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Emergency department screening reveals declining HCV viraemia but stable HBV prevalence in Western Europe: A sentinel surveillance opportunity

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ABSTRACT

Background: The World Health Organization targets the elimination of viral hepatitis as a public health threat by 2030, requiring scalable strategies for hepatitis B (HBV) and C (HCV), especially in underserved populations. Emergency departments (EDs) offer a key setting for opt-out blood-borne virus screening, enabling early diagnosis and monitoring of elimination efforts.

Methods: We reviewed Western European ED-based HCV and HBV screening studies (2005-2025), including HCV antibody (Ab) positivity with confirmatory HCV-RNA testing and/or HBV surface antigen (HBsAg) positivity. Temporal trends in HCV-RNA+/Ab+ and HBsAg prevalence were analyzed across countries.

Results: Seventeen HCV studies from five countries (1500,659 individuals) identified 26,081 HCV Ab+ and 4347 HCV-RNA+ cases. Weighted viremic HCV prevalence declined from 56% in the pre-DAA era (2008-2015) to 10% in 2022-2024, consistently in Spain, England, and Ireland. Ten HBV studies (1425,954 individuals) showed stable HBsAg prevalence (0.70%).

Conclusion: ED-based screening reflects population-level changes in viral hepatitis. The decline in viremic HCV highlights the impact of DAA access, while stable HBV prevalence underscores unmet therapeutic needs. ED data could function as a low-cost sentinel surveillance system for hepatitis elimination in Europe.

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Introduction

In 2016, the World Health Organization (WHO) set the ambitious goal of eliminating viral hepatitis as a public health threat by 2030, defining key targets of diagnosing at least 90% of infected individuals and treating at least 80% of those eligible. Achieving these targets requires the implementation of effective, scalable, and innovative strategies for both diagnosis and linkage to care [1].

Given their shared transmission routes, affected populations, and long-term clinical consequences, the WHO recommends integrated screening strategies for hepatitis B virus (HBV) and hepatitis C virus (HCV). Combined screening approaches, based on validated serological assays (HBV surface antigen [HBsAg] and HCV antibody [Ab]) followed by confirmatory testing, have been shown to improve case detection, reduce missed diagnoses, and optimize healthcare resource utilization, particularly in high-prevalence and high-risk settings. Embedding integrated screening within primary care and other public health services is therefore considered essential to expand access to treatment, prevent liver-related complications, and accelerate progress toward viral hepatitis elimination [2].

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Among the strategies developed to enhance case finding, growing international evidence indicates that opt-out blood-borne virus (BBV) testing for HBV, HCV, and human immunodeficiency virus (HIV) in urban emergency departments (EDs) is both clinically effective and cost-effective [3]. EDs often serve as a primary point of healthcare contact for marginalized and underserved populations who are disproportionately affected by BBVs and may have limited engagement with conventional healthcare services. Consequently, ED-based screening offers a unique opportunity to reach these populations, facilitate early diagnosis, and ensure timely linkage to care [4].

Although multiple strategies have been implemented to advance viral hepatitis elimination, robust data evaluating temporal trends in HBV and HCV prevalence remain limited, particularly using routinely collected testing data. Monitoring changes in viremic HCV and HBsAg prevalence is essential to quantify progress toward elimination targets and to identify potential gaps in diagnosis and treatment coverage. EDs, where systematic screening programs have been increasingly implemented, may represent a valuable and pragmatic source of real-world data for epidemiological surveillance.

In this context, the aim of this study was to analyze trends in viremic HCV prevalence and HBsAg prevalence over time using data from ED-based testing studies, and to assess the potential utility of ED screening as a tool to monitor progress toward viral hepatitis elimination.

Methods

We reviewed Western European ED–based viral hepatitis screening initiatives published between 2009 and 2024. Inclusion criteria were studies reporting the number of HCV-Ab+ screened patients and subsequent rates of HCV viraemia, as confirmed by polymerase chain reaction testing and/or rates of HBsAg positivity. Studies with ≥30 HCV Ab+ or HBsAg+ individuals per year were eligible. For articles containing data for more than 6 months per year over multiple years, we contacted corresponding authors of the published study to provide data broken down for annual years. We analyzed trends for the proportion of HCV RNA+/Ab+.

Results

Seventeen HCV screening studies were included. Ten were conducted in England, four in Spain, one in Ireland, one in Germany, and one in France. Single country data over several time points were available from Spain, England, and Ireland. Of note, the one Irish study by Townsend et al. was from a single centre over 10 consecutive years [8]. Eighty percent of authors from the multiyear studies spanning more than 6 months responded to our request for yearly data breakdown.

A total of 1500,659 individuals were screened for HCV, based on available data. Overall, 26,081 individuals were HCV Ab+ and tested for HCV-RNA. A total of 4347 were HCV-RNA positive. The data were stratified by year where available (Supplementary Table 1), and the ratio of HCV RNA+/Ab+ patients was analyzed (Table 1). At European level, we observed a substantial decrease in the proportion of viremic patients over time from 56% in 2008-2015 (weighted average pre-DAA access) to 10% in 2022-2024 (weighted average, broad DAA access). In line with the overall pattern at European level, this temporal downward trend was even more pronounced in the single-country multiyear data points from Spain, England, and in particular the 10-year longitudinal single-centre study in Ireland by Townsend et al. (Figure 1, Table 1).

In 10 of the 17 studies, HBV screening was also performed, and data were stratified by year when available (Table 1, Supplementary Table 1). A total of 1425,954 individuals were tested between 2017 and 2024, of whom 10,580 were HBsAg-positive. For prevalence comparison, the study period was divided into two time periods (2017-2021 and 2022-2024). In contrast to what was observed for HCV, there was no decrease in the prevalence of HBsAg-positive individuals between the first (2017-2021) and second (2022-2024) period, with prevalence of 0.70% and 0.74%, respectively (Figure 2). Data on HBV-DNA levels were reported in only 2 of the 10 studies included.

Discussion

Routine laboratory test data in the ED suggests a substantial decrease in the HCV-RNA+/Ab+ ratio across European studies over the last 15 years. This trend correlates with major improvements and accessibility in innovative HCV treatments. The introduction of largely curative DAAs in Europe began with the approval of sofosbuvir in 2014, and rapidly evolved with the introduction of interferon-free combinations such as the 3D regimens (paritaprevir/ritonavir-ombitasvir and dasabuvir). By around 2018, several European countries provided unrestricted access to several pan-genotypic regimen [5]. These policy changes, investing in expanding treatment access, together investment in HCV case-finding elimination initiatives, very likely contributed to the ratio reduction over time observed in our study [6].

Consistent with our findings, modeling estimates suggest approximately 3.3 million people across the European region were diagnosed by 2020, and a substantial proportion of these received treatment during the period. In 2020 alone, 122,400 people were treated in European Region [5].

Viral hepatitis infections, particularly HCV, are declined as a leading cause of chronic liver disease in Western Europe over the last 10 years. However, other etiologies such as metabolic-dysfunction-associated steatotic liver disease and alcohol liver-related diseases have emerged as the most prevalent chronic liver disease worldwide. This shift reflects the impact of antiviral treatment scale-up but highlights the growing importance of addressing metabolic health and harmful alcohol use to reduce the future liver disease burden [7].

Importantly, when analyzing the single-country multiyear time point data from Spain, England, and the 10-year Ireland study separately, we could confirm the decreasing proportion of viremic HCV infection in each country over time. These countries share key strengths in their government's HCV elimination commitment and robust universal healthcare delivery systems that likely significantly contributed to this success. Each provides publicly funded, universal access to direct-acting antivirals, ensuring that treatment eligibility is based on need, regardless of socioeconomic status or disease stage [4,8,9], and have invested in successful strategic case finding initiatives, including evaluation of ED screening studies.

On the other hand, regarding HBV, although most western European countries now recommend universal childhood HBV vaccination, and suppressive HBV treatment is available, the percentage of HBsAg-positive patients observed remained stable over time, and even with incomplete data. Only approximately 20% of studies reported HBV DNA levels or other indicators along the HBV care cascade, limiting the assessment of treatment uptake and virological control over time [10].

Apart from migratory effects, this difference likely reflects that, while DAAs can completely eliminate HCV infection through viral clearance, current HBV treatments in diagnosed and in-care patients mainly suppress viral replication without achieving a functional cure and therefore require long-term or lifelong therapy [1]. In this context, the 2024 WHO HBV guidelines, which recommend substantially lower treatment eligibility thresholds, further highlight the importance of robust impact measurement beyond HBsAg prevalence alone.

Table 1
Percentage of HCV-RNA positivity among HCV antibody–positive individuals and prevalence of HBsAg-positive individuals by year within included studies.

Study	Study year	Country	% RNA+/Ab+	%HBsAg+
Vermehren et al. [13]	2009	Germany	68%	-
Orkin et al. [14]	2014	England	46%	-
Cieply et al. [15]	2015	England	60%	-
Townsend et al. [8]	2015	Ireland	39%	-
Townsend et al. [8]	2016	Ireland	28%	-
Parry et al. [9]	2016	England	68%	-
Bradshaw et al. [16]	2016	England	72%	-
Evans et al. [17]	2016	England	51%	-
Hopkins et al. [18]	2017	England	56%	1.1%
Nebbia et al. [19]	2017	England	50%	0.9%
Townsend et al. [8]	2017	Ireland	23%	-
Townsend et al. [8]	2018	Ireland	21%	-
Wong et al. [20]	2019	France	61%	2.7%
Townsend et al. [8]	2019	Ireland	12%	-
Phyu [21]	2019	England	42%	0.4%
Llaneras et al. [4]	2020	Spain	18%	0.6%
Townsend et al. [8]	2020	Ireland	8%	0.5%
Townsend et al. [8]	2021	Ireland	7%	0.5%
Llaneras et al. [4]	2021	Spain	20%	0.6%
Camelo-Castillo et al. [22]	2021	Spain	18%	-
Townsend et al. [8]	2022	Ireland	5%	0.4%
Camelo-Castillo et al. [22]	2022	Spain	25%	-
Townsend et al. [8]	2023	Ireland	7%	0.4%
Camelo-Castillo et al. [22]	2023	Spain	21%	-
Ruiz-Cobo et al. [23]	2022	Spain	15%	0.7%
Zeng et al. [24]	2022	England	14%	0.7%
Hill-Tout et al. [25]	2023	England	11%	0.8%
Ruiz-Cobo et al. [23]	2023	Spain	9%	0.6%
Llopis-Roca et al. [26]	2023	Spain	10%	-
Llopis-Roca et al. [26]	2024	Spain	13%	-
Camelo-Castillo et al. [22]	2024	Spain	25%	-
Ruiz-Cobo et al. [23]	2024	Spain	16%	0.6%
Townsend et al. [8]	2024	Ireland	6%	0.4%

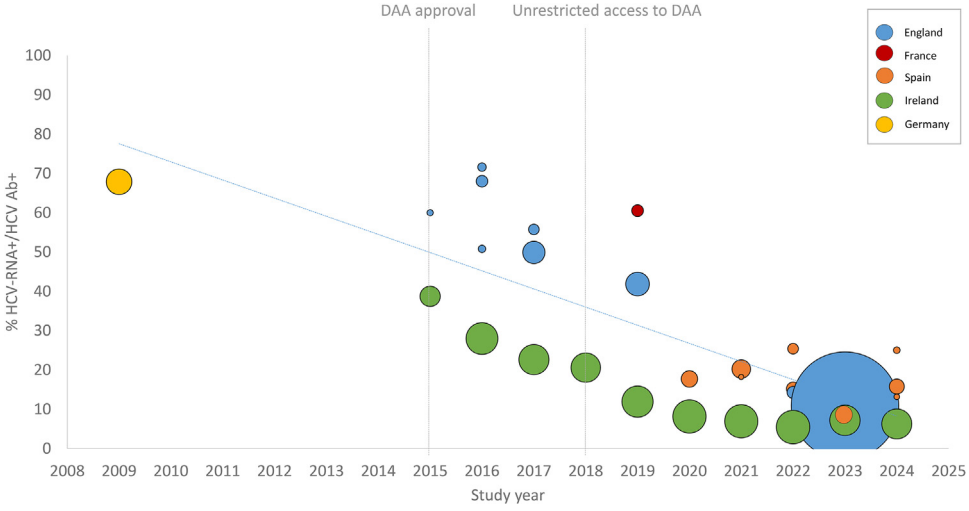

Figure 1. Percentage of HCV-RNA positivity among HCV antibody–positive individuals by year within included studies. Bubble size: number of HCV Ab+ patients undergoing HCV-RNA testing.

Evidence on annual HBV prevalence trends is more limited and therefore can be less robust. A study conducted in Spain found that the prevalence of HIV/HBV coinfection at the end of 2018 did not differ significantly from values reported in studies over the previous 15 years [11], which is in line with the stable HBV rates observed in our European analysis.

We believe, in addition to the international evidence on effectiveness and cost-effectiveness of systematic combined BBV ED screening and prevalence monitoring, our methodology suggests sentinel surveillance opportunities of ED screening to track viral hepatitis elimination advances [8,9,11].

Our review has some limitations. All the manuscripts come from Western European countries, particularly from England, where publicly funded healthcare systems provide broad and universal, equitable access to health care, including viral hepatitis testing and treatment [12]. Consequently, these findings may not be generalizable to Eastern Europe, in which access to healthcare services and antiviral therapies may be more heterogeneous and often more limited. A further limitation of this study is that consistent access was limited to published data on overall hepatitis screening positivity. Consequently, we were unable to evaluate prevalence trends within specific key populations. This may have

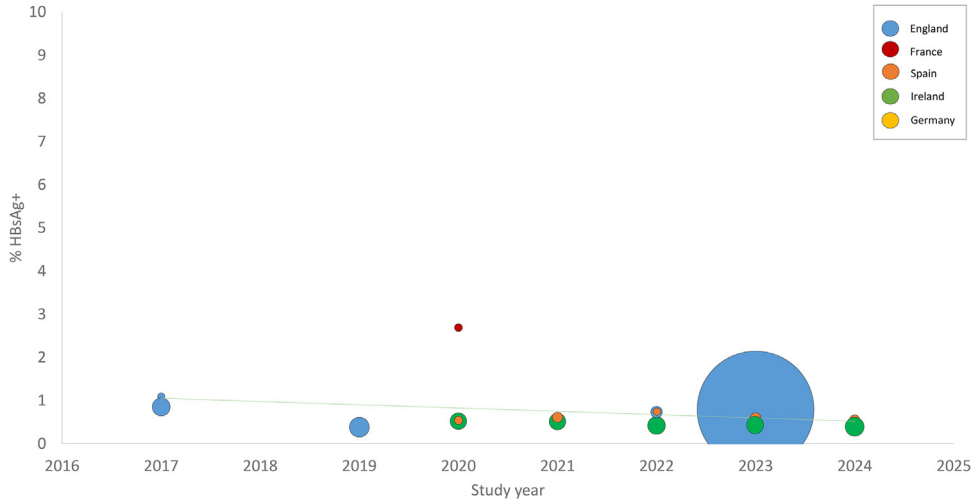

Figure 2. Percentage of HBsAg-positive individuals among screened individuals. Bubble size: number of tested individuals for HBsAg. Due to differences in prevalence percentages, different y-axis scales are used between the two graphs.

contributed to the observed patterns and precluded assessment of whether the ED population is representative of the general population.

Moreover, the trends were derived from heterogeneous sources, with temporal variations in screening strategies, diagnostic algorithms, and the availability of reflex RNA testing. Such differences may have influenced the number of observed HCV RNA–detectable cases and should be considered when interpreting these findings.

Conclusions

In summary, systematic ED-based BBV testing shows a dramatic decline in active HCV infection in most of Western Europe, correlating with widespread investment in broad DAA access, while HBsAg prevalence appears stable.

Our methodology using routinely available viral hepatitis test laboratory data, independent of local viral hepatitis prevalence and screening-type (e.g., opt-in/opt-out), allows comparisons between sites and monitor trends over time. We believe, routine viral hepatitis ED screening data could become a valuable sentinel tool to contribute to tracking real-world progress toward hepatitis elimination goals at negligible additional cost. This work should inform a formal utility evaluation of these programs.

Ethical approval and informed consent

Ethical approval was not required for this study, as it did not involve the collection or analysis of individual-level patient information.

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Author contributions

Conceptualization, M.R. and M.B.; methodology, M.R. and M.B.; software, E.V.-A.; validation, E.V.-A. and M.R.; formal analysis, E.V.-A and M.R.; investigation, E.V.-A., M.R., L.T., M.C.-M., J.C.R.-C. and F.Ll.R.; data curation, E.V.-A. and M.R.; writing—original draft preparation, E.V.-A., M.R. and M.B.; writing—review and editing, E.V.-A., M.R., L.T., M.C.-M., J.C.R.-C., F.Ll.R. and M.B.; supervision M.B.; project administration, M.B. All authors have read and agreed to the published version of the manuscript.

Declaration of competing interest

The authors declare the following financial interests/personal relationships, which may be considered as potential competing interests: MR is an employee of Gilead Sciences. JCR has served as a speaker for Gilead Sciences and GSK and has received travel grants from Gilead. MB has served as a speaker and advisor for Gilead and AbbVie. All other authors declare no competing interests.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.ijid.2026.108575.

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