

# Evaluation of notifiable infectious diseases between 2018 and 2021 in Van province: A descriptive study

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## Abstract

**Objective:** In this study, it was aimed to examine the infectious diseases reported in Van province between 2018 and 2021 in terms of various characteristics.

**Method:** It is a descriptive study that was conducted between January 1 and January 31, 2022. Necessary permissions and an ethics committee were obtained for the study. Infectious diseases reported in Van province between January 1, 2018 and September 30, 2021 were examined using the Infectious Diseases Surveillance and Early Warning System (IZCI) of the Ministry of Health. It was examined in terms of various variables. The study's data were analysed with the Jamovi 2.2 statistical program. Descriptive data were given as numbers and percentages. The Pearson Chi-square test was used for comparisons between categorical variables.

**Results:** There were 16778 notifications between 01.01.2018-30.09.2021. Of the people with the reported disease, 59.5% were men and 40.5% were women. The mean age was  $23.3 \pm 19.0$  (min: 0-max: 99). The 3 most frequently reported diseases/conditions were 32.51% (n=5455) Brucellosis, 31.07% (n=5212) Rabies-risk contact, and 12.70% (n=2131) Rotavirus. There were 5555 (33.1%) disease reports in 2018, 4769 (28.4%) in 2019, 3411 (20.3%) in 2020, and 3043 (18.1%) in the first nine months of 2021. The incidence of Brucellosis, Rabies Risky Contact, Echinococcosis, and Anthrax diseases was found to be higher in rural districts than in urban districts (for each  $p < 0.001$ ).

**Conclusion:** The most common infectious diseases reported in the city where the study was conducted were Brucellosis, Rabies Risky Contact, and Rotavirus disease, respectively. The fact that the main livelihood of Van province is animal husbandry may explain the prevalence of zoonotic diseases.

**Keywords:** Notification, Infectious Disease, Surveillance

## INTRODUCTION

Surveillance is the continuous and systematic examination of all aspects of the emergence and spread of a disease or health condition in accordance with effective control of the condition (1,2). Monitoring of infectious diseases is essential to detect outbreaks that require public health response and control measures. Therefore, effective and reliable surveillance and notification systems are vital for monitoring public health trends and the early detection of outbreaks (3). Notifiable infectious diseases (NID) determined by law and regulation are among the basic components of surveillance (4).

With the Public Health Law published in 1930 in Turkey, the notification of some infectious diseases became a legal obligation (5,6). Through the data obtained through the notification of communicable diseases, health policies are determined in order to reduce the morbidity and mortality of these diseases, and new regulations are made when necessary by creating control programmes for diseases. With the Communique on the Notification System of Infectious Diseases published in 2004, 51 diseases collected in four groups as "Group A", "Group B", "Group C" and "Group D" were updated to 73 diseases and conditions with the circular published in 2015 (7,8).

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Notification systems included traditional methods using mail, telephone, fax, or e-mail. With the development of electronic software systems in recent years, the availability of data such as patient file records, laboratory test records, and laboratory reports in electronic form has facilitated instant notification and follow-up for public health services at both the regional and national level (3,9). In Turkey, NID data collected through software systems are monitored, and necessary interventions are made by authorised persons using the Infectious Diseases Surveillance and Early Warning System (IZCI) of the Ministry of Health.

The types, numbers, and distribution of infectious diseases seen in a particular region according to certain characteristics are among the most important health indicators of that region. At the same time, these data are critical for the planning of infectious disease prevention studies and the direction of health care (5).

In this study, it was aimed to examine the data of notifiable infectious diseases and conditions in Van province between 2018 and 2021 in terms of various characteristics.

## METHODS

This is a descriptive study that was conducted between January 1 and January 31, 2022. Necessary permissions for the study were obtained from the Van Provincial Health Directorate (Letter dated 24.11.2021 and numbered E-73040253-129-1100), and ethics committee approval was obtained from the Clinical Research Ethics Committee of SBU Van Training and Research Hospital (Date of 29.12.2021 and decision no. 2021/23). Infectious diseases reported in Van province between January 1, 2018 and September 30, 2021 were examined using the IZCI system of the Ministry of Health. The sample was not determined because the population of the study consisted of the disease records reported within the specified date range. Reports of SARS-CoV-2 infection (COVID-19) were excluded from the study.

Van is a province located in the Eastern Anatolia Region of Turkey, with a population of 1149342 (45.6% rural district population, 54.4% urban district population) according to the data of the Turkish Statistical Institute (TUIK) for the year 2020, and the main source of livelihood is animal husbandry (10). 42.8% of the population is 19 years old or younger, 52.8% is between 20 and 64 years old, and 4.4% is 65 years old or older. In the study, the districts affiliated with the metropolitan municipality were taken as the central district (Edremit, İpekyolu and Tuşba) and the other districts as rural districts (Bahçeşaray, Başkale, Çaldıran, Çatak, Erciş, Gevaş, Gürpınar, Muradiye, Özalp and Saray).

## Statistical Analysis

The study's data were analysed with the Jamovi version 2.2 statistical program. Descriptive data were given as numbers and percentages. The Pearson Chi-square test was used for comparisons between categorical variables. Cases with  $p \leq 0.05$  were accepted for statistical significance.

## RESULTS

There were 16778 notifications between 01.01.2018-30.09.2021. Of the people with the reported disease, 59.5% (n=9984) were male and 40.5% (n=6794) were female. The mean age was  $23.3 \pm 19.0$  (min: 0-max: 99). When the notifiable infectious disease groups were examined, there were 13130 (78.3%) notifications from group A, 1007 (6.0%) notifications from group C, and 2641 (15.7%) from group D, while there were no notifications from group B diseases. When the diagnostic status was evaluated, 71.6% (n=12019) were definite, 17.9% (n=2995) probable, and 10.5% (n=1764) suspected. There were 5555 (33.1%) disease reports in 2018, 4769 (28.4%) in 2019, 3411 (20.3%) in 2020, and 3043 (18.1%) in the first nine months of 2021. When analysed according to seasons, 4410 (26.3%) diseases were reported in spring, 4489 (26.8%) in summer, 3450 (20.6%) in autumn, and 4429 (26.4%) in winter. There were 8877 (52.9%) notifications from rural districts and 7901 (47.1%) notifications from central districts (Table 1) (Figure 1) (Figure 2).

**Table 1. Distribution of reported diseases grouped according to some characteristics**

	Number (n)	Percent (%)
<b>Gender</b>	Male	9984
	Female	6794
<b>Age Group</b>	0-9 years	4965
	10-19 years	3943
	20-29 years	2359
	30-39 years	1926
	40-49 years	1570
	50-59 years	1160
	60-69 years	572
	70-79 years	229
80 years and older	54	
<b>Notification Group</b>	A	13130
	C	1007
	D	2641
<b>Diagnostic status</b>	Definite	12019
	Possible	2995
	Suspicious	1764
<b>Notification Year</b>	2018	5555
	2019	4769
	2020	3411
	2021	3043
<b>Season</b>	Spring	4410
	Summer	4489
	Autumn	3450
	Winter	4429
<b>District</b>	Central District	7901
	Rural District	8877

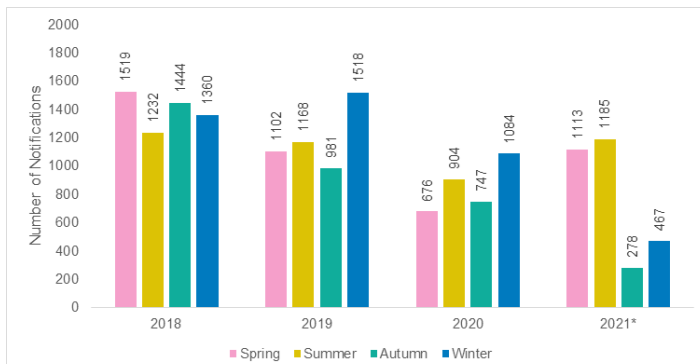


Figure 1. Distribution of notifications by years and seasons

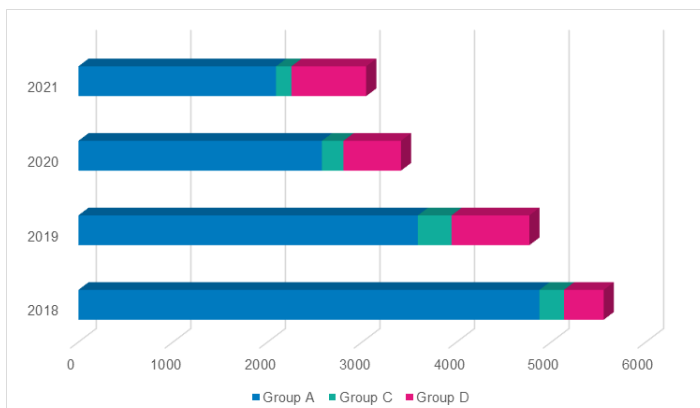


Figure 2. Group distribution of notifications by years

Table 2. Distribution of infectious diseases reported between 2018 and 2021

Reported Disease	2018 (n)	2019 (n)	2020 (n)	2021* (n)	Total (n)	Percent (%)
Brucellosis	2134	1357	1104	860	5455	32.51
Rabies Risk Contact	1513	1471	1164	1064	5212	31.07
Rotavirus	327	552	512	740	2131	12.70
Varicella	927	515	146	28	1616	9.63
Echinococcosis	164	212	165	143	684	4.08
Giardia Intestinalis	59	123	73	46	301	1.79
Hepatitis B	50	80	56	47	233	1.39
Tuberculosis	86	54	24	30	194	1.16
Entamoeba Histolytica	26	112	14	2	154	0.92
Anthrax	58	21	23	24	126	0.75
Toxoplasmosis	41	35	13	9	98	0.58
Influenza	16	32	41	0	89	0.53
Crimean Congo Hemorrhagic Fever	11	65	6	6	88	0.52
Syphilis	27	33	12	10	82	0.49
Hepatitis C	11	24	21	17	73	0.44
Measles	17	16	14	3	50	0.30
Mumps	27	12	6	1	46	0.27
Salmonella	6	25	6	0	37	0.22
Tularemia	16	3	2	0	21	0.13
Other	39	27	9	13	88	0.52
<b>Total</b>	<b>5555</b>	<b>4769</b>	<b>3411</b>	<b>3043</b>	<b>16778</b>	<b>100</b>

\*It covers the period from January 1 to September 30, 2021.

The five most frequently reported diseases/conditions were 32.5% (n=5455) Brucellosis, 31.1% (n=5212) Rabies risky contact, 12.7% (n=2131) Rotavirus, 9.6% (n=1616) Chickenpox, 4.1% (n=684) was Echinococcosis (Table 2). The four-year incidences (per 10000 people) of the most frequently reported diseases/conditions by rural and urban regions are as follows: Brucellosis 66.9, Rabies risk contact 65.7, Rotavirus 4.9, Chickenpox 11.9, Echinococcosis 7.6 in the rural area, while Brucellosis 31.1, Rabies risk contact 65.7, Rotavirus 29.9, Chickenpox 15.8, Echinococcosis 4.5 in the urban area.

The incidence of Brucellosis ( $p<0.001$ ), Rabies Risk Contact ( $p<0.001$ ), Echinococcosis ( $p<0.001$ ) and Anthrax ( $p<0.001$ ) diseases/conditions was higher in rural districts than in central districts. Diseases seen more frequently in central districts than in rural districts are: Rotavirus ( $p<0.001$ ), Chickenpox ( $p<0.001$ ), Giardia Intestinalis ( $p<0.001$ ), Hepatitis B ( $p=0.008$ ), Entamoeba Histolytica ( $p<0.001$ ), Toxoplasmosis ( $p<0.001$ ), Influenza ( $p=0.041$ ), Crimean-Congo Hemorrhagic Fever ( $p=0.001$ ), Syphilis ( $p=0.001$ ) and Salmonella ( $p=0.015$ ) (Table 3).

Table 3. Distribution of reported diseases by central and rural districts

Reported Disease	Rural Districts		Central Districts		Statistical Analysis	
	Number (n)	Percent (%)	Number (n)	Percent (%)	$\chi^2$	p
Brucellosis	3510	64.34	1945	35.66	775.877	<0.001
Rabies Risk Contact	3446	66.12	1766	33.88	887.955	<0.001
Rotavirus	257	12.06	1874	87.94	968.460	<0.001
Varicella	627	38.80	989	61.20	30.217	<0.001
Echinococcosis	402	58.77	282	41.23	47.828	<0.001
Giardia Intestinalis	103	34.22	198	65.78	15.735	<0.001
Hepatitis B	86	36.91	147	63.09	7.103	0.008
Tuberculosis	100	51.55	94	48.45	2.761	0.097
Entamoeba Histolytica	26	16.88	128	83.12	51.221	<0.001
Anthrax	93	73.81	33	26.19	40.408	<0.001
Toxoplasmosis	25	25.51	73	74.49	15.954	<0.001
Influenza	31	34.83	58	65.17	4.165	0.041
Crimean Congo Hemorrhagic Fever	25	28.41	63	71.59	10.491	0.001
Syphilis	22	26.83	60	73.17	10.910	0.001
Hepatitis C	29	39.73	44	60.27	1.017	0.313
Measles	19	38.00	31	62.00	0.879	0.348
Mumps	28	60.87	18	39.13	3.727	0.054
Salmonella	9	24.32	28	75.68	5.924	0.015
Tularemia	8	38.10	13	61.90	0.223	0.637
Other	31	35.23	57	64.77	3.821	0.051
<b>Total</b>	<b>8877</b>	<b>52.91</b>	<b>7901</b>	<b>47.09</b>	<b>366.081</b>	<b>&lt;0.001</b>

$\chi^2$ : Pearson Chi-square Test result

## DISCUSSION

Infectious diseases are still an important cause of mortality and morbidity in underdeveloped and developing countries. Knowing the regional distribution of infectious diseases will facilitate field studies and preventive interventions on this subject. The literature on the reporting of infectious diseases in Turkey mostly focuses on a limited number of diseases, and there are not many studies that evaluate all diseases together. Aside from the studies conducted in Izmir in 2012 and Erzurum in 2008, no current studies were found at the regional level (5, 11).

When the reports were evaluated according to gender and age, it was found that NID was reported more frequently in males (59.5%) and in individuals under the age of 20 (53.1%). It has also been reported in other studies that NID is more common in males (5,11,12). Given Turkey's social structure, particularly in the Eastern Anatolia Region, it is expected that men will be more likely than women to be in a risky environment in terms of infectious diseases. When the age distribution is examined, the fact that a significant portion (53.1%) of the communicable disease notifications are seen in the under-20 age group can be explained by the fact that 42.8% of the population is under the age of 20 when the population characteristics of Van are taken into account.

When NID groups are examined, group A and group B diseases include diseases to be reported from all health institutions and organisations serving throughout the country; group C diseases are reported only from inpatient treatment institutions; and group D diseases include agents detected by laboratories with diagnostic capacity (8). Although group A (n=13130) was the most reported group in this study, it is seen that group A disease reports decreased from year to year. On the other hand, there was an increase in the notifications of group C and group D diseases in 2019 and 2021 compared to the previous years. The decrease in notifications in 2020 may be due to the COVID-19 pandemic. There were no reports from group B. Similar to this study, in a study conducted at a university hospital in Izmir, it was reported that group A diseases decreased by years, while group D reports increased by years (11).

In this study, when the notifications are analysed by years, it is observed that the notifications are decreasing gradually. In a study covering the years 2005–2008, it was reported that the number of notifications increased by year, whereas in another study covering the years 1997–2000, it decreased compared to the year (5,11). Since there is a long time between this study and other studies, it is thought that an accurate comparison by year cannot be made due to the differences in both the reporting system and scope of NID in this process. In addition, the significant decrease in notifications in 2020 and 2021 in the study may be due to the COVID-19 pandemic. In a

study conducted in China, it was reported that the incidence of infectious diseases decreased during the restrictions applied due to the COVID-19 pandemic and increased again when the restrictions were lifted (13). In a study conducted in Australia, it was shown that during the COVID-19 pandemic, vaccine-preventable diseases decreased, while there was an increase in some sexually transmitted diseases and vector-borne diseases (14). The fact that the spread of infectious diseases has decreased due to the restrictions applied during the COVID-19 process and that the health personnel workforce has been shifted to pandemic services may explain the decrease in notifications in this study. In addition, since this study does not have data for the last three months of 2021, there may be a relative low for this year.

The most frequently reported diseases/conditions in this study were Brucellosis, Rabies Risky Contact, and Rotavirus disease, respectively. In a study conducted in Erzurum, the most frequently reported diseases were presented as Streptococcal angina, Measles, and Amoebic dysentery, respectively (5). Rabies Risky Contact, Tuberculosis, and Salmonellosis were reported as the most common diseases or conditions in a study of notifications in an Izmir university hospital (11). Again, in a study conducted in a paediatric hospital in Izmir, the most frequently reported diseases were chickenpox, pertussis, and influenza (12). Considering the regional characteristics, it can be assumed that animal husbandry is the main source of livelihood and a significant part of the population lives in the countryside, which explains the high number of Brucella and Rabies Risky Contact notifications in Van.

In this study, notifications in central and rural districts were compared both according to incidence and number of notifications. The distribution according to the number of notifications is presented in Table 3, since the total populations of the central and rural districts are close to each other and the differences between the districts are similar according to the incidence and the number of notifications. Brucellosis, Rabies Risky Contact, Echinococcosis and Anthrax notification rates were higher in rural districts than in central districts. It can be said that these diseases are expected to be seen in rural districts that deal with livestock and are more open to contact with animal/animal products. Reports of Rotavirus, Chickenpox, Giardiasis, Hepatitis B, Amoebic dysentery, Toxoplasmosis, Influenza Crimean Congo Hemorrhagic Fever, Syphilis and Salmonella were higher in central districts compared to rural districts. Human-to-human transmission is possible for many of these diseases. Risk factors include being in public living areas, living in unsuitable housing, being unable to access clean water, insufficient waste management, and consuming foods that have not been stored and processed under proper conditions. Therefore, it is not surprising that it is reported more in urban areas than in rural areas (15,16).



The lack of adequate studies evaluating notifiable infectious diseases in Turkey and the Eastern Anatolia Region, where the study was conducted, constitutes a limitation for conducting a comparative current situation assessment both at the regional level and across the country. At the same time, due to this situation, this study is considered one of the rare ones in which NID is evaluated comprehensively.

## CONCLUSION

In the province of Van, where the study was conducted, the most frequently reported infectious diseases/conditions are Brucellosis, Rabies Risky Contact, and Rotavirus disease, respectively. The prevalence of diseases such as Brucellosis, Echinococcosis and Anthrax can be explained by the fact that animal husbandry is the main source of livelihood in rural areas and people consume animal products under inappropriate conditions. Since studies examining the epidemiology of communicable diseases will guide the interventions to be made, it is very important for our region to increase the number of similar studies. In line with the data obtained within the scope of this study, it is recommended to plan studies to increase the effectiveness of primary prevention studies for common infectious diseases.

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### Conflict of Interest

The authors declare that they have no conflict of interests regarding content of this article..

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### Presentation

A part of this study was presented as an oral presentation at the 5th International 23rd National Public Health Congress, held online on December 13–18, 2021, with the title “Evaluation of infectious disease notifications in a province between 2018 and 2021”.

### Ethical Declaration

The Clinical Research Ethics Committee of Health Sciences University, Van Training and Research Hospital granted ethical approval with the date 12.29.2021 and the number 2021/23 to conduct this study, and the rules of the Helsinki Declaration were followed.

### Authorship Contributions

Concept: ÖFT, MÇT, Design: ÖFT, MÇT, Data collection and entry: MÇT, Analysis and interpretation: ÖFT, Literature search: ÖFT, MÇT, Writing: ÖFT, MÇT, Critical review: ÖFT, MÇT

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