Epidemiological Report

State Viral Hepatitis Program
Historic Series 2010 – 2021

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BRIEF HISTORY

The term viral hepatitis refers to the inflammation of the liver related to a viral infection. Currently, five viruses are recognized to infect the liver by different routes: hepatitis A, B, C, D and E. Viral hepatitis is still a global public health problem that affects millions of people and causes thousands of deaths due to acute and chronic infection, cirrhosis and liver cancer. Great scientific and technological advances in recent decades have led to the implementation of prevention and control measures, such as the development of vaccines and immunization strategies (hepatitis A and B), laboratory diagnostic methods (serology, rapid testing and molecular biology) and, more recently, the effective treatment of hepatitis C, incorporated into the Unified Health System (SUS) since 2015.

The achievements in the prevention and treatment of viral hepatitis are perhaps the paradigm of successful translational research. The World Health Organization (WHO) global strategy, endorsed by all its member states in 2016, approved the plan to eliminate these diseases by 2030.

ETIOLOGICAL AGENT

Hepatitis A is caused by an RNA virus of the family *Picornaviridae* (HAV). Hepatitis B virus (HBV) is classified in the *Hepadnaviridae* family with a DNA genome. The hepatitis C virus (HCV) belongs to the *Flaviridae* family and its genome consists of a single strand of RNA. The hepatitis D virus (HDV) is an undefined RNA family that needs the hepatitis B surface antigen (HBsAg) to replicate. The hepatitis E virus (HEV) is formed by a single strand of RNA and belongs to the family *Hepeviridae*. Although they all cause liver disease, these viruses differ in modes of transmission, clinical course and severity of the disease, as well as geographic distribution and methods of prevention and treatment.

TRANSMISSION MODE

The risk of HAV infection is associated with the lack of drinking water and basic sanitation, and young adults are currently the most susceptible to infections caused by this virus. In countries where faecal-oral transmission, through contaminated water or food, has become rare, outbreaks have been reported among men who have sex with men (MSM).

Hepatitis B is a sexually transmitted infection (STI). HBV can also be transmitted parenterally and vertically, from mother to fetus.

Regarding hepatitis C, transmission of HCV results from parenteral exposure, which can happen by:

- contact with contaminated blood, by sharing needles, syringes and other objects for drug use (pipes);
- reuse or failure to sterilize medical or dental equipment;
- failure to sterilize manicure equipment;
- reuse of material for tattooing;
- invasive procedures (eg hemodialysis, surgery and transfusion) without due biosafety care;
- use of contaminated blood and its derivatives (since 1993, after donor screening and blood quality control, this mode of transmission has become rare);
- sexual intercourse without the use of condoms (less common); and
- mother-to-fetus transmission (less common).

Hepatitis D, also called Delta, is associated with the presence of the hepatitis B virus that causes infection and inflammation of liver cells. There are two forms of HDV infection: simultaneous coinfection with HBV and superinfection with HDV in an individual with chronic HBV infection.

HEV is transmitted mainly by the fecal-oral route, through the consumption of contaminated water or food, in places with poor sanitary infrastructure.

EPIDEMIOLOGICAL SITUATION

HEPATITIS A

Unlike hepatitis B and C, hepatitis A does not lead to chronic liver disease, but it can cause debilitating symptoms and, rarely, fulminant hepatitis (acute liver failure). Areas of geographic distribution can be characterized by high, intermediate or low levels of HAV virus infection.

The WHO estimates that 7,134 people died from hepatitis A worldwide (representing 0.5% of viral hepatitis mortality) in 2016. The infection is common in low- and middle-income countries with poor sanitary conditions, and the majority of infected people are children (90%) under 10 years of age, mostly without symptoms.

In some territories, vaccination is recommended for people at risk of HAV infection, such as drug users, men who have sex with men, and individuals with chronic liver disease. The recent improvement in socioeconomic, hygienic and sanitary measures could translate into an increase in the number of adults who were never infected in childhood and therefore have not acquired immunity. In addition, despite pediatric immunization, many young adults who have not been included in these immunization programs are more susceptible to HAV infections. In areas of low and medium endemicity, the prevalence of symptomatic cases in this population has increased. In 2017, several cases and outbreaks of the disease were reported in Europe, the United States and South America, infecting unvaccinated young adult men, mainly MSM.

HEPATITIS B

The burden of hepatitis B infection is greatest in the Western Pacific and Africa, where 116 million and 81 million people, respectively, are chronically infected.

In Brazil, from 1999 to 2020, 254,384 confirmed cases of the disease were reported, most concentrated in the Southeast region (34.2%), followed by the South (31.8%), North (14.7%), Northeast (10.3%) and Midwest (9.0%).

In highly endemic areas, HBV is most commonly transmitted from mother to child at birth (perinatal transmission) or by horizontal transmission (exposure to infected blood), especially from an infected to an uninfected child during the first five years of life. The development of chronic infection is common in infants infected by their mothers or before age 5 years who did not receive adequate immunoprophylaxis at birth (hyperimmune immunoglobulin and the 1st dose of the vaccine).

Vaccination is the most effective method of preventing hepatitis B, offering between 98% and 100% protection against the disease. Three doses are needed for the immunizing agent to be effective, and it is available in SUS primary care regardless of age or vulnerability.

HEPATITIS C

It is estimated that HCV infects more than 1% of the global population and about 55% to 75% of those infected can develop chronic liver disease. Usually asymptomatic, with a slow evolution and characterized by inflammation and fibrosis, the disease can progress, in about 20 years, to cirrhosis in 30%-40% of cases or to liver carcinoma in 1%-3%.

Hepatitis C is a disease that occurs globally. An estimated 10 million people in Southeast Asia and an equal number in the Western Pacific region are chronically infected, while 9 million are chronically infected in Africa and 5 million in the Americas. From 1999 to 2020, 263,815 confirmed cases of hepatitis C were reported in Brazil, with 58.9% in the Southeast, 27.7% in the South, 6.5% in the Northeast, 3.6% in the Midwest and 3.5% in the North.

Currently, the effectiveness of the treatment leads to the regression of the clinical picture and complications, even in those individuals with other comorbidities, co-infections or advanced liver disease, with evolution to cure in about 95% of cases. In this new scenario, in 2016 the World Health Assembly approved a global strategy to achieve the elimination of viral hepatitis, which in relation to hepatitis C aims to reduce 90% of new infections (incidence), 65% of deaths (mortality) and treat at least 80% of people diagnosed with the disease.

HEPATITIS D

It is estimated that 5% of individuals with chronic hepatitis B are coinfected with HDV, raising the global burden of infection by this virus to more than 62 million people, almost 1% of the world's population. Despite this distribution, HDV is more prevalent in Central and West Africa, Central and North Asia, the Pacific Islands, the Middle East, Eastern Europe, South America (Amazon Basin) and Greenland.

Hepatitis B vaccination prevents HDV co-infection, and therefore the expansion of childhood immunization programs has resulted in a decline in the incidence of hepatitis D worldwide.

From 1999 to 2020, 4,150 confirmed cases of hepatitis D were reported in Brazil. The highest occurrence was in the North region, with 74.8% of reported cases, followed by the Southeast (10.4%), Northeast (5.3%) and Midwest (3.2%). In 2020, 70 cases were reported in the country, 36 (51.4%) in the North region.

HEPATITIS E

Hepatitis E is found throughout the world, but is most common in East and South Asia. Globally, HEV is responsible for about 20 million infections a year; it is estimated that 3.3 million cases are symptomatic.

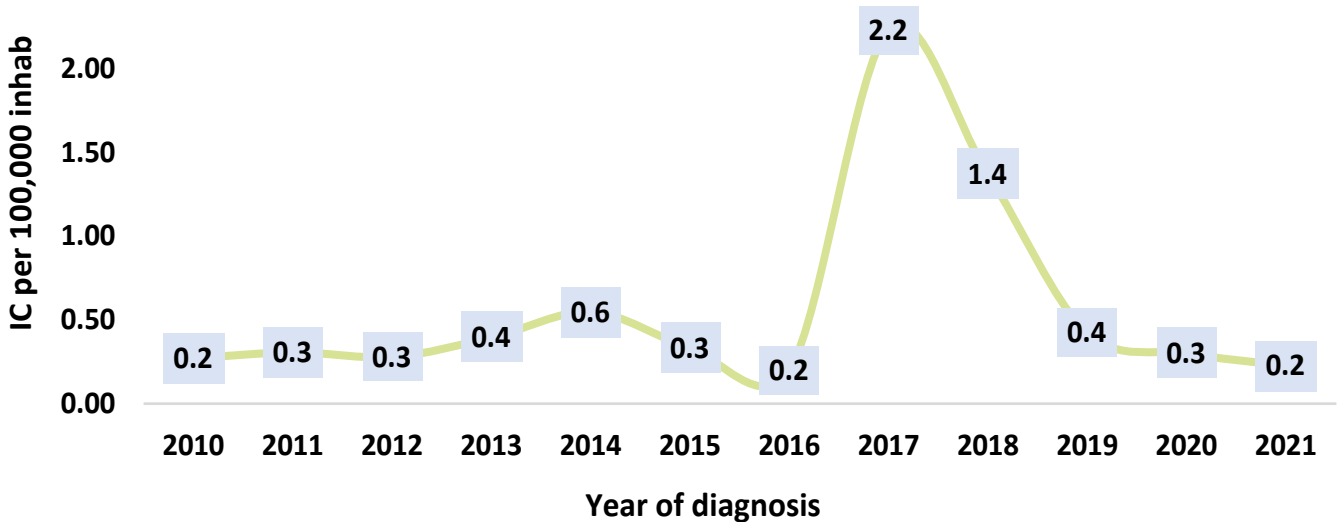
The disease represents a significant public health challenge in resource-limited places, particularly in Asia and Africa. In developed countries, hepatitis E has historically been considered of little clinical relevance. In recent years, however, it has been recognized as an emerging and often undiagnosed disease in developed countries.

EPIDEMIOLOGICAL ANALYSIS IN THE STATE OF SÃO PAULO

HEPATITIS A

Between 2010 and 2021, 3,020 cases of hepatitis A were reported by epidemiological surveillance groups (ESGs) in the state of São Paulo (SSP), most of them in the capital of São Paulo, representing 56.4% of the total. Data analysis shows that the disease incidence rate remained stable from the beginning until 2016 (0.2 cases per 100,000 inhabitants), with an increase in 2017, when it reached 2.2 cases per 100,000 inhabitants, with a tendency to fall in the following years. At the end of the analyzed period, the observed rates did not exceed 0.3 cases per 100,000 inhabitants (Table 1 and Graph 1).

Graph 1. Incidence coefficient (IC*) of hepatitis A per year of diagnosis. SSP, 2010 to 2021.**



Source: Notifiable Diseases Information System (Sinan) – CVE /CCD/SES-SP; Pop Seade. *IC per 100,000 inhabitants. **Data until May 10, 2022, subject to correction.

Table 1. Number and incidence coefficient (IC*) of hepatitis A cases by ESG of residence and year of onset of symptoms. SSP, 2010 to 2021.**

ESG of residence	2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		TOTAL
	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	
Araçatuba	2	0.3		-	1	0.1		-	1	0.1	1	0.1	1	0.1		-	1	0.1		-		-		-	**7**
Araraquara	1	0.1		-		-	1	0.1		-		-	1	0.1		-	2	0.2		-		-		-	**5**
Assis		-		-	1	0.2	1	0.2	2	0.4		-		-	3	0.6	2	0.4		-		-		-	**9**
Barretos	1	0.2		-		-		-	3	0.7		-	1	0.2	3	0.7	1	0.2	1	0.2	1	0.2		-	**11**
Bauru	8	0.7		-	2	0.2	1	0.1		-	2	0.2		-	2	0.2		-		-	1	0.1		-	**16**
Botucatu		-	1	0.2		-		-		-		-		-	3	0.5		-	1	0.2	1	0.2		-	**6**
Campinas	8	0.2	12	0.3	7	0.2	8	0.2	7	0.2	4	0.1	3	0.1	20	0.5	18	0.4	8	0.2	5	0.1	2	0.0	**102**
Capital	28	0.2	25	0.2	52	0.5	72	0.6	82	0.7	88	0.8	40	0.3	682	5.8	425	3.6	119	1.0	40	0.3	51	0.4	**1,704**
Caraguatatuba	2	0.7		-	1	0.3		-		-		-		-	1	0.3		-	1	0.3		-		-	**5**
Franca	7	1.1	1	0.2		-		-	1	0.1		-		-	3	0.4	1	0.1		-	1	0.1		-	**14**
Franco da Rocha	1	0.2		-		-		-		-	1	0.2		-	1	0.2	1	0.2		-	1	0.2	1	0.2	**6**
Itapeva		-		-		-	1	0.4		-		-		-	1	0.4		-		-		-		-	**2**
Jales		-		-		-		-	1	0.4		-	2	0.8	2	0.8	1	0.4		-		-		-	**6**
Marília		-		-	1	0.2		-		-		-		-		-	1	0.2		-		-	1	0.2	**3**
Moji das Cruzes	22	0.8	5	0.2	9	0.3	10	0.4	64	2.3	20	0.7	14	0.5	29	1.0	33	1.1	13	0.4	18	0.6	2	0.1	**239**
Osasco	7	0.3	10	0.4	13	0.5	15	0.5	8	0.3	6	0.2	8	0.3	59	2.0	26	0.9	15	0.5	3	0.1	6	0.2	**176**

ESG of residence	2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		TOTAL
	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	Nº	IC	
Piracicaba		-		-	3	0.2	2	0.1	53	3.6	6	0.4	1	0.1	2	0.1		-		-		-		-	**67**
Presidente Prudente		-		-		-		-		-		-	1	0.2	1	0.2	1	0.2		-	1	0.2		-	**4**
Presidente Venceslau		-		-		-		-	1	0.3	1	0.3	2	0.7		-	1	0.3		-		-		-	**5**
Registro		-		-		-		-		-	1	0.4	1	0.4		-	1	0.4	3	1.1		-		-	**6**
Ribeirão Preto	2	0.2	4	0.3	8	0.6	1	0.1	1	0.1	2	0.1	2	0.1	28	1.9	11	0.8	1	0.1	1	0.1		-	**61**
SantoAndré	4	0.2	1	0.0	4	0.2	2	0.1	5	0.2	2	0.1	2	0.1	60	2.3	30	1.1	5	0.2	5	0.2	5	0.2	**125**
Santos	1	0.1	2	0.1	5	0.3	5	0.3	4	0.2	6	0.3	5	0.3	31	1.7	13	0.7	4	0.2	53	2.9	35	1.9	**164**
São João da Boa Vista	1	0.1	1	0.1		-		-		-		-	1	0.1	4	0.5	13	1.6		-		-		-	**20**
São José do Rio Preto		-	16	1.3	1	0.1	2	0.2		-		-		-	20	1.6	5	0.4	10	0.8	3	0.2		-	**57**
São José dos Campos	1	0.1		-	3	0.3	45	4.5	1	0.1	5	0.5	1	0.1	7	0.7	10	0.9	4	0.4	2	0.2	1	0.1	**80**
Sorocaba	17	0.9	50	2.5	9	0.4	2	0.1	2	0.1	1	0.0	4	0.2	10	0.5	7	0.3	5	0.2	1	0.0		-	**108**
Taubaté	2	0.2	2	0.2		-	2	0.2		-		-		-	3	0.3	1	0.1	1	0.1		-	1	0.1	**12**
Total	**115**	**0.3**	**130**	**0.3**	**120**	**0.3**	**170**	**0.4**	**236**	**0.6**	**146**	**0.3**	**90**	**0.2**	**975**	**2.2**	**605**	**1.4**	**191**	**0.4**	**137**	**0.3**	**105**	**0.2**	**3,020**

Source: Sinan – CVE /CCD/SES-SP; Pop Seade. *IC per 100,000 inhabitants. **Data until May 10, 2022, subject to correction.

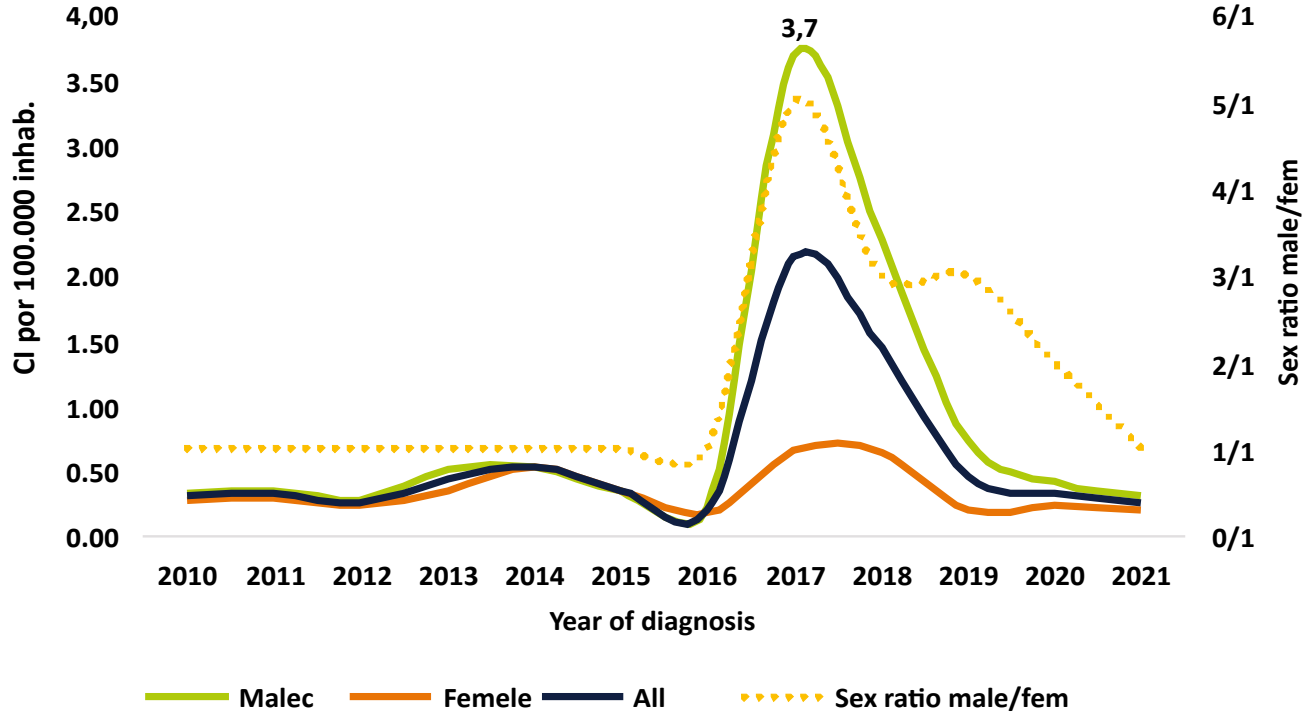
Over the period, the male:female sex ratio had little variation, with the exception of 2017 and 2018, when it reached 2.14 and 1.44, respectively (Table 2; Graph 2).

Table 2. Notified cases of hepatitis A and Incidence Coefficient (IC*), according to sex and year of diagnosis, with sex ratio.** SSP, 2010 to 2021.***

Year of notification	Sex				Total		SEX RATIO Male/Fem
	Male		Female				
	Nº	IC	Nº	IC	Nº	IC	
2010	59	0.3	56	0.3	115	0.3	**1/1**
2011	67	0.3	63	0.3	130	0.3	**1/1**
2012	65	0.3	55	0.3	120	0.2	**1/1**
2013	98	0.5	71	0.3	169	0.4	**1/1**
2014	113	0.5	123	0.6	236	0.6	**1/1**
2015	76	0.4	70	0.3	146	0.3	**1/1**
2016	44	0.2	46	0.3	90	0.2	**1/1**
2017	819	3.9	156	0.7	975	2.2	**5/1**
2018	466	2.2	139	0.6	605	1.4	**3/1**
2019	146	0.7	45	0.2	191	0.4	**3/1**
2020	88	0.4	49	0.2	137	0.3	**2/1**
2021	62	0.3	43	0.2	105	0.2	**1/1**
Total	**2,103**	-	**916**	-	**3,019**	-	-

Source: Sinan – CVE/CCD/SES-SP; Pop Seade. *IC per 100,000 inhabitants. ** Excluded case with unknown sex. ***Data until May 10, 2022, subject to correction.

Graph 2. Hepatitis A incidence coefficient (IC*) according to sex and year of diagnosis, with sex ratio. SSP, 2010 to 2021.**

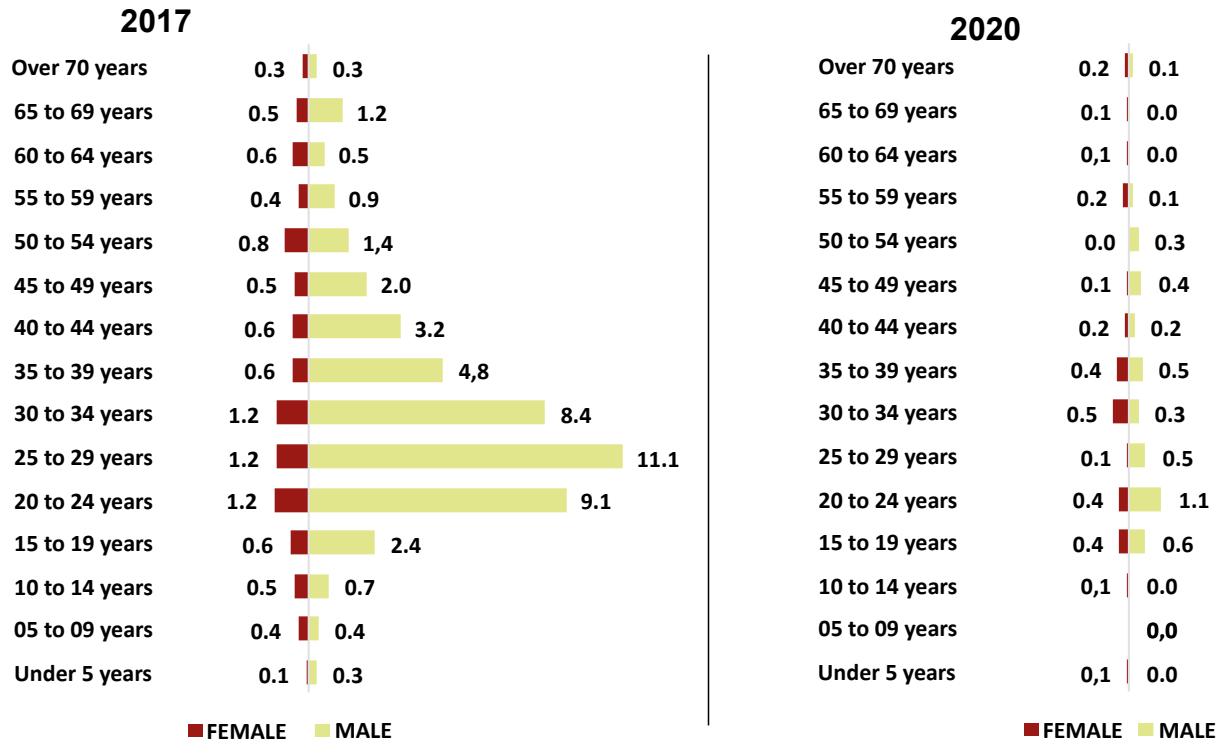


Source: Sinan – CVE/CCD/SESSP; Pop Seade. *IC per 100,000 inhab. **Provisional data until May 10, 2022, subject to correction.

Regarding the distribution by sex and age group, the highest incidence rate was observed in 2017 in the male population aged 20 to 34 years. In 2021, the incidence did not exceed 0.5 cases per 100,000 women and 0.6 cases per 100,000 men, with the exception of the 24-year-old male group, with 1.1 cases per 100,000 men (Graph 3).

The highest incidence rates of hepatitis A in the years 2017 and 2018 in males and younger age groups were related to fecal-oral transmission through unprotected sexual practices.

Graph 3. Distribution of the incidence coefficient (IC*) of hepatitis A cases according to sex and age group by year of diagnosis. SSP, 2017 and 2021.**



Source: Sinan – CVE/CCD/SESSP; Pop Seade. *IC per 100,000 inhab. **Provisional data until May 10, 2022, subject to correction.

HEPATITIS B

In the period from 2010 to 2021, 35,613 confirmed cases of hepatitis B were reported in the SSP, most in the city of São Paulo (39.5%), followed by ESG of residence in Campinas (9.5%), Santo André (4.7 %), Ribeirão Preto (4.2%) and Osasco (5.2%) (Table 3).

Table 3. Number and detection rate (DR*) of hepatitis B cases by ESG of residence and year of notification. SSP, 2010 to 2021.**

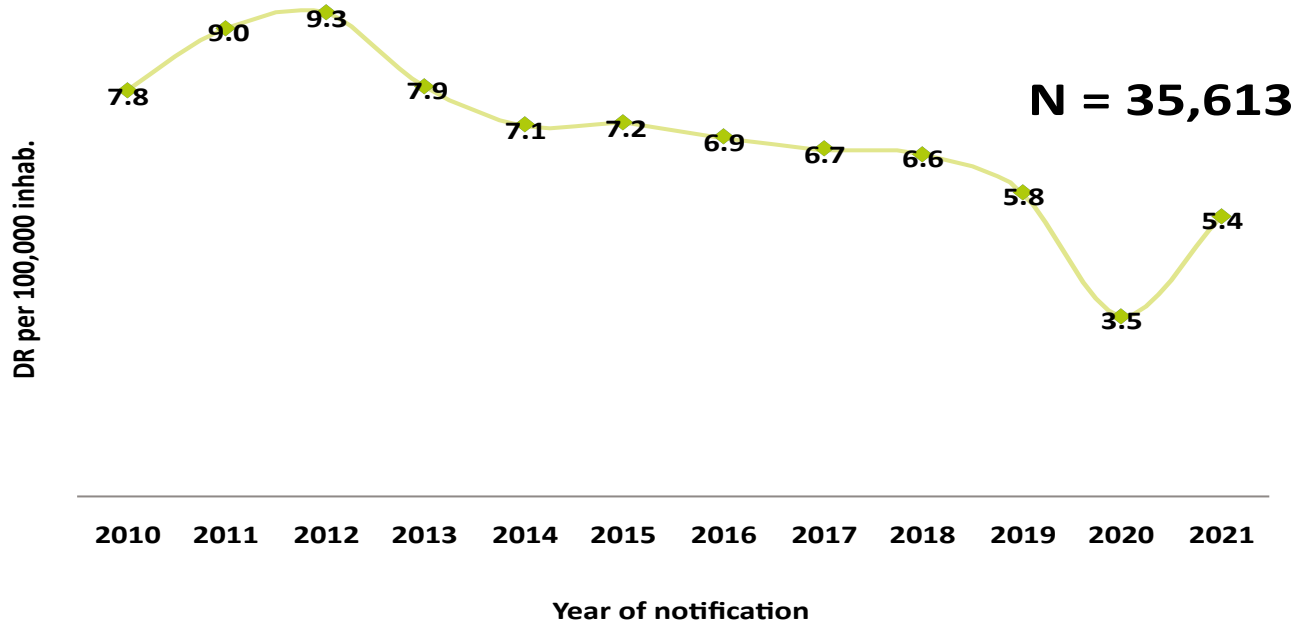
ESG of residence	2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		TOTAL
	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	
Araçatuba	30	4.2	39	5.4	38	5.2	21	2.9	41	5.6	35	4.7	29	3.9	37	4.9	20	2.6	29	3.8	11	1.4	33	4.3	**363**
Araraquara	47	5.1	51	5.5	46	4.9	66	7.0	45	4.7	37	3.9	34	3.5	32	3.3	40	4.1	33	3.4	13	1.3	42	4.2	**486**
Assis	15	3.3	15	3.3	18	3.9	39	8.5	18	3.9	17	3.6	11	2.3	19	4.0	17	3.6	10	2.1	2	0.4	15	3.1	**196**
Barretos	37	9.0	21	5.1	39	9.4	33	8.0	50	12.0	44	10.5	28	6.7	51	12.1	26	6.2	24	5.7	8	1.9	14	3.3	**375**
Bauru	73	6.8	66	6.1	69	6.4	119	10.9	73	6.6	71	6.4	54	4.8	53	4.7	43	3.8	42	3.7	26	2.3	28	2.4	**717**
Botucatu	31	5.6	26	4.6	48	8.5	45	7.9	42	7.3	26	4.5	15	2.6	15	2.6	2	0.3	6	1.0	2	0.3	7	1.2	**265**
Campinas	309	7.7	563	13.8	442	10.7	325	7.7	290	6.8	239	5.5	251	5.7	223	5.0	207	4.6	173	3.8	101	2.2	267	5.8	**3,390**
Capital	1,107	9.8	1,236	10.9	1,417	12.5	1,250	10.9	1,187	10.3	1,331	11.5	1,275	11.0	1,227	10.5	1,242	10.6	1,146	9.7	700	5.9	963	8.1	**14,081**
Caraguatatuba	55	19.6	59	20.6	65	22.4	60	20.3	52	17.3	65	21.3	64	20.7	66	21.1	68	21.4	55	17.1	42	12.9	46	14.0	**697**
Franca	23	3.5	24	3.7	27	4.1	25	3.8	21	3.1	31	4.6	26	3.8	26	3.8	28	4.1	22	3.2	19	2.7	12	1.7	**284**
Franco da Rocha	43	8.3	46	8.8	49	9.2	27	5.0	24	4.3	16	2.9	19	3.3	22	3.8	27	4.6	24	4.0	16	2.7	20	3.3	**333**
Itapeva	4	1.5	3	1.1	5	1.8	4	1.5	7	2.6	5	1.8	7	2.5	8	2.9	10	3.6	7	2.5	3	1.1	4	1.4	**67**
Jales	26	10.2	12	4.7	11	4.3	20	7.8	21	8.2	11	4.3	9	3.5	12	4.7	22	8.5	14	5.4	6	2.3	10	3.9	**174**
Marília	41	6.7	47	7.6	37	6.0	33	5.3	25	4.0	27	4.3	28	4.5	25	4.0	27	4.3	13	2.1	13	2.1	20	3.2	**336**
Mogi das Cruzes	137	5.1	163	6.1	184	6.8	166	6.0	93	3.3	119	4.2	156	5.5	128	4.4	142	4.9	121	4.1	75	2.5	75	2.5	**1,559**
Osasco	157	5.8	221	8.1	253	9.2	175	6.3	168	6.0	129	4.5	140	4.9	163	5.6	143	4.9	118	4.0	73	2.4	121	4.0	**1,861**
Piracicaba	72	5.1	92	6.5	113	7.9	69	4.8	73	5.0	113	7.6	97	6.5	82	5.5	58	3.8	67	4.,4	57	3.7	99	6.4	**992**

ESG of residence	2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		TOTAL
	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	
Presidente Prudente	32	7.3	22	5.0	52	11.8	32	7.2	25	5.6	18	4.0	23	5.1	23	5.1	19	4.2	20	4.4	11	2.4	14	3.0	**291**
Presidente Venceslau	11	3.8	13	4.5	13	4.5	18	6.2	16	5..5	15	5.2	10	3.4	25	8.6	17	5.8	13	4.4	6	2.0	21	7.2	**178**
Registro	24	8.8	30	11.0	25	9.1	27	9.8	38	13.,8	21	7.6	12	4.4	21	7.6	11	4.0	15	5.4	1	0.4	5	1.8	**230**
Ribeirão Preto	148	11.2	105	7.8	129	9.5	143	10.4	127	9.1	139	9.9	103	7.2	133	9.3	152	10.5	123	8.4	74	5.0	73	4.9	**1,449**
Santo André	151	5.9	218	8.5	248	9.6	175	6.7	129	4.9	116	4.4	114	4.3	112	4.2	92	3.5	95	3.5	55	2.0	154	5.7	**1,659**
Santos	161	9.7	212	12.6	243	14.3	153	8.9	151	8.7	153	8.7	238	13.5	172	9.7	187	10.4	148	8.2	88	4.8	111	6.0	**2,017**
São João da Boa Vista	47	6.1	68	8.7	35	4.5	31	3.9	39	4.9	30	3.8	32	4.0	24	3.0	29	3.6	21	2.6	14	1.7	34	4.2	**404**
São José do Rio Preto	257	21.1	142	11.6	115	9.3	79	6.3	98	7.8	87	6.9	74	5.8	72	5.6	110	8.5	101	7.7	60	4.6	103	7.8	**1,298**
São José dos Campos	50	5.1	59	6.0	52	5.2	59	5.9	64	6.3	72	7.0	55	5.3	34	3.2	46	4.3	44	4.1	30	2.8	15	1.4	**580**
Sorocaba	95	4.8	153	7.7	92	4.6	109	5.4	99	4.8	88	4.2	68	3.2	85	4.0	91	4.3	93	4.3	35	1.6	71	3.2	**1,079**
Taubaté	23	2.3	28	2.8	27	2.6	23	2.2	23	2.2	28	2.7	15	1.4	19	1.8	12	1.1	12	1.1	8	0.7	34	3.1	**252**
Total	3,206	7.8	3,734	9.0	3,892	9.3	3,326	7.9	3,039	7.1	3,083	7.2	2,987	6.9	2,909	6.7	2,888	6.6	2,589	5.8	1,549	3.5	2,411	5.4	**35,613**

Source: Sinan – CVE/CCD/SES-SP; Pop Seade. *DR per 100 thousand inhabitants. **Data until May 10, 2022. Subject to correction.

Hepatitis B detection rates showed little variation between 2010 and 2019, with the highest rate in 2012 (9.3 cases per 100,000 inhabitants) and the lowest in 2019 (5.8 cases per 100,000 inhabitants). In 2020, the detection rate dropped to 3.5 cases per 100,000 inhabitants in the state, the lowest in the analyzed period, while in 2021, it increased to 5.4 cases per 100,000 inhabitants (Table 3 and Graph 4).

Graph 4. Detection rate (DR*) of hepatitis B cases per year of notification. SSP, 2010 to 2021.**



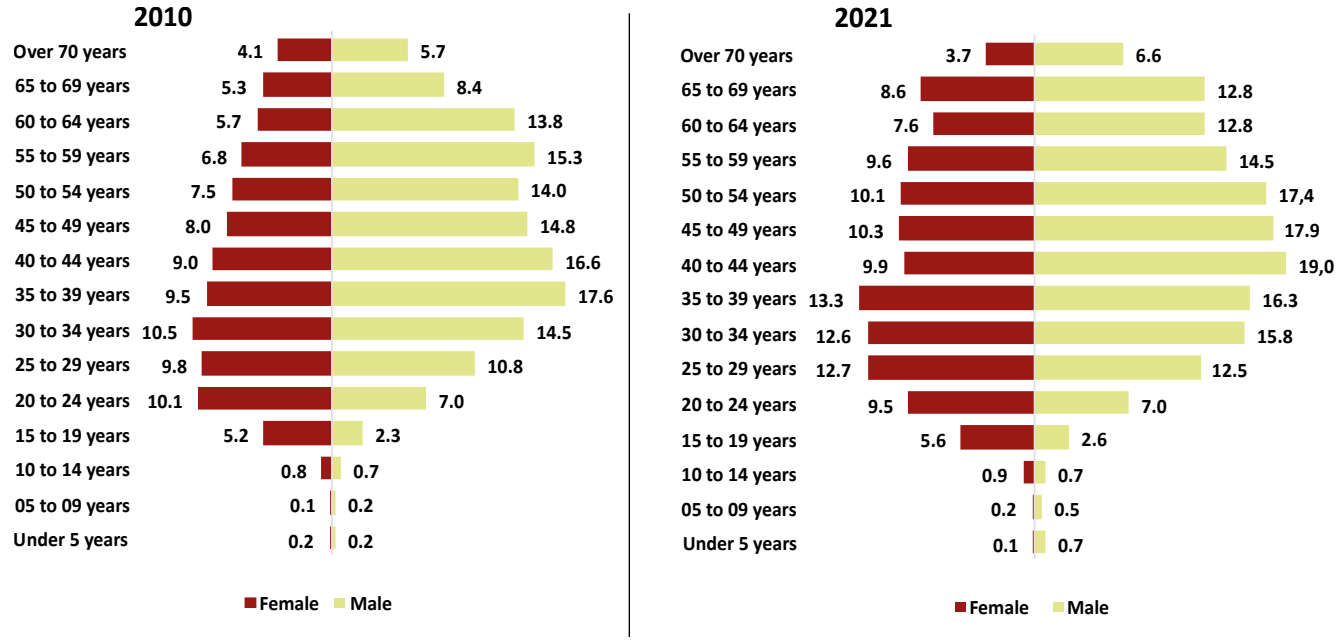
Source: Sinan – CVE/CCD/SES-SP; Pop Seade. *DR per 100 thousand inhabitants. **Data until May 10, 2022, subject to correction.

The reduction in the detection rate in 2020 probably reflects the decrease in diagnostic and surveillance activities seen in the SARS-CoV-2 pandemic.

Stratification according to sex and age group shows that in 2010 the detection rate of hepatitis B was higher in men aged 35 to 39 years (17.6 cases per 100,000) and in 2021, the highest occurrence was in the male population aged 40 to 44 years (19.0 per 100,000 men) (Graph 5).

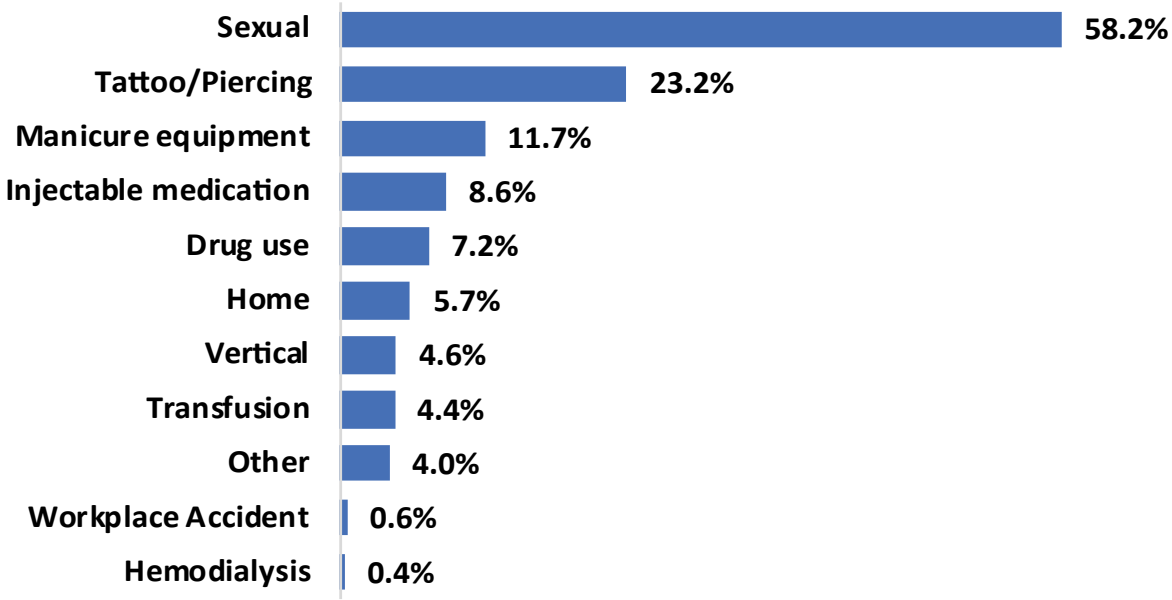
As for the probable source or mechanism of transmission, it was observed that in more than 60% of the reported cases in the historical series (N=22,098) such information was recorded as “ignored”, making it difficult to better assess this variable. Considering this limitation, among the cases whose probable source was known, the majority occurred through sexual intercourse (58.2% of the total) (Graph 6).

Graph 5. Distribution of detection rate (DR*) of hepatitis B cases according to sex and age group by year of notification. SSP, 2010 and 2021.**



Source: Sinan – CVE/CCD/SES-SP; Pop Seade. *DR per 100,000 inhabitants. **Provisional data until May 10, 2022, subject to correction.

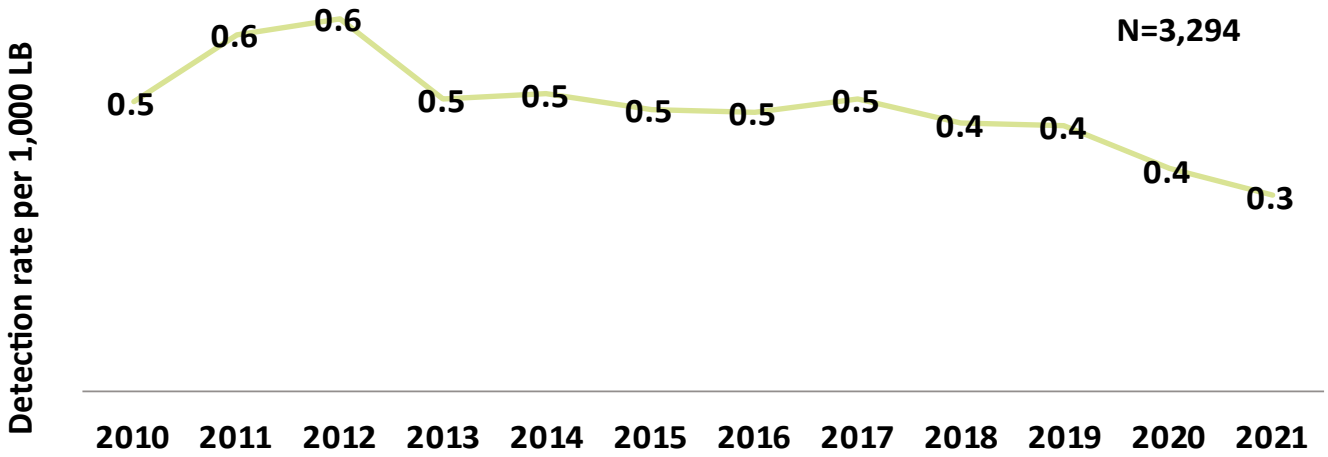
Graph 6. Percentage distribution of reported hepatitis B cases according to probable source/transmission mechanism defined. SSP, 2010 to 2021.*



Source: Sinan – CVE. * Provisional data until May 10, 2022, subject to correction.

The detection rate of hepatitis B in pregnant women showed a stability trend between 2013 and 2019, with 0.47 and 0.43 cases per 1,000 live births, respectively. In 2021, this rate represented 0.31 per 1,000 live births (Graph 7).

Graph 7. Detection rate* of hepatitis B cases reported as pregnant women per year of reporting. SSP, 2010 to 2021.**



Source: Sinan – CVE; NV 2010 = unified SEADE/SESSP database; 2011 to 2021 = SINASC-CCD/SES-SP. *Detection rate per 1,000 live births (LB). ** Provisional data until May 10, 2022, subject to correction.

Regarding the distribution of reported cases by race/color, the data showed little variability in the historical series from 2010 to 2021, with a proportion of "ignored" information of 9.2% and 8.8% at the beginning and end of the period, respectively. In all years, the most frequent category corresponded to the variable "white", with 55.2% of cases registered in 2010 and 49.1% in 2021, respectively (Table 4).

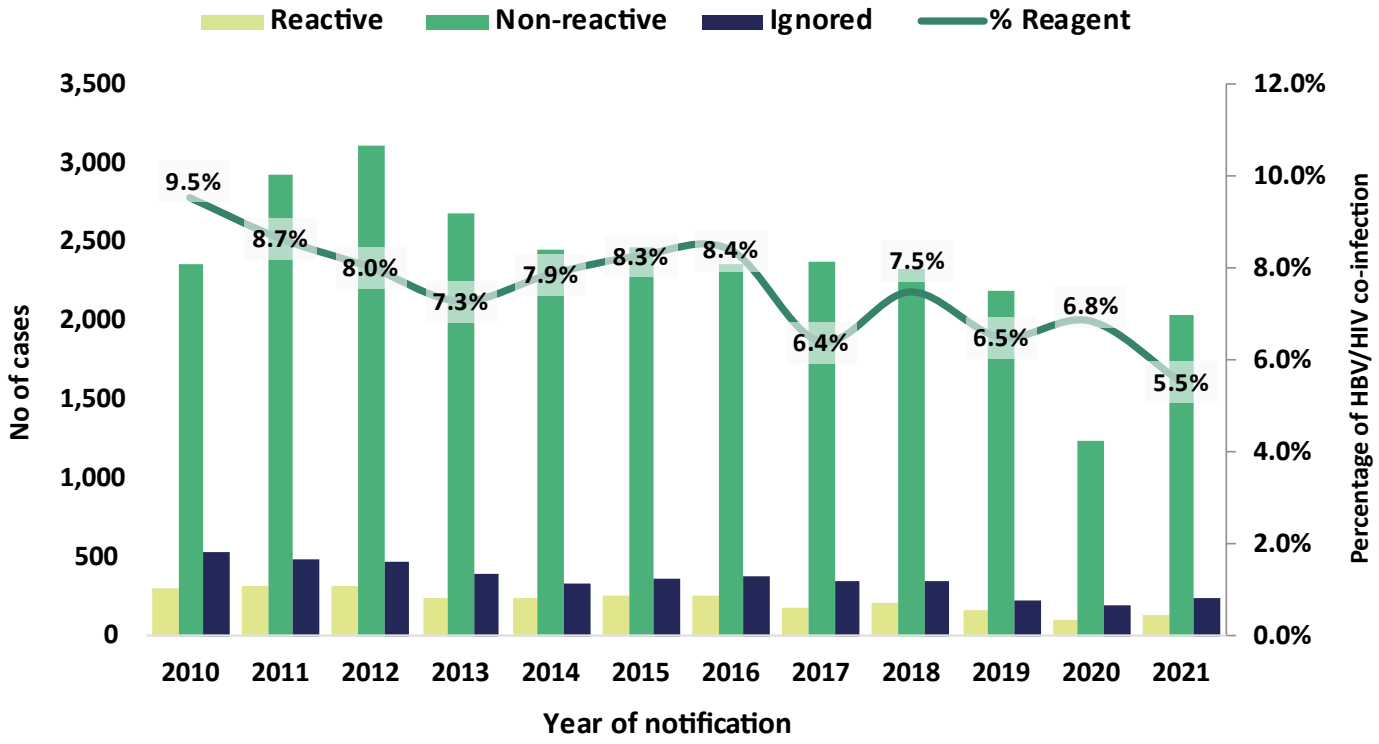
Table 4. Number and percentage of reported cases of hepatitis B according to race/color by year of notification. SSP – 2010 to 2021.*

Year of notification	White		Black		Yellow		Brown		Indigenous		Ignored/ No information		Overall
	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%	
2010	1,770	55.2	296	9.2	102	3.2	734	22.9	9	0.3	295	9.2	**3,206**
2011	1,999	53.5	342	9.2	128	3.4	883	23.6	8	0.2	373	10.0	**3,733**
2012	1,988	51.1	345	8.9	133	3.4	993	25.5	14	0.4	419	10.8	**3,892**
2013	1,711	51.4	342	10.3	101	3.0	855	25.7	3	0.1	314	9.4	**3,326**
2014	1,456	47.9	298	9.8	133	4.4	813	26.8	11	0.4	328	10.8	**3,039**
2015	1,492	48.4	365	11.8	130	4.2	801	26.0	3	0.1	292	9.5	**3,083**
2016	1,327	44.4	360	12.1	83	2.8	901	30.2	12	0.4	304	10.2	**2,987**
2017	1,294	44.5	371	12.8	75	2.6	879	30.2	10	0.3	280	9.6	**2,909**
2018	1,316	45.6	391	13.5	82	2.8	842	29.2	8	0.3	249	8.6	**2,888**
2019	1,051	40.6	361	13.9	76	2.9	850	32.8	8	0.3	243	9.4	**2,589**
2020	619	40.0	252	16.3	35	2.3	509	32.9	6	0.4	128	8.3	**1,549**
2021	1,184	49.1	263	10.9	144	6.0	605	25.1	4	0.2	212	8.8	**2,412**
Total	**17,207**		3,986		1,222		9,665		96		3,437		**35,613**

Source: Sinan – CVE. *Provisional data until May 10, 2022, subject to correction.

Co-infection with HIV among reported cases of hepatitis B was observed in 8% of cases accumulated in the period from 2010 to 2021 (n=35,609). The percentage of reported cases ranged from 9.5% in 2010 to 6.8% and 5.5% in 2020 and 2021, respectively (Graph 8).

Graph 8. Number of reported cases of hepatitis B according to the presence of HIV and percentage of HBV/HIV co-infection per year of notification. SSP, 2010 to 2021.*



Source: Sinan – CVE. * Provisional data until May 10, 2022, subject to correction.

HEPATITIS C

In the period from 2010 to 2021, 69,801 confirmed cases of hepatitis C were reported in the state of São Paulo. Of these, the majority in the capital of São Paulo (28.9%), followed by ESG of residence Campinas (10.7%), Santo André (7.6%), Santos and Osasco (5.3%), according to the Table 5.

Table 5. Number and detection rate (DR*) of hepatitis C cases by ESG of residence and year of notification. SSP, 2010 to 2021.**

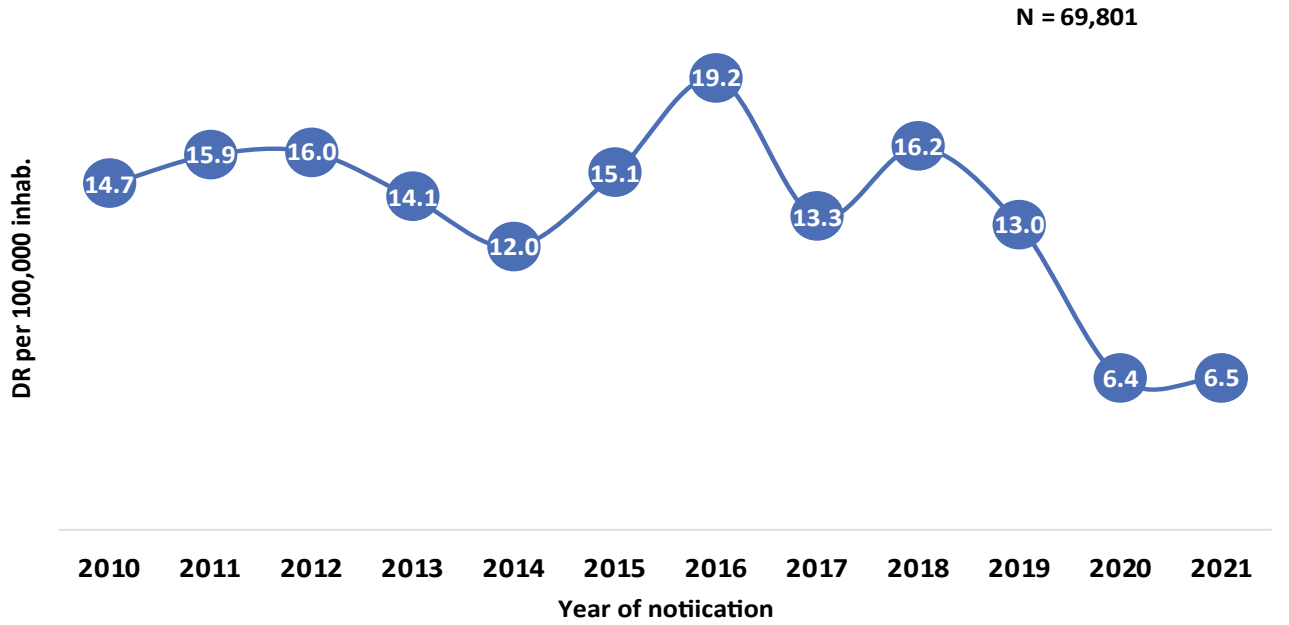
ESG of residence	2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		TOTAL
	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	
Araçatuba	95	13.2	138	19.1	141	19.4	95	13.0	117	15.8	99	13.3	136	18.2	143	19.0	114	15.1	66	8.7	43	5.6	46	6.0	**1,233**
Araraquara	124	13.5	93	10.0	92	9.8	132	14.0	117	12.3	77	8.0	183	19.0	122	12.6	140	14.3	107	10.9	63	6.4	63	6.3	**1,313**
Assis	56	12.3	43	9.4	63	13.7	45	9.8	48	10.4	31	6.7	51	10.9	34	7.2	70	14.8	58	12.2	21	4.4	24	5.0	**544**
Barretos	164	40.1	113	27.5	120	29.1	114	27.5	115	27.6	120	28.7	86	20.5	69	16.4	69	16.3	110	26.0	45	10.6	32	7.5	**1,157**
Bauru	201	18.8	174	16.2	163	15.1	126	11.6	162	14.7	145	13.1	146	13.1	88	7.9	166	14.7	129	11.4	71	6.2	58	5.1	**1,629**
Botucatu	50	9.0	66	11.8	91	16.1	73	12.8	73	12.7	69	11.9	58	9.9	41	7.0	58	9.8	73	12.2	31	5.2	31	5.1	**714**
Campinas	490	12.2	829	20.3	795	19.2	770	18.3	576	13.5	855	19.8	968	22.2	554	12.5	660	14.8	475	10.5	263	5.8	231	5.0	**7,466**
Capital	1,725	15.3	1,785	15.8	1,897	16.7	1,609	14.1	1,437	12.5	1,909	16.5	2,557	22.0	1,715	14.7	2,240	19.1	1,707	14.5	707	6.0	863	7.2	**20,151**
Caraguatatuba	56	19.9	74	25.9	81	27.9	49	16.6	47	15.7	84	27.6	66	21.4	51	16.3	63	19.9	50	15.6	37	11.4	49	14.9	**707**
Franca	75	11.6	72	11.0	64	9.7	75	11.3	62	9.3	70	10.4	54	8.0	70	10.2	61	8.9	54	7.8	47	6.7	14	2.0	**718**
Francoda Rocha	62	12.0	83	15.8	97	18.2	88	16.2	66	12.0	70	12.5	72	12.6	61	10.6	90	15.4	72	12.1	36	6.0	40	6.5	**837**
Itapeva	4	1.5	15	5.5	10	3.7	17	6.2	20	7.3	32	11.6	31	11.2	16	5.8	15	5.4	21	7.5	2	0.7	5	1.8	**188**
Jales	46	18.0	19	7.4	10	3.9	15	5.8	22	8.6	12	4.7	32	12.4	25	9.7	26	10.1	16	6.2	7	2.7	10	3.9	**240**
Marília	99	16.1	128	20.8	92	14.9	102	16.5	85	13.7	78	12.5	95	15.2	68	10.8	88	14.0	67	10.6	40	6.3	43	6.8	**985**
Mogi das Cruzes	191	7.2	138	5.1	197	7.2	228	8.3	141	5.,1	342	12.1	418	14.6	350	12.1	425	14.6	314	10.7	166	5.6	124	4.1	**3,034**
Osasco	251	9.3	342	12.6	362	13.1	282	10.1	256	9.1	275	9.6	459	15.9	349	12.0	388	13.2	367	12.4	167	5.6	188	6.2	**3,686**
Piracicaba	212	15.0	250	17.5	278	19.3	176	12.1	116	7.9	216	14.6	241	16.2	166	11.0	262	17.3	200	13.1	143	9.3	116	7.5	**2,376**

ESG of residence	2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		TOTAL
	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	Nº	DR	
PresidentePrudente	30	6.9	26	5.9	76	17.2	53	12.0	37	8.3	39	8.7	56	12.4	35	7.7	56	12.3	56	12.3	23	5.0	23	5.0	**510**
Presidente Venceslau	4	1.4	4	1.4	8	2.8	8	2.8	11	3.8	7	2.4	17	5.9	17	5.8	27	9.3	32	10.9	24	8.2	21	7.2	**180**
Registro	16	5.8	16	5.8	12	4.4	8	2.9	24	8.7	24	8.7	4	1.5	16	5.8	14	5.1	25	9.0	3	1.1	1	0.4	**163**
Ribeirão Preto	294	22.2	209	15.6	214	15.8	276	20.1	238	17.1	271	19.2	247	17.4	213	14.8	220	15.2	207	14.1	120	8.1	88	5.9	**2,597**
Santo André	439	17.2	555	21.6	509	19.7	462	17.8	280	10.7	405	15.4	643	24.4	501	18.9	566	21.2	428	16.0	220	8.2	275	10.2	**5,283**
Santos	257	15.5	414	24.7	383	22.6	321	18.7	270	15.6	368	21.0	456	25.8	282	15.8	363	20.2	338	18.6	133	7.3	140	7.6	**3,725**
São João da Boa Vista	137	17.7	203	26.1	227	29.1	206	26.2	174	22.1	157	19.8	169	21.2	113	14.1	149	18.6	122	15.1	60	7.4	80	9.8	**1,797**
São José do Rio Preto	492	40.5	312	25.4	248	20.0	214	17.2	218	17.3	250	19.7	308	24.1	195	15.2	208	16.1	150	11.5	102	7.8	104	7.9	**2,801**
São José dos Campos	233	23.9	272	27.6	240	24.1	186	18.4	154	15.1	152	14.7	170	16.3	152	14.5	154	14.5	119	11.1	62	5.7	46	4.2	**1,940**
Sorocaba	163	8.3	191	9.6	179	8.9	177	8.7	166	8.1	192	9.2	421	20.0	221	10.4	241	11.3	229	10.6	159	7.3	99	4.5	**2,438**
Taubaté	82	8.1	61	6.0	80	7.8	58	5.6	99	9.5	166	15.9	177	16.8	127	12.0	215	20.1	151	14.1	79	7.3	94	8.6	**1,389**
Total	**6,048**	**14.7**	**6,625**	**15.9**	**6,729**	**16.0**	**5,965**	**14.1**	**5,131**	**12.0**	**6,515**	**15.1**	**8,321**	**19.2**	**5,794**	**13.3**	**7,148**	**16.2**	**5,743**	**13.0**	**2,874**	**6.4**	**2,908**	**6.5**	**69,801**

Source: Sinan – CVE/CCD/SES-SP; Pop Seade. *DR per 100,000 inhabitants. **Data until May 10, 2022, subject to correction.

The hepatitis C detection rate fluctuated in the analyzed period, with a record of 14.7 cases per 100,000 inhabitants at the beginning, reaching 19.2 in 2016. This indicator showed a downward trend since 2019, with 6.4 and 6, 5 cases per 100,000 inhabitants in 2020 and 2021, respectively (Graph 9).

Graph 9. Detection rate (DR*) of hepatitis C cases per year of notification. SSP, 2010 to 2021.**



Source: Sinan – CVE/CCD/SES-SP; Pop Seade.*DR per 100 thousand inhabitants. **Data until May 10, 2022, subject to correction.

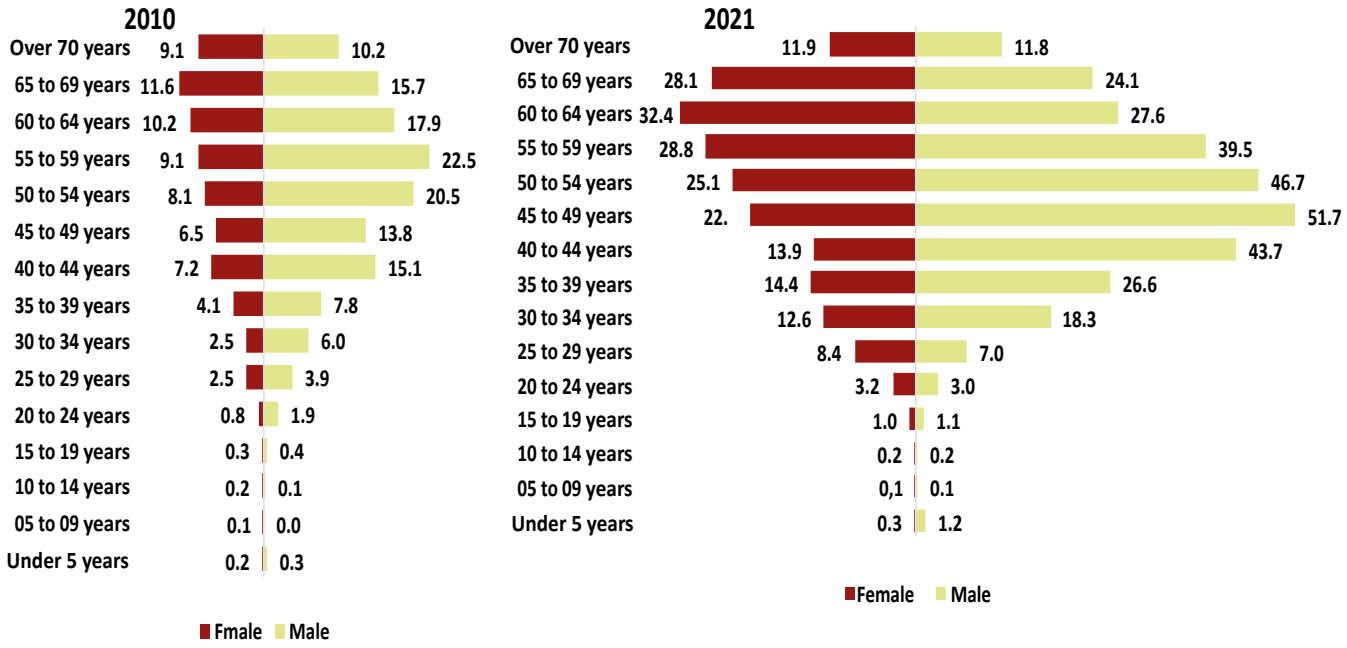
The increase in the detection of confirmed cases of hepatitis C between 2015 and 2018 coincides with the introduction of new treatments with direct-acting antivirals and the stimulus for notification in Sinan, when prescribing and dispensing medicines to people diagnosed with the disease. The decrease in notifications in recent years suggests the low activity of health services in relation to diagnosis and surveillance in the SARS-CoV-2 pandemic.

Regarding stratification by sex and age group, detection rates at the beginning of the period were higher in the male population aged 40 to 54 years, with a predominance between 45 and 49 years (51.7 cases per 100,000 men). In 2021, the highest rate observed was in the male population aged 55 to 59, with 22.5 cases per 100,000 men (Graph 10).

The detection rate of hepatitis C in pregnant women showed a tendency towards stability and values lower than 0.20 per 1,000 live births in all years of the series (Graph 11).

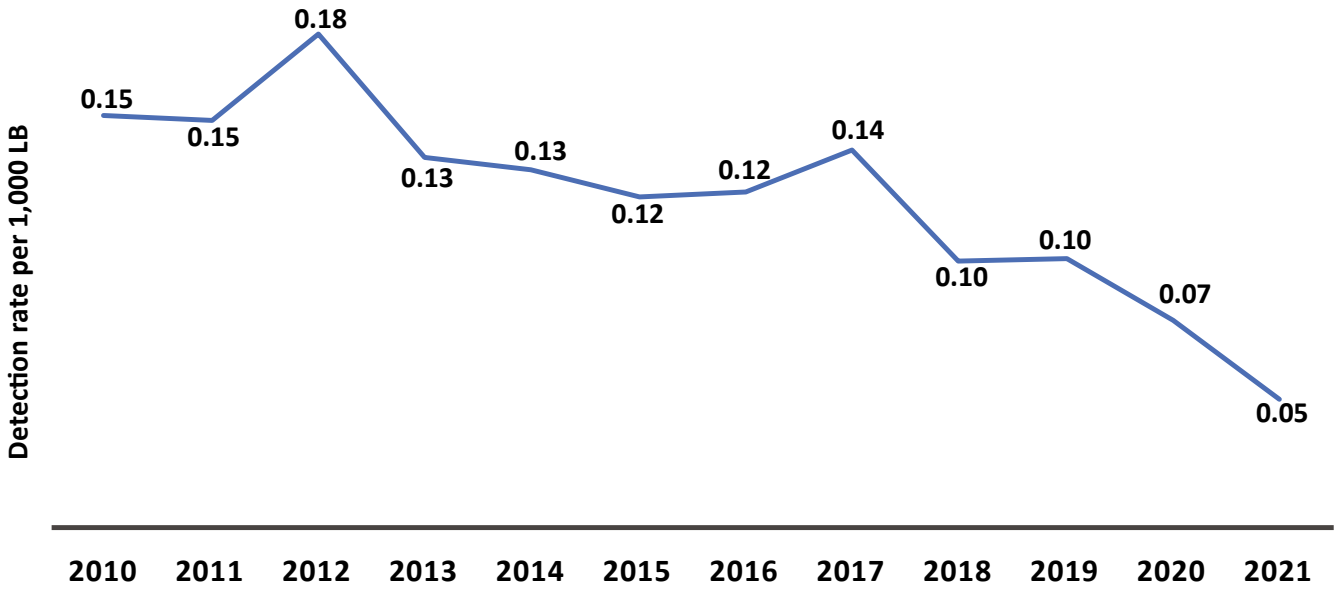
Regarding the distribution by race, the variable “white” was the most frequent in all years of the series, representing 66.5% and 58.7% of the cases reported in 2010 and 2021, respectively. Proportionally, the black race increased from 6.9% in 2010 to 8.5% in 2019 (Table 6).

Graph 10. Distribution of detection rate (DR*) of hepatitis C cases according to sex and age group by year of notification. SSP, 2010 and 2021.**



Source: Sinan – CVE/CCD/SES-SP; Pop Seade. *DR per 100,000 population. **Provisional data until May 10, 2022, subject to correction.

Graph 11. Detection rate* of hepatitis C cases reported as pregnant women per year of reporting. SSP, 2010 to 2021.**



Source: Sinan – CVE; NV 2010 = unified Seade/SESSP database; 2011 to 2021 = SINASCCCD/SES-SP. *Detection rate per 1,000 live births (LB); **Provisional data until May 10, 2022, subject to correction.

Table 6. Number and percentage of reported cases of hepatitis C by race/color by year of reporting. SSP, 2010 to 2021.**

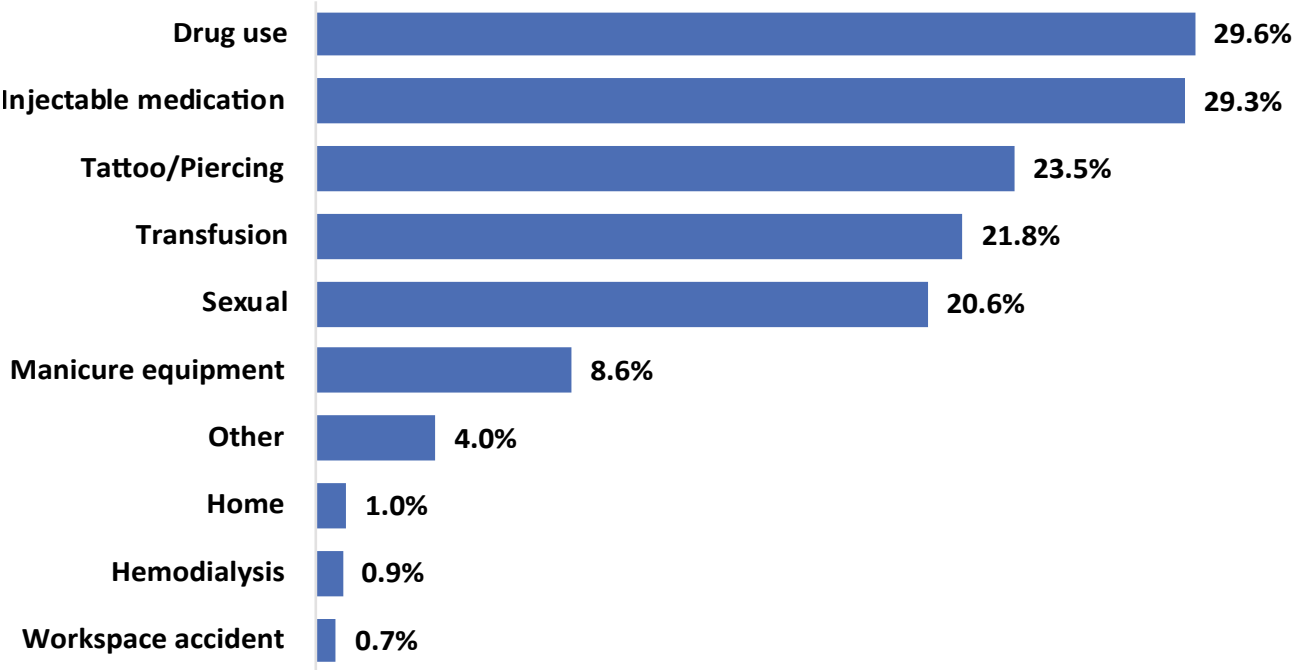
Year of notification	White		Black		Yellow		Brown		Indigenous		Ignored/ No information		Total
	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%	
2010	4,024	66.5	415	6.9	57	0.9	1,172	19,4	6	0.1	374	6.2	**6,048**
2011	4,224	63.8	460	6.9	58	0.9	1,303	19,7	17	0.3	562	8.5	**6,624**
2012	4,306	64.0	423	6.3	62	0.9	1,348	20,0	10	0.1	580	8.6	**6,729**
2013	3,818	64.0	397	6.7	55	0.9	1,305	21,9	11	0.2	378	6.4	**5,964**
2014	3,191	62.2	368	7.2	47	0.9	1,085	21,1	4	0.1	435	8.5	**5,130**
2015	4,019	61.7	465	7.1	69	1.1	1,317	20,2	11	0.2	634	9.7	**6,515**
2016	5,157	62.0	571	6.9	91	1.1	1,699	20,4	16	0.2	787	9.5	**8,321**
2017	3,422	59.1	446	7.7	60	1.0	1,344	23,2	7	0.1	516	8.9	**5,795**
2018	4,321	60.4	555	7.8	61	0.9	1,549	21,7	9	0.1	654	9.1	**7,149**
2019	3,382	58.9	489	8.5	64	1.1	1,306	22,7	5	0.1	498	8.7	**5,744**
2020	1,673	58.2	197	6.9	24	0.8	666	23,2	3	0.1	311	10.8	**2,874**
2021	1,707	58.7	191	6.6	20	0.7	675	23,2	5	0.2	310	10.7	**2,908**
Total	**43,244**		**4,977**		**668**		**14,769**		**104**		**6,044**		**69,801**

Source: Sinan – CVE. *Detection rate per 100,000 population per race/color. **Provisional data until May 10, 2022, subject to correction.

As for the probable source or mechanism of infection, there is a lack of information in more than 50% of the total cases reported in this historical series from 2010 to 2021 (N=69,801), which makes it difficult to analyze this variable. Among those with a known source (n=30,367), it was observed that the most frequent was drug use, corresponding to 29.6% of all cases (Graph 12).

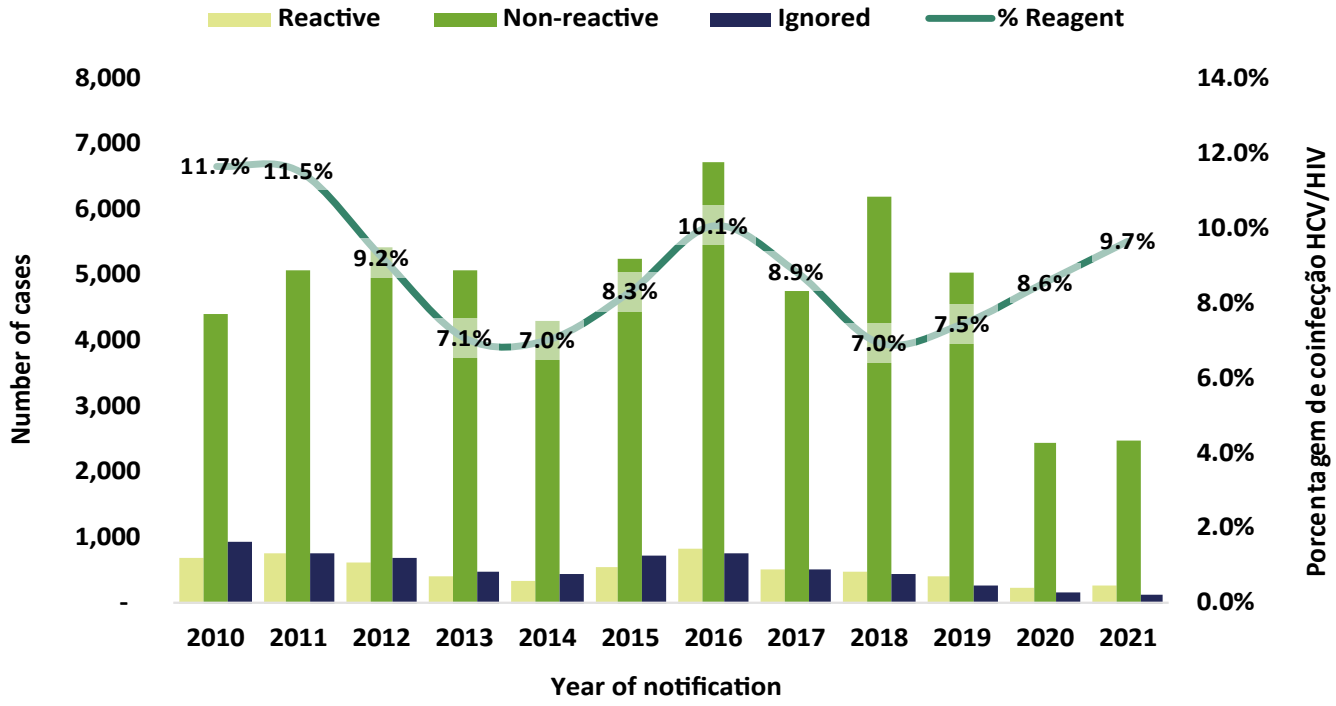
Of the total number of cases reported from 2010 to 2021 (n=68,801), the proportion of HIV and hepatitis C co-infection increased from 11.7% in 2010 to 7.0% in 2014, with fluctuations in the following years, reaching 8.6% and 9.7% in 2020 and 2021, respectively (Graph 13).

Graph 12. Percentage distribution of reported hepatitis C cases according to probable source/transmission mechanism defined. SSP, 2010 to 2021.*



Source: Sinan – CVE. *Provisional data until May 10, 2022, subject to correction.

Graph 13. Number of reported cases of hepatitis C according to the presence of HIV and percentage of HCV/HIV co-infection per year of notification. SSP, 2010 to 2021.*



Source: Sinan – CVE. *Provisional data until May 10, 2022, subject to correction.

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