (7.46%)	3 (2.88%)	413 (2.52%)	308 (5.81%)	91 (2.26%)	2752 (3.60%)
60-64	695 (3.71%)	0 (0.00%)	902 (3.31%)	133 (2.98%)	6 (2.99%)	3 (2.88%)	662 (4.04%)	319 (6.02%)	145 (3.60%)	2865 (3.75%)
65-69	632 (3.37%)	1 (7.69%)	667 (2.45%)	103 (2.31%)	4 (1.99%)	2 (1.92%)	782 (4.77%)	257 (4.85%)	98 (2.43%)	2546 (3.33%)
70-74	739 (3.95%)	2 (15.38%)	590 (2.16%)	140 (3.14%)	3 (1.49%)	1 (0.96%)	1073 (6.55%)	304 (5.73%)	94 (2.33%)	2946 (3.85%)
75-79	462 (2.47%)	1 (7.69%)	407 (1.49%)	64 (1.43%)	2 (1.00%)	0 (0.00%)	778 (4.75%)	210 (3.96%)	72 (1.79%)	1996 (2.61%)
>80	536 (2.86%)	1 (7.69%)	365 (1.34%)	61 (1.37%)	2 (1.00%)	0 (0.00%)	893 (5.45%)	179 (3.38%)	42 (1.04%)	2079 (2.72%)
Total	18730	13	27270	4460	201	104	16393	5301	4027	76499

Table 2.3 highlights the distribution of disease burden across different age groups. Acute Gastroenteritis (AGE) is particularly prevalent among children under 5 years, who bear almost a quarter of the total disease burden (26.4%). No other age group, except for those aged 5-9 years, accounts for more than 7% of the cases. Cholera is observed exclusively in individuals aged 15 years and above. Enteric fever affects all age groups, with a notable concentration among children aged 1-9 years, who account for 25.5% of the cases. Dengue disease burden is distributed among all age groups with more than 50% of reported caseload in 2023 belonging to age group less than 34 years. Both Influenza-like Illness (ILI) and Severe Acute Respiratory Infection (SARI) primarily affect children under 9 years old. This age group accounts for 46.8% of ILI cases and 58.8% of SARI cases reported. Kala-azar is distributed across all age groups, with over 50% of cases occurring in individuals under 34 years. The prevalence of Kala-azar gradually decreases with advancing age. Scrub typhus affects all age groups relatively equally, except for the very young and the elderly. Malaria shows an irregular age distribution pattern, likely reflecting its near-elimination status. Most of the diseases included in this analysis shows a near equal distribution among male and female groups except malaria and Kala-azar which show a male preponderance while scrub typhus skewed towards female. It is important to note there were missing information on sex for AGE (n=156), Dengue (n=222), Enteric fever (n=9), ILI (n=7), Kala azar (n=1), SARI (n=30) and Scrub typhus (n=66). (Figure 2.3)

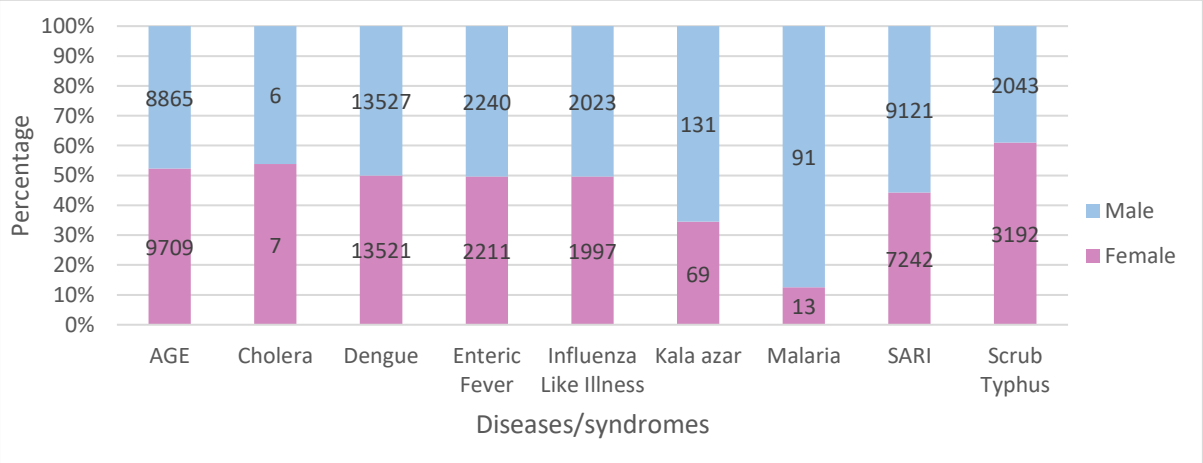


Figure 2.3: Distribution of nine selected diseases/syndromes by sex at the national level, 2023

Figure 2.4 provides a visual representation of the distribution of the nine selected diseases/syndromes reported in EWARS across Nepal in the year 2023. The geographic spread is depicted through a mapping of case incidences per 100,000 population for each of the nine selected disease and syndrome across various districts. Acute Gastroenteritis (AGE) was highly prevalent in Mustang, Rukum East, and Rukum West. Severe Acute Respiratory Infection (SARI) was most reported in Jumla, Dhankuta, Pyuthan, and Udaypur. Dengue had significant incidence in Tanahun, Sankhuwasabha, Dhading, and Sunsari, while Scrub Typhus was notably present in Darchula, Sankhuwasabha, and Rukum West. Enteric fever was prevalent in Dolpa, Parsa, and Okhaldhunga. Influenza-like Illness (ILI) cases were concentrated in Achham, Rukum West, Sindhupalchowk, and Rasuwa. Malaria was reported in Achham, Bajura, Doti, and Lamjung. Kala-azar was detected in Kalikot and Dolpa, and Cholera cases were identified in Kailali, Okhaldhunga, Kathmandu, Lalitpur, Surkhet, Palpa, and Syangja.

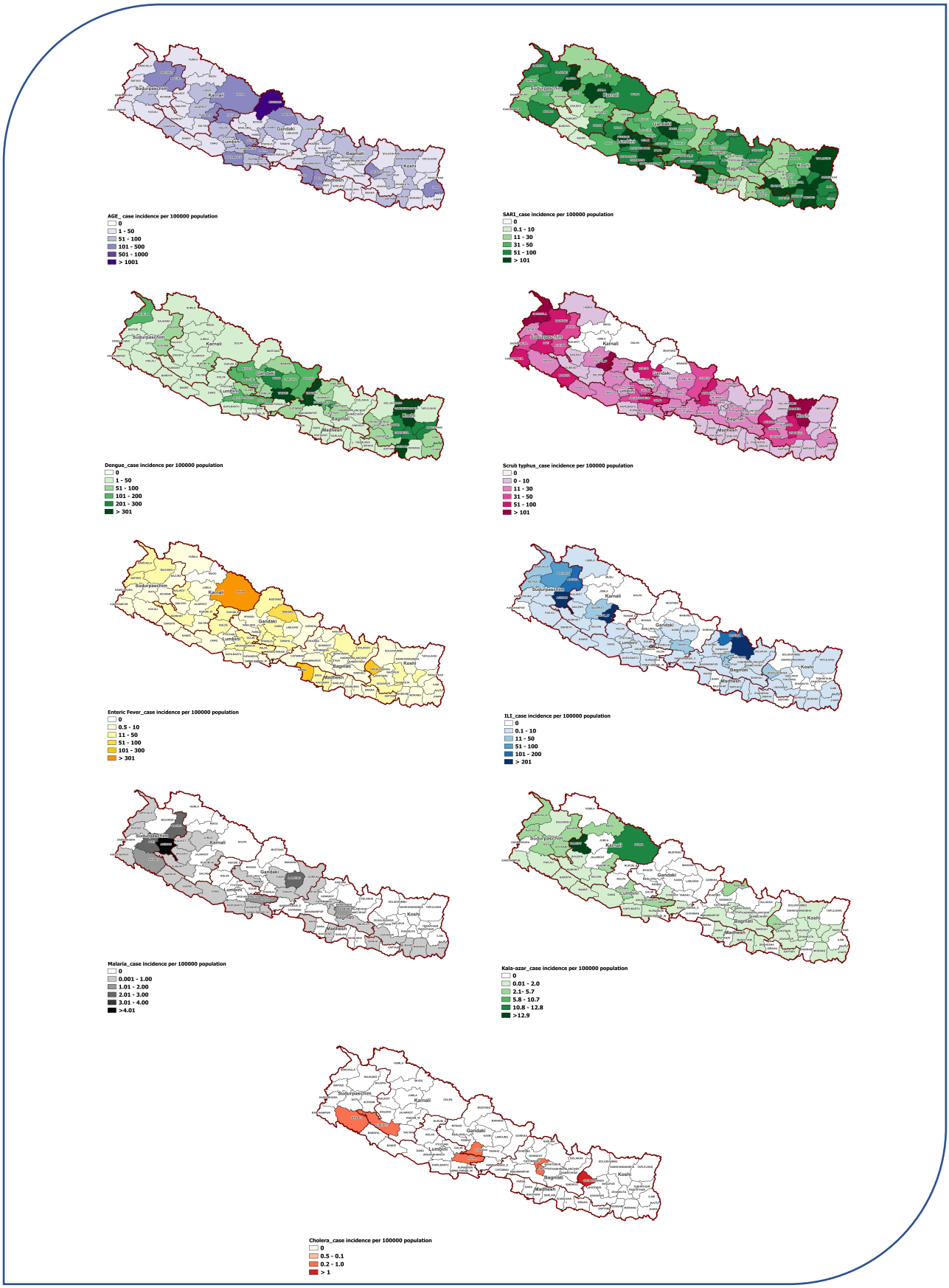


Figure 2.4: Distributions of cases of nine selected diseases/syndromes in Nepal, 2023

EWARS Reporting status: National

In 2023, there were 118 officially registered sentinels in EWARS. At the national level, the average number of weeks a sentinel site reported in EWARS was 42 (81.7%), compared to 2022 when it was 38 (72.2%), representing a 13.1% increase. Thirty-five sentinel sites (29.7%) achieved 100% reporting in EWARS in 2023, covering all seven provinces, compared to 18 (15.3%) sentinel sites reaching 100% reporting completeness in 2022. In 2023, five sentinel sites did not report in any epidemiological week, four located in Bagmati province and one in Karnali province. This marks an increase compared to 3 non-reporting sentinel sites in 2022.

Compared to 2022, 72 sentinel sites (61.0%) showed improvement in reporting completeness in 2023. The most notable improvement was observed at Rukum East Hospital, which increased its reporting rate from 13.5% in 2022 to 96.2% in 2023. Conversely, reporting completeness remained constant for 24 sentinel sites (21.2%), while it decreased for 22 sentinel sites (18.6%). The most significant drop was seen at District Hospital Jajarkot, which decreased from 78.8% in 2022 to 15.4% in 2023.

Koshi Province

Koshi Province reported a total of 17,846 cases of nine selected diseases/syndromes to EWARS. This is 23% of the national caseload reported in 2023 (Table 2.2). Table 2.4 presents disease distribution, with Dengue being the most reported (52.2%, n=9,314), followed by SARI (22.4%, n=4,004) and AGE (16.3%, n=2,905).

Table 2.4: Frequency of nine selected diseases/syndromes reported in Koshi Province, 2023

Disease	Number	Percentage
Dengue	9,314	52.2%
SARI	4,004	22.4%
AGE	2,905	16.3%
Scrub Typhus	879	4.9%
Enteric Fever	626	3.5%
Influenza Like Illness	89	0.5%
Kala azar	23	0.1%
Malaria	4	0.0%
Cholera	2	0.0%
Total	**17,846**	**100.0%**

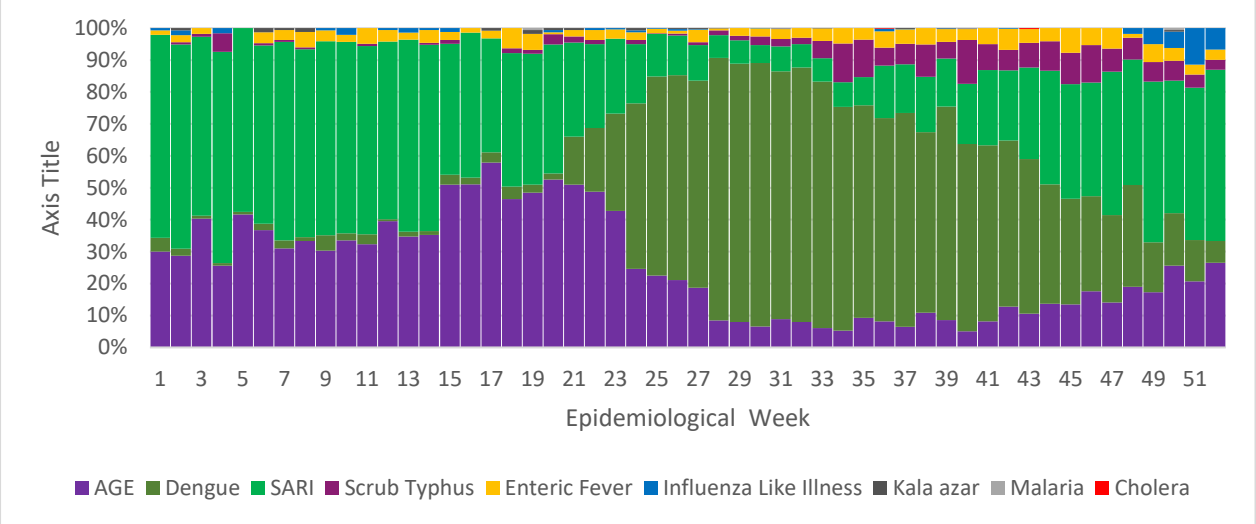


Figure 2.5: Weekly burden of nine selected diseases/syndromes reported in Koshi Province, 2023

Seasonal variation in reporting was observed for dengue, enteric fever, ILI, and scrub typhus, as illustrated in Figure 2.5 and 2.6. This pattern closely follows the national trend and provides valuable insights into the epidemiological dynamics important for disease control and prevention.

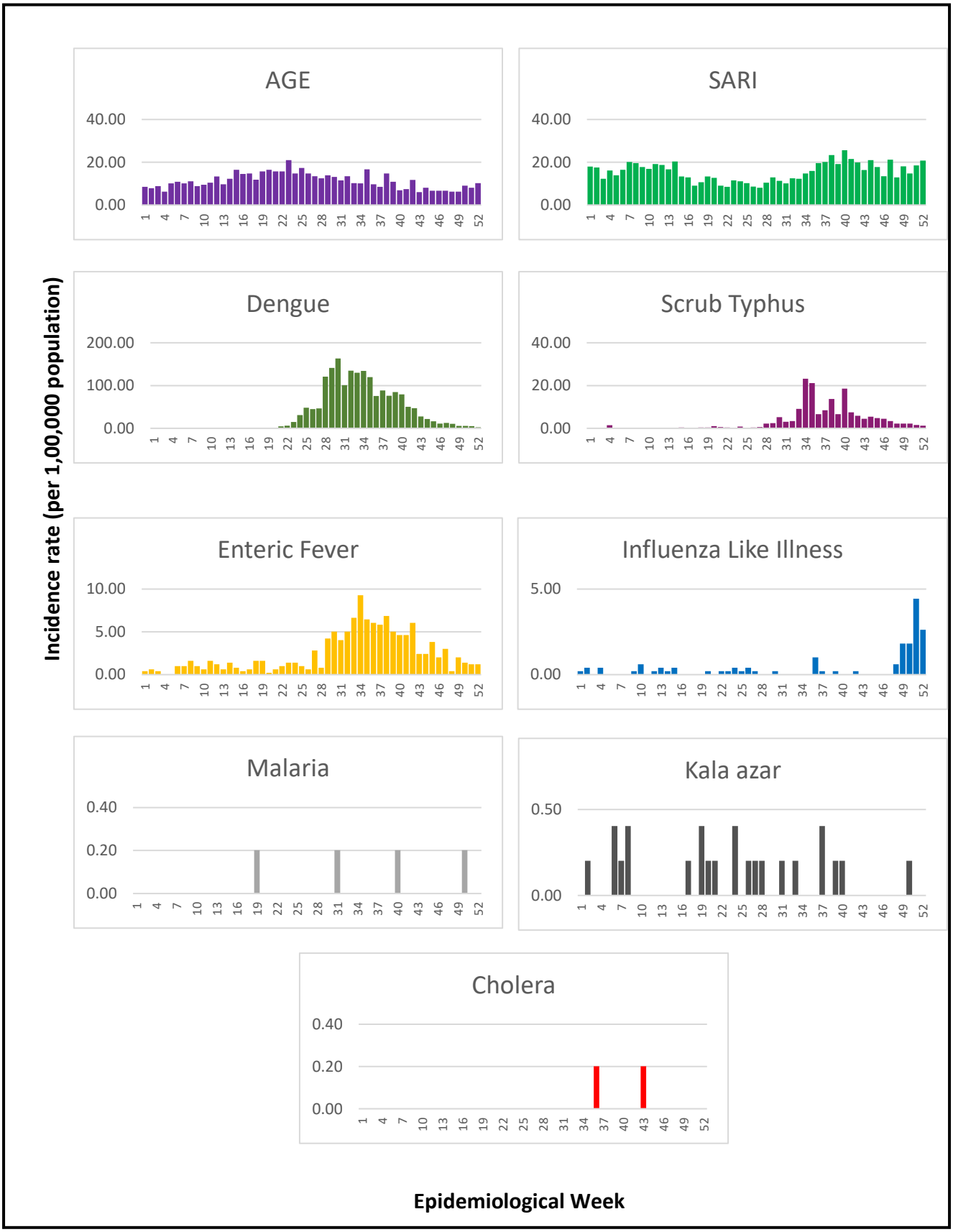


Figure 2.6: Weekly trend of nine selected diseases/syndromes reported in Koshi Province, 2023

Caseloads were generally higher in females compared to males. Higher caseloads among females were observed for AGE, dengue, enteric fever, ILI, and scrub typhus. It is important to note there were missing information on sex for AGE (n=119), Dengue (n=187), ILI (n=3), SARI (n=9) and Scrub typhus (n=1). (Figure 2.7)

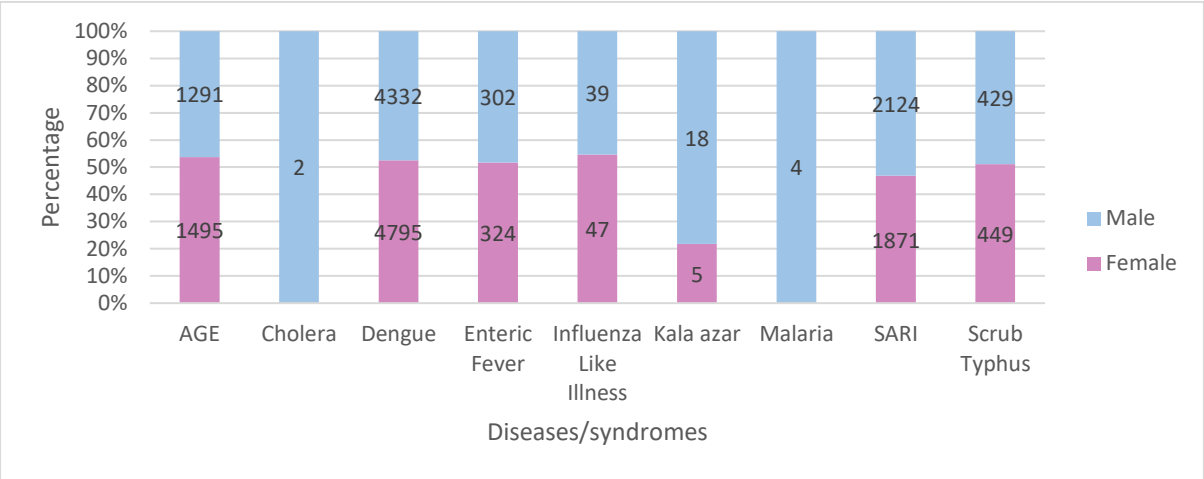


Figure 2.7: Distribution of nine selected diseases/syndromes by sex in Koshi Province, 2023

EWARS Reporting status: Koshi province

In 2023, there were 18 officially registered sentinel sites in the EWARS, belonging to the Koshi province. The average number of weeks a sentinel site reported in EWARS was 46 compared to 43 in 2022, a 5.2% increment. The average reporting completeness increased to 87.9% in 2023 from 83.5% in 2022. Out of 18 sentinel sites in the province, eight sites (44.4%) reported in all epidemiological weeks in 2023. Ten sentinel sites (55.5%) improved reporting completeness in 2023, while three sites (16.7%) did not improve. The highest improvement was recorded by the District Hospital Taplejung (from 63.5% in 2022 to 92.3% in 2023). (Figure 2.8)

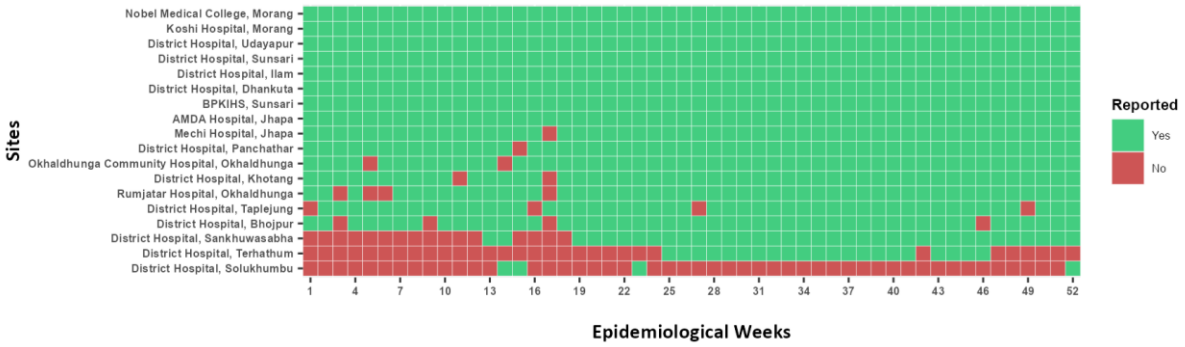


Figure 2.8: Weekly reporting status of sentinel sites in Koshi Province, 2023

Madhesh Province

Madhesh province reported a total of 9,030 cases of nine selected diseases and syndromes in EWARS. This is 12% of the national caseload reported in 2023 (Table 2.2). The highest disease burden was caused by AGE, followed by SARI and enteric fever (Table 2.5).

Table 2.5: Frequency of nine selected diseases/syndromes reported in Madhesh Province, 2023

Disease	Number	Percentage
AGE	4,130	45.7%
SARI	2,048	22.7%
Enteric Fever	1,989	22.0%
Dengue	690	7.6%
Scrub Typhus	147	1.6%
Influenza Like Illness	11	0.1%
Kala azar	10	0.1%
Malaria	5	0.1%
Cholera	0	0.0%
Total	**9,030**	**100.0%**

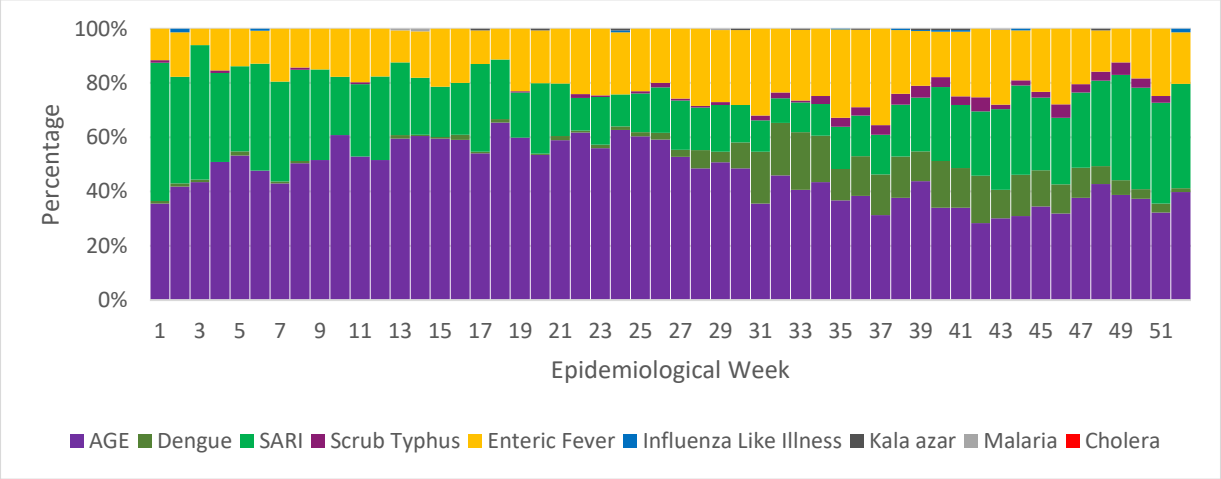


Figure 2.9: Weekly burden of nine selected diseases/syndromes reported in Madhesh Province, 2023

Seasonal variation in reporting was observed for dengue, scrub typhus and enteric fever (Figure 2.9 and 2.10). The higher caseload among male were observed for dengue, enteric fever, ILI, kala azar, malaria, and SARI whereas females were more affected by AGE, and scrub typhus. It is important to note there were missing information on sex for AGE (n=13), Dengue (n=3), Enteric fever (n=6), SARI (n=5) and Scrub typhus (n=2). No cholera reported in this province. (Figure 2.11)

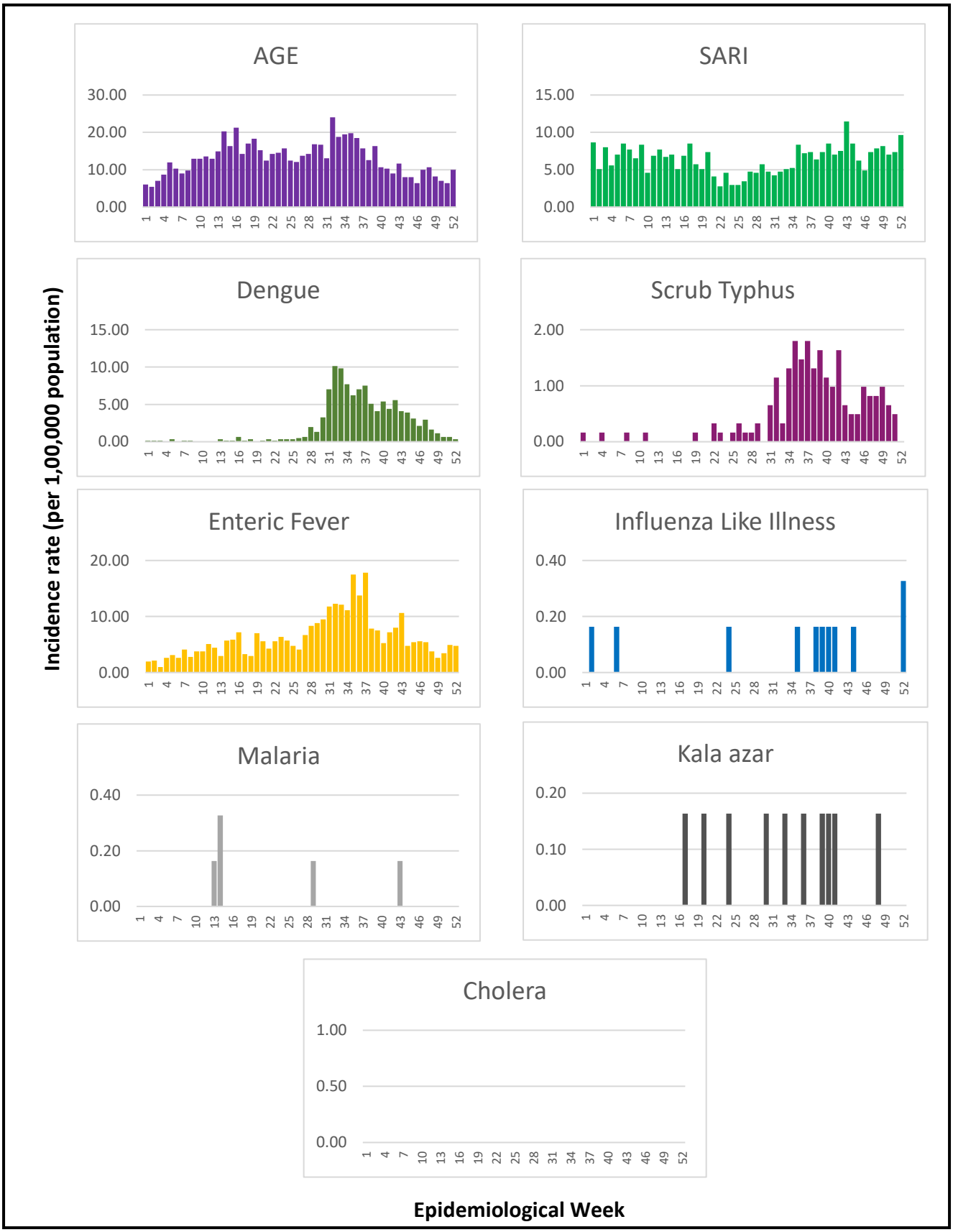


Figure 2.10: Weekly trend of nine selected diseases/syndromes reported in Madhesh Province, 2023

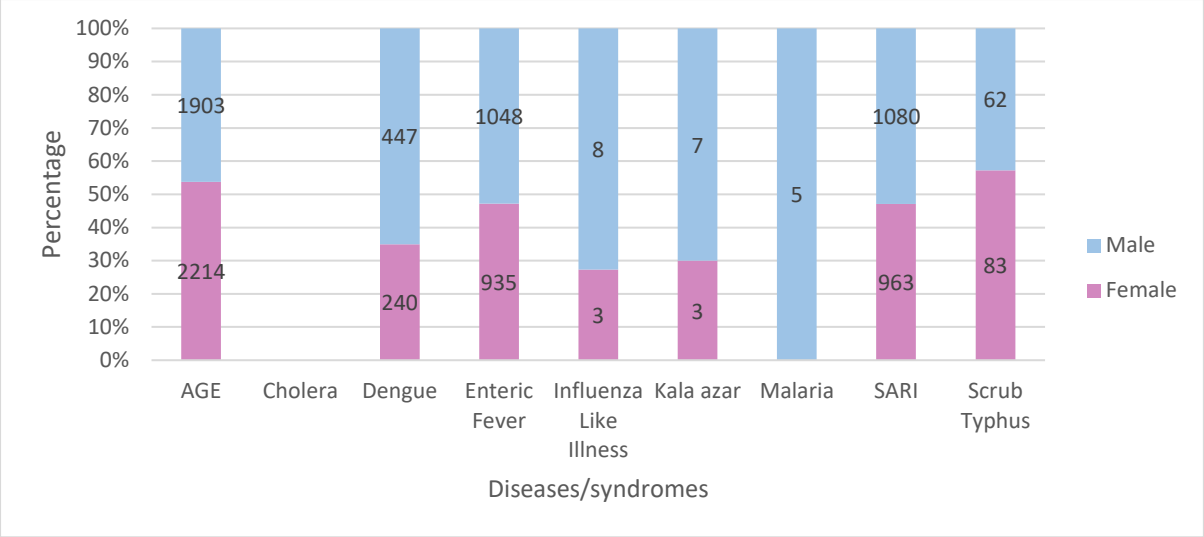


Figure 2.11: Sex distribution of selected diseases/syndromes reported in Madhesh Province, 2023

EWARS Reporting status: Madhesh province

In 2023, there were 11 EWARS sentinel sites reporting in Madhesh province. The average number of weeks a sentinel site reported in EWARS was 48 compared to 38 in 2022, a 34.5% increment. The average reporting completeness increased to 91.4% in 2023 from 73.6% in 2022. Out of 11 sentinel sites in the province, six sites (54.5%) reported in all epidemiological weeks in 2023. Eight sentinel sites (72.7%) improved reporting completeness in 2023, while two sites (18.2%) did not improve. The highest improvement was recorded by the Provincial Hospital Siraha (from 44.2% in 2022 to 94.2% in 2023). (Figure 2.12)

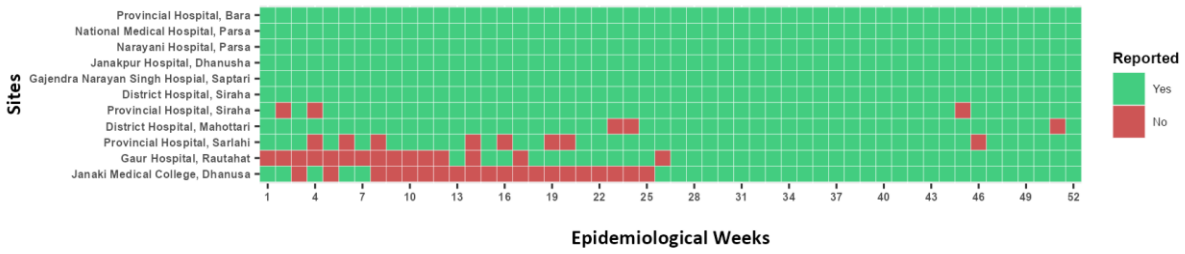


Figure 2.12: Weekly reporting status of sentinel sites in Madhesh Province, 2023

Bagmati Province

Bagmati province reported a total of 17,881 cases of nine selected diseases/syndromes to EWARS. This is 23% of the national caseload reported in 2023 (Table 2.2). The disease-wise data disaggregation shows that dengue bears the highest-burden followed by AGE and SARI (Table 2.6).

Table 2.6: Frequency of nine selected diseases/syndromes reported in Bagmati Province, 2023

Disease	Number	Percentage
Dengue	7,757	43.4%
AGE	3,958	22.1%
SARI	2,774	15.5%
Influenza Like Illness	1,982	11.1%
Scrub Typhus	853	4.8%
Enteric Fever	522	2.9%
Kala azar	23	0.1%
Cholera	6	0.0%
Malaria	6	0.0%
Total	**17,881**	**100.0%**

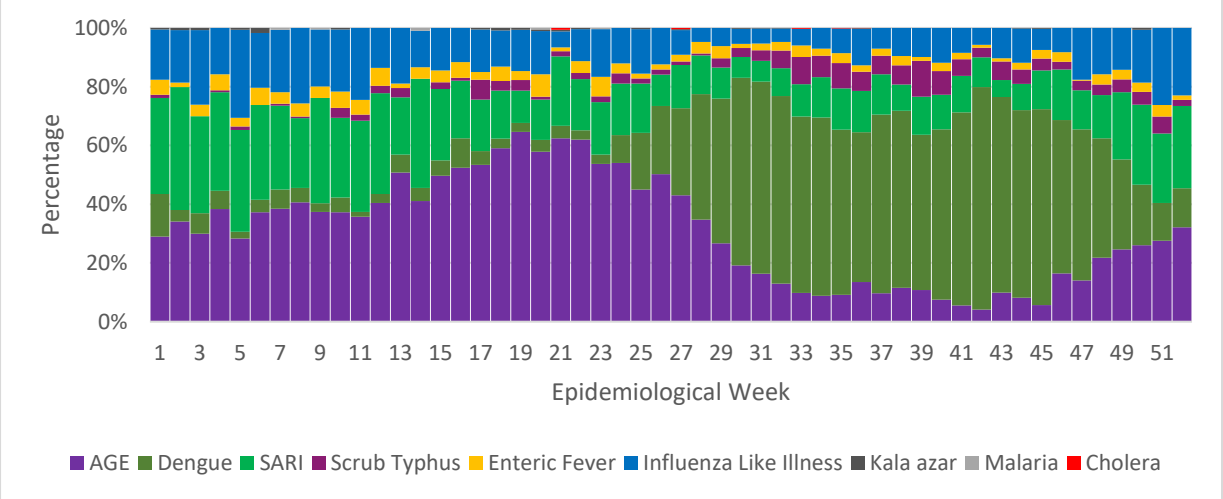


Figure 2.13: Weekly burden of nine selected diseases/syndromes reported in Bagmati Province, 2023

Seasonal variation in reporting was observed for dengue, cholera, enteric fever, ILI, and scrub typhus (Figure 2.13 and 2.14). The seasonality pattern variation did not deviate significantly from the national variation. Higher caseloads among males were observed for dengue, enteric fever, ILI, kala-azar, and SARI, whereas females were more affected by AGE and scrub typhus. It is important to note there were missing information on sex for AGE (n=8), Dengue (n=13), ILI (n=1), SARI (n=3) and Scrub typhus (n=58). (Figure 2.15)

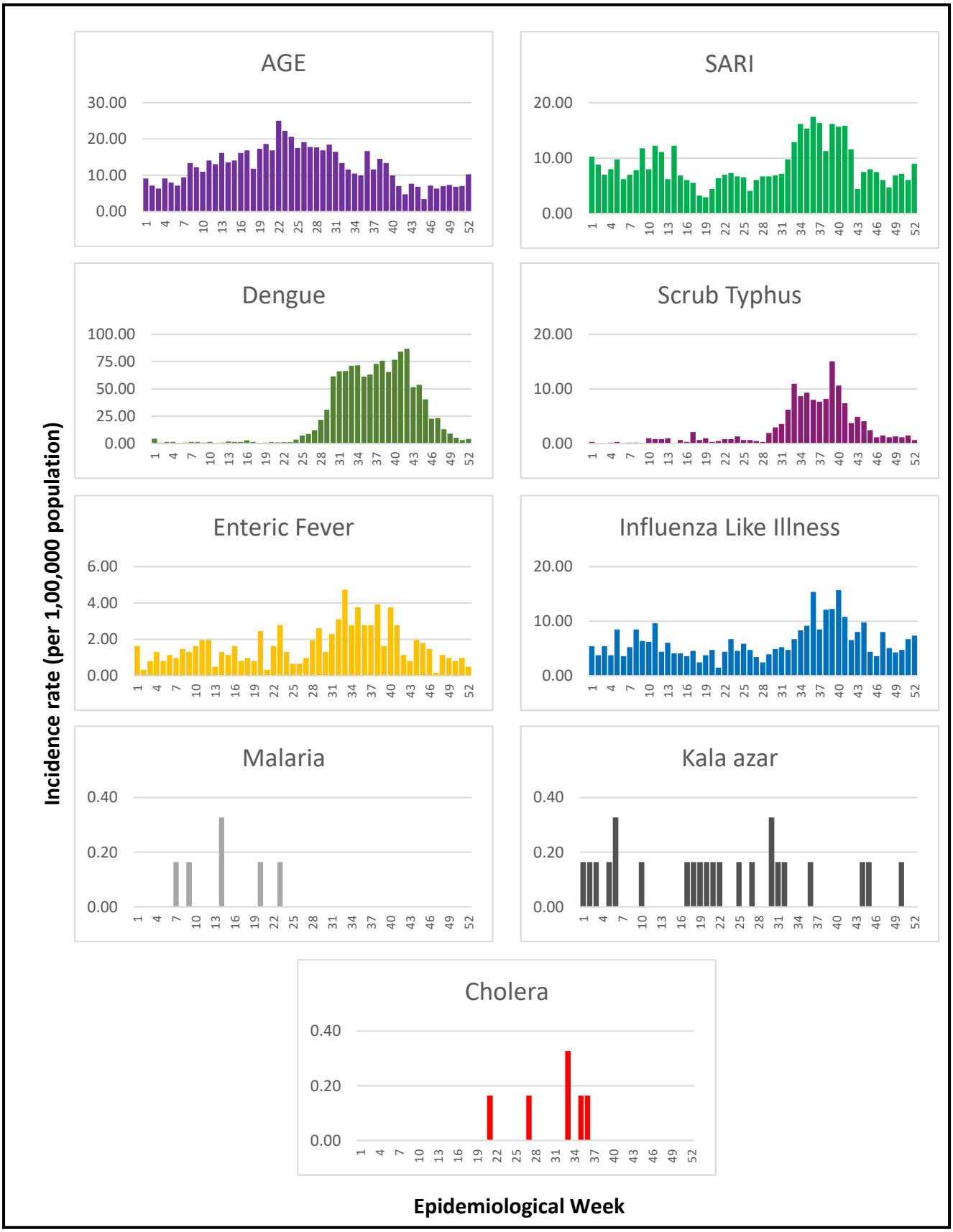


Figure 2.14: Weekly trend of nine selected diseases/syndromes reported in Bagmati Province, 2023

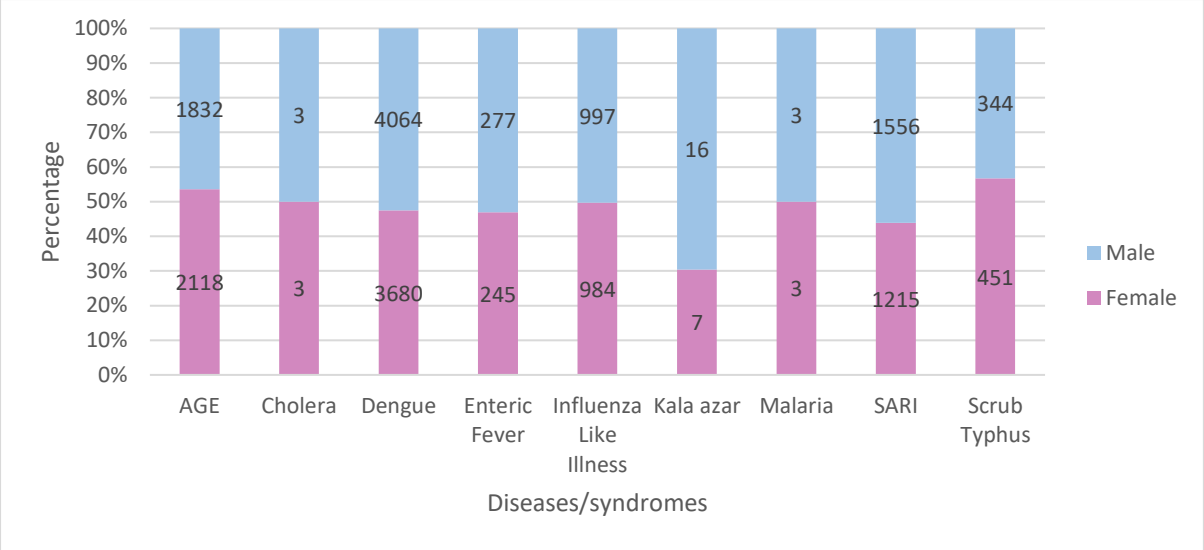


Figure 2.15: Distribution of nine selected diseases/syndromes by sex in Bagmati Province, 2023

EWARS Reporting status: Bagmati province

In 2023, there were 36 officially registered EWARS sentinel sites in Bagmati province. The average number of weeks a sentinel site reported in EWARS was 39 compared to 34 in 2022, a 12.8% increment. The average reporting completeness increased to 74.3% in 2023 from 65.8% in 2022. Out of 36 sentinel sites in the province, seven sites (19.4%) reported in all epidemiological weeks in 2023 while four sites did not report in any epidemiological weeks. Twenty-two sentinel sites (61.1%) improved reporting completeness in 2023, while five sites (13.9%) did not improve. The highest improvement was recorded by the College of Medical Sciences (from 46.2% in 2022 to 90.4% in 2023). (Figure 2.16)

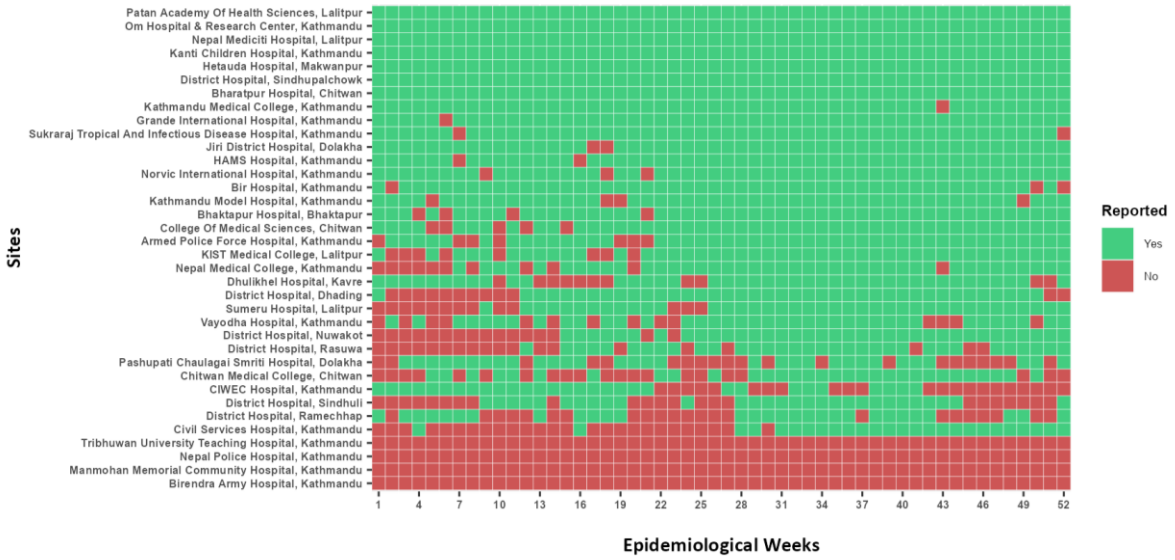


Figure 2.16: Weekly reporting status of sentinel sites in Bagmati Province, 2023

Gandaki Province

Gandaki province reported 10,110 cases of nine selected diseases/syndromes to EWARS. This is 13% of the national caseload reported in the 2023 (Table 2.2). Table 2.7 presents selected disease and syndrome data, with dengue being the most reported disease, followed by SARI and AGE.

Table 2.7: Frequency of nine selected diseases/syndromes reported in Gandaki Province, 2023

Disease	Number	Percentage
Dengue	6,240	61.7%
SARI	1,492	14.8%
AGE	1,387	13.7%
Scrub Typhus	563	5.6%
Enteric Fever	225	2.2%
Influenza Like Illness	178	1.8%
Malaria	18	0.2%
Kala azar	6	0.1%
Cholera	1	0.0%
Total	**10,110**	**100.0%**

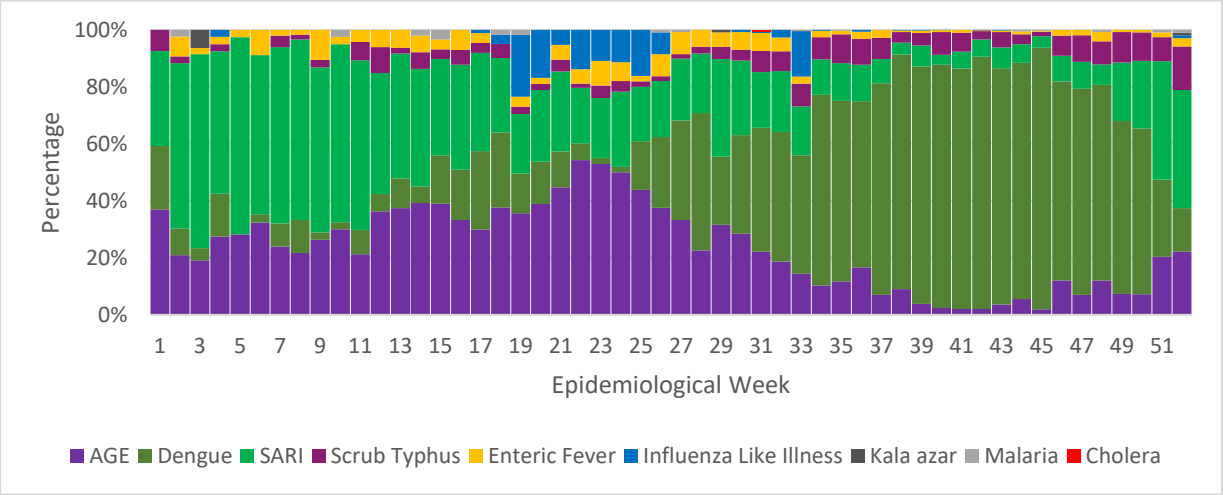


Figure 2.17: Weekly burden of nine selected diseases/syndromes reported in Gandaki Province, 2023

Seasonal variation in reporting was observed for AGE, dengue, scrub typhus, enteric fever and ILI (Figure 2.17 and 2.18). The caseload was higher in females compared to males. Higher caseloads among females were observed for AGE, dengue, and scrub typhus whereas males were more affected by cholera, enteric fever, ILI, malaria, and SARI. It is important to note there were missing information on sex for AGE (n=6), Dengue (n=7), and SARI (n=5). (Figure 2.19)

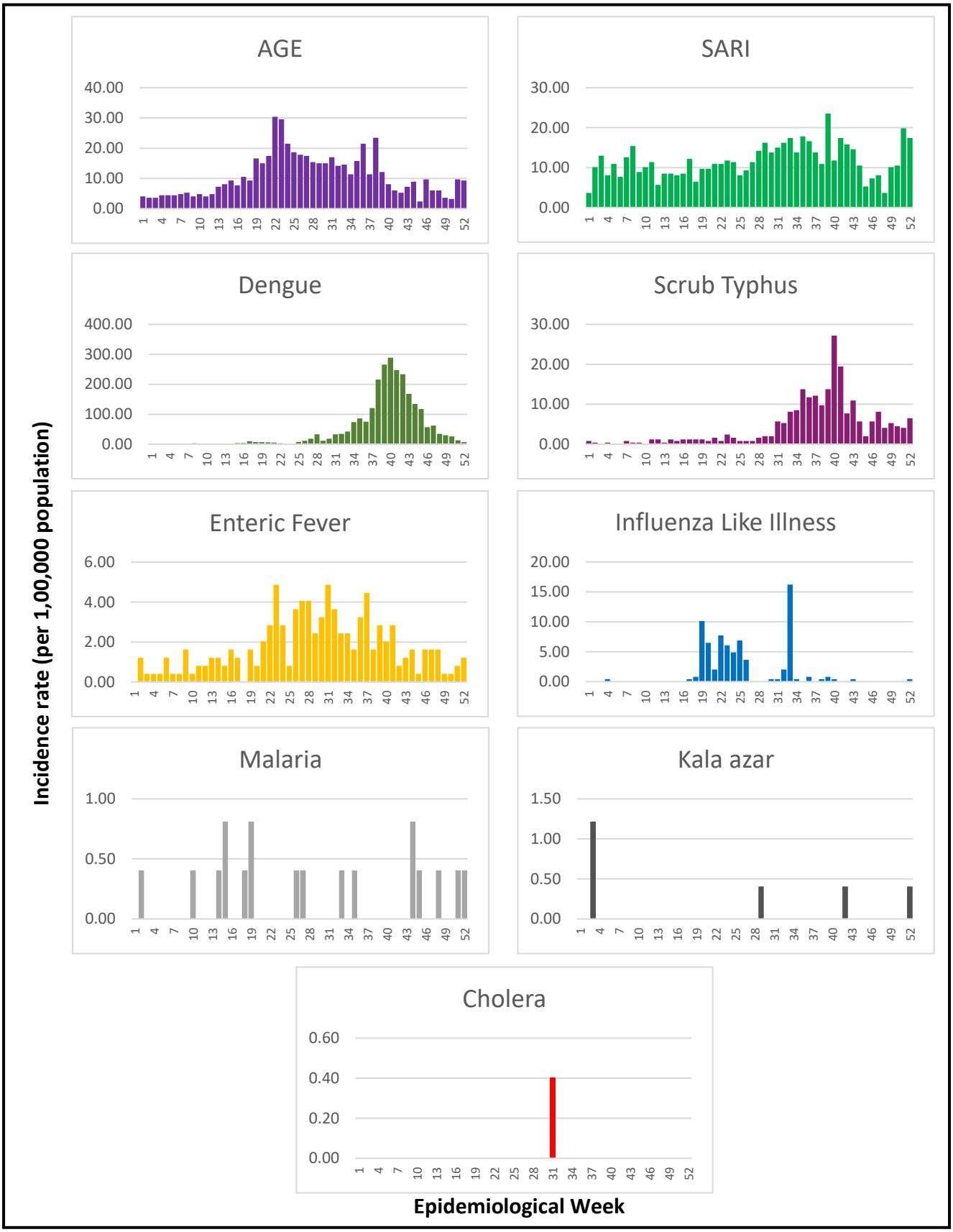


Figure 2.18: Weekly trend of nine selected diseases/syndromes reported in Gandaki Province, 2023

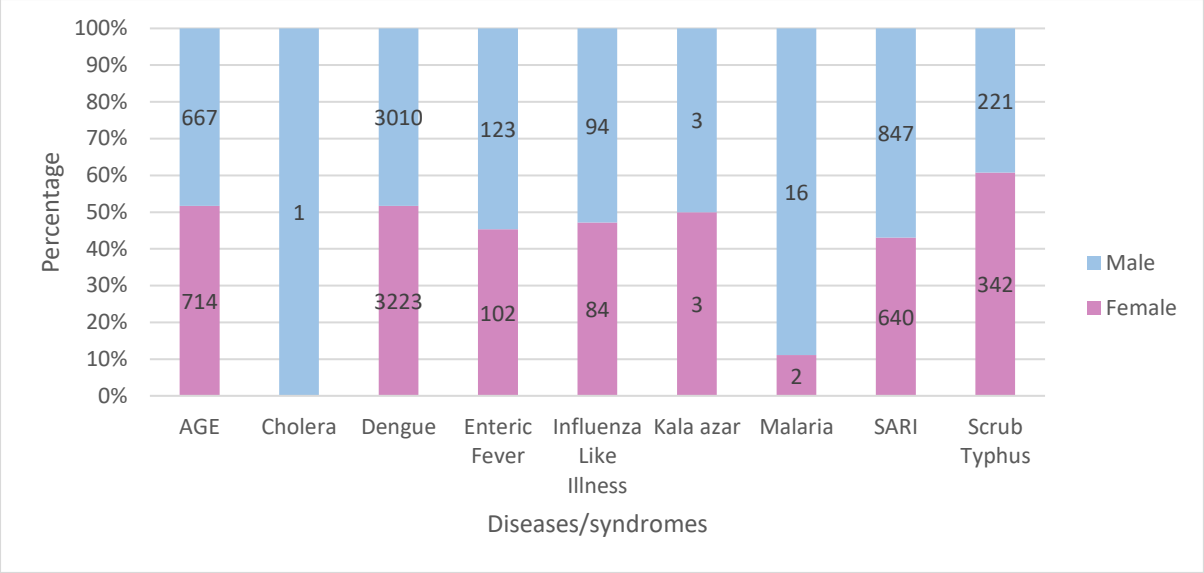


Figure 2.19: Distribution of nine selected diseases/syndromes by sex in Gandaki Province, 2023

EWARS Reporting status: Gandaki province

In 2023, there were 13 officially registered EWARS sentinel sites in Gandaki province. The average number of weeks a sentinel site reported in EWARS was 43 compared to 34 in 2022, a 25.1% increment. The average reporting completeness increased to 82.7% in 2023 from 66.1% in 2022. Out of 13 sentinel sites in the province, one sites (7.7%) reported in all epidemiological weeks in 2023. Nine two sentinel sites (69.2%) improved reporting completeness in 2023, while four sites (30.7%) did not improve. The highest improvement was recorded by the District Hospital Parbat (from 36.5% in 2022 to 96.2% in 2023). (Figure 2.20)

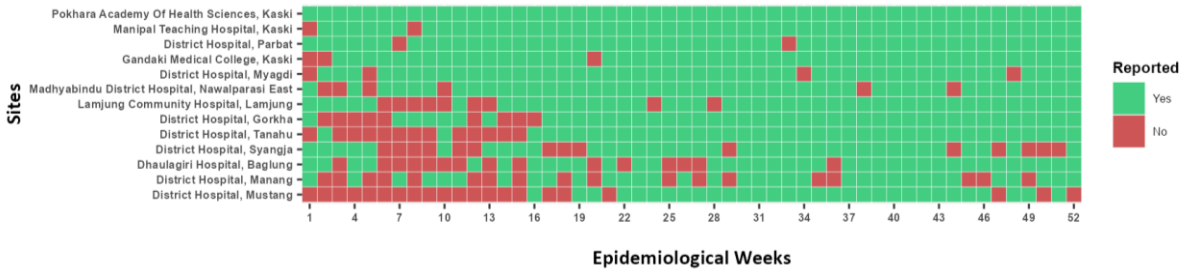


Figure 2.20: Weekly reporting status of sentinel sites in Gandaki Province, 2023

Lumbini Province

Lumbini province reported a total of 10,680 cases of nine selected diseases/syndromes to EWARS. This is 14% of the national caseload reported in 2023 (Table 2.2). Table 2.8 presents disease and syndrome wise data with AGE being the most reported, followed by SARI and dengue.

Table 2.8: Frequency of nine selected diseases/syndromes reported in Lumbini Province, 2023

Disease	Number	Percentage
AGE	3,581	33.5%
SARI	3,533	33.1%
Dengue	1,681	15.7%
Scrub Typhus	1,243	11.6%
Enteric Fever	487	4.6%
Influenza Like Illness	93	0.9%
Kala azar	43	0.4%
Malaria	18	0.2%
Cholera	1	0.0%
Total	**10,680**	**100.0%**

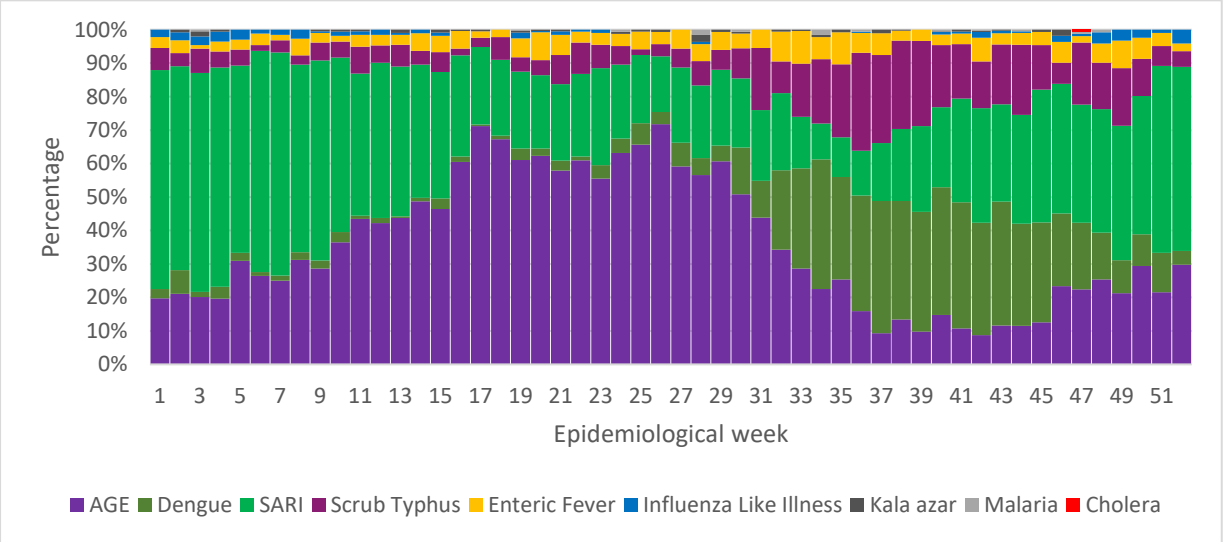


Figure 2.21: Weekly burden of nine selected diseases/syndromes reported in Lumbini Province, 2023

Seasonal variation of the reported diseases/syndromes closely matched with the patterns observed at the national level (Figure 2.21 and 2.22). The caseload was higher in males compared to females. Higher caseloads among males were observed in dengue, ILI, kala-azar, malaria, and SARI, whereas females were more affected by AGE, enteric fever and scrub typhus. It is important to note there were missing information on sex for AGE (n=6), Dengue (n=7), ILI (n=2), SARI (n=3) and Scrub Typhus (n=1). (Figure 2.23)

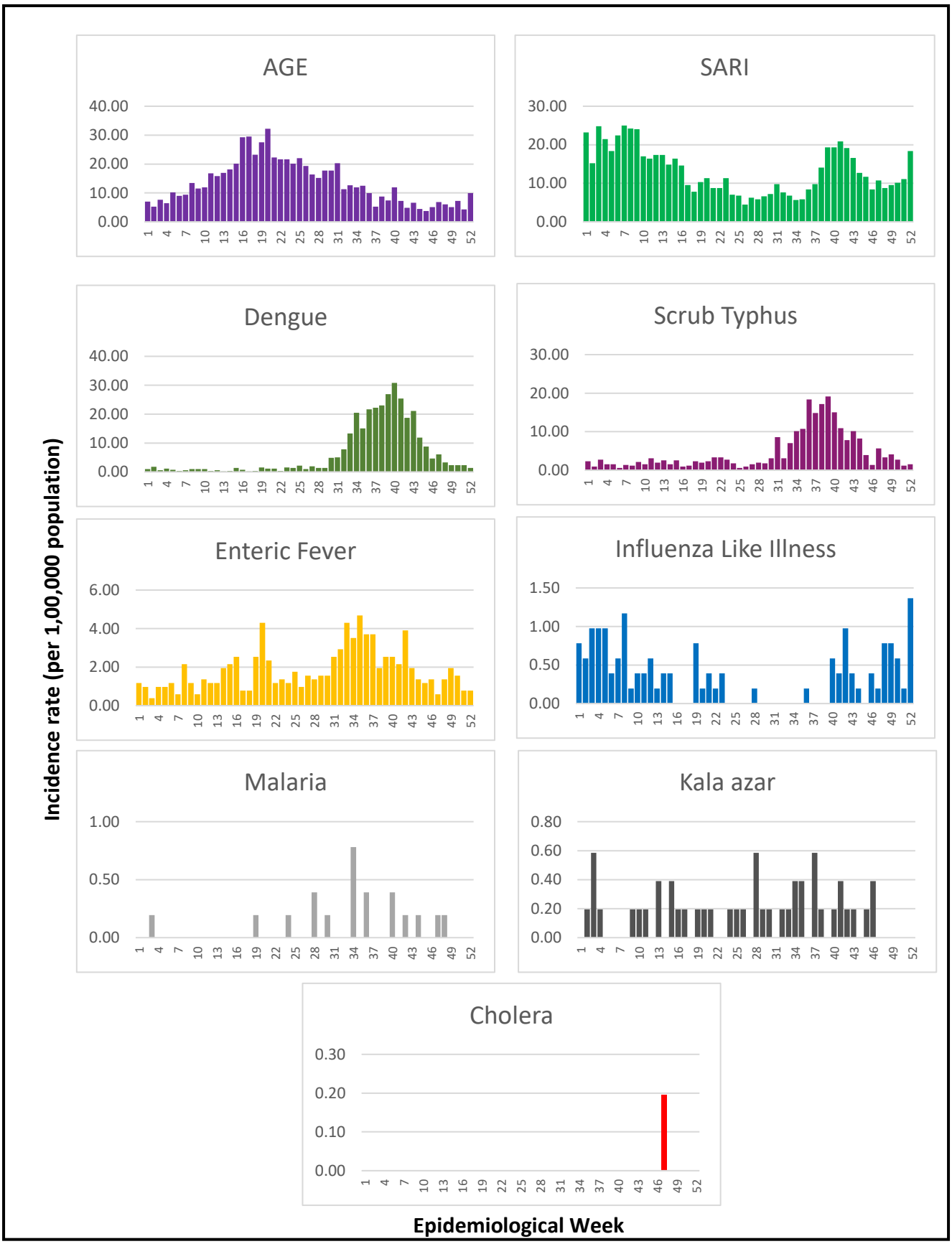


Figure 2.22: Weekly trend of nine selected diseases/syndromes reported in Lumbini Province, 2023

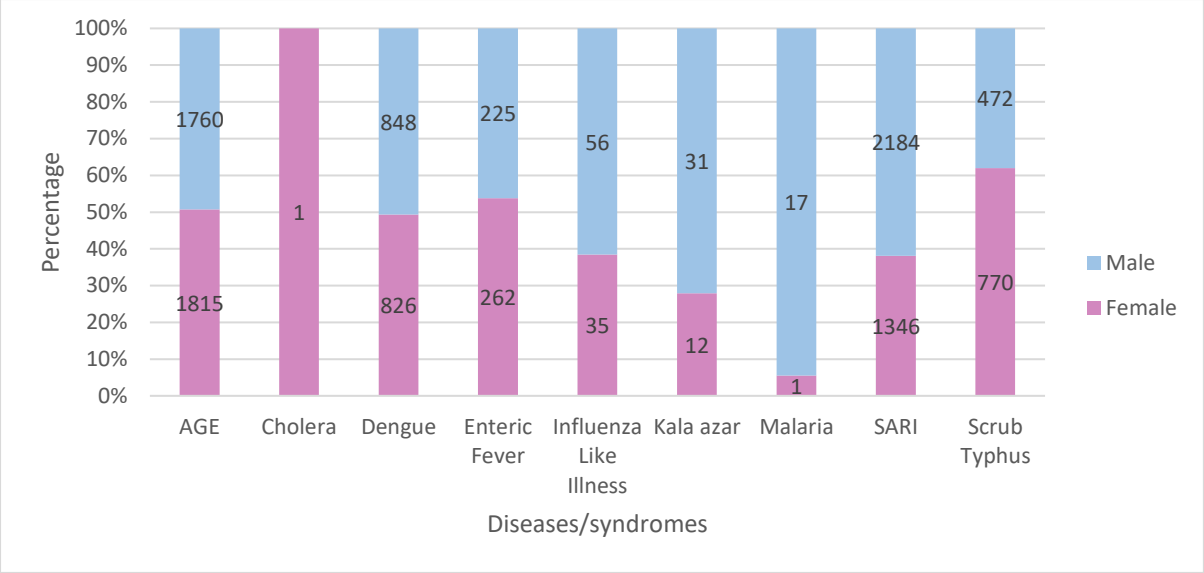


Figure 2.23: Distribution of nine selected diseases/syndromes by sex in Lumbini Province, 2023

EWARS Reporting status: Lumbini province

In 2023, there were 18 officially registered EWARS sentinel sites in Lumbini province. The average number of weeks a sentinel site reported in EWARS was 48 compared to 42 in 2022, a 13.9% increment. The average reporting completeness increased to 92.0% in 2023 from 80.8% in 2022. Out of 18 sentinel sites in the province, 8 sites (44.4%) reported in all epidemiological weeks in 2023. Twelve sentinel sites (66.7%) improved reporting completeness in 2023, while two sites (11.1%) did not improve. The highest improvement was recorded by the Rukum East Hospital (from 13.5% in 2022 to 96.2% in 2023). (Figure 2.24)

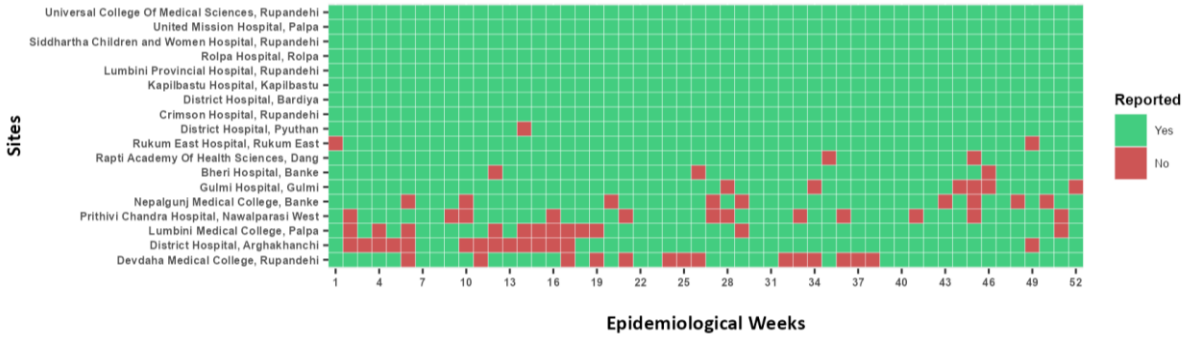


Figure 2.24: Weekly reporting status of sentinel sites in Lumbini Province, 2023

Karnali Province

Karnali province reported a total of 3,948 cases of nine selected diseases/syndromes to EWARS. This is 5% of the national caseload reported in 2023 (Table 2.2). Table 2.9 presents disease and syndrome wise data, with AGE being the most reported, followed by SARI and ILI.

Table 2.9: Frequency of nine selected diseases/syndromes reported in Karnali Province, 2023

Disease	Number	Percentage
AGE	1,409	35.7%
SARI	1,072	27.2%
Influenza Like Illness	483	12.2%
Dengue	358	9.1%
Enteric Fever	340	8.6%
Scrub Typhus	230	5.8%
Kala azar	46	1.2%
Malaria	9	0.2%
Cholera	1	0.0%
Total	**3,948**	**100.0%**

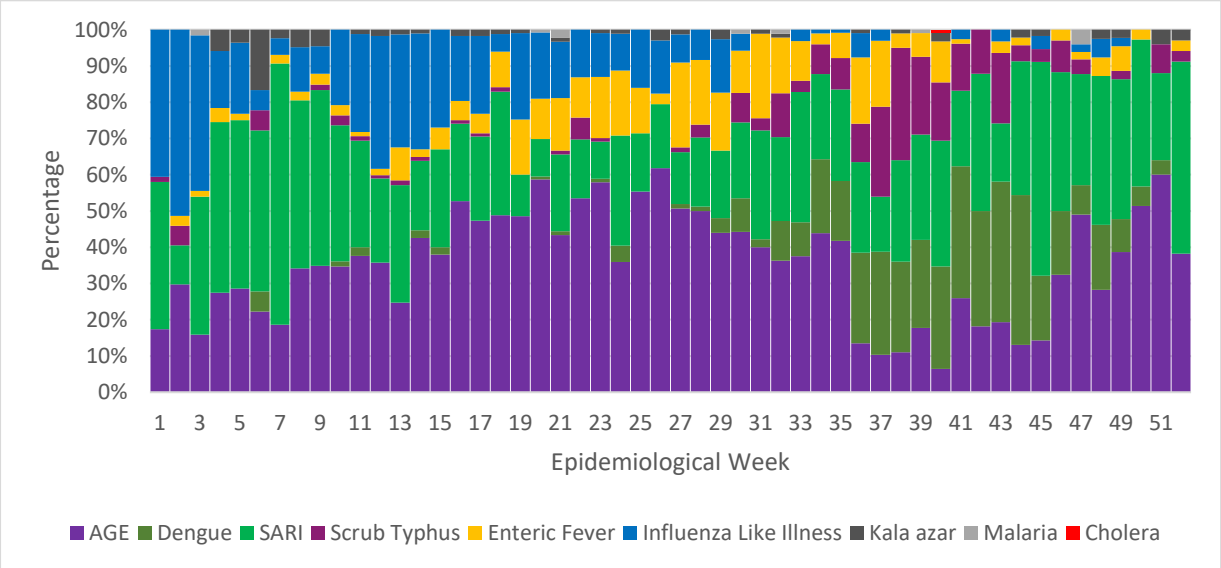


Figure 2.25: Weekly burden of nine selected diseases/syndromes reported in Karnali Province, 2023

Seasonal variation in reporting was observed for dengue, enteric fever, scrub typhus and ILI (Figure 2.25 and 2.26). The caseload was higher in females compared to males. Higher case load among female were observed for AGE, cholera, enteric fever, and scrub typhus whereas males were more affected by dengue, ILI, kala azar, malaria, and SARI. It is important to note there were missing information on sex for AGE (n=2), Dengue (n=1), Enteric fever (n=3), ILI (n=1), and Scrub typhus (n=1). (Figure 2.27)

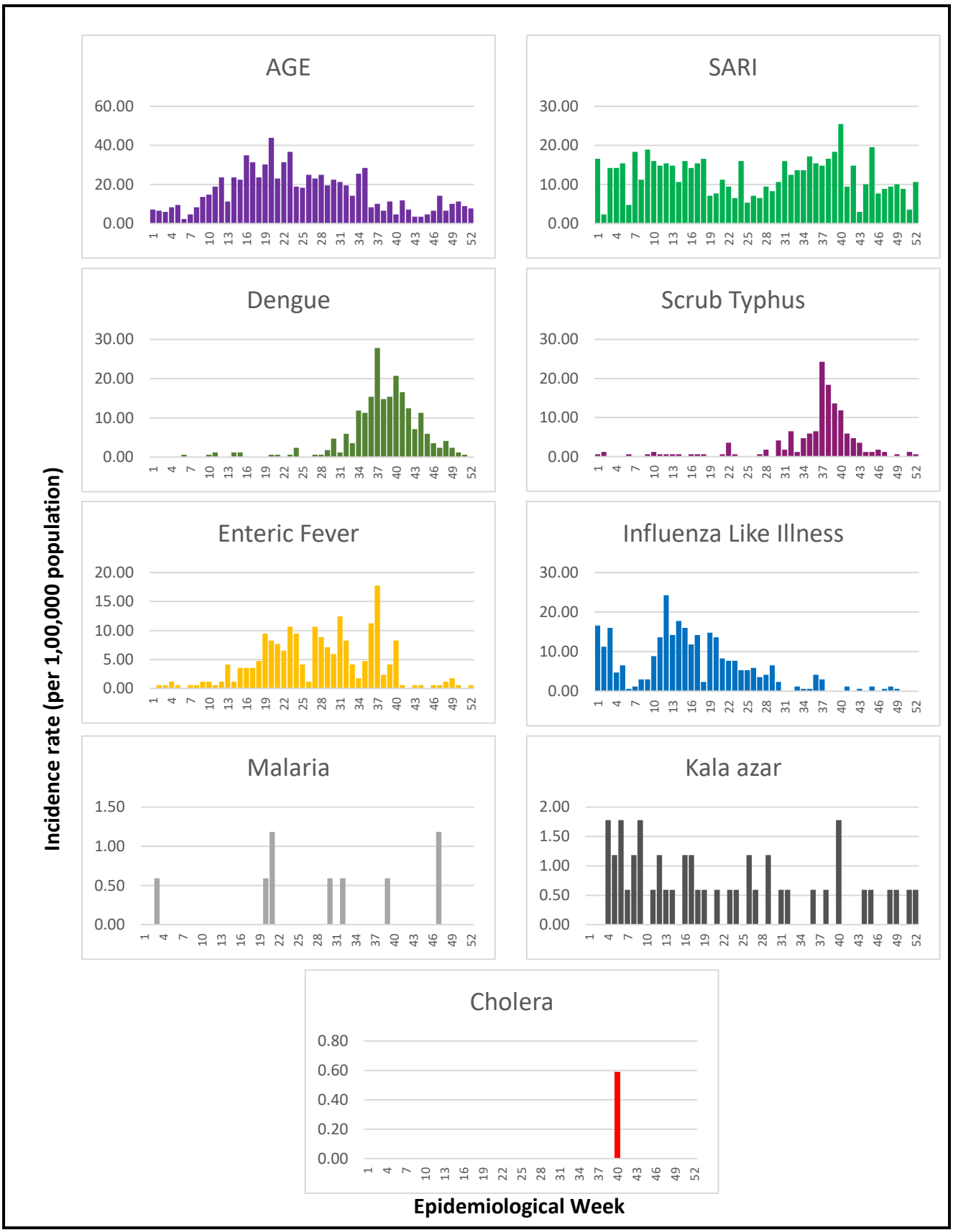


Figure 2.26: Weekly trend of nine selected diseases and syndromes reported in Karnali Province, 2023

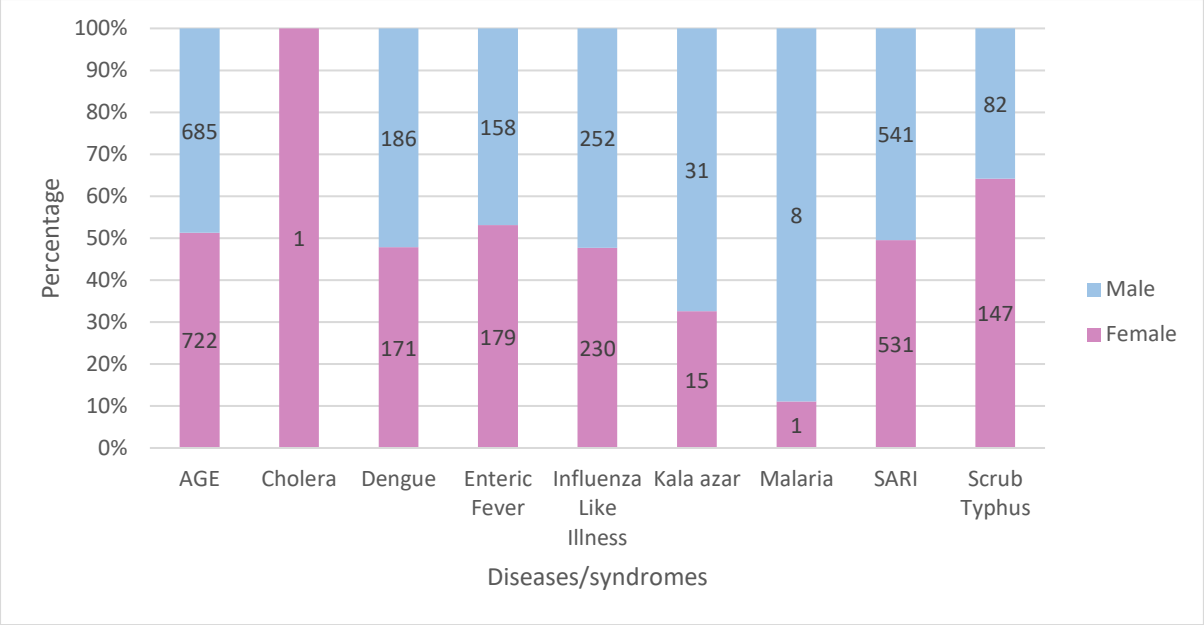


Figure 2.27: Distribution of nine selected diseases/syndromes by sex in Karnali Province, 2023

EWARS Reporting status: Karnali province

In 2023, there were 11 officially registered EWARS sentinel sites in Karnali province. The average number of weeks a sentinel site reported in EWARS was 32 compared to 28 in 2022, a 14.5% increment. The average reporting completeness increased to 60.8% in 2023 from 53.1% in 2022. Out of 11 sentinel sites in the province, 2 sites (18.2%) reported in all epidemiological weeks in 2023. Seven sentinel sites (63.6%) improved reporting completeness in 2023, while three sites (27.2%) did not improve. The highest improvement was recorded by the District Hospital Dolpa (from 19.2% in 2022 to 88.5% in 2023). (Figure 2.28)

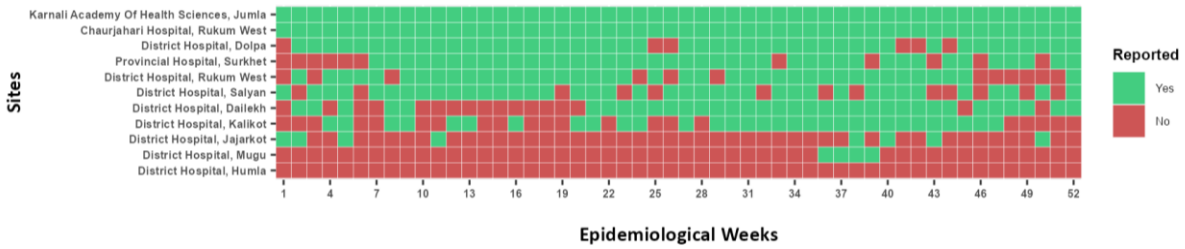


Figure 2.28: Weekly reporting status of sentinel sites in Karnali Province, 2023

Sudurpaschim Province

Sudurpaschim province reported a total of 7,004 cases of nine selected diseases/syndromes to EWARS. This is 9% of the national caseload reported in 2023 (Table 2.2). Table 2.10 presents disease and syndrome data reported with SARI being the most reported, followed by scrub typhus and AGE.

Table 2.10: Frequency of nine selected diseases/syndromes reported in Sudurpaschim province, 2023

Disease	Number	Percentage
SARI	1,470	21.0%
Scrub Typhus	1,386	19.8%
AGE	1,360	19.4%
Dengue	1,230	17.6%
Influenza Like Illness	1,191	17.0%
Enteric Fever	271	3.9%
Kala azar	50	0.7%
Malaria	44	0.6%
Cholera	2	0.0%
Total	**7,004**	**100.0%**

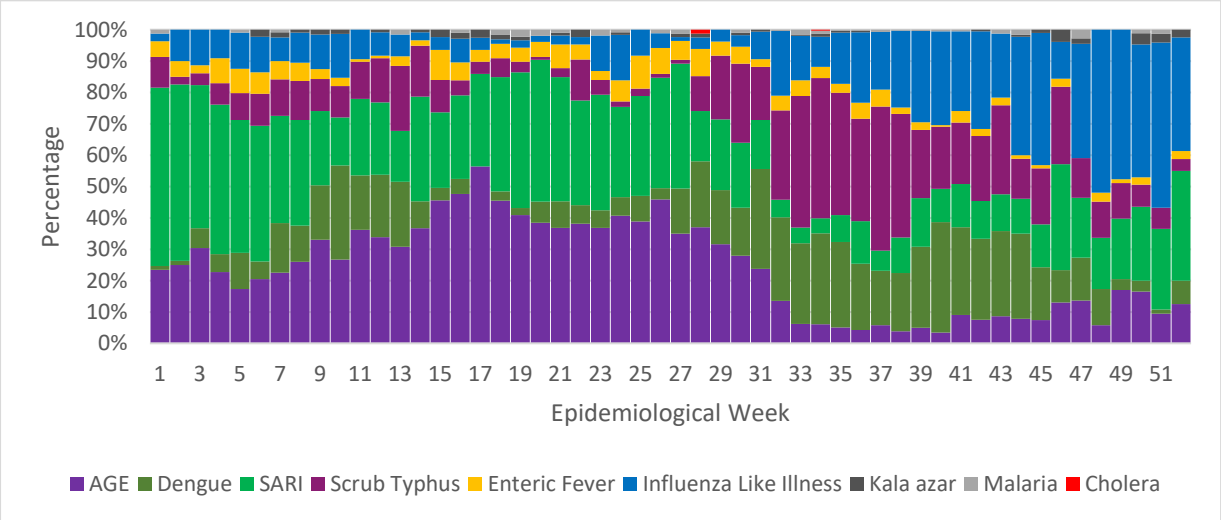


Figure 2.29: Weekly burden of nine selected diseases/syndromes reported in Sudurpaschim Province, 2023

Seasonal variation in reporting was observed for AGE, dengue, scrub typhus, enteric fever, ILI and malaria (Figure 2.29 and 2.30) and closely followed the national trends. The caseload was higher in females compared to males. Higher caseloads among female were observed for cholera, enteric fever, ILI and scrub typhus whereas males were more affected by AGE, dengue, kala azar, malaria and SARI. It is important to note there were missing information on sex for AGE (n=2), Dengue (n=4), Kala azar (n=1), SARI (n=5) and Scrub typhus (n=3). (Figure 2.31).

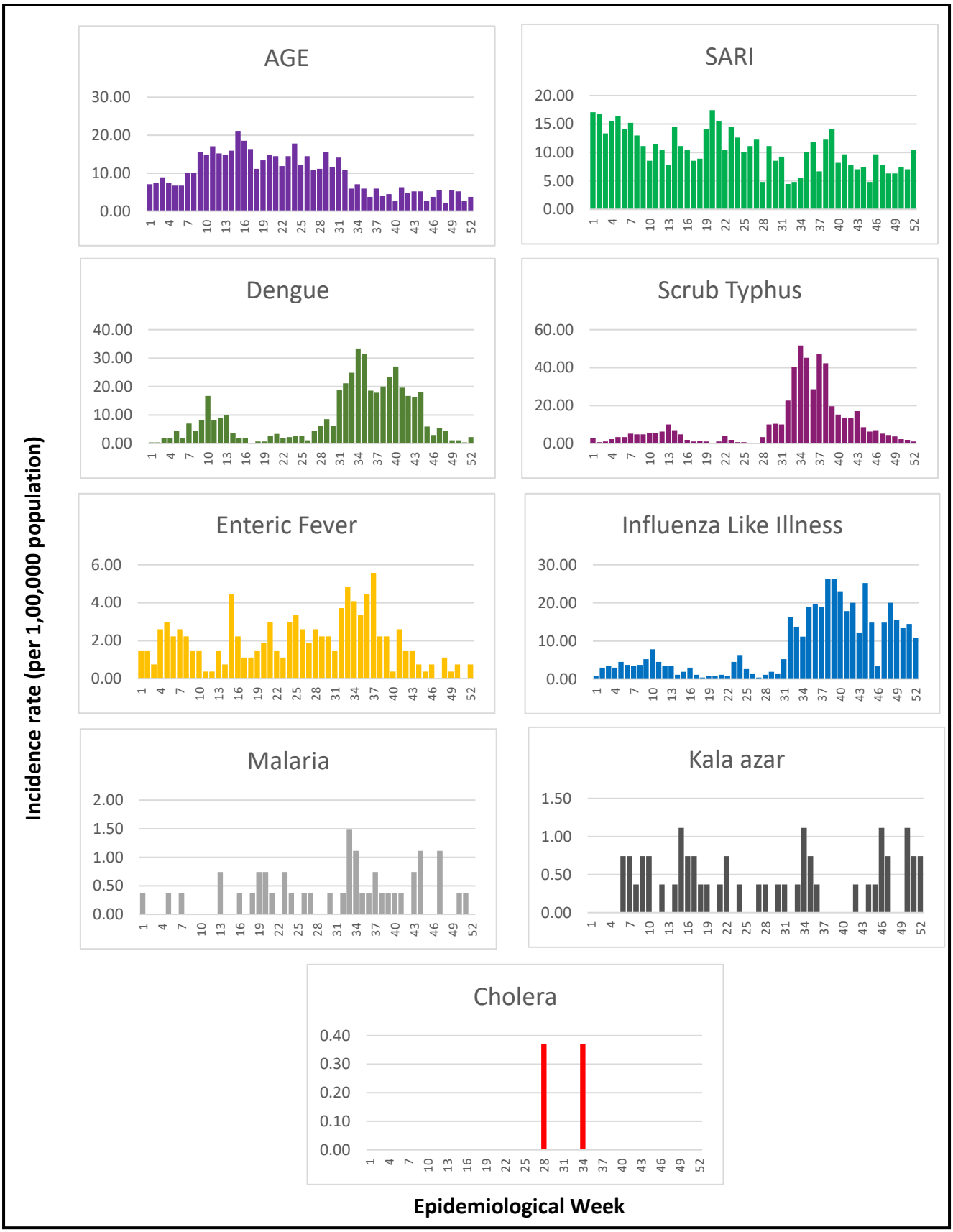


Figure 2.30: Weekly trend of nine selected diseases/syndromes reported in Sudurpaschim Province, 2023

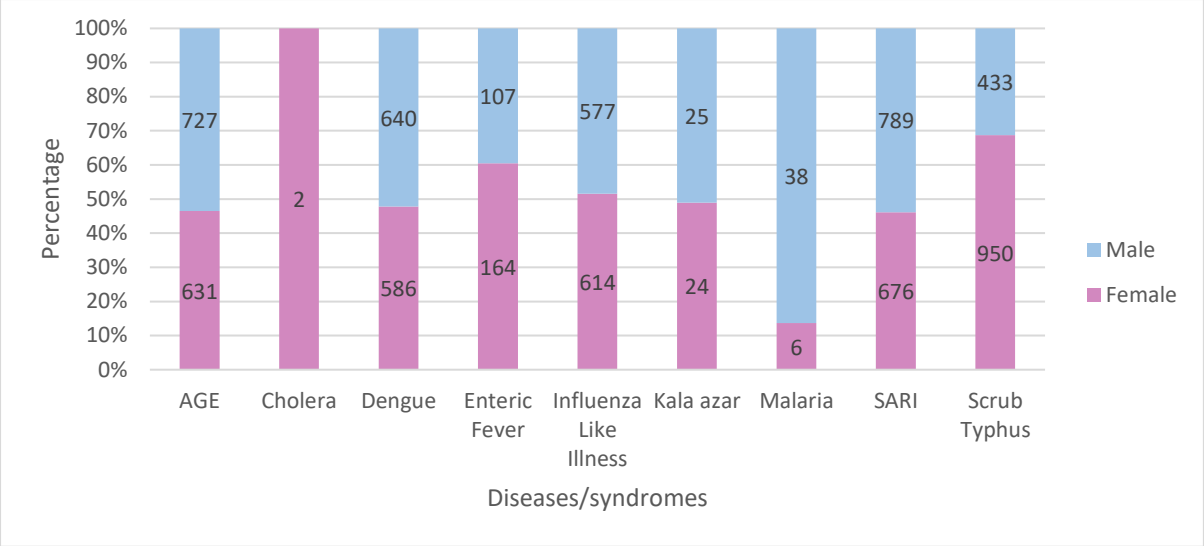


Figure 2.31: Sex distribution of nine selected diseases/syndromes reported in Sudurpaschim Province, 2023

EWARS Reporting status: Sudurpaschim province

In 2023, there were 11 officially registered EWARS sentinel sites in Sudurpaschim province. The average number of weeks sentinel sites reported in EWARS was 46 in 2023 compared to 45 in 2022. Average reporting completeness increased to 89.2% in 2023 from 85.8% in 2022. None of the sites fell into the zero-reporting completeness category. Three sentinel sites (27.2%) managed to report in all epidemiological weeks in 2023. An improvement in reporting status was observed in four sentinel sites (36.4%). The highest improvement was recorded by District Hospital Bajura (from 57.7% in 2022 to 92.3% in 2023). Reporting completeness was constant in four sentinel sites (36.4%). Three reporting sites (27.3%) did not improve their reporting status in 2023 compared to 2022. The highest drop in Dadeldhura Hospital (from 71.2% in 2022 to 30.8% in 2023). (Figure 2.32)

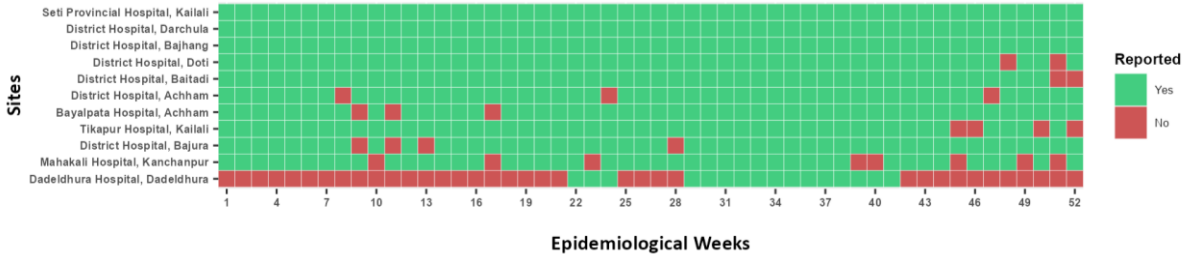


Figure 2.32: Weekly reporting status of sentinel sites in Sudurpaschim Province, 2023

Chapter 5. Issues and challenges

Koshi Province

EWARS reporting in Koshi Province is facing several challenges, particularly in Solukhumbu District Hospital, which has consistently reported less than 40% of its EWARS data. This issue might be due to a lack of on-site coaching and the possible need for refresher training for focal persons, along with potentially insufficient monitoring by provincial health authorities and the EDCD. Additionally, as suggested in the EWARS review program, the high volume of medicolegal cases handled by the medical record section especially in high-demand sites like Koshi Hospital could be placing significant strain on staff, potentially impeding timely EWARS data entry. However, with targeted capacity building, enhanced monitoring, and an exploration of workload management solutions in the medical record section, Koshi Province's EWARS reporting could be significantly strengthened, leading to more timely public health event reporting.

Madhesh Province

EWARS reporting in Madhesh Province needs improvement, particularly in certain health facilities. Janaki Medical College has consistently shown low reporting rates, with Gaur Hospital also reporting less frequently in 2022. Although some progress was observed at EWARS sentinel sites in 2023, ongoing attention is necessary. To address these challenges, implementing a system of six-month reviews could help identify facilities that require targeted support. This might involve on-site coaching, refresher training for EWARS personnel, and close collaboration with the facilities to overcome specific reporting obstacles.

Bagmati Province

In 2022, the reporting rate from District Hospitals in Nuwakot and Rasuwa, the Civil Service Hospital, and the Nepal Police Hospital was less than 40%, highlighting significant issues in data reporting and management. By 2023, overall reporting rates improved, though the Civil Service Hospital still reported less than 50%. Birendra Army Hospital, Manmohan Memorial Community Hospital, and Tribhuvan University Teaching Hospital in Kathmandu did not report at all in both the years 2022 and 2023. Additionally, Nepal Police Hospital failed to report in 2023. To address these challenges, creating a dashboard accessible to provincial health

authorities that displays data from other provinces and the national level could enhance their ability to assess and analyze data, allowing for better comparisons with their own province's sentinel sites and facilitating appropriate feedback. Improving real-time reporting and building the capacity of the health workforce are crucial steps toward better data management. Providing orientation and on-site coaching to both governmental and non-governmental institutions can further support these efforts. Moreover, enhancing the capacity of local governments to coordinate with EWARS sentinel sites and monitor their performance is essential. The use of social media groups, such as chat groups among sentinel sites and the Provincial Health Directorate, has already eased the feedback mechanism, significantly improving EWARS reporting.

Gandaki Province

Gandaki Province's EWARS reporting has shown overall improvement in 2023. District hospitals in Tanahun, Parbat, and Mustang, which had low reporting rates in 2022, have made notable progress in 2023. However, outpatient department data remains lacking, similar to other provinces. To further enhance reporting, Gandaki Province could benefit from targeted training, knowledge-sharing initiatives, user-friendly software, and data analysis workshops. Additionally, transitioning to Electronic Medical Records (EMRs) and strengthening monitoring by health authorities can help ensure complete data collection and support informed decision-making. By addressing these challenges, Gandaki Province can achieve consistent and comprehensive EWARS reporting across all facilities.

Lumbini province

Lumbini Province has seen significant improvement in EWARS reporting across most sentinel sites. While all facilities reported above 60%, Rukum East required particular attention due to a very low reporting rate of 13.5% in 2022. However, there was a drastic improvement in 2023, with the rate rising to 96.2%. Despite these advances, data validation remains a crucial focus to ensure the accuracy of the information being entered from sentinel sites. Prioritizing data quality alongside continued monitoring can further strengthen Lumbini Province's EWARS reporting system.

Karnali province

Karnali Province faces challenges with consistent EWARS reporting, particularly in remote areas. In 2022, several district hospitals, including Mugu, Humla, Dolpa, and Salyan, reported below 40%. While some improvement was seen in 2023, Mugu, Humla, and Jajarkot continue to struggle with their reporting status. To address these issues, dedicating specific manpower in hospitals for EWARS reporting and implementing alert messages for directors and focal persons regarding reporting deficiencies could contribute to improvements. Additionally, regular training for medical recorders on EWARS procedures and emphasizing their responsibility in data entry are crucial steps toward achieving consistent and accurate reporting in Karnali Province.

Sudurpaschim province

Sudurpaschim Province presents a mixed picture regarding EWARS reporting, with an overall improvement to a reporting rate of over 80%. District Hospital Bajura has made significant progress, increasing its reporting rate from 57.7% in 2022 to over 95% in 2023. In contrast, Dadeldhura has experienced a troubling decline, with its reporting rate dropping from 71.2% in 2022 to just 30.8% in 2023. To address these issues, it is important to regularly provide reference materials from the EDCD, such as information notices and booklets, and to update reporting performance across sentinel sites to enhance awareness and encourage improvements. Additionally, addressing the shortage of dedicated medical recorders in some facilities is crucial. Although other personnel have provided support, dedicated staff focused on EWARS data entry can ensure better accuracy and timeliness. Finally, implementing a system to recognize and reward those who consistently report on time can help build a culture of accountability and sustain efforts.

Chapter 6. CONCLUSION

In 2022, dengue was the most reported, followed by Acute Gastroenteritis (AGE) and Severe Acute Respiratory Infection (SARI). While dengue led nationally, provincial breakdowns revealed variations: SARI was most reported in Koshi province, AGE led in Madhesh and Lumbini provinces, Influenza-Like Illness (ILI) was highest in Karnali province, and Scrub Typhus was most frequent in Sudurpaschim province. In 2023, dengue remained the most frequently reported. AGE was the leading one in Madhesh, Lumbini, and Karnali provinces, and SARI was the most reported in Sudurpaschim province. A comparison of EWARS data from 2022 and 2023 reveals a notable rise in reported cases. Dengue remained the most prevalent across both years, though its proportional share of cases showed a slight decrease in 2023. Both AGE and SARI experienced significant increases from 2022 to 2023.

Seasonality:

A review of burden by week in 2022 revealed seasonal trends across several illnesses. AGE and SARI were most reported during the first half of the year, while dengue, enteric fever, and scrub typhus peaked in the latter half, particularly between weeks 27 and 41. The timing of peaks varied by disease/syndromes, with SARI reaching its highest point in winter weeks and AGE peaking earlier in the year. Interestingly, Madhesh province diverged from the national trend, with SARI cases reported more frequently in the latter half. Similarly, Karnali province saw a higher caseload of enteric fever in the first half of the year compared to the rest of the country. All other provinces, including Koshi, Bagmati, Gandaki, Lumbini, and Sudurpaschim, were in line with the national trend with regards to seasonal disease burden.

In 2023, AGE and SARI cases peaked earlier in the year, primarily between weeks 16 and 23 for AGE. In contrast, dengue, enteric fever, and scrub typhus peaked later, concentrated during weeks 31 to 40. This peak period also coincided with the highest occurrence ILI. Interestingly, Karnali province deviated from the national trend, with a higher prevalence of ILI cases observed in the first half of the year. The remaining provinces - Koshi, Madhesh, Bagmati, Gandaki, Lumbini, and Sudurpaschim, aligned with the national pattern regarding seasonal disease burden.

Analysis of disease burden by week revealed similar seasonal patterns across both 2022 and 2023. AGE and SARI cases peaked earlier in the year compared to Dengue, Enteric Fever, and Scrub Typhus, which peaked later in the latter half. Overall, the data suggests a potential increase in reported illnesses and possible shifts in their geographic distribution.

Reporting Status:

Reporting performance improved markedly in 2022 and 2023. The national reporting rate increased from 52.9% in 2021 to 72.2% in 2022, and further to 81.7% in 2023. In 2022, Sudurpaschim Province had the highest reporting rate at 85.8%, while Karnali Province had the lowest at 53.1%. By 2023, Lumbini Province achieved the highest reporting rate at 92.0%, with Karnali Province once again having the lowest, though improved, reporting rate at 60.8%. This indicates a significant enhancement in surveillance and reporting capabilities throughout 2023. The table below highlights the highest and lowest performing sentinel sites based on reporting completeness for the years 2022 and 2023. The top-performing sites maintained 100% reporting completeness, submitting reports for all epidemiological weeks (52 weeks) in both years. In contrast, the lowest performing sites demonstrated less than 40% reporting completeness across the same period.

Top Performing Sites in 2022 and 2023

SN	Province	Sentinel sites	Reporting completeness 2022 & 2023
1	Koshi	BPKIHS, Sunsari	100.0%
2	Koshi	District Hospital, Dhankuta	100.0%
3	Koshi	District Hospital, Ilam	100.0%
4	Koshi	Koshi Hospital, Morang	100.0%
5	Madesh	Provincial Hospital, Bara	100.0%
6	Bagmati	Bharatpur Hospital, Chitwan	100.0%
7	Bagmati	Kanti Children Hospital, Kathmandu	100.0%
8	Bagmati	Nepal Mediciti Hospital, Lalitpur	100.0%
9	Bagmati	Patan Academy of Health Sciences, Lalitpur	100.0%
10	Lumbini	Lumbini Provincial Hospital, Rupandehi	100.0%
11	Lumbini	Siddhartha Children and Women Hospital, Rupandehi	100.0%
12	Lumbini	United Mission Hospital, Palpa	100.0%
13	Karnali	Karnali Academy of Health Sciences, Jumla	100.0%
14	Sudurpaschim	District Hospital, Bajhang	100.0%
15	Sudurpaschim	District Hospital, Darchula	100.0%
16	Sudurpaschim	Seti Provincial Hospital, Kailali	100.0%

Lowest performing Sites in 2022 and 2023

SN	Province	Sentinel sites	No of weeks reported in 2022	Reporting completeness 2022	No of weeks reported in 2023	Reporting completeness 2023
1	Koshi	District Hospital, Solukhumbu	11	21.2%	4	7.7%
2	Bagmati	Birendra Army Hospital, Kathmandu	0	0.0%	0	0.0%
3	Bagmati	Manmohan Memorial Community Hospital, Kathmandu	0	0.0%	0	0.0%
4	Bagmati	Tribhuwan University Teaching Hospital, Kathmandu	0	0.0%	0	0.0%
5	Bagmati	Nepal Police Hospital, Kathmandu	19	36.5%	0	0.0%
6	Karnali	District Hospital, Mugu	3	5.8%	4	7.7%
7	Karnali	District Hospital, Humla	8	15.4%	0	0.0%

It is important to acknowledge that the data reported here has not been validated, which may affect the analysis and interpretation of the findings. Furthermore, information on deaths has not been included in this report due to its sensitivity and the need for thorough validation before reporting. Moving forward, the findings in this report will guide the efforts to enhance the EWARS system and improve disease surveillance and response.

Annexes

Annex 1 List of EWARS reporting sites

SN	EWARS Reporting sites	Province
1	Bharatpur Eye Hospital	Bagmati
2	BHIM HOSPITAL RUPANDEHI	Lumbini
3	BP Koirala Lions Center for Opthalmic Studies Kathmandu	Bagmati
4	DISTRICT HOSPITAL PALPA	Lumbini
5	DULLU HOSPITAL DAILEKH	Karnali
6	FEWACITY HOSPITAL & RESEARCH CENTRE KASKI	Gandaki
7	GOKULESHWOR HOSPITAL DARCHAULA	Sudurpaschim
8	JOGBUDA HOSPITAL DADELDHURA	Lumbini
9	Lumbini Eye Institute and Research Center Rupandehi	Lumbini
10	MALAKHETI HOSPITAL KAILALI	Sudurpaschim
11	Manmohan Memorial Medical College & Teaching Hospital Kathmandu	Bagmati
12	MAYA METRO HOSPITAL	Sudurpaschim
13	MECHI EYE HOSPITAL JHAPA	Koshi
14	MEHELKUNA HOSPITAL SURKHET	Karnali
15	METHINKOT HOSPITAL KAVRE	Bagmati
16	NAWA JEEWAN HOSPITAL KAILALI	Sudurpaschim
17	NEPAL EYE HOSPITAL KATHMANDU	Bagmati
18	NISARGA HOSPITAL	Sudurpaschim
19	POKHARIYA HOSPITAL PARSA	Madhesh
20	PPHL Bagmati Hetauda	Bagmati
21	PPHL Gandaki KASKI	Gandaki
22	PPHL Koshi MORANG	Koshi
23	PPHL Madhesh Dhanusha	Madhesh
24	PPHL Lumbini RUPANDEHI	Lumbini
25	RAMPUR HOSPITAL PALPA	Lumbini
26	RAPTI HOSPITAL DANG	Lumbini
27	TILGANGA EYE HOSPITAL KATHMANDU	Bagmati
28	WALLING HOSPITAL SYANGJA	Gandaki

Annex 2 List of EWARS sentinel sites with reporting completeness

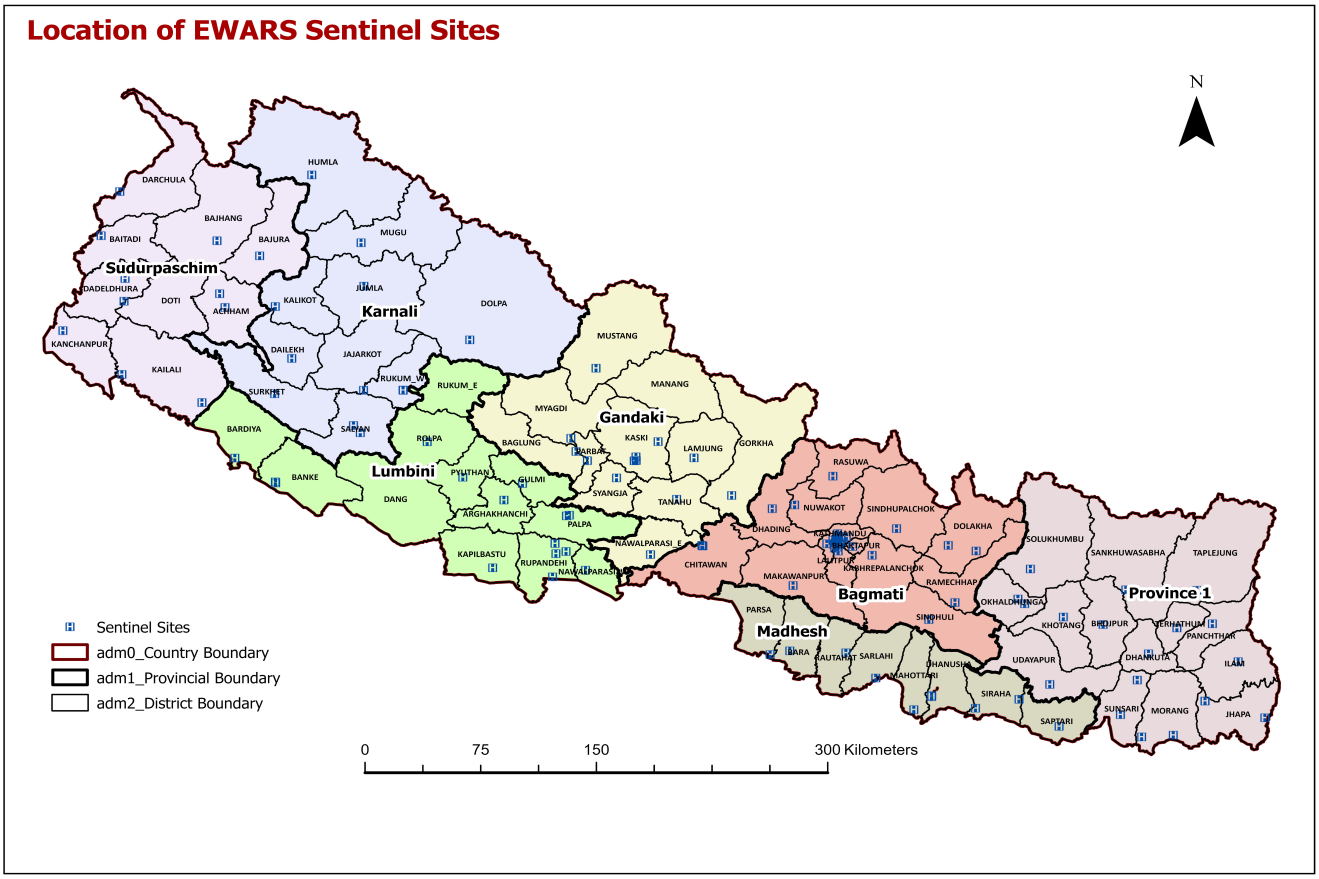
SN	Province	Sentinel sites	No of weeks reported in 2021	Reporting completeness 2021	No of weeks reported in 2022	Reporting completeness 2022	No of weeks reported in 2023	Reporting completeness 2023
1	Koshi	AMDA Hospital, Jhapa	36	67.9%	45	86.5%	52	100.0%
2	Koshi	BPKIHS, Sunsari	17	32.1%	52	100.0%	52	100.0%
3	Koshi	District Hospital, Bhojpur	43	81.1%	43	82.7%	48	92.3%
4	Koshi	District Hospital, Dhankuta	52	98.1%	52	100.0%	52	100.0%
5	Koshi	District Hospital, Ilam	53	100.0%	52	100.0%	52	100.0%
6	Koshi	District Hospital, Khotang	46	86.8%	50	96.2%	50	96.2%
7	Koshi	District Hospital, Panchathar	47	88.7%	50	96.2%	51	98.1%
8	Koshi	District Hospital, Sankhuwasabha	29	54.7%	48	92.3%	36	69.2%
9	Koshi	District Hospital, Solukhumbu	1	1.9%	11	21.2%	4	7.7%
10	Koshi	District Hospital, Sunsari	8	15.1%	49	94.2%	52	100.0%
11	Koshi	District Hospital, Taplejung	17	32.1%	33	63.5%	48	92.3%
12	Koshi	District Hospital, Terhathum	1	1.9%	11	21.2%	21	40.4%
13	Koshi	District Hospital, Udayapur	49	92.5%	45	86.5%	52	100.0%
14	Koshi	Koshi Hospital, Morang	53	100.0%	52	100.0%	52	100.0%
15	Koshi	Mechi Hospital, Jhapa	51	96.2%	52	100.0%	51	98.1%
16	Koshi	Nobel Medical College, Morang	38	71.7%	51	98.1%	52	100.0%
17	Koshi	Okhaldhunga Community Hospital, Okhaldhunga	48	90.6%	42	80.8%	50	96.2%
18	Koshi	Rumjatar Hospital, Okhaldhunga	34	64.2%	44	84.6%	48	92.3%
19	Madhesh	District Hospital, Mahottari	50	94.3%	50	96.2%	49	94.2%
20	Madhesh	District Hospital, Siraha	48	90.6%	48	92.3%	52	100.0%
21	Madhesh	Gajendra Narayan Singh Hospial, Saptari	22	41.5%	42	80.8%	52	100.0%
22	Madhesh	Gaur Hospital, Rautahat	45	84.9%	22	42.3%	37	71.2%
23	Madhesh	Janaki Medical College, Dhanusa	0	0.0%	12	23.1%	32	61.5%
24	Madhesh	Janakpur Hospital, Dhanusha	53	100.0%	50	96.2%	52	100.0%
25	Madhesh	Narayani Hospital, Parsa	0	0.0%	34	65.4%	52	100.0%
26	Madhesh	National Medical Hospital, Parsa	47	88.7%	41	78.8%	52	100.0%
27	Madhesh	Provincial Hospital, Bara	1	1.9%	52	100.0%	52	100.0%
28	Madhesh	Provincial Hospital, Sarlahi	52	98.1%	47	90.4%	44	84.6%
29	Madhesh	Provincial Hospital, Siraha	1	1.9%	23	44.2%	49	94.2%
30	Bagmati	Armed Police Force Hospital, Kathmandu	0	0.0%	25	48.1%	45	86.5%
31	Bagmati	Bhaktapur Hospital, Bhaktapur	31	58.5%	39	75.0%	48	92.3%
32	Bagmati	Bharatpur Hospital, Chitwan	35	66.0%	52	100.0%	52	100.0%

33	Bagmati	Bir Hospital, Kathmandu	27	50.9%	41	78.8%	49	94.2%
34	Bagmati	Chitwan Medical College, Chitwan	1	1.9%	24	46.2%	31	59.6%
35	Bagmati	Civil Services Hospital, Kathmandu	0	0.0%	17	32.7%	26	50.0%
36	Bagmati	CIWEC Hospital, Kathmandu	13	24.5%	24	46.2%	30	57.7%
37	Bagmati	College Of Medical Sciences, Chitwan	0	0.0%	24	46.2%	47	90.4%
38	Bagmati	Dhulikhel Hospital, Kavre	11	20.8%	41	78.8%	41	78.8%
39	Bagmati	District Hospital, Dhading	12	22.6%	38	73.1%	40	76.9%
40	Bagmati	District Hospital, Nuwakot	0	0.0%	16	30.8%	36	69.2%
41	Bagmati	District Hospital, Ramechhap	18	34.0%	39	75.0%	29	55.8%
42	Bagmati	District Hospital, Rasuwa	47	88.7%	14	26.9%	33	63.5%
43	Bagmati	District Hospital, Sindhuli	31	58.5%	34	65.4%	29	55.8%
44	Bagmati	District Hospital, Sindhupalchowk	37	69.8%	47	90.4%	52	100.0%
45	Bagmati	Grande International Hospital, Kathmandu	39	73.6%	47	90.4%	51	98.1%
46	Bagmati	HAMS Hospital, Kathmandu	18	34.0%	43	82.7%	50	96.2%
47	Bagmati	Hetauda Hospital, Makwanpur	40	75.5%	48	92.3%	52	100.0%
48	Bagmati	Jiri District Hospital, Dolakha	53	100.0%	49	94.2%	50	96.2%
49	Bagmati	Kanti Children Hospital, Kathmandu	53	100.0%	52	100.0%	52	100.0%
50	Bagmati	Kathmandu Medical College, Kathmandu	3	5.7%	31	59.6%	51	98.1%
51	Bagmati	Kathmandu Model Hospital, Kathmandu	11	20.8%	30	57.7%	48	92.3%
52	Bagmati	KIST Medical College, Lalitpur	15	28.3%	41	78.8%	44	84.6%
53	Bagmati	Nepal Medical College, Kathmandu	19	35.8%	33	63.5%	41	78.8%
54	Bagmati	Nepal Mediciti Hospital, Lalitpur	53	100.0%	52	100.0%	52	100.0%
55	Bagmati	Norvic International Hospital, Kathmandu	41	77.4%	43	82.7%	49	94.2%
56	Bagmati	Om Hospital & Research Center, Kathmandu	53	100.0%	48	92.3%	52	100.0%
57	Bagmati	Pashupati Chaulagai Smriti Hospital, Dolakha	43	81.1%	41	78.8%	31	59.6%
58	Bagmati	Patan Academy of Health Sciences, Lalitpur	53	100.0%	52	100.0%	52	100.0%
59	Bagmati	Sukraraj Tropical and Infectious Disease Hospital, Kathmandu	53	100.0%	50	96.2%	50	96.2%
60	Bagmati	Sumeru Hospital, Lalitpur	24	45.3%	36	69.2%	39	75.0%
61	Bagmati	Vayodha Hospital, Kathmandu	24	45.3%	42	80.8%	38	73.1%
62	Bagmati	Birendra Army Hospital, Kathmandu	0	0.0%	0	0.0%	0	0.0%

63	Bagmati	Manmohan Memorial Community Hospital, Kathmandu	0	0.0%	0	0.0%	0	0.0%
64	Bagmati	Tribhuwan University Teaching Hospital, Kathmandu	0	0.0%	0	0.0%	0	0.0%
65	Bagmati	Nepal Police Hospital, Kathmandu	0	0.0%	19	36.5%	0	0.0%
66	Gandaki	Dhaulagiri Hospital, Baglung	7	13.2%	40	76.9%	37	71.2%
67	Gandaki	District Hospital, Gorkha	21	39.6%	44	84.6%	43	82.7%
68	Gandaki	District Hospital, Manang	34	64.2%	27	51.9%	34	65.4%
69	Gandaki	District Hospital, Mustang	13	24.5%	22	42.3%	31	59.6%
70	Gandaki	District Hospital, Myagdi	39	73.6%	32	61.5%	48	92.3%
71	Gandaki	District Hospital, Parbat	0	0.0%	19	36.5%	50	96.2%
72	Gandaki	District Hospital, Syangja	15	28.3%	34	65.4%	37	71.2%
73	Gandaki	District Hospital, Tanahu	0	0.0%	15	28.8%	39	75.0%
74	Gandaki	Gandaki Medical College, Kaski	19	35.8%	44	84.6%	49	94.2%
75	Gandaki	Lamjung Community Hospital, Lamjung	53	100.0%	52	100.0%	43	82.7%
76	Gandaki	Madhyabindu District Hospital, Nawalparasi East	43	81.1%	47	90.4%	46	88.5%
77	Gandaki	Manipal Teaching Hospital, Kaski	25	47.2%	46	88.5%	50	96.2%
78	Gandaki	Pokhara Academy of Health Sciences, Kaski	0	0.0%	25	48.1%	52	100.0%
79	Lumbini	Bheri Hospital, Banke	52	98.1%	43	82.7%	49	94.2%
80	Lumbini	Crimson Hospital, Rupandehi	52	98.1%	51	98.1%	52	100.0%
81	Lumbini	Devdaha Medical College, Rupandehi	0	0.0%	36	69.2%	38	73.1%
82	Lumbini	District Hospital, Arghakhanchi	34	64.2%	30	57.7%	38	73.1%
83	Lumbini	District Hospital, Bardiya	50	94.3%	43	82.7%	52	100.0%
84	Lumbini	District Hospital, Pyuthan	51	96.2%	43	82.7%	51	98.1%
85	Lumbini	Gulmi Hospital, Gulmi	12	22.6%	48	92.3%	46	88.5%
86	Lumbini	Kapilbastu Hospital, Kapilbastu	50	94.3%	51	98.1%	52	100.0%
87	Lumbini	Lumbini Medical College, Palpa	0	0.0%	35	67.3%	40	76.9%
88	Lumbini	Lumbini Provincial Hospital, Rupandehi	50	94.3%	52	100.0%	52	100.0%
89	Lumbini	Nepalgunj Medical College, Banke	13	24.5%	43	82.7%	43	82.7%
90	Lumbini	Prithivi Chandra Hospital, Nawalparasi West	16	30.2%	30	57.7%	40	76.9%
91	Lumbini	Rapti Academy of Health Sciences, Dang	53	100.0%	51	98.1%	50	96.2%
92	Lumbini	Rolpa Hospital, Rolpa	38	71.7%	45	86.5%	52	100.0%
93	Lumbini	Rukum East Hospital, Rukum East	0	0.0%	7	13.5%	50	96.2%

94	Lumbini	Siddhartha Children and Women Hospital, Rupandehi	46	86.8%	52	100.0%	52	100.0%
95	Lumbini	United Mission Hospital, Palpa	53	100.0%	52	100.0%	52	100.0%
96	Lumbini	Universal College of Medical Sciences, Rupandehi	26	49.1%	44	84.6%	52	100.0%
97	Karnali	Chaurjahari Hospital, Rukum West	53	100.0%	51	98.1%	52	100.0%
98	Karnali	District Hospital, Dailekh	38	71.7%	29	55.8%	35	67.3%
99	Karnali	District Hospital, Dolpa	1	1.9%	10	19.2%	46	88.5%
100	Karnali	District Hospital, Jajarkot	16	30.2%	41	78.8%	8	15.4%
101	Karnali	District Hospital, Kalikot	21	39.6%	23	44.2%	31	59.6%
102	Karnali	District Hospital, Mugu	0	0.0%	3	5.8%	4	7.7%
103	Karnali	District Hospital, Rukum West	1	1.9%	28	53.8%	40	76.9%
104	Karnali	District Hospital, Salyan	0	0.0%	15	28.8%	39	75.0%
105	Karnali	Karnali Academy of Health Sciences, Jumla	49	92.5%	52	100.0%	52	100.0%
106	Karnali	Provincial Hospital, Surkhet	49	92.5%	44	84.6%	41	78.8%
107	Karnali	District Hospital, Humla	0	0.0%	8	15.4%	0	0.0%
108	Sudurpaschim	Bayalpata Hospital, Achham	40	75.5%	49	94.2%	49	94.2%
109	Sudurpaschim	Dadeldhura Hospital, Dadeldhura	40	75.5%	37	71.2%	16	30.8%
110	Sudurpaschim	District Hospital, Achham	42	79.2%	51	98.1%	49	94.2%
111	Sudurpaschim	District Hospital, Baitadi	13	24.5%	42	80.8%	50	96.2%
112	Sudurpaschim	District Hospital, Bajhang	53	100.0%	52	100.0%	52	100.0%
113	Sudurpaschim	District Hospital, Bajura	28	52.8%	30	57.7%	48	92.3%
114	Sudurpaschim	District Hospital, Darchula	49	92.5%	52	100.0%	52	100.0%
115	Sudurpaschim	District Hospital, Doti	39	73.6%	40	76.9%	50	96.2%
116	Sudurpaschim	Mahakali Hospital, Kanchanpur	23	43.4%	50	96.2%	44	84.6%
117	Sudurpaschim	Seti Provincial Hospital, Kailali	53	100.0%	52	100.0%	52	100.0%
118	Sudurpaschim	Tikapur Hospital, Kailali	37	69.8%	36	69.2%	48	92.3%
	National	**Overall Reporting**	**28**	**52.9%**	**38**	**72.2%**	**42**	**81.7%**

Annex 3 Location of EWARS sentinel sites



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References:

1. Epidemiology and Disease Control Division. *Updated Dengue Case Defintion for Surveillance 2024.* Available from: https://edcd.gov.np/uploads/news/pdf/665f4448932e3.pdf

2. Epidemiology and Disease Control Division. *A guide to early warning and reporting system (EWARS) (2019)*. Available from: https://edcd.gov.np/uploads/resource/5d77751c54922.pdf

3. World Health Organization. WHO guidance for the use of Annex 2 of the International Health Regulations (2005). Geneva: World Health Organization. 2008.

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