

# Integrating Viral Hepatitis Screening into the Emergency Department

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Evaluating middle-term results and implications for  
sustaining a screening program

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# Conflicts of Interest

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Speaker for Gilead.

We acknowledge funding from Gilead Sciences' FOCUS program to support screening and linkage to the first medical appointment after diagnosis

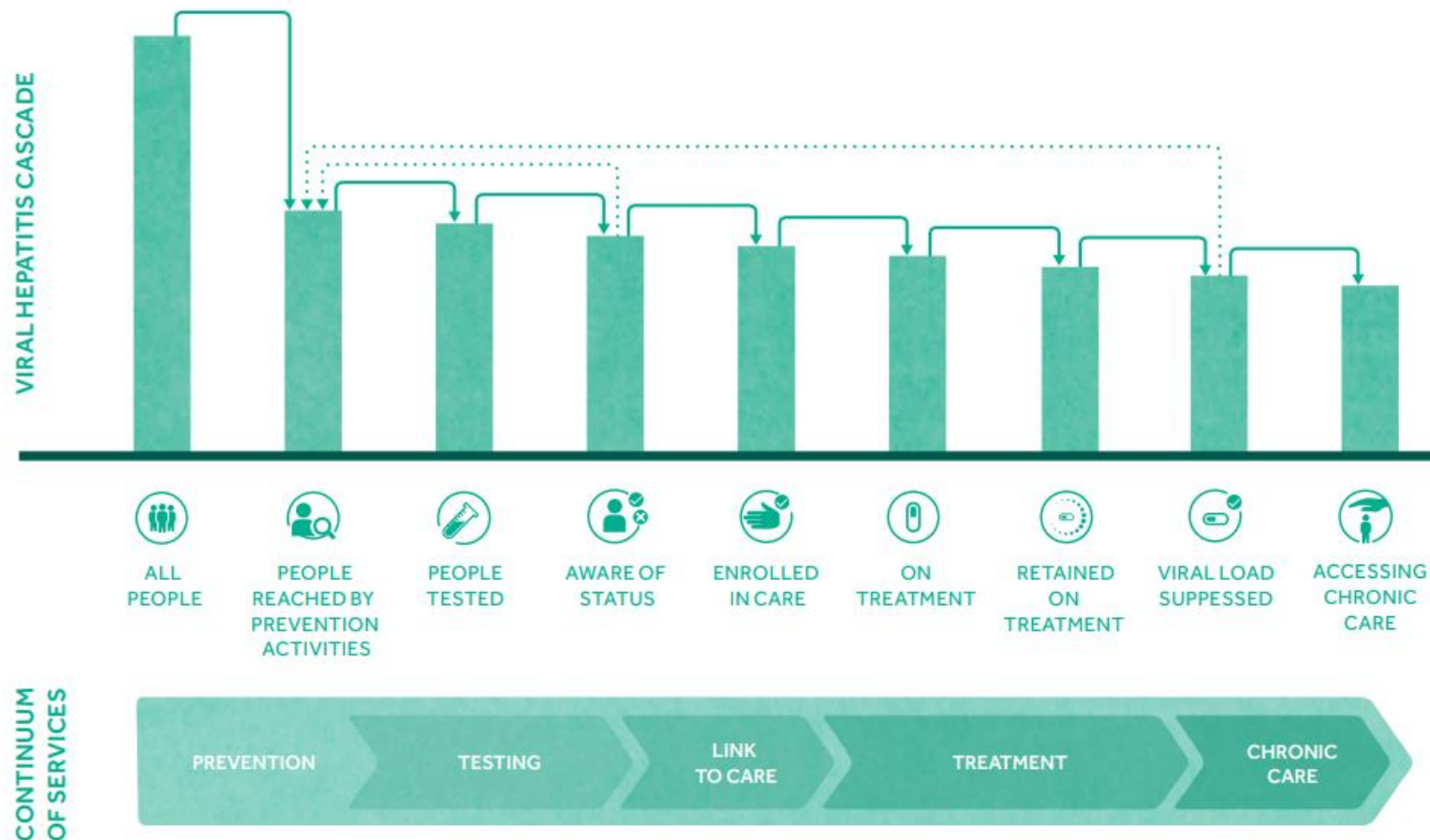
# Global epidemiology of viral hepatitis

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- It is estimated that 240 million people are living with HBV.
  - Large regional variation between low (<2%) and high (>8%) endemicity.
- It is estimated that 57 million people are living with HCV.
  - Over 70% residing in low-income and middle-income countries.

# Viral hepatitis face several barriers from diagnosis to linkage

The continuum of viral hepatitis services and the retention cascade



# Potencial approaches to viral hepatitis screening

Screening based on risk factors	Universal screening
<ul style="list-style-type: none"> <li>- <b>Usual current strategy</b></li> <li>- Requires good knowledge of epidemiology and risk factors in the target population.</li> <li>- <b>More cost-effective</b></li> <li>- Ethical implications</li> <li>- Uneven results</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Do not require knowledge of epidemiology or risk factors</b></li> <li>- Less ethical implications</li> <li>- High cost / Resources needed</li> <li>- Requires stablished and functional circuits to succesfully link to care patients diagnosed</li> </ul>

JAMA   US Preventive Services Task Force   RECOMMENDATION STATEMENT	
Screening for Hepatitis C Virus Infection in Adolescents and Adults US Preventive Services Task Force Recommendation Statement	
What does the USPSTF recommend?	For adults aged 18 to 79 years: <b>Grade B</b> Screen adults for hepatitis C virus (HCV) infection.
To whom does this recommendation apply?	All asymptomatic adults (including pregnant persons) aged 18 to 79 years without known liver disease.
What's new?	This recommendation expands the population that should be screened. The USPSTF now recommends that all adults aged 18 to 79 years be screened. Previously, it recommended screening adults born between 1945 and 1965 and others at high risk.
How to implement this recommendation?	<p>Screen. Screen adults aged 18 to 79 years with anti-HCV antibody testing followed by confirmatory polymerase chain reaction testing.</p> <p>a. The USPSTF also suggests that clinicians consider screening persons younger than 18 years and older than 79 years who are at high risk for infection (eg, those with past or current injection drug use).</p> <p>Adults with a positive screening test result are usually followed up with a diagnostic evaluation using one of various noninvasive tests. Treatment typically consists of oral direct-acting antiviral regimens for 8 to 12 weeks.</p> <p>Important considerations include</p> <ul style="list-style-type: none"> <li>• Communicating that screening is voluntary and undertaken only with the patient's knowledge</li> <li>• Informing patients about HCV infection, how it can (and cannot) be acquired, the meaning of positive and negative test results, and the benefits and harms of treatment</li> <li>• Providing patients the opportunity to ask questions and to decline screening</li> </ul>
How often?	<p><b>One-time screening for most adults.</b></p> <p><b>Periodically screen persons with continued risk for HCV infection (eg, persons with past or current injection drug use).</b></p> <p>There is limited evidence to determine how often to screen persons at increased risk.</p>

Cooke CS. Lancet Gastroenterology and Hepatology 2019.

Dillon JF. Hepatology medical policy 2016.

Guidelines for the screening, care and treatment of persons with chronic hepatitis C. WHO 2016.

# Potential benefit of screening at ED

The FOCUS program is a public health initiative that promotes best practices for screening and linking individuals to healthcare for bloodborne virus transmission, following the screening guidelines established by public health authorities.



## Only point of contact with the health system for vulnerable populations

- Marginalized individuals
- Migrants
- People living with psychiatric disorders
- Elderly population

## Vulnerable population might have higher seroprevalence than general population

- Migrants from high prevalence / endemic regions.
- Higher proportion of risk factors: intravenous drug use, sexual risk behaviour

# Implementation of a screening program at ED

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## Our goals were...

1. To implement an **opportunistic HBV, HCV and HDV screening** and linkage to care strategy at the Emergency Department of an academic hospital attending a population of 430.000 adults.
2. To determine whether the strategy is cost-effective.

# Implementation of a screening program at ED

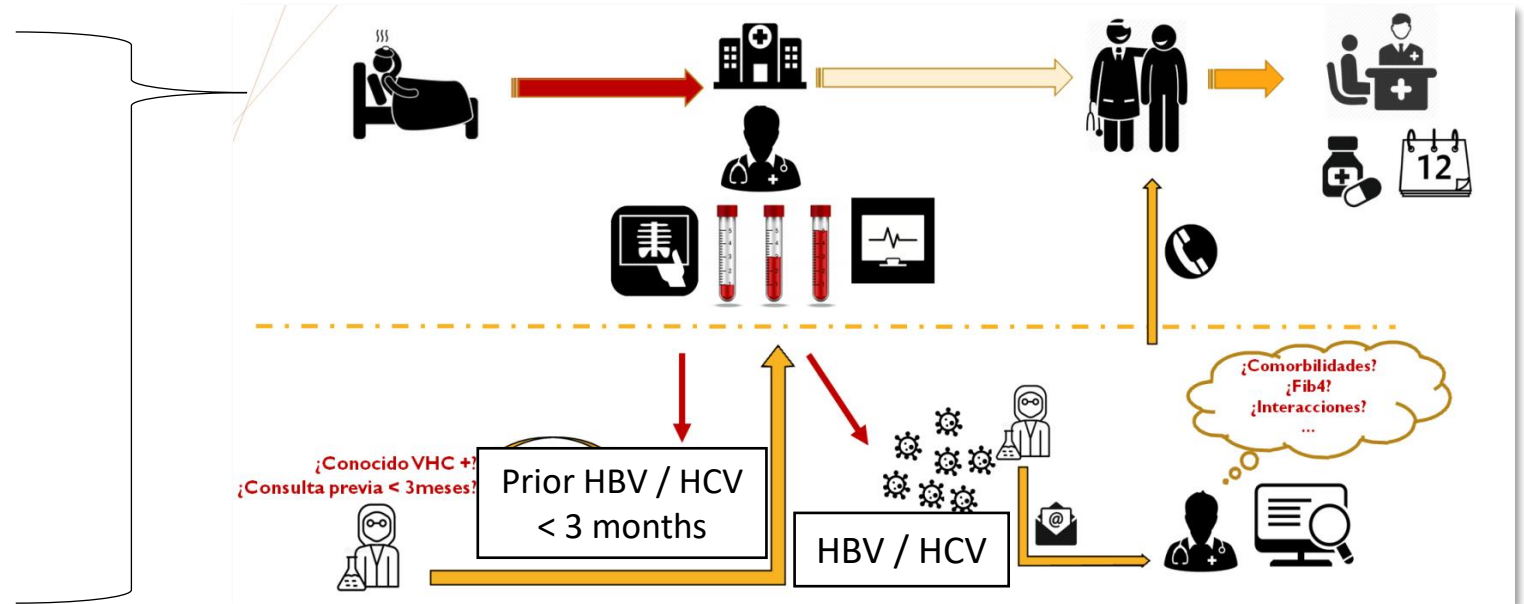
- Prospective Study performed at the Emergency Department of Vall d'Hebron University Hospital in Barcelona, Spain.
- From January/2020 – Ongoing

## Inclusion criteria

- Adults attended at the ED.
- Blood test needed because of the ED episode.

## Exclusion criteria

- Denial to be tested after iconographic information and oral consent



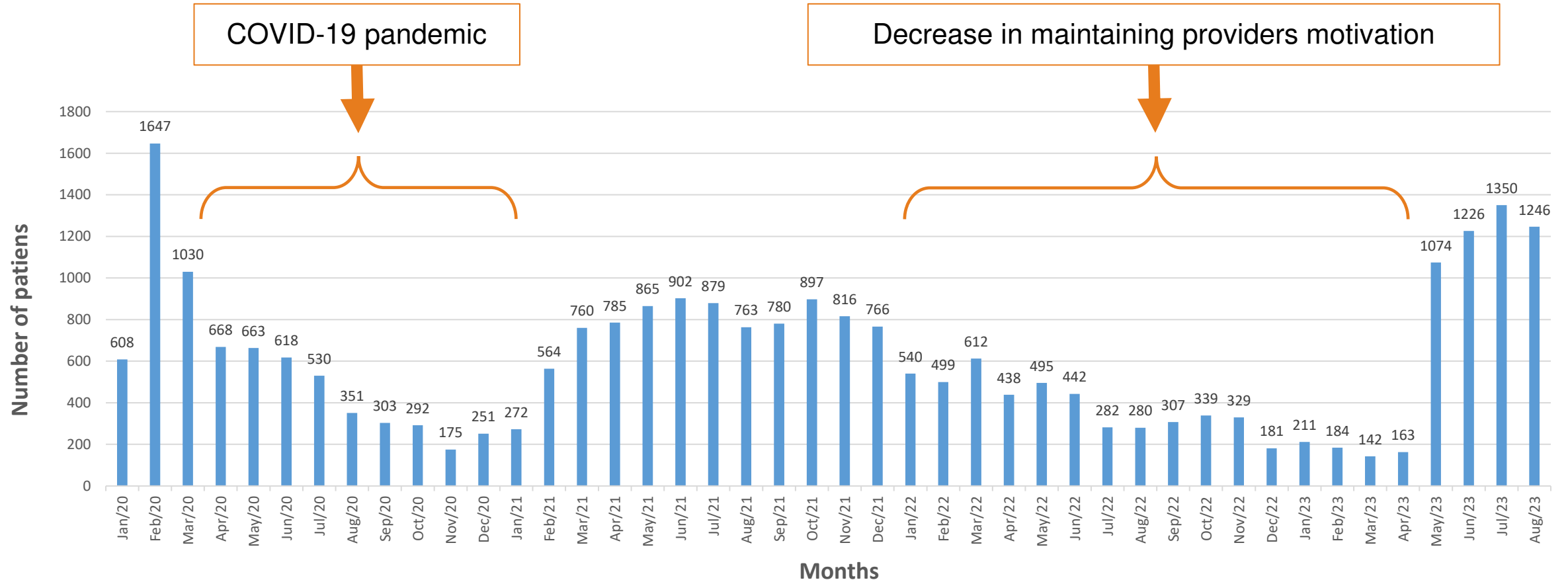
## Recorded data

- Demographic and epidemiological characteristics.
- Relevant medical history (liver or psychiatric diseases).
- Clinical characteristics.
- Laboratory results (MELD, APRI, FIB4).
- Linkage to care and treatment.



# Implementation of a screening program at ED

There were some difficulties to successfully implement the screening program.



26525 patients were screened during 44 months

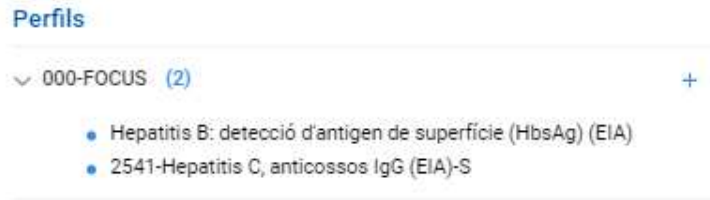
# Implementation of a screening program at ED

There were some difficulties to successfully implement the screening program.

COVID-19 pandemic



- Simplification of serologies request.



- Distribution of informative materials for professionals and patients.



- Feedback of positive results.

Decrease in maintaining providers motivation



- Complete automation of viral hepatitis screening without need of a request by the treating physician:



18 – 80 years old  
No HBV / HCV testing > 1 year



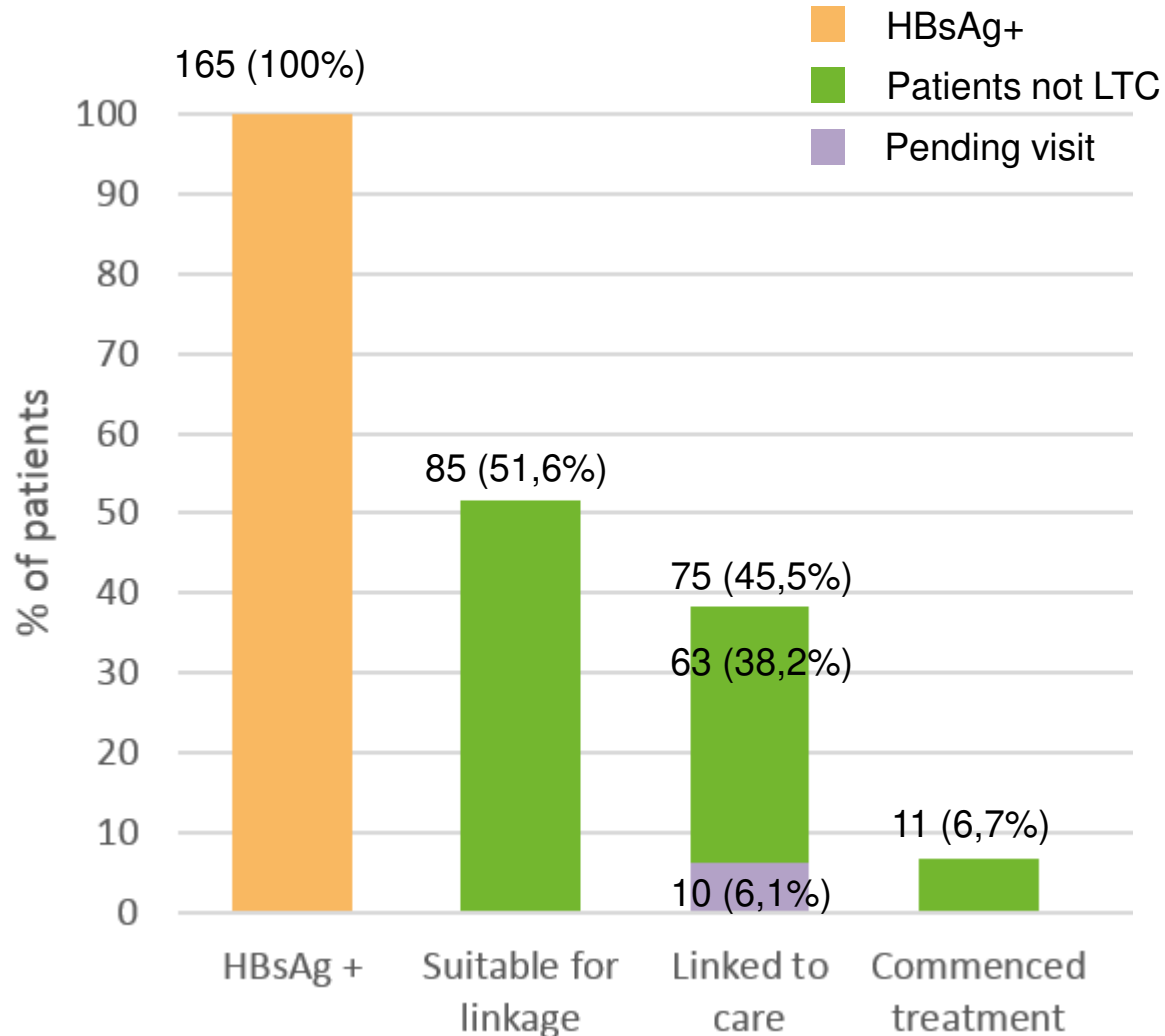
# 0.62% (165) of patients screened were HBsAg +

Age, years (IQR)	58,09 (46.2 – 72.3)
Male, n (%)	108 (65.5)
Ethnicity, n (%)	
<b>White</b>	<b>116 (70.3)</b>
Hispanic	9 (5.4)
Asian	6 (3.6)
African/Afroamerican	15 (9.1)
North Africa/Middle East	19 (11.5)
Alcohol abuse history, n (%)	30 (18.9)
<b>Risk Factors for viral hepatitis, n (%)</b>	<b>15 (9.1)</b>
People who inject drugs, n (%)	6 (3.6)
HIV coinfection, n (%)	6 (3.6)
Psychiatric comorbidity, n (%)	34 (20.6)
Sustance Use Disorder	10 (6.1)
Mixed anxiety–depressive disorder	10 (6.1)
Major depression	8 (4.9)
Psychotic disorder	6 (3.6)

Known HBV, n (%)	<b>84 (50.9)</b>
Linked to specialist, n (%)	<b>56 (33.9)</b>
FIB4 (IQR)	1,69 (0.96 – 2.52)
FIB4 > 3.25	25 (15,6)
APRI (IQR)	0.38 (0.28 – 0.62)
APRI > 1.5	21 (12.7)
Phase of HBV infection, n (%)	
HBeAg+ chronic hepatitis	4 (2.4)
HBeAg- chronic infection	123 (74.5)
HBeAg- chronic hepatitis	38 (23.1)
Anti-HDV, n (%)	6 (3.6)
HDV-RBNA +, n (%)	2 (1.2)

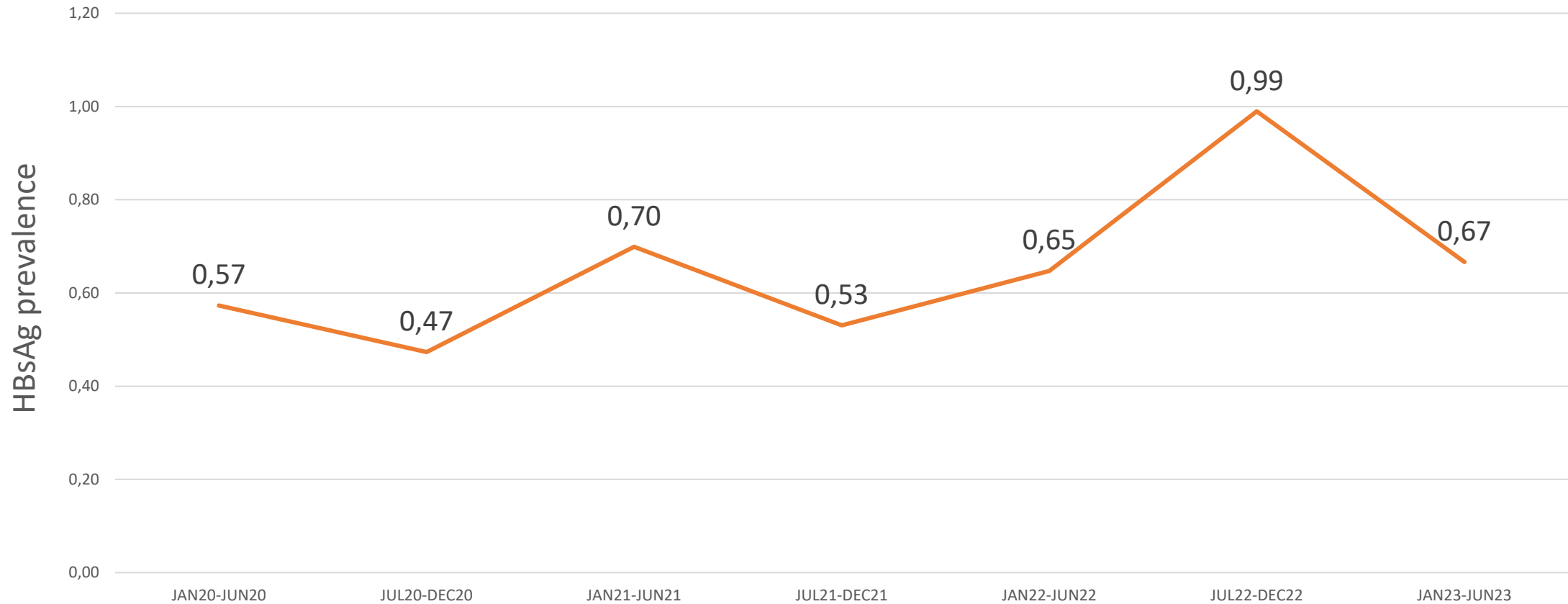
- 49.1% (81) were unaware of their infection.
- 33.3% (28) of known HBsAg + patients were not linked to care.
- 66.1% (28+81=109) of all HBsAg + were not linked to care.

# Flowchart of HBsAg + patients



- 109 (66,1%) were not linked to care. Of them 24 were not considered for linkage:
  - Death 6
  - Low life expectancy 9
  - Lack of contact information 9
- **85 (51,6%) were considered for linkage**
  - 12 did not attend the appointment.
  - 10 are pending the visit.
  - **63 were successfully linked to care.**
- **Treatment with ETV/TDF was initiated in 11 patients without prior linkage to care.**

# Evolution of HBsAg prevalence



HBsAg + /  
Screened

30/5234

9/1902

29/4148

26/4901

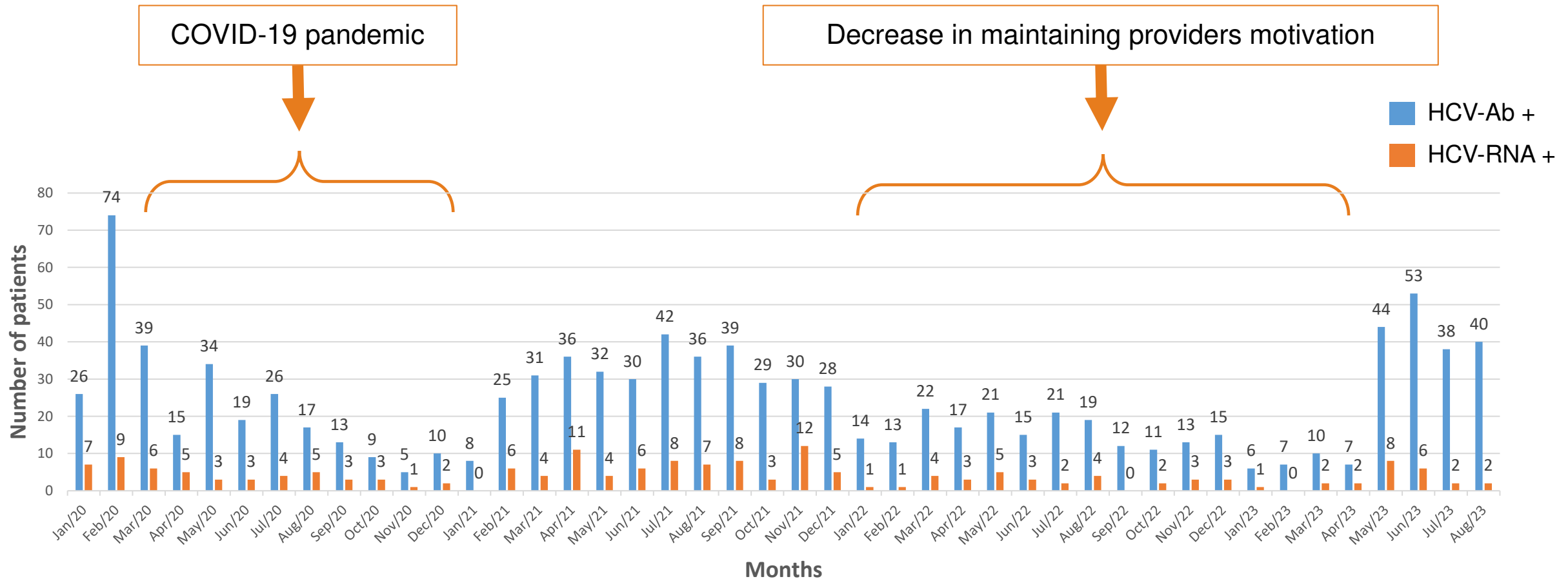
17/2626

17/1718

20/3000

# Total number of HCV-Ab and HCV-RNA detected

During de 44 months of the screening program, 1050 (4%) patients had anti-HCV and 178 (0,67%) were viremic.

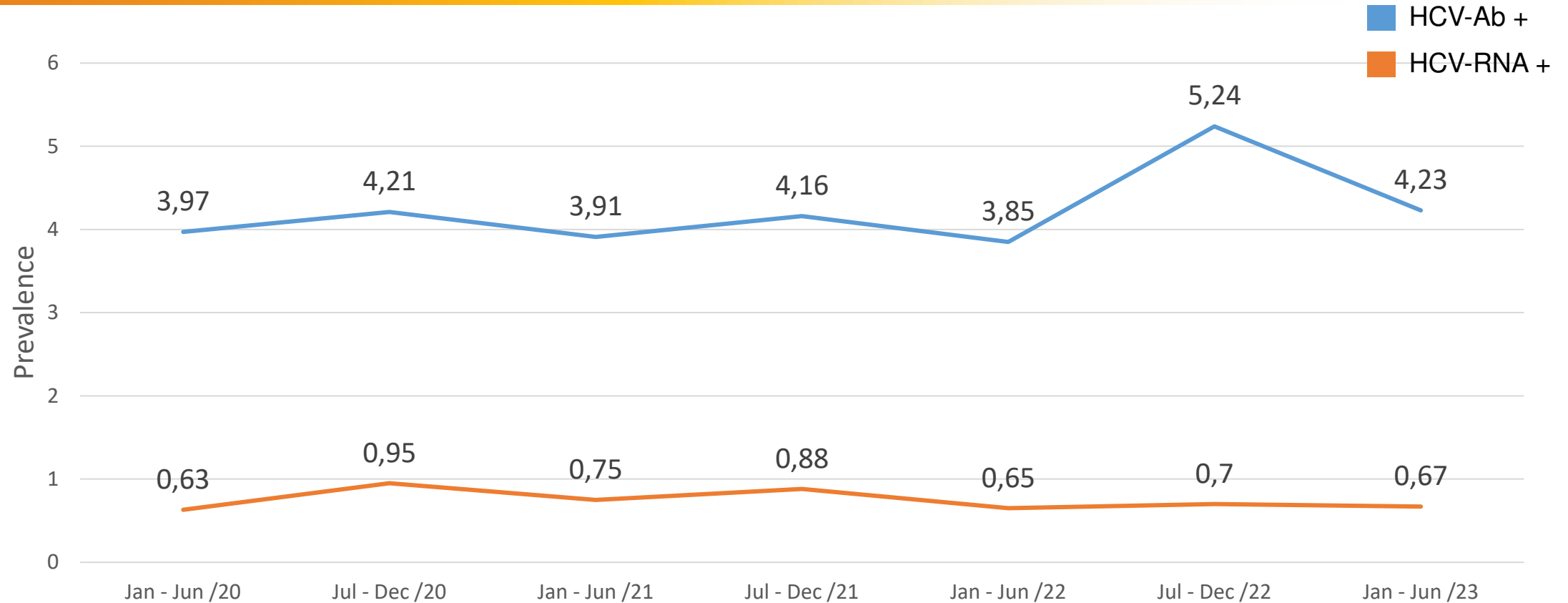


# 0.67% (178) of patients screened had detectable HCV-RNA

Age, years (IQR)	77 (53 – 87.8)
Male, n (%)	84 (47.2)
Ethnicity, n (%)	
<b>White</b>	<b>165 (92.7)</b>
Hispanic	7 (3.9)
Asian	0 (0)
African/Afroamerican	1 (0.6)
North Africa/Middle East	5 (2.8)
Alcohol abuse history, n (%)	51 (28.6)
<b>Risk Factors for viral hepatitis, n (%)</b>	<b>72 (40.4)</b>
People who inject drugs, n (%)	47 (26.4)
HIV coinfection, n (%)	19 (10.7)
Psychiatric comorbidity, n (%)	65 (36.5)
Sustance Use Disorder	41 (23)
Mixed anxiety–depressive disorder	6 (3.4)
Major depression	8 (4.5)
Psychotic disorder	8 (4.5)
Other	2 (1,1)

<b>Known HCV-RNA, n (%)</b>	<b>96 (53.9)</b>
FIB4 (IQR)	2.83 (1.7 – 5.1)
FIB4 > 3.25, n (%)	80 (44.9)
APRI (IQR)	0.64 (0.36 – 1.3)
APRI > 1.5, n (%)	38 (21.3)
<b>Suitable for linkage, n (%)</b>	<b>85 (47.8)</b>
<b>Reason to not be suitable for linkage, n (%)</b>	
Death	14 (15)
Low life expectancy	61 (65.6)
Lack of contact information	19 (20.4)
Linked to care, n (%)	
No	2 (2.3)
Erratic follow up	14 (16.5)
<b>Yes</b>	<b>69 (81.2)</b>

# Evolution of HCV-Ab and HCV-RNA prevalence




HCV-Ab + / Screened	208/5234	80/1902	162/4148	204/4901	101/2626	90/1718	127/3000
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HBsAg + / Screened	33/5234	18/1902	31/4148	43/4901	17/2626	12/1718	20/3000
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# Results: summary

Prevalence of HCV-Ab, HCV-RNA and HBsAg was 3 times higher at the ED than previously described in general population

January 2020 to August 2023 (44 months)	Total patients	 MINISTERIO DE SANIDAD
Patients tested for viral hepatitis	26.525	
HCV Ab-positive patients	1.051 (3.96%)	0.85% <sup>1</sup>
HCV RNA-positive patients	179 (0.67%)	0.22% <sup>1</sup>
HBsAg-positive patients	165(0.62%)	0.22% <sup>2</sup>

**17% of HCV Ab-positive patients were viraemic**

1. Resultados del 2º Estudio de Seroprevalencia en España (2017-2018). Ministerio de Sanidad, Consumo y Bienestar Social; 2019.

2. Centro Nacional de Epidemiología, Instituto de Salud Carlos III. Vigilancia epidemiológica de la Hepatitis B en España, 2019. Madrid; octubre 2020

# Results: cost-effectiveness analysis

- **A cost-effective analysis using two Markov models** (one each for HBV and HCV) was performed for **the patients screened during the first two years of the program.**
- Untreated patients progress according to natural history were compared with patients with guideline-based management.
- **HCV screening** led to a 1.06 QALY increase with an incremental cost of €8110 per participant, yielding an **ICUR of €7629 per QALY gained.**
- **HBV screening** led to a 0.42 QALY increase and a cost saving of €150 per participant, yielding an **ICUR of -€147 per QALY gained** and indicating a **dominant strategy.**

The screening program was considered efficient if ICUR was below the willingness-to-pay (WTP) threshold accepted in Spain: €25,000 per quality-adjusted life year (QALY) gained.

# Conclusions

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- The prevalence of viral hepatitis in the Emergency Department of our hospital is 3 times higher than in the Spanish general population.
- Only 9% of HBsAg + and 40% of HCV-RNA + patients had identifiable risk factors for viral hepatitis. This could hinder the effectiveness of risk factor-based screening.
- Viral hepatitis screening in the ED is a cost-effective public health strategy in our setting
- Despite the large number of patients treated, the prevalence of HCV-RNA remains higher than previously reported in the Spanish population. This underscores the importance of screening viral hepatitis to align with the WHO's goal of eliminating viral hepatitis by 2030.