JORNADA CIENTÍFICA

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Zaragoza

Pósteres

ciber | ESP CENTRO DE INVESTIGACIÓN BIOMÉDICA EN RED Epidemiología y Salud Pública

Pósteres presentados en la Jornada Científica CIBERESP 2025

- ALEVINT Platform. All-in-one tool for dietary questionnaire data collection, analysis, and nutritional evaluation.
- Appropriateness of requesting preoperative tests in elective surgeries of different complexity. Variability between hospitals.
- Assessment of stigma in individuals living with chronic pain in Spain using the 8-item Stigma Scale for Chronic Illnesses (SSCI-8).*
- Cancer in Young Adults in Spain: Site-Specific Incidence Trends from 1993 to 2018.*
- Clinical characteristics of influenza by type and subtype in primary care: a sentinel surveillance study in Catalonia (2008–2020).*
- Comparison of self-reported questionnaires about physical activity and sleep with accelerometry data: DAFSA Project.*
- Cost-effectiveness of community interventions to promote awareness, testing and treatment of hepatitis B and C in the migrant population in Catalonia.
- Cost-Utility of Direct Transport to Thrombectomy-Capable Centres vs. Local Stroke Centres for Suspected Large-Vessel Occlusion Stroke (RACECAT Randomised Clinical Trial).*
- Development and validation of a metabolomic score for provegetarian diets and its relationship with metabolic pathways implicated in cancer. The OMIVECA study.
- Early development and dynamics of nasopharyngeal microbiota in infants during the COVID-19 pandemic: A 2-year prospective cohort study.*
- Efficacy and safety of remote automatic monitoring in the follow-up of outpatients with heart failure: preliminary results of a Systematic Review.
- Enhancing Nursing Education: Simulation Laboratory Practices in Virtual Reality Obstetric Emergencies.*
- Genomic Surveillance in Catalonia Uncovers Ongoing TB Transmission in Vulnerable Urban Communities.*
- Hepatitis A in Spain: Evolution of hospitalization in the period 2000-2021.

- Methodological and reporting quality of Clinical Practice Guidelines for prenatal care on nutritional counselling in high-income countries: A systematic review.
- Mixtures of chemicals in pregnancy and their effects on cognitive and fine motor abilities in childhood.*
- Mpox in people living with and without HIV, including people on PrEP, during a multistate outbreak in Spain in 2022.*
- Neutralization of the B3 and D8 genotypes of the measles virus.
- Pediatric vaccination failures in the era of pneumococcal conjugate vaccination in Catalonia (Spain).
- Postnatal maternal bonding and children's cognitive development at 5 years of age in the INMA Project.
- Prenatal nutrition with (wall)nuts and fish, omega-3 fatty acids and cognitive trajectories from 4 to 15 years of age.
- Prevalence of acquired resistance to antiretrovirals in children and adolescents living with hiv under clinical follow-up at the roosevelt hospital in Guatemala.
- Prevalence of HCV and HIV in People Who Inject Drugs: Transmission Determinants.*
- 30-days post-discharge mortality following RSV-associated hospitalizations in older adults: insights from four Spanish regions (2023–2024).*
- Unravelling GII.17[P17] Norovirus transmission clusters in two consecutive outbreaks in a Spanish hospital: a retrospective whole-genome analysis with implications for infection prevention and control.
- Walking promotion in healthy pregnancy and perinatal outcomes: A multivariable analysis comparing active and sedentary mothers.

* Póster seleccionado para presentación oral corta.

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Jornada Científica CIBERESP 2025 | Congresos

ALEVINT Platform

All-in-one tool for dietary questionnaire data collection, analysis, and nutritional evaluation

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Background and Objective

The collection, processing, and transformation of dietary questionnaires is a laborious and time-consuming process. This work aims to provide the scientific community with an **open-access, user-friendly, interactive tool for the standardized collection, transformation, and nutritional evaluation of large datasets of dietary data collected in epidemiological or clinical studies: ALEVINT (Spanish acronym for ALimentation, EValuation, INvestigation and Translation).**

Methods

A web application (https://alevint.ciberisciii.es/alevint/) was developed and implemented on a CIBER-hosted R-Shiny server. Data processing is based on parallel matrix computation to optimize processing time. The platform is built on a microservices architecture that integrates different APIs, enabling interoperability across applications.

Dietary intake data can be collected through: a) Excel files, b) REDCap surveys, c) a conversational ChatBot via Telegram (currently under validation in Spain and Sweden), and d) the ANIMATE mobile app (an mHealth tool that implements a professionally supported weight loss and behavior modification program) (Fig. 1).

The application supports various dietary questionnaire formats (Food Frequency Questionnaire [FFQ], 24-hour Recall [24hR], or Dietary Record) and includes a comprehensive, regularly updated Food Composition Table with Spanish foods, as well as Recommended Dietary Allowances (RDA) for energy and nutrients according to physical activity, age, and sex. For non-specific food items in FFQs, the tool optionally allows a more accurate intake estimation by incorporating reference data from national food consumption surveys (Food Consumption Panel of the Ministry of Agriculture, 2001–2024) (Fig. 2).

Results

The application processes 1,000 questionnaires with 100 items in under 15 seconds. The application provides, in exportable tables, daily energy (kcal) and nutrient intakes (macronutrients, vitamins, minerals, and alcohol) for each participant based on the reported diet. Results are grouped by total diet, time of consumption, and food groups (absolute and relative values). In addition, the tool calculates nutritional profiles (caloric and lipid) and compliance indicators with RDAs. Additional outputs under development include graphical displays, dietary pattern analysis, nutritional quality indices, environmental impact, and economic cost (Figs. 1 and 2).

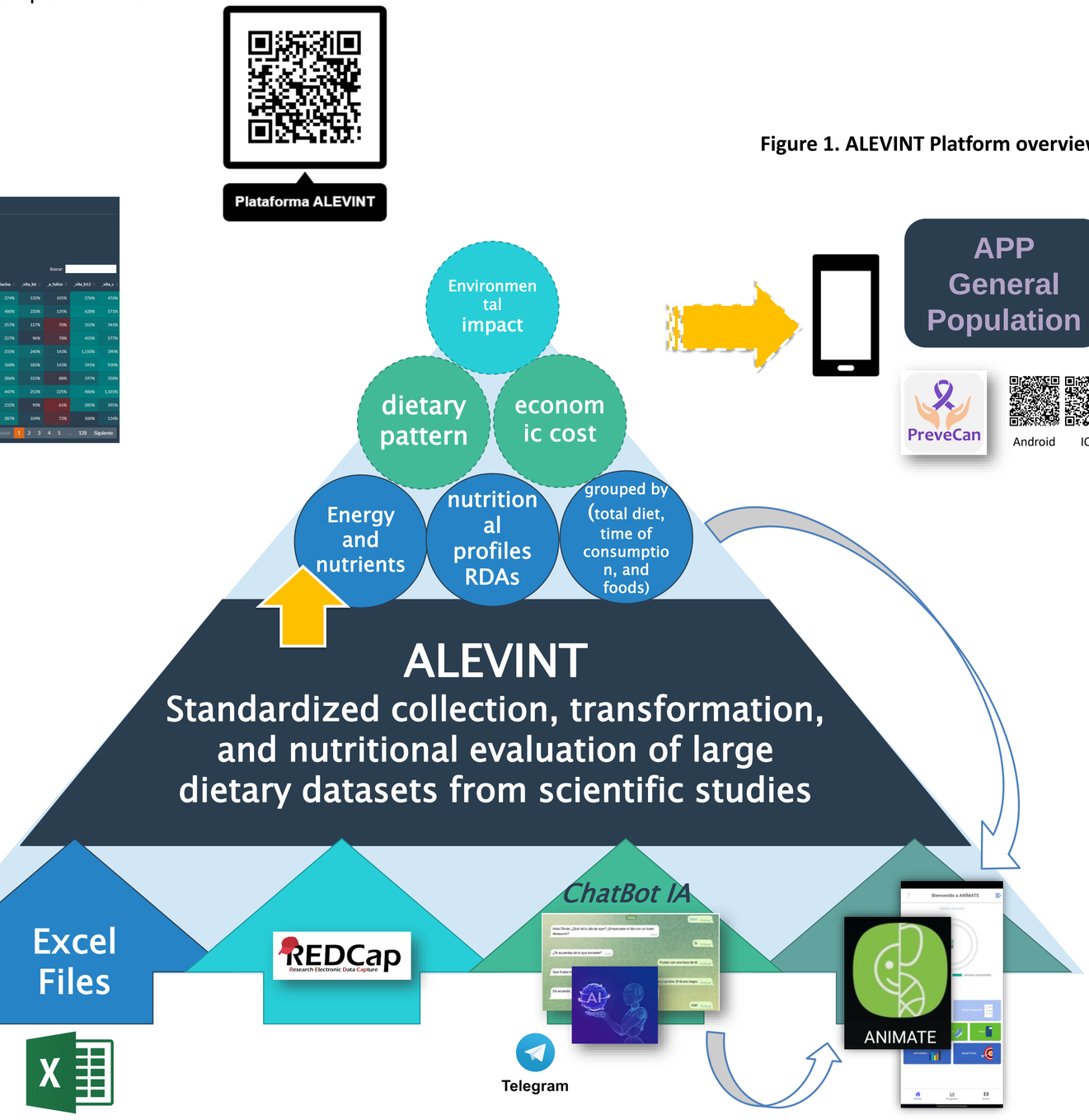
In addition, the data collection module through REDCap will be implemented in the PREVECAN mobile app, designed for the general population and aimed at cancer prevention through the assessment of healthy lifestyle habits.

Conclusions

This application provides a fast, user-friendly, and accurate tool for collecting and analyzing dietary data in large populations, supporting group comparisons and assessing their impact on health. Its use is expected to reduce time and costs for research centers in nutritional studies, promoting more standardized and reproducible data exchange.

Figure 2. Data upload and results in the ALEVINT Web platform

Figure 1. ALEVINT Platform overview



Additional Outcomes

To date, the ALEVINT platform, through its initial data collection and processing functionalities, has supported the generation of research results in the following studies: **Health-EpiGEICAM Study** (longitudinal study on "Healthy lifestyles and quality of life in women with breast cancer"), **BCDAS** (case–case study on "Diet, lipid profile, mammographic density, and breast cancer"), **DDM-Madrid** (cross-sectional study on "Effect of vitamin D on mammographic density as a risk marker of breast cancer in premenopausal women") y **PSYNIGED** (longitudinal study in children and adolescents on the "Onset and maintenance of Eating Disorders (EDs) through the analysis of psychological, physiological, neurobiological, and microbiome factors").

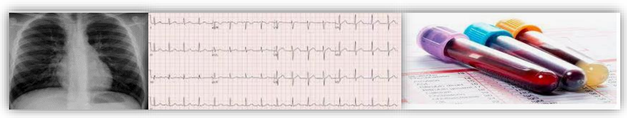
Funding: Acción Estratégica en Salud (DTS22/00038) / Proyecto colaborativo CiberESP-BBN 2022

Appropriateness of requesting preoperative tests in elective surgeries of different complexity. Variability between hospitals

Iratxe Urreta Barallobre[1,2], Ignasi Bolibar Riba[1,3], Antonio Sánchez Hidalgo[5], Eva Bassas Parga[6], Miren Arrieta Barnarás[7], Gaizka Gutierrez Sanchez[8], David Sánchez Cirera[8], Francisco José González Moraga[8], Iñigo Gorostiza Hormaetxe[10], Raúl de Frutos Parra[11], Susana Álvarez Gomez[12], Pablo Manuel Keenoy[13], Marta Roque Figuls[1,14], Carolina Requeijo[1,3], Javier Zamora Romero[4,15]

1. BACKGROUND AND OBJECTIVES

Numerous studies have questioned the usefulness of routine preoperative tests, and several guidelines have published recommendations aimed at reducing unnecessary preoperative testing.[1-3]



The **objectives** were to analyze the appropriateness of preoperative test requests and interhospital variability in criteria for requesting preoperative tests. The appropriateness was evaluated according to hospital internal protocols and, using as a standard, the National Institute for Health and Care Excellence (NICE) guidelines on routine preoperative test for elective surgery. [4]

2. MATHERIAL AND METHODS

Cross-sectional, retrospective and multicentre observational study. Conducted in 9 Spanish National Health System hospitals.

Patients > 18 years of age undergoing elective surgical intervention during one week in June 2022 were included (n=1522).

Preoperative testing for cataract surgery, inguinal hernia, laparoscopic cholecystectomy, colon surgery, and primary knee replacement were evaluated.
The main outcome was the appropriateness of the requested preoperative tests, according to the criteria of each hospital and according to the NICE guideline.
Comparisons at hospital level were conducted by chi-square test. Two multilevel logistic regression models explored the variables influencing preoperative test inappropriateness.

3. RESULTS

A total of 1522 patients underwent the 5 selected surgical procedures. 51,9% were men with a median age of 71 years. Most patients were classified as ASA II (58,.3%) or ASA III (31.9%).

Preoperative test request inappropriateness in overall was 20.64% according to hospital protocols and 70.52% according to the NICE guidelines. Inappropriateness was mostly due to excessive requests and differed by hospital (fig 1), surgery type (fig 2), and ASA grade (fig 3).

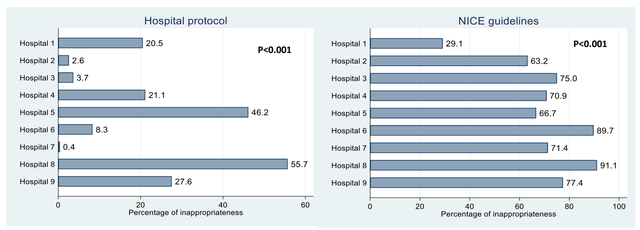


Fig1. Inappropriateness (%) according to hospital protocols and NICE guiedelines by hospital

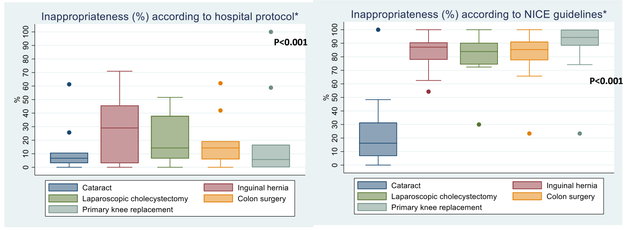


Fig2.Inappropiateness (%) according to hospital protocols and NICE guiedelines by surgery type

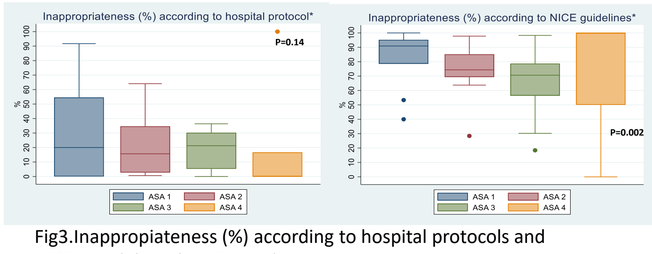


Fig3.Inappropiateness (%) according to hospital protocols and NICE guiedelines by ASA grade

The risk of inappropriateness according to **hospital protocols** increased significantly for the following hospital-level variables: being located in Spanish region A and the high complexity of the center; at the patient-level: younger age and undergoing intermediate and high-risk surgery. The inappropriateness according to the **NICE guidelines** was significantly higher for the following hospital-level variables: high complexity of the center and non-availability of computerized preoperative request templates; at patient-level were ASA I/II grades and intermediate and high risk surgery. (table 1)

Variables	Value of category	Hospital protocols OR (95% CI)	Variables	Value of category	NICE guidelines OR (95% CI)
Spanish region	Region B/C Region A	1 8.92 (1.23 to 64.96)	Hospital complexity	Low Intermediate High	1 1.58 (0.57 to 4.38) 4.80 (1.69 to 13.61)
Hospital complexity	Low Intermediate High	1 3.65 (0.26 to 51.22) 7.34 (1.25 to 42.98)	Computerized preoperative request templates	No Yes	1 0.09 (0.04 to 0.21)
Age	years	0.98 (0.97 to 0.99)	ASA grade	III/IV I/II	1 2.04 (1.50 to 2.77)
Surgical risk	Low Intermediate High	1 2.21 (1.40 to 3.49) 1.69 (1.09 to 2.61)	Surgical risk	Low Intermediate High	1 15.59 (10.58 to 22.97) 23.20 (15.40 to 34.97)

Table 1. Centre and patients factors associated to preoperative test inappropriateness according to Hospital protocols and the NICE guidelines

Protocol criteria for requesting preoperative tests varied notably between hospitals, and most protocols showed low agreement with NICE recommendations, especially in terms of over-requested preoperative tests.

4. CONCLUSIONS

- Inappropriateness of preoperative test requests was high according to hospital protocols and especially high according to the NICE guidelines.
- Appropriateness was determined by patient characteristics, surgical risk, and institutional factors.
- Interhospital variability in inappropriateness was explained by differing criteria for preoperative test requests.

References

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[3]Department of Clinical Epidemiology and Public Health, Institut de Recerca Sant Pau (IR SANT PAU), Hospital de la Santa Creu i Sant Pau.[4]Consortium for Biomedical Research in Epidemiology and Public Health, CIBERESP, Madrid, Spain. [5]Department of Cardiology, Consorci Sanitari de Terrassa.[6]Department of Anesthesiology and Critical Care, Complex Hospitalari Moisès Broggi-Consorci Sanitari Integral.[7]Emergency Department, Hospital Zumárraga OSI Goierri Alto Urola.[8]Anesthesiology and Reanimation Department, Hospital de la Santa Creu i Sant Pau.[9]Anesthesia and Postoperative Critical Care section of Cardiac Surgery, Hospital Gregorio Marañón [10]Research Unit. Hospital Universiatrio Basurto.[11]Department of Anesthesiology and Resuscitation. Hospital Universitario Basurto.[12]Quality and Safety Unit, Parc Sanitari Sant Joan de Déu [13]Anesthesia Department, Hospital San Eloy.[14]Iberoamerican Cochrane Centre. Institut de Recerca Sant Pau (IR SANT PAU).[15]Clinical Bioestatistics Unit. Hospital Ramón y Cajal.

Assessment of stigma in individuals living with chronic pain in Spain using the 8-item Stigma Scale for Chronic Illnesses (SSCI-8)

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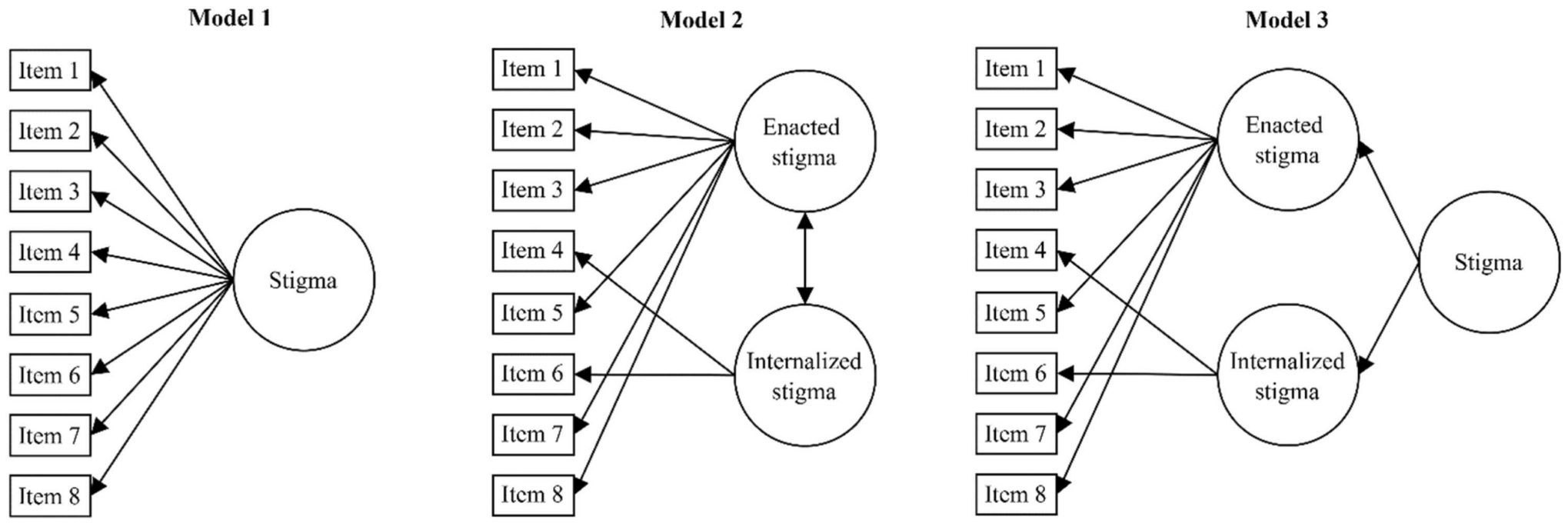
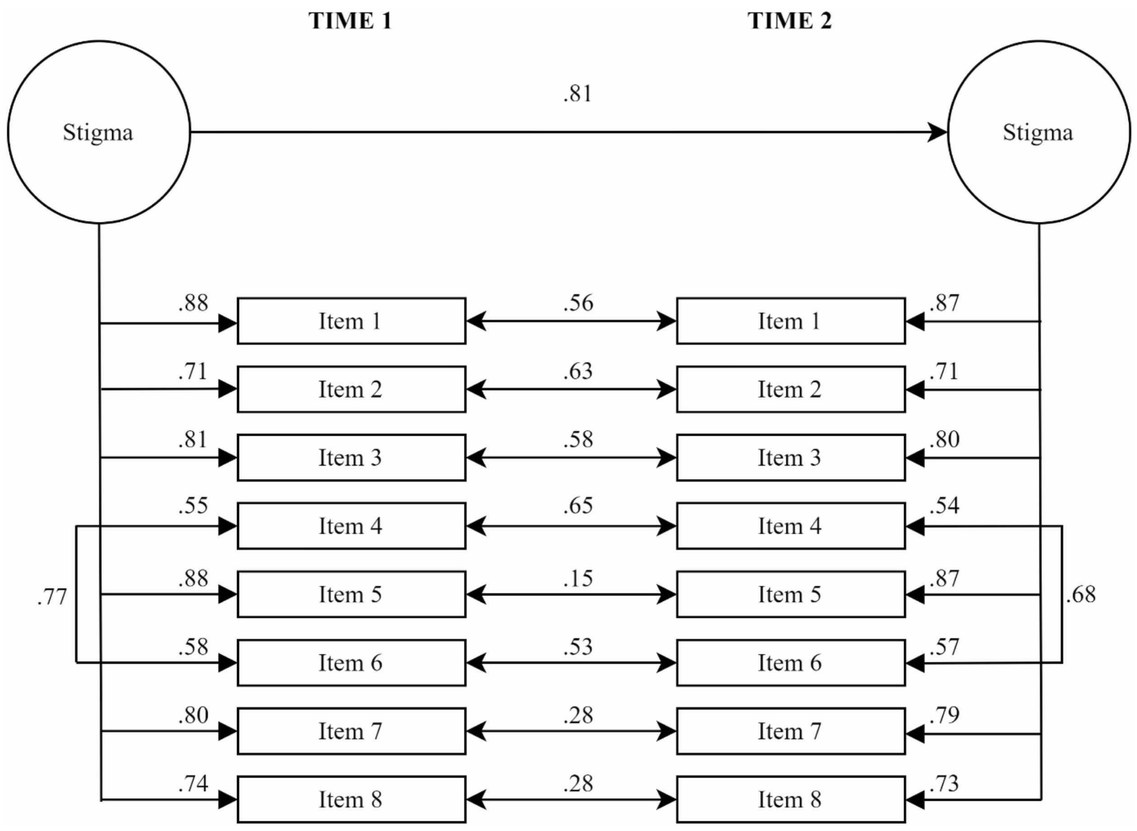
Background: Stigma is a commonly reported experience among individuals living with chronic pain. It may be due to the invisible nature of pain and lack of clear biomedical causes in most cases. It is a construct that needs to be carefully assessed to provide an adequate pain management.

Objectives: This study examines the psychometric properties of the Spanish version of the Stigma Scale for Chronic Illnesses 8-item version (SSCI-8), in individuals living with chronic pain, focusing on dimensionality, factorial invariance, reliability (internal consistency and test-retest), and construct validity.



Methods: Eligible participants were Spanish adult individuals with longstanding chronic pain (≥ 3 months). An online survey link, encompassing self-report assessments related to sociodemographic data, chronic pain diagnosis, pain-related outcomes, depression and anxiety symptoms, psychological flexibility, pain-related injustice experiences (IEQ), and the Spanish SSCI-8 was posted and shared across patient associations. The final sample was composed of 530 individuals living with chronic pain (89.2% women; age range: 20 – 70 years old), primarily from Barcelona, Spain.

Results: Factor analysis showed that the Spanish version of the SSCI-8 is unifactorial (Model 1) with correlated residuals of items 4 and 6 (CFI =.988; TLI =.983; WRMR =.938; RMSEA =.093; 95% CI [.076,.110]), as the original version. Internal consistency was adequate with Cronbach's α and McDonald's ω values of .88 and .87, respectively. The Intraclass Correlation Coefficient was .86, suggesting good test-retest reliability at 1 month. Pearson's correlations with the other measures were significant and in the expected direction. Factorial invariance across age, gender, and pain type was supported. Finally, the SSCI-8 significantly explained additional variance of pain-related outcomes beyond the IEQ scores.



Conclusions: The Spanish version of the SSCI-8 appears psychometrically sound as a measure of stigma for use in individuals living with chronic pain (Sanabria-Mazo et al., 2025).

Reference: Sanabria-Mazo, J. P., Navarrete, J., Serrat, M., Castaño-Asins, J. R., Alonso, J., McCracken, L. M., Scott, W., Nieto, R., & Luciano, J. V. (2025). Assessment of stigma in Spanish people with chronic pain using the 8-item Stigma Scale for Chronic Illnesses (SSCI-8). The journal of pain, 105538. Advance online publication. https://doi.org/10.1016/j.jpain.2025.105538.

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CANCER IN YOUNG ADULTS IN SPAIN: Site-specific incidence trends from 1993 to 2018

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BACKGROUND AND OBJECTIVES

Data from other countries show alarming increases in the incidence of several types of cancer in young adults, including breast and digestive tumours. To evaluate the epidemiological situation in Spain, our objective was to **analyse the trends in cancer incidence in young adults for the period 1993-2018.**

METHODS

We included all new incident cases in adults between **20-49 years old** diagnosed in the period 1993-2018, using data from **15 provinces/islands** covered by 12 population-based cancer registries of the **Spanish Network of Cancer Registries (REDECAN)**. For each sex-anatomical site combination, we calculated truncated age-standardised rates per 100,000 persons using the European new standard population (TASR-E), and used **joinpoint regression** to analyse TASR-E trends and compute **Annual Percent Change** (APC) and 95% confidence intervals.

KEY RESULTS

- 153,599 new cases (58% in women) were diagnosed in young adults in 1993-2018, accounting for 12.1% of all cancer cases
- Significant increases in breast, testicular, and thyroid cancers, and decreases in lung, lip, oral cavity and pharynx, bladder, and ovarian cancers (Fig. 1).
- An increase in the incidence of cervical cancer among the youngest groups (+4,2*% APC for 20-29 yo (2000-2018) and +6,8*% for 30-39 yo (2012-2018).
- Sharp rises in the incidence of breast (in women, +2,3*% APC) and colon cancer (in both sexes) among younger individuals (ages 20-29) (Fig. 2)
- Increase in pancreatic cancer among women aged 20-49 (Fig. 2)

Figure 1. Results from Joinpoint regression expressed as Annual Percent Change (APC) in incidence for the most frequent cancer sites during the study period (1993-2018).

Note: *p<0.05 for the trend. NHL=Non-Hodgkin lymphoma. A more intense red color signifies a larger increase, whereas a more intense green color signifies a larger decrease in incidence.

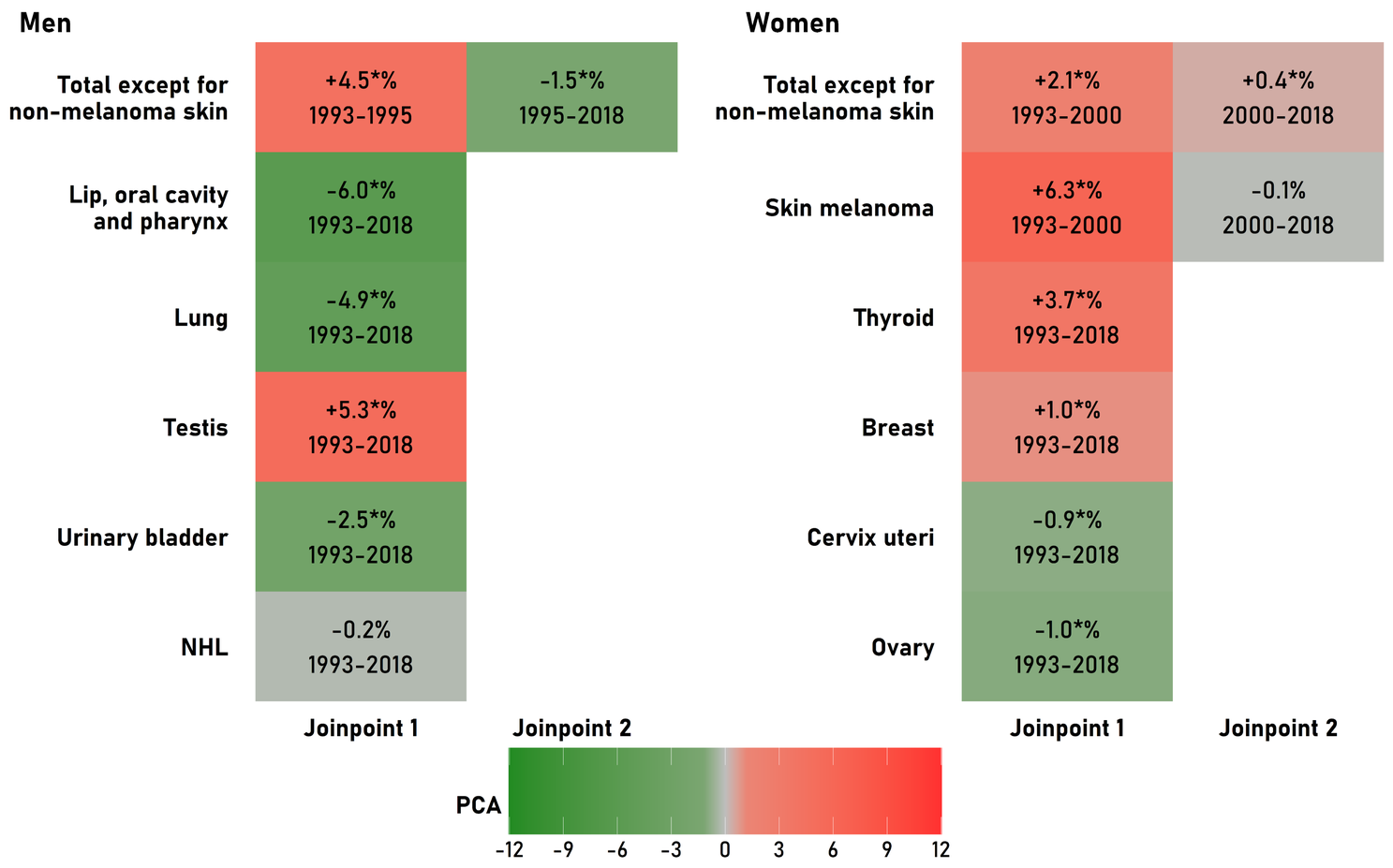
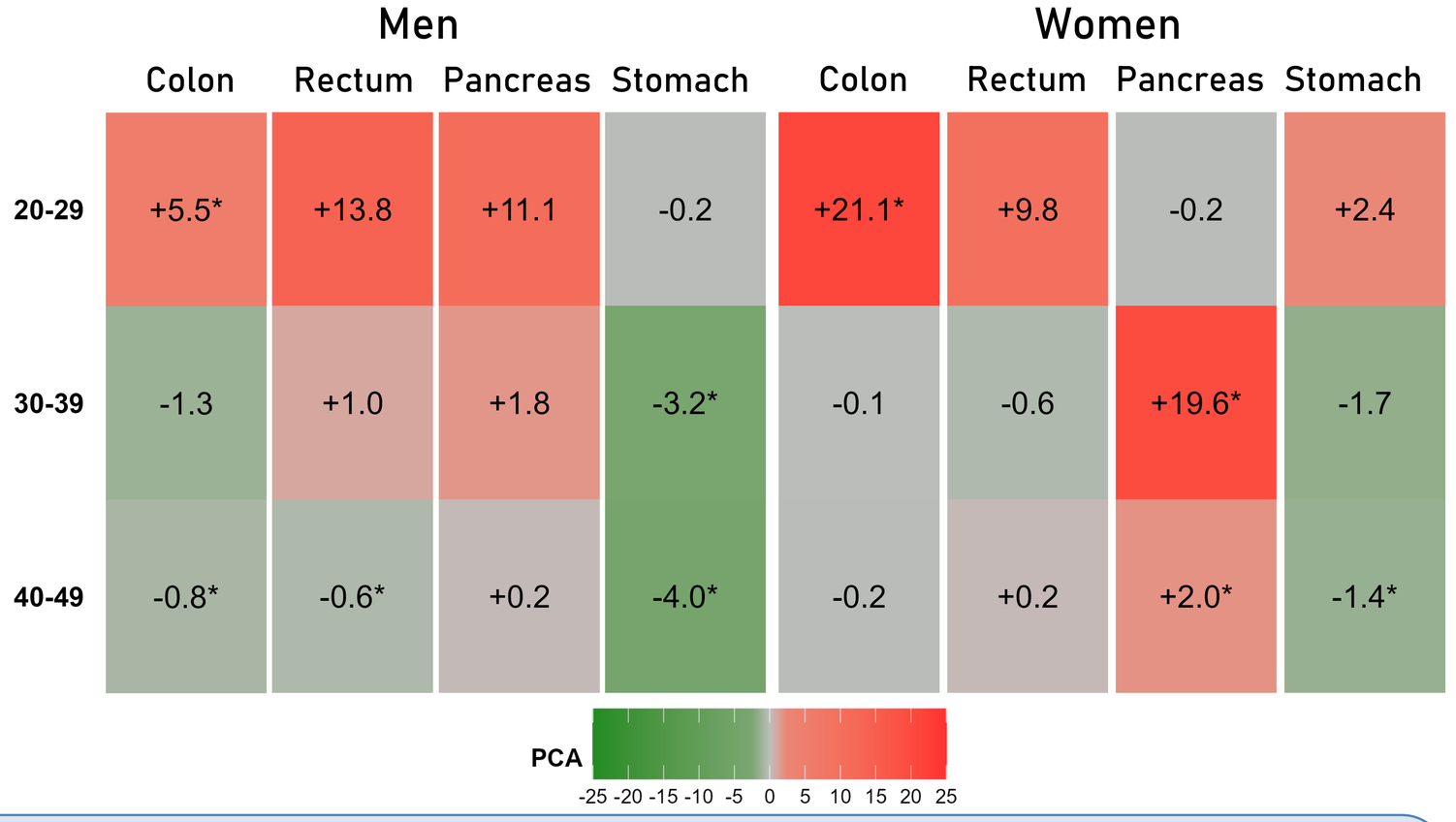


Figure 2. Results from Joinpoint regression expressed as Annual Percent Change (APC) in incidence by age group for digestive cancer sites of interest (1993-2018).

Note: *p<0.05 for the trend.



CONCLUSIONS

Our analyses reveal **rising incidence in certain cancers in specific age groups**, consistent with patterns observed in other developed countries. Understanding these epidemiological trends is crucial for developing targeted prevention and early detection strategies to address the existing cancer burden in younger populations.

Funding: Subprogram VICA CIBERESP, SIEC, Proyecto intramural A_PI01_2024 del Área de Oncología de ibs.GRANADA (2024).

*REDECAN members: Amaia Onaindia, Virginia Menéndez, Marta De La Cruz, Ana Vizcaíno, Silvia Sanclemente, Jan Trallero Morales, Xitama Nayra Álvarez, María-Isabel Palacios-Castaño, Marta Muncunill, Antonia Sánchez Gil, Pilar Gutiérrez Meléndez, Marià Carulla, Montserrat Garrido.

Clinical characteristics of influenza by type and subtype in primary care: a sentinel surveillance study in Catalonia (2008–2020)

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Introduction: Influenza remains a significant public health concern due to its seasonal prevalence and variable clinical presentation. Clinical differences between influenza types and subtypes have importance for community-based public health surveillance.

Objective: To describe the clinical characteristics of influenza cases in primary care according to type and subtype.

Methods: We analyzed influenza cases detected by the sentinel network of primary care physicians in Catalonia during the 2008-09 to 2019-20 seasons. Information was collected on demographic variables, clinical symptoms, and influenza vaccination status. Adjusted odds ratios (aORs) were calculated using a multivariate logistic regression model to assess factors associated with influenza type and subtype.

Results: A total of 4,407 influenza-positive samples were obtained: 2,843 (64.5%) influenza A, 1,512 (34.3%) influenza B, 42 (0.9%) influenza C, 7 (0.2%) influenza A+B, and 3 (0.1%) influenza A+C. Of the influenza A-positive samples, 1,270 (51.5%) were H1N1, and 1,196 (48.5%) were H3N2. 19.3% of the samples were <5 years, 35.1% 5-14 years, 38.7% 15-59 years, and 6.9% were ≥60 years.

Abrupt onset was more common for influenza A than for influenza B (aOR 1.32; 95% CI 1.15-1.50); odynophagia and malaise were less common (aOR 0.82; 95% CI 0.72-0.93 and aOR 0.71; 95% CI 0.62-0.82; respectively).

Headache was more common in influenza A(H1N1) than in influenza A(H3N2) (aOR 1.33; 95% CI 1.11-1.59), and malaise was less common (aOR 0.46; 95% CI 0.38-0.57). Patients with A(H1N1) were less vaccinated (aOR 0.67; 95% CI 0.48-0.95).

Factors associated with influenza type and subtype

	Influenza A (N=2843)	Influenza B (N=1512)	aOR (CI 95%)
Age group			
0-4 years	591 (20.8%)	250 (16.6%)	0.89 (0.74-1.08)
5-14 years	878 (30.9%)	647 (42.9%)	**0.55 (0.47-0.64)**
15-59 years	1180 (41.5%)	501 (33.2%)	Ref.
≥60 years	191 (6.7%)	111 (7.4%)	**0.72 (0.56-0.93)**
Abrupt onset	1895 (66.7%)	925 (61.2%)	**1.32 (1.15-1.50)**
Cough	2493 (87.7%)	1309 (86.6%)	1.16 (0.96-1.40)
Odynophagia	1387 (48.8%)	836 (55.3%)	**0.82 (0.72-0.93)**
Malaise	1914 (67.3%)	1095 (72.4%)	**0.71 (0.62-0.82)**

	H1N1 (N=1270)	H3N2 (N=1196)	aOR (CI 95%)
Age group			
0-4 years	253 (20.0%)	252 (21.1%)	**0.67 (0.53-0.85)**
5-14 years	394 (31.1%)	387 (32.4%)	**0.68 (0.56-0.83)**
15-59 years	563 (44.4%)	454 (38.0%)	Ref.
≥60 years	57 (4.5%)	103 (8.6%)	**0.55 (0.37-0.80)**
Abrupt onset	833 (65.6%)	785 (65.6%)	1.15 (0.96-1.37)
Odynophagia	592 (46.6%)	601 (50.3%)	**0.83 (0.70-0.98)**
Dyspnea	39 (3.1%)	61 (5.1%)	**0.64 (0.42-0.99)**
Malaise	822 (64.7%)	954 (79.8%)	**0.46 (0.38-0.57)**
Headache	656 (51.7%)	550 (46.0%)	**1.33 (1.11-1.59)**
Chills	424 (33.4%)	494 (41.3%)	**0.75 (0.62-0.90)**
Vaccination	74 (5.8%)	115 (9.6%)	**0.67 (0.48-0.95)**

Conclusions: Clinical presentations varied by virus type. Influenza A more frequently present abrupt onset and headache, while odynophagia and dyspnea were less common. Although most cases occurred in individuals aged 5–59 years, strengthening vaccination campaigns for children aged 6-59 months and targeting population at higher risk for complications, would further diminish burden of influenza during seasonal activity.

Comparison of self-reported questionnaires about physical activity and sleep with accelerometry data: DAFSA Project

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BACKGROUND:

A lack of sleep and a deficit of physical activity (PA) are related to several problems, such as obesity, diabetes or cancer and even increased mortality.

While self-reported questionnaires can assess sleep and PA, devices such as smartwatches and accelerometers offer more accurate measurements. Combining both methods could improve the comprehensive assessment of these factors.

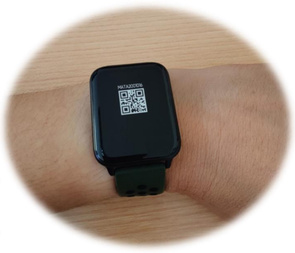
OBJECTIVE:

To compare self-reported sleep and PA data with accelerometry records in the university community.

METHODS:

Longitudinal observational study. Snowball convenience sample of people over 18 years of age.

Sleep: the Athens Insomnia Scale was used (≥6 points was considered insomnia). Descriptive analyses were carried out for the variables analysed and the association was assessed by Spearman correlation. Differences between accelerometer-based sleep efficiency and the presence of insomnia were assessed using the Wilcoxon test.

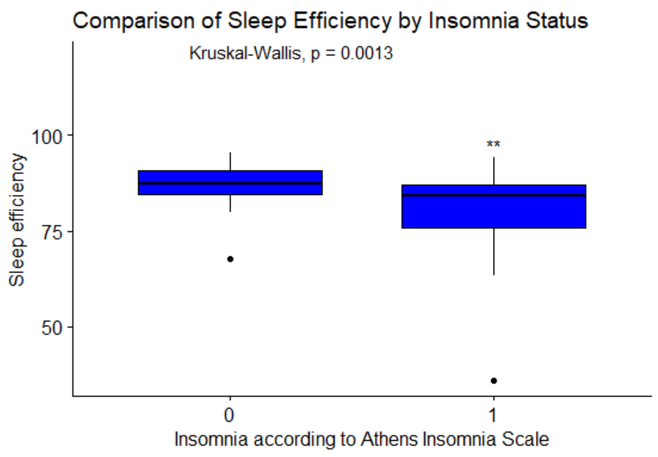


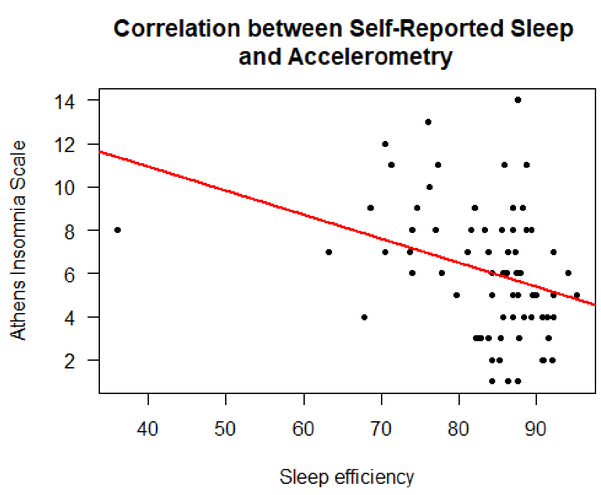
PA: the International Physical Activity Questionnaire (IPAQ) was used. Participants were dichotomised according to compliance with WHO physical activity recommendations. Descriptive analyses were carried out for the variables analysed and differences between the two groups, according to PA recorded by accelerometers. were analyzed using the Wilcoxon test. To evaluate the sensitivity and specificity of the IPAQ. the ROC curve was plotted.

RESULTS:

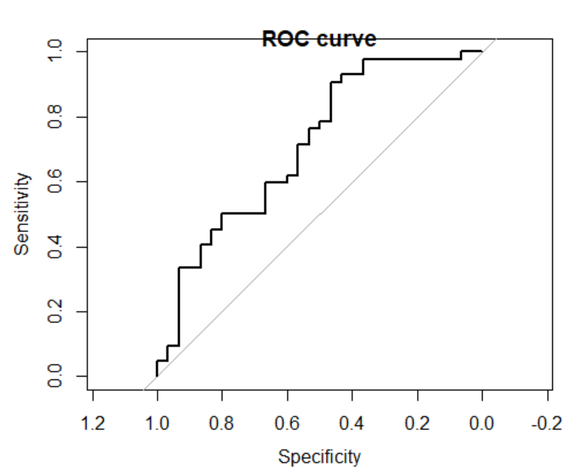
Seventy-two people (63.9% female) with a mean age of 27.4 years (SD 11.7 years) participated.

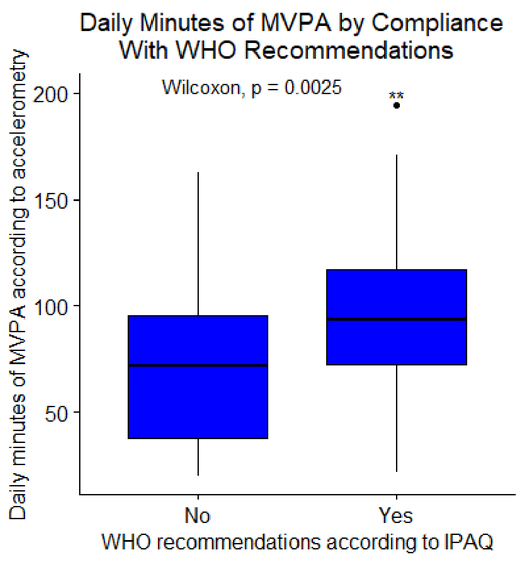
A mean score of 6.1 (SD = 3.0) was obtained in the Athens questionnaire, with 55.6% of the sample (n = 40) presenting insomnia. The mean sleep efficiency was 83.5% (SD = 8.9). with significantly lower efficiency observed in the insomnia group compared to the non-insomnia group (80.9 ± 10.2% vs. 87.0 ± 5.0%. p = 0.001). The Athens questionnaire score showed a moderate inverse correlation with sleep efficiency estimated by accelerometry (*rho* = –0.35).





The average daily duration of moderate-to-vigorous PA (MVPA) was 86.1 minutes (SD = 38.2). Participants who. according to the IPAQ. did not meet the WHO recommendations had a significantly lower mean of daily minutes of MVPA compared to those who did meet the criteria (69.3 minutes. SD = 37.2 vs. 96.7 minutes. SD = 35.2; p < 0.01). The area under the curve was 0.71 (IC95%: 0.59-0.83).





CONCLUSIONS:

Our results reveal that the Athens questionnaire is useful for identifying individuals with low sleep efficiency. However, the correlation found with accelerometry is moderate to low. The IPAQ demonstrates moderate sensitivity in identifying individuals who meet the WHO recommendations. Studies with larger sample sizes are required to obtain more reliable conclusions.

Jornada Científica CIBERESP 28-29 octubre 2025

There is no conflict of interest.

Cost-effectiveness of community interventions to promote awareness, testing and treatment of of hepatitis B and C in the migrant population in Catalonia

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[#] Shared co-first autors.

BACKGROUND

One of the challenges in viral hepatitis elimination is reaching populations with difficulties accessing the healthcare system. In Catalonia, 17.2% of the population has a foreign origin. Community-based interventions aimed at the diagnosis and treatment of viral hepatitis in migrants from high-prevalence countries have been recently piloted (HepBC*link* and MiCatC studies – **Table 1**).

Objective: To carry out a cost-effectiveness analysis of these community screening strategies and simplified access to care and treatment for hepatitis B virus (HBV) and hepatitis C virus (HCV) infection versus no intervention in migrant populations in Catalonia.

METHODS

Two hybrid models were developed, one for HBV and the other for HCV, with a community strategy decision tree that included screening and simplified access to care and treatment, evaluation of the treatment response, and a Markov model to simulate the progression of the disease from the perspective of the National Health System.

The parameters used were obtained from the intervention or from the published literature. Several sensitivity analyses were performed with the parameters with the highest uncertainty.

Table 1. Number of people screened in the community by country of origin.

	HepBC*link**	MiCatC
Pakistan	346	1016
Senegal	304	235
Romania	136	148
Nigeria	-	78
Gambia	-	15
Other	-	13
Total	786	1505

* Not A, Ouaarab-Essadek H, Montoro M, Treviño B, Buti M, Morillas RM, Bordoy AE, Folch C, Majó X, Casabona J, Prat JGI, Martró E. Hepatitis B and C Screening and Linkage to Care in Migrants From Endemic Countries in Barcelona Through a Community Action. Liver Int. 2025;45(6):e70126.

RESULTS

- Among the 2,291 people screened, 74 (3.23%) cases of HBV infection and 21 (0.91%) cases of HCV infection were diagnosed, which avoided 79% and 62% of liver complications related to HBV and HCV, respectively (**Figure 1**).
- The community HCV screening strategy showed an incremental cost of € 13,999/patient versus no intervention, with a gain in quality-adjusted life years (QALYs) of 2.98 QALYs/patient, resulting an incremental cost–utility ratio (ICUR) of € 4,692/QALY.
- The HBV community screening strategy was dominant (more effective and less expensive).
- The most relevant parameter in the sensitivity analysis was the variation in the distribution of fibrosis stage among HCV-positive individuals (ICUR to vary between € 2,232 and € 5,657).

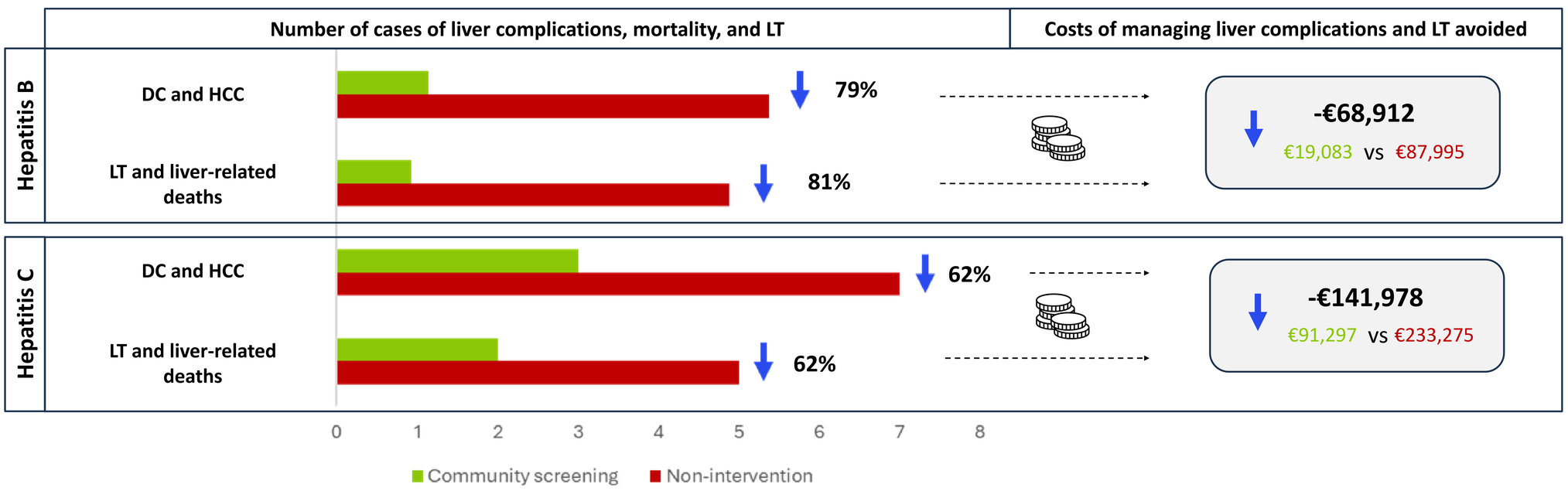

Figure 1. Number of cases of liver complications, mortality, and liver transplantation due to HBV and HCV for the entire cohort prevented and cost of management of prevented liver complications and liver transplantation.

DC, decompensated cirrhosis, HCC, hepatocellular carcinoma; LT, liver transplant

CONCLUSIONS

The implementation of a community screening strategy, including increasing awareness of HBV and HCV infections, screening and treatment in migrant populations from countries with high prevalence rates, is a cost-effective option than no intervention.

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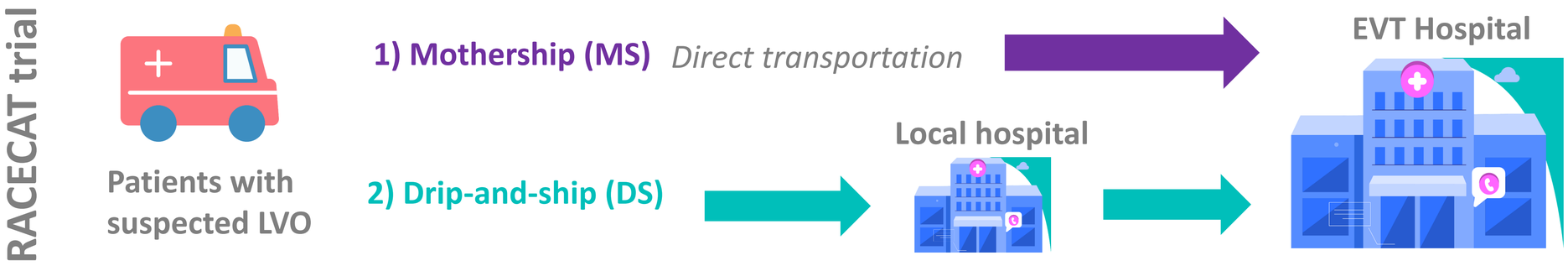
Cost-Utility of Direct Transport to Thrombectomy-Capable Centres vs. Local Stroke Centres for Suspected Large-Vessel Occlusion Stroke (RACECAT Randomised Clinical Trial)

Mercè Soler-Font [1, 2], Aida Ribera [2, 3], Ignacio Aznar-Lou [1, 2], Alba Sánchez-Viñas [1, 2, 4], John Slof [5], Emili Vela [6, 7], Mercè Salvat-Plana [2, 8, 9], Lorena Villa-García [3, 10], Antoni Serrano-Blanco [1, 2, 11], Natàlia Pérez de la Osa [12], Marc Ribó [13], Sònia Abilleira [8]

Background

- **Large-vessel occlusion** (LVO) accounts for approximately 20–30% of ischaemic strokes.
- Endovascular therapy (EVT) is effective and time related. However, varies geographically.



Objective

To evaluate the **cost–utility** of the two prehospital triage strategies of the RACECAT trial (**MS vs DS**) for patients with **suspected LVO stroke** over a **12-month follow-up** period, from a **societal perspective**.

Methods

Design: Cost-utility analysis of 1-year after stroke in Catalonia (Spain) of the RACECAT trial, a multicenter, population-based, cluster-randomized trial.

Societal perspective

Costs (€, 2023)

- Healthcare costs *(Healthcare perspective)*
- Social care costs
- Productivity losses

Outcome: Quality Adjusted Life Years (QALYs) through utilities (EQ-5D-5L).

Incremental Cost Utility Ratio (ICUR): Generalised linear model with family gamma and log link, adjusted for pre-stroke costs for estimating mean differences in costs and QALYs.

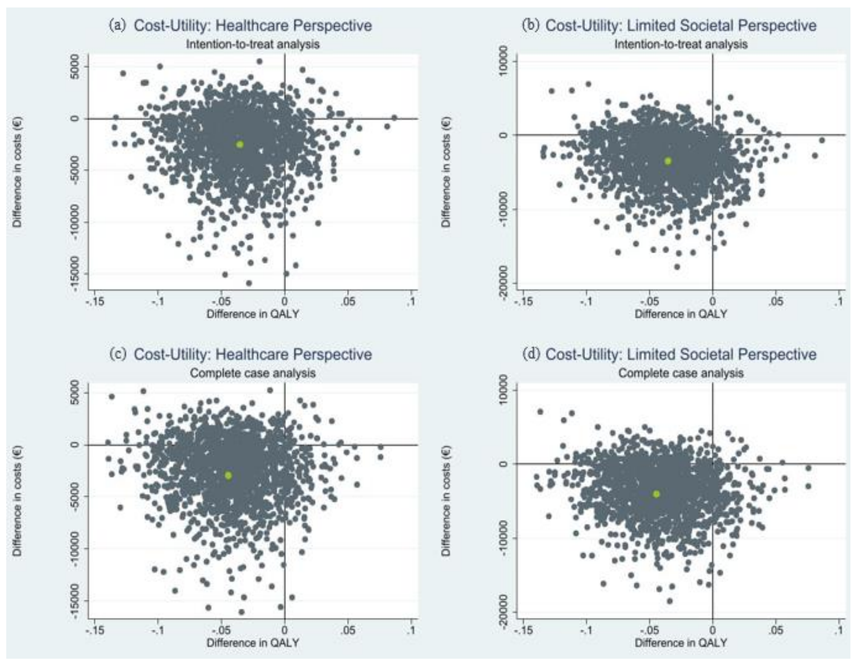
$$ICUR = \frac{\Delta\ COSTS}{\Delta\ QALY}$$

Results

Table 1. Costs, QALYS (mean per group and mean difference) and ICUR for the main and sensitivity analyses

	n	Follow-up costs DS Mean € (SD)	Follow-up costs MS Mean € (SD)	Cost difference (95% CI) in €	QALY DS Mean (SD)	QALY MS Mean (SD)	QALY difference (95% CI)	ICUR (€/QALY)
Healthcare perspective (ITT)	629	18,290 (2,733)	16,819 (1,102)	-2,514 (-8,050; 3,017)	0.41 (0.02)	0.38 (0.02)	-0.04 (-0.10; 0.03)	Less costly & less effective (€71,100 /QALY)
Societal perspective (ITT)	629	29,665 (3,085)	27,203 (1,505)	-3,489 (-9,914; 2,936)				Less costly & less effective (€98,581/QALY)
Healthcare perspective (Complete case)	594	18,573 (49,517)	16,836 (19,771)	-2,941 (-8,691; 2,810)	0.41 (0.39)	0.37 (0.37)	-0.05 (-0.11; 0.02)	Less costly & less effective (€65,979 /QALY)
Societal perspective (Complete case)	594	29,265 (55,768)	26,373 (26,695)	-4,035 (-10,719; 2,649)				Less costly & less effective (€90,543/QALY)

Figure 1. Cost-utility planes



Conclusion

In suspected LVO stroke, the **MS was slightly less costly but marginally less effective than DS**. No clear dominance was observed. Optimal triage strategy may depend on local infrastructure and transport logistics.

Development and validation of a metabolomic score for provegetarian diets and its relationship with metabolic pathways implicated in cancer. The OMIVECA study

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[4]Andalusian School of Public Health (EASP), Granada, Spain; [5]Centro Nacional de Epidemiología, ISCIII; [6]Catalan Institute of Oncology (ICO)

BACKGROUND

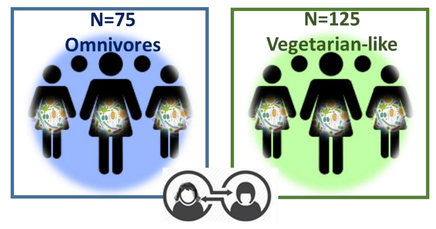
The increasing adoption of plant-based diets (PBDs) highlights the need to understand their composition and health implications. However, PBDs remain insufficiently characterized using and validated dietary assessment tools and omics.

Within the OMIVECA study, the aim was to characterize PBDs, taking the omnivorous diet as reference and considering dietary data collected via a validated f

Classification into 32 groups → **Exploratory analysis: ANOVA** → **Dietary patterns: PCA** → **Correlation flavonoids with R24h**

METHODS

Cross-sectional study including 760 participants (mostly university students; 73% women, and 21.2% vegan/vegetarians) with complete dietary data. A subset of 200 subjects provided urine and stool samples, along with three 24-hour recalls, for omics and dietary validation studies.



A 175-items food frequency questionnaire (FFQ) adapted from a validated tool, was developed. Foods were classified into 32 groups and intake was compared across dietary types (ANOVA test). Pro-vegetarian (PVG) diet indices, the Mediterranean Diet score and the EAT-Lancet index were built and compared between the groups. Dietary patterns were characterized with principal component analysis (PCA), K-Means and hierarchical clustering analysis (HCA).

Levels of 36 flavonoids were quantified in urine and correlated (Spearman) with the dietary intake derived from the PhenolExplorer database. Significance level: 5%.

RESULTS

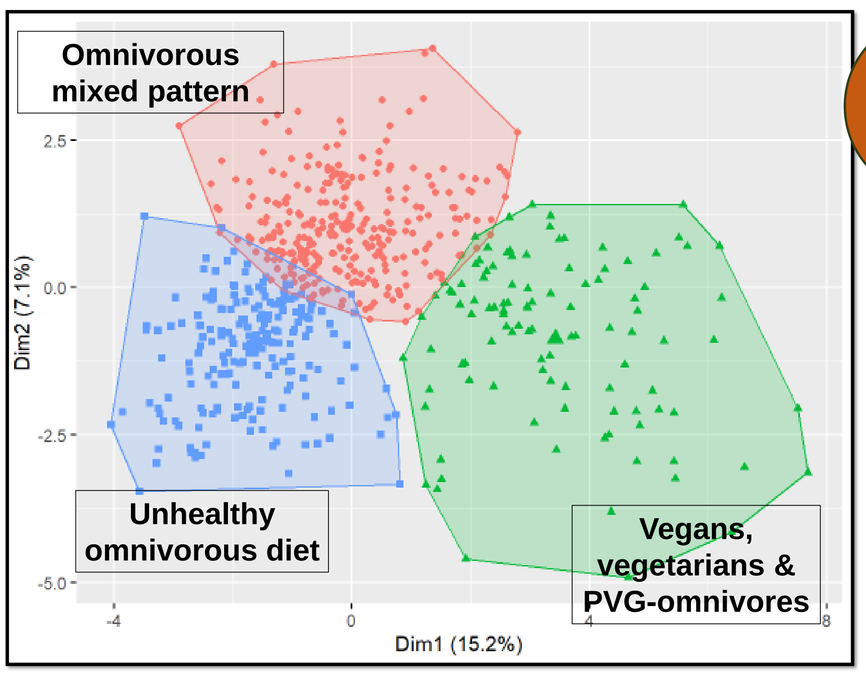
Most of the population study was younger than 26 years old (65,4%) considered as active: high (37,4%) and moderate (49,9%), and recruited in Granada (74,2%), Madrid (8.9%), Seville (5,7%), Almería (7,2%) and Other (3,9%).

	All n=760	OMN *n=599*	PCV *n=31*	OVL *n=73*	VGN *n=57*	p-value
DAIRY	316.2 (254.1)	365.1 (246.1)	230.0 (236.9)	198.0 (195.4)	0.6 (2.4)	<0.001
EGG	40.8 (41.2)	44.1 (41.6)	37.1 (16.6)	47.8 (43.8)	0.2 (0.8)	<0.001
MEAT	124.9 (107.4)	157.5 (97.7)	16.1 (33.9)	1.3 (7.3)	0.0 (0.0)	<0.001
FISH & SEAFOOD	72.2 (54.3)	85.9 (45.6)	102.3 (81.3)	2.6 (9.3)	0.3 (1.4)	<0.001
POTATOES	54.4 (41.5)	56.3 (42.5)	44.0 (29.4)	49.8 (37.7)	46.5 (39.7)	0.105
VGT/MSR	455.5 (294.1)	415.4 (270.2)	547.8 (218.8)	548.9 (287.5)	707.3 (404.2)	<0.001
LEGUMES	98.4 (74.1)	84.3 (63.3)	124.3 (62.3)	133.5 (70.7)	186.7 (105.6)	<0.001
FRUITS	472.3 (344.3)	467.4 (355.5)	501.8 (240.8)	490.5 (291.5)	484.1 (339.0)	0.200
NUTS	24.3 (25.9)	21.0 (21.5)	27.2 (21.7)	27.5 (23.2)	53.6 (46.7)	<0.001
WG CEREAL	52.7 (54.8)	48.4 (54.1)	76.4 (53.2)	64.3 (55.3)	69.8 (54.4)	<0.001
REFINED CEREAL	85.1 (72.2)	91.0 (75.9)	67.7 (56.2)	65.9 (51.0)	56.9 (48.1)	<0.001
SUM OF CEREALS	137.7 (82.8)	139.4 (86.9)	144.2 (61.6)	130.2 (62.1)	126.7 (71.5)	0.472
TOTAL PASTRIES	29.1 (38.0)	30.6 (40.3)	24.3 (31.4)	27.2 (30.6)	18.2 (18.4)	0.026
SUGARS	11.0 (13.4)	11.9 (13.7)	9.8 (14.8)	8.8 (11.7)	5.1 (8.2)	<0.001
COFFEE & TEA	69.5 (64.8)	64.2 (61.9)	101.9 (89.5)	88.1 (61.6)	83.6 (72.6)	<0.001
NON-ALC. BEVERAGES	42.9 (73.1)	47.9 (79.1)	23.9 (34.4)	23.4 (34.7)	26.1 (45.8)	<0.001
PB BEVERAGES	67.2 (133.6)	32.7 (83.8)	159.4 (173.1)	147.2 (167.7)	277.6 (209.7)	<0.001
ALC. BEVERAGES	49.1 (83.1)	47.8 (84.7)	50.1 (63.0)	67.3 (88.3)	38.6 (65.3)	0.062
SPICES	5.6 (6.0)	4.8 (5.2)	6.5 (5.0)	7.5 (5.6)	11.4 (9.9)	<0.001
PRECOOKED	34.8 (31.8)	36.6 (32.5)	34.6 (34.4)	32.3 (30.1)	19.2 (18.6)	<0.001
PB ALT. PROTEIN	36.8 (83.0)	7.0 (16.4)	91.5 (92.9)	123.5 (92.2)	208.7 (154.8)	<0.001
SPREADS	7.3 (10.0)	5.8 (8.2)	9.5 (10.5)	13.6 (11.7)	14.8 (16.8)	<0.001
VGN DAIRY-LIKE	18.1 (41.5)	11.1 (30.9)	31.5 (52.4)	37.5 (59.1)	60.0 (65.3)	<0.001

Adjusted intake to 2.000 kcal. Mean (SD), KW test

Dietary patterns were characterized based on the factor loadings of each component (>±0.2) calculated in orthogonal rotation to maximize their variance (varimax). A parallel clustering process using K-means was added as a complementary measure to verify the patterns obtained (Figure 1).

Figure 1. K-means clusters.



Explained Variance 15,0%

- **Dairy → (- 0,55)**
- **Meat → (- 0,67)**
- **Fish → (-0,56)**
- **VGT-Mush→ (+0,25)**
- **Legumes → (+0,43)**
- **PB ALT. protein→ (+0,78)**
- **PB Beverages → (+0,55)**
- **OMN Precooked → (-0,39)**
- **Nuts→ (+0,27)**

Explained Variance 7,1%

- **Meat → (+0,21)**
- **VGT-Mush → (-0,48)**
- **Frutas → (-0,47)**
- **Nuts → (-0,45)**
- **WG cereal → (-0,52)**
- **Non-ALC → (-0,45)**

Figure 2. Dietary patterns identified using PCA. Principal dimensions and Factor loadings

Figure 3. Hierarchical Clustering Analysis heatmap.

- Three main clusters were identified using HCA. 61 omnivores were classified into PBD pattern.
- PBDs provide more polyphenols, especially anthocyanins and isoflavonoids, than omnivorous diets.
- Preliminary results show a moderate correlation between dietary and urinary daidzein (rho=0.63), supporting validity of the FFQ to assess PBDs.

CONCLUSION

So far, the FFQ demonstrates good validity for assessing PBDs. There are distinct dietary patterns within PBDs, beyond the restriction of animal foods, highlighting the complexity and diversity of PBDs. To further investigate these patterns and their role in cancer, metabolomic studies are currently in progress

Conflict of interest: No

Funding: ESP23PI03/2024. CIBERESP Proyectos Intramurales
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VEGAN VS OMNIVOROUS DIET
THE OMIVECA STUDY

EARLY DEVELOPMENT AND DYNAMICS OF NASOPHARYNGEAL MICROBIOTA IN INFANTS DURING THE COVID-19 PANDEMIC: A 2-YEAR PROSPECTIVE COHORT STUDY

A. Lluansí[1,2], P. Brotons[1,2,3], M. Díaz[1,4], A. Rigalos[1], D. Henares[1,2], C. Garcia-Beltran[1], M. Blanco-Fuertes[1,2], A. Pérez-Argüello[1], M. Cisneros[1,3], L. Ibáñez[1,2,4], C. Muñoz-Almagro[1,2,3].

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BACKGROUND

The COVID-19 pandemic lockdown significantly affected nasopharyngeal microbiota in children and adults, which plays a critical role in health and disease However, the specific effects on nasopharyngeal microbiota in infants remain understudied.

OBJECTIVES

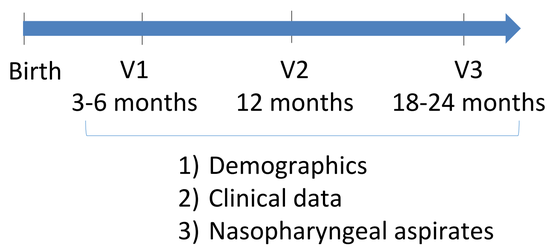
To explore the dynamics of the nasopharyngeal microbiota in infants born during the COVID-19 pandemic, and its potential correlations with postnatal weight gain patterns, as well as the host, environmental, and lifestyle factors.

METHODS

A cohort of 32 healthy infants recruited between December 2019 - December 2020

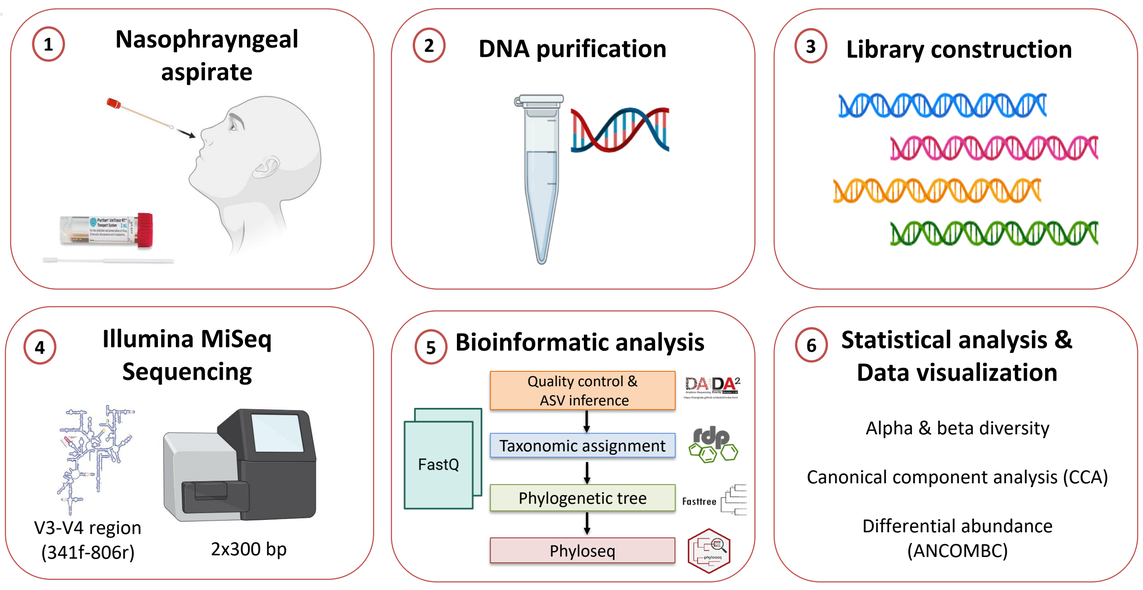
Hospital Sant Joan de Déu (Barcelona, Spain)

Epidemiological, clinical and microbiological variables were registered



Rapid postnatal weight gain (RPWG): BMI Z-score - birth weight Z-score > 1

Workflow for nasopharyngeal microbiota analysis



RESULTS

- Inter- and intra-individual analyses revealed an **early microbiota stabilization** by age 12 months (visit 2) (**Figure 1**).

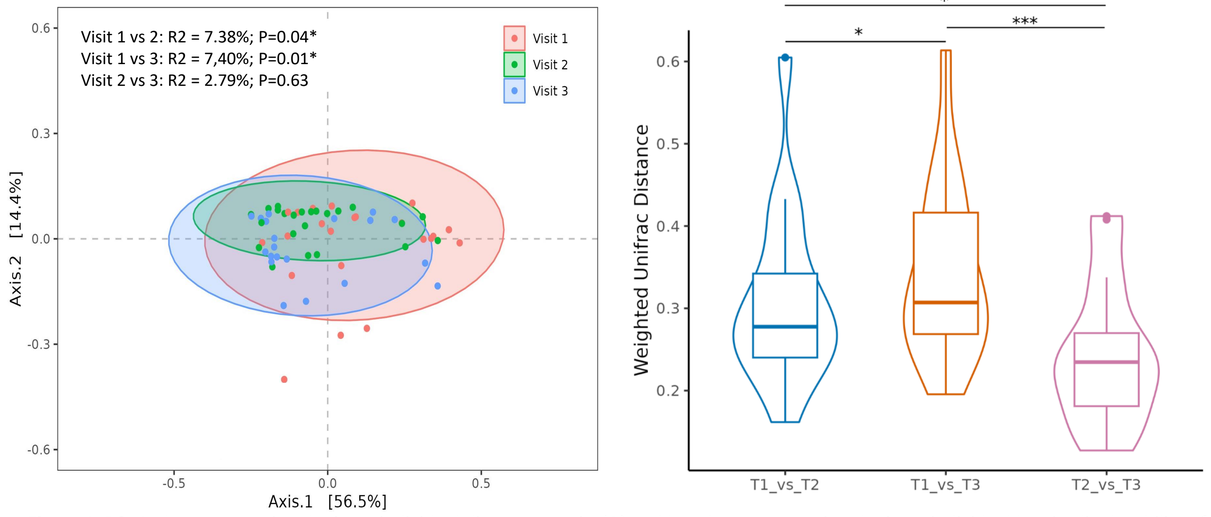


Figure 1. PCoA plot representing the inter-individual distance matrix (**A**) and boxplots representing the intra-individual longitudinal stability of the nasopharyngeal microbiota (**B**). Distances based on Weighted UniFrac.

- Differential abundance analyses revealed **increased abundance of *Streptococcus pneumoniae*** (ASV3) at 24 months (visit 3) *versus* 12 months (visit 2) (**Figure 2C**), with no significant differences observed at earlier ages.

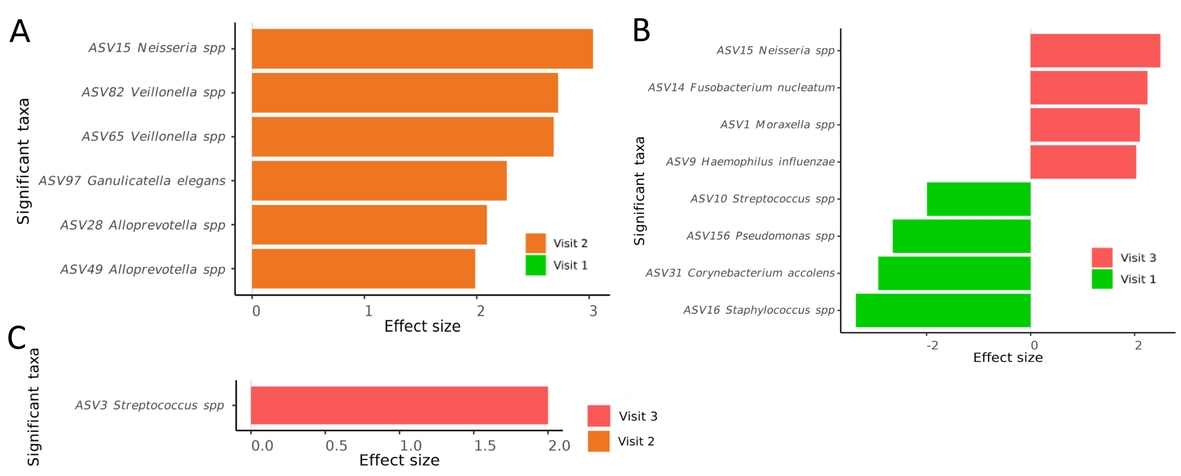


Figure 2. Bar plots displaying the significantly differential abundant taxa across the three time points. (**A**) Comparison between visit 1 and 2, (**B**) comparison between visit 1 and 3, (**C**) comparison between visit 2 and 3.

- **Key factors associated with differential microbiota patterns**: URTI history, RPWG, pneumococcal carriage, recent vaccines, and antibiotic/corticosteroid intake (**Figure 3**).

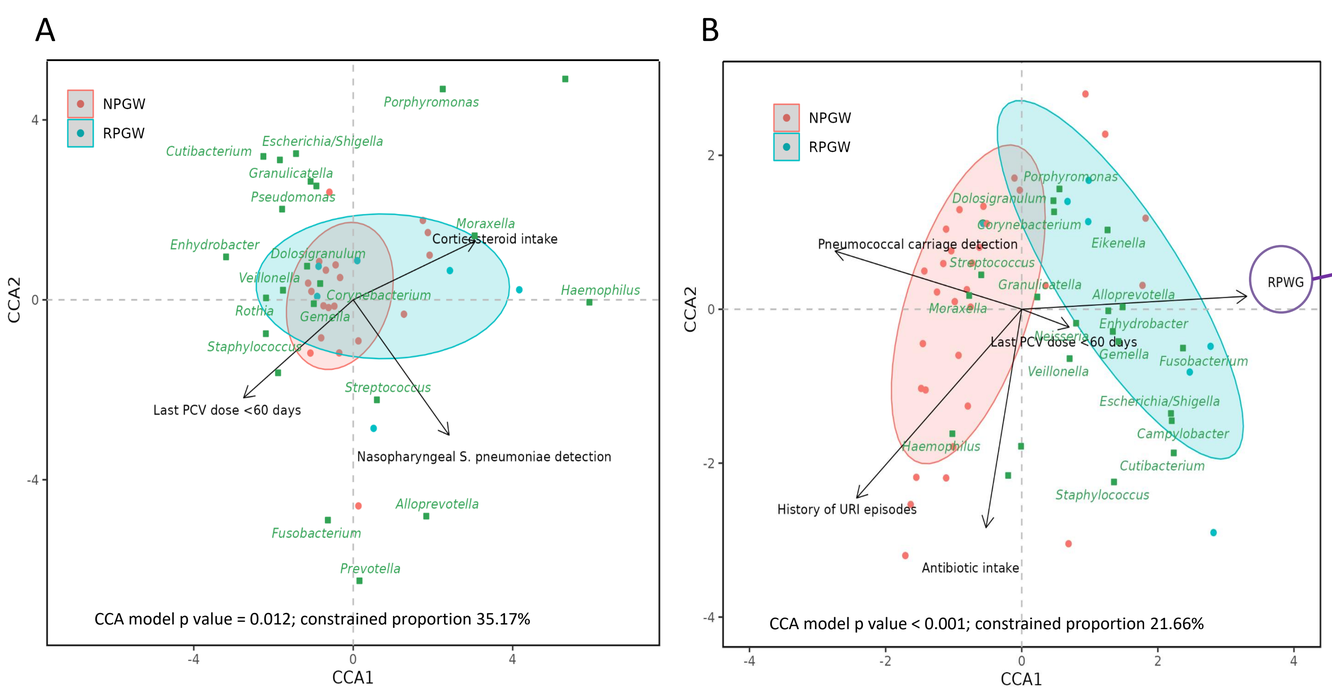
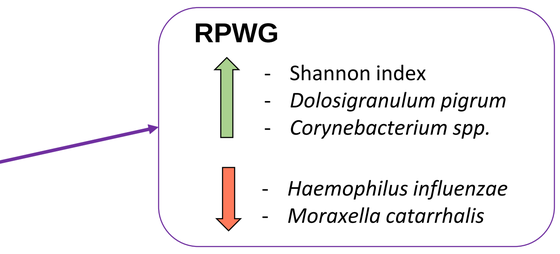


Figure 3. CCA triplots illustrating the associations between nasopharyngeal samples, bacterial genera, and significant explanatory variables at visit 1 (**A**) and visits 2 and 3 (**B**). Samples are color-coded according to the pattern of post-natal weight gain [rapid post-natal weight gain (RPWG) in blue; normal post-natal weight gain (NPWG) in red]

- **RPWG correlated** with a higher Shannon index, increased abundance of *Dolosigranulum pigrum* and *Corynebacterium spp*., and decreased abundance of *Moraxella catarrhalis* and *Haemophilus influenza* (**Figure 4**).



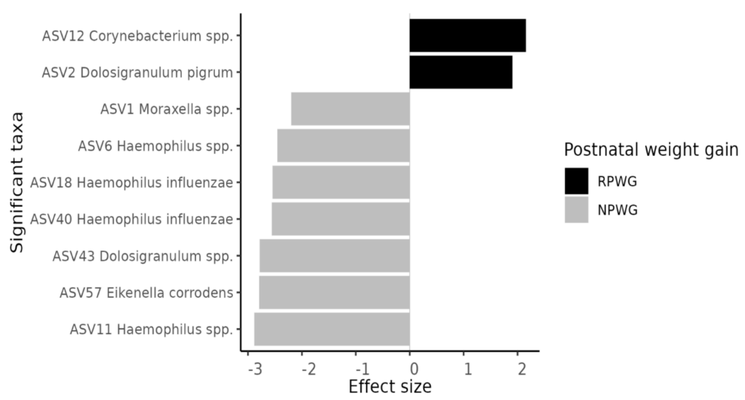


Figure 4. Bar plots displaying the significantly differential abundant features between rapid post-natal weight gain (RPWG, in black) normal post-natal weight gain (NPWG, in grey) pattern.

CONCLUSIONS

These findings suggest an **early stabilization of the nasopharyngeal microbiota** by age 12 months and the presence of interconnections between microbiota dynamics and early postnatal weight gain.

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Efficacy and safety of remote automatic monitoring in the follow-up of outpatients with heart failure: preliminary results of a Systematic Review

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Background

Heart failure (HF), the leading cause of hospitalization among individuals aged over 65, in advanced stages compromises the blood supply to the body thus limiting the patients' quality of life and increasing mortality. Remote Automatic Monitoring (RAM) could assist the patients at home and alert about signs and symptoms related with HF and prevent complications.

Objectives

To assess the efficacy and safety of RAM in adult outpatients with HF compared to usual care (UC).

Methods

Systematic review of interventions with protocol registered at PROSPERO, CRD42024503882. We searched MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, ClinicalTrials.gov and the ICTRP portal (from inception up to February 2024), and checked the reference list from selected studies. There were no language restrictions. We included randomized clinical trials (RCT) assessing RAM with alerts about signs and symptoms related with HF decompensation in outpatients compared with UC. Two reviewers independently screened, selected the studies and assessed the Risk of Bias using the RoB2 tool. The main outcomes were reduction of hospitalization and all-cause mortality, individually or as a composite outcome. Safety of interventions was a secondary outcome. We performed a subgroup analysis by non-invasive RAM and invasive RAM (medical devices implanted in the body for monitoring), calculated the Risk Ratio (RR) and 95% Confidence Interval (CI). We assessed the certainty of evidence with GRADE method.

Results

Of 2232 reports screened after excluding duplicates, we included 116 reports providing results from 54 RCTs. In total 21448 participants were included (30% women), mean age 66 years. Eight RCT were assessing invasive RAM. Only four RCT were single blinded. RoB2 for the main outcomes was of high risk and low for safety related to monitoring. The certainty of evidence was moderate for efficacy and low for safety. RAM compared with usual care probably reduce slightly all-cause mortality (RR:0.92; CI95% 0.85 to 0.99, I^2=23%; 36RCT; 18257 participants), hospitalizations (RR:0.90; CI95% 0.84 to 0.96, I^2=17%; 31RCT; 10821 participants) and the composite outcome of both (RR:0.92; CI95% 0.86 to 0.99, I^2=38%; 15 RCT; 7529 participants) without statistical subgroup differences between non-invasive RAM and invasive RAM. RAM compared with usual care may result in little to no difference in safety (RR: 0.90; CI95% 0.39 to 2.08; 699 participants; 1 RCT).

Conclusions

RAM with alerts administered in HF outpatients probably reduces slightly all-cause mortality and hospitalizations. More studies are needed to establish the safety related to RAM.

Figure 1. Forest plot of comparison RAM vs UC: All-cause mortality

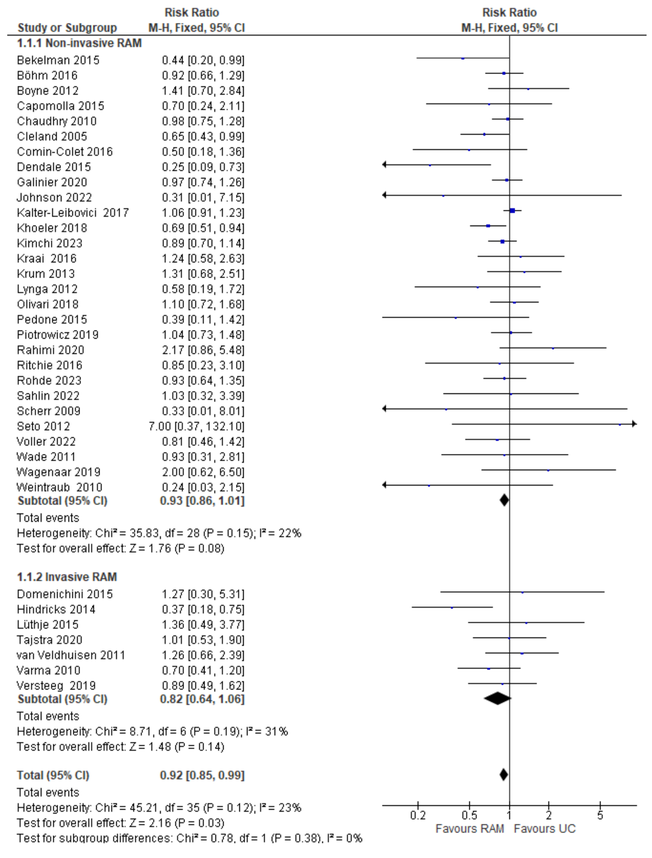


Figure 2. Forest plot of comparison RAM vs UC: HF hospitalization

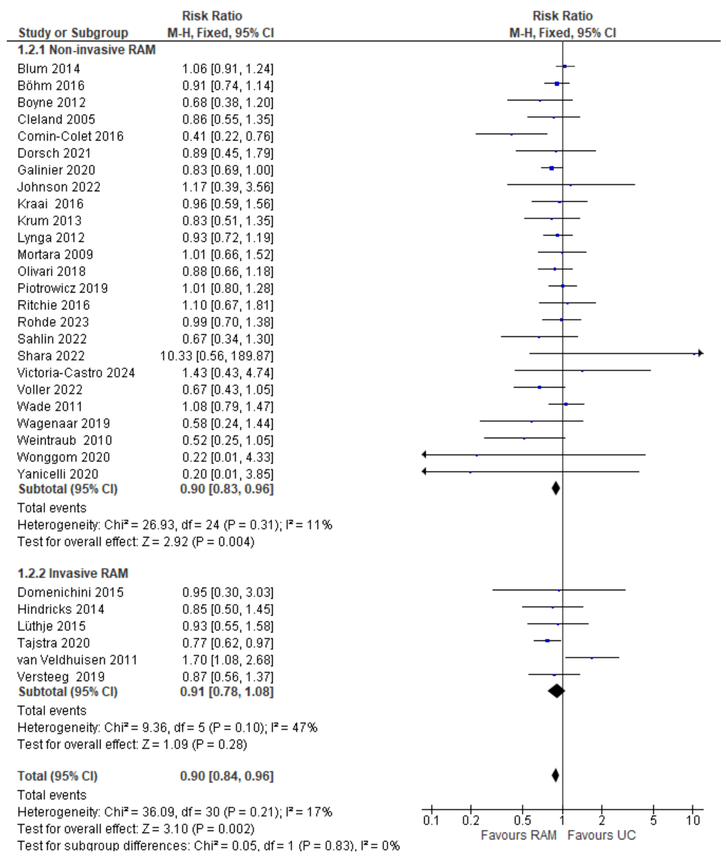
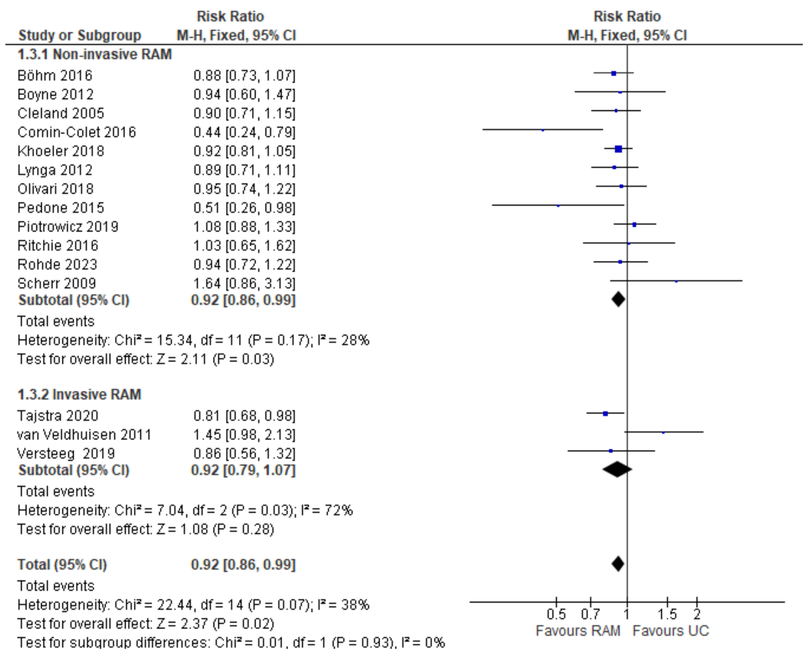


Figure 3. Forest plot of comparison RAM vs UC: Combined outcome



Enhancing Nursing Education: Simulation Laboratory Practices in Virtual Reality Obstetric Emergencies

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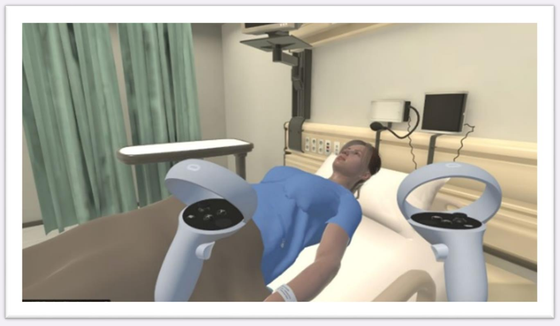
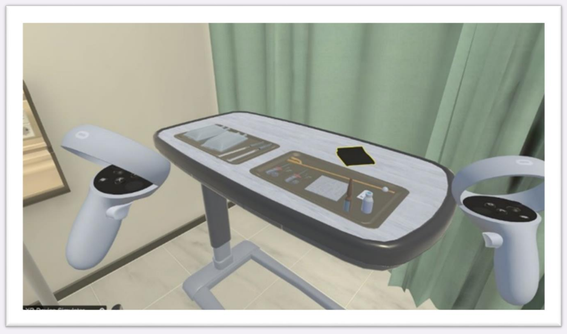
Background

The **World Health Organization (WHO)** highlights the **importance of simulation in clinical teaching and patient safety**[1]; at the same time, virtual reality is presented as an innovative methodology in **nursing training** and is being widely incorporated into training. An instrument has not been identified that allows us to know the assessment of the students who use these resources.

Objetives

Validate the Self-Evaluation Scale for Simulation Laboratory Practices (SES-SLP) in nursing students in Spain.





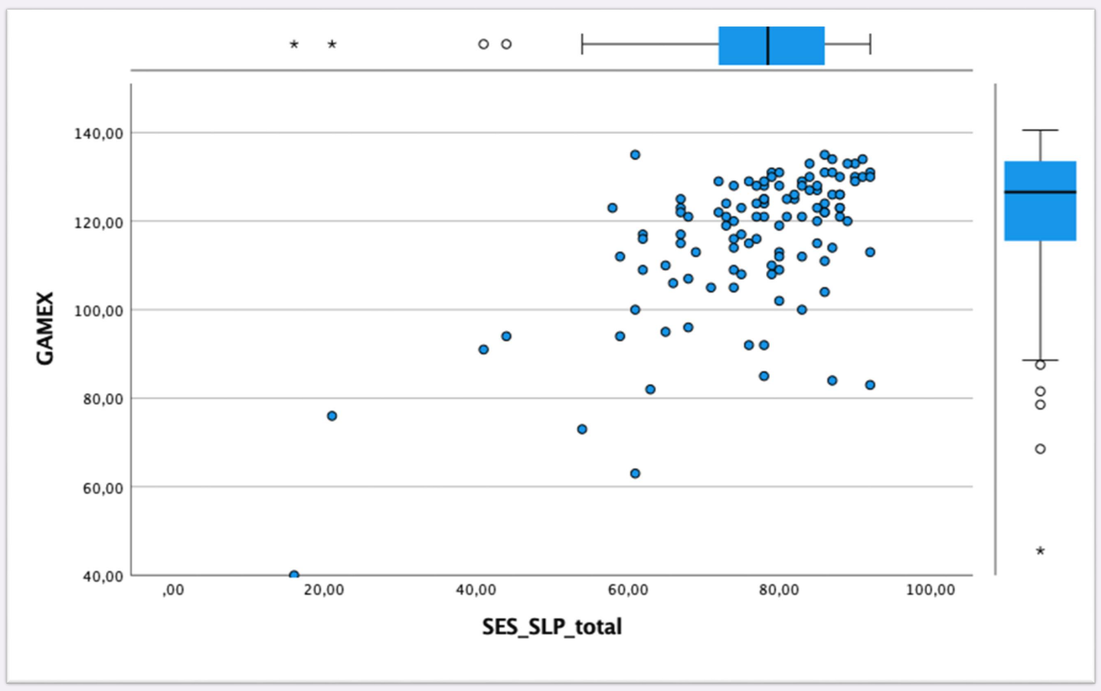
Methods

- **Study design:** Cross-sectional observational study of 120 nursing students carried out at the University of Jaén during the 2023-2024 academic year.
- **Information sources:** After facing an immersive experience of postpartum haemorrhage using virtual reality glasses, sociodemographic and academic data were collected, and the SES-SLP questionnaire[2] and the Gameful Experience in Gamification (GAMEX)[3,4] scale were administered.
- **Statistical análisis:** An Exploratory Factor Analysis (EFA) was carried out with convergence and criterion validity. Internal Consistency (IC) was evaluated using Cronbach's α. The convergence validation of the SES-SLP was analyzed through the GAMEX scale using the Pearson correlation coefficient. Temporal reliability was studied through a test-retest using the Intraclass Correlation Coefficient (ICC).
- To collect the information, approval was requested from the Research Ethics Committee, code 20231110/NOV.PRY, and informed consent was obtained from the participants.

Results

- The AFE identified two components, Factor 1 "Developing" and Factor 2 "Challenging", which explained 56.79% of the variability, the first covering 45.82% and the second 10.97%.
- A statistically significant and positive correlation was observed between the SES-SLP and GAMEX scales both globally and in almost all of their dimensions ($p<0.001$) except the “Absence of negative effect” dimension.
- **Cronbach's α was 0.909**, indicating **high internal consistency**.
- Temporal reliability, evaluated with test-retest using the Fleiss criteria, obtained a result of 0.898 (95% CI=0.801-0.948), demonstrating excellent or almost perfect agreement.

Figure 1. Convergent validity between SES-SLP and GAMEX scales.



Conclusion

Given its good psychometric characteristics, **the Self-Evaluation Scale for Simulation Laboratory Practices (SES-SLP) is a valid and reliable tool to be used in simulation laboratories for university nursing training.**

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Genomic Surveillance in Catalonia Uncovers Ongoing Tuberculosis Transmission in Vulnerable Urban Communities

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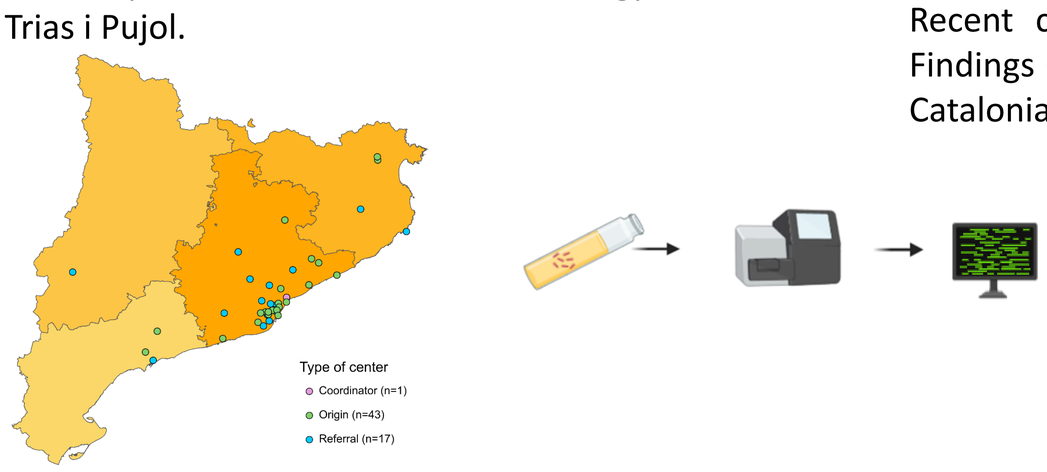
Background

Tuberculosis (TB) remains the leading cause of death from infectious disease globally. In 2022, the Public Health Agency of Catalonia launched with the Hospital Germans Trias i Pujol (Microbiology Department) the **TB-SEQ strategy**, applying whole-genome sequencing (WGS) to all culture-positive TB cases for population-based genomic epidemiology. This strategy improves outbreak detection and contact tracing, especially among hard-to-reach and socially vulnerable populations disproportionately affected by TB in low-incidence settings like Spain.

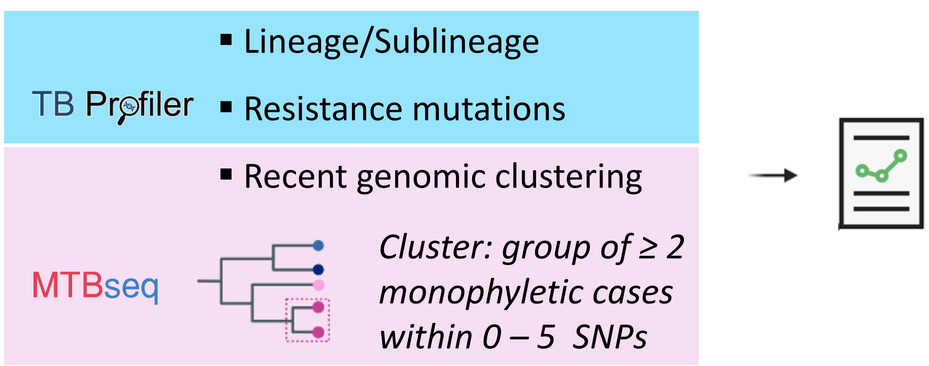
This study aims to characterize and monitor a transmission cluster, initially detected by WGS through the TBSEQ strategy, combining classical and genomic epidemiology.

Methods

1. **Prospectively, all TB-positive cultures in Catalonia** from a network of 43 public and private labs **were centralised**.
   Illumina-based WGS was performed at the Microbiology Service of Hospital Germans Trias i Pujol.



2. Bioinformatics: Genomes were analyzed with TB-Profiler for lineage and drug resistance typing, and with MTBseq for SNP-based genomic clustering. Median Joining Networks (MJNs) were used to infer transmission pathways. Recent cluster was defined by ≥2 monophyletic cases within 0-5 SNPs. Findings were reported to the Tuberculosis Prevention and Control Service in Catalonia.



3. A task force was established, under the auspices of the Tuberculosis Prevention and Control Service, to analyse the most relevant clusters and design targeted control activities.

Results

- Cluster A31-5-L4 was first detected in July 2023, comprising three cases (cases 1 to 3). By January 2025, the cluster had expanded to 13 cases across multiple municipalities. Continued surveillance identified five additional cases in 2025, increasing the cluster size to 18 patients from nine countries diagnosed between 2021 and 2024.
- Epidemiological links included squatter communities in urban locations of the Metropolitan Area of Barcelona.
- MJN analysis revealed five central cases with three diverging transmission chains (**Figure 1**).
- The cases involved did not show genotypic resistance to first- and second-line drugs, and 11 cases were cured after treatment. One case died by TB.

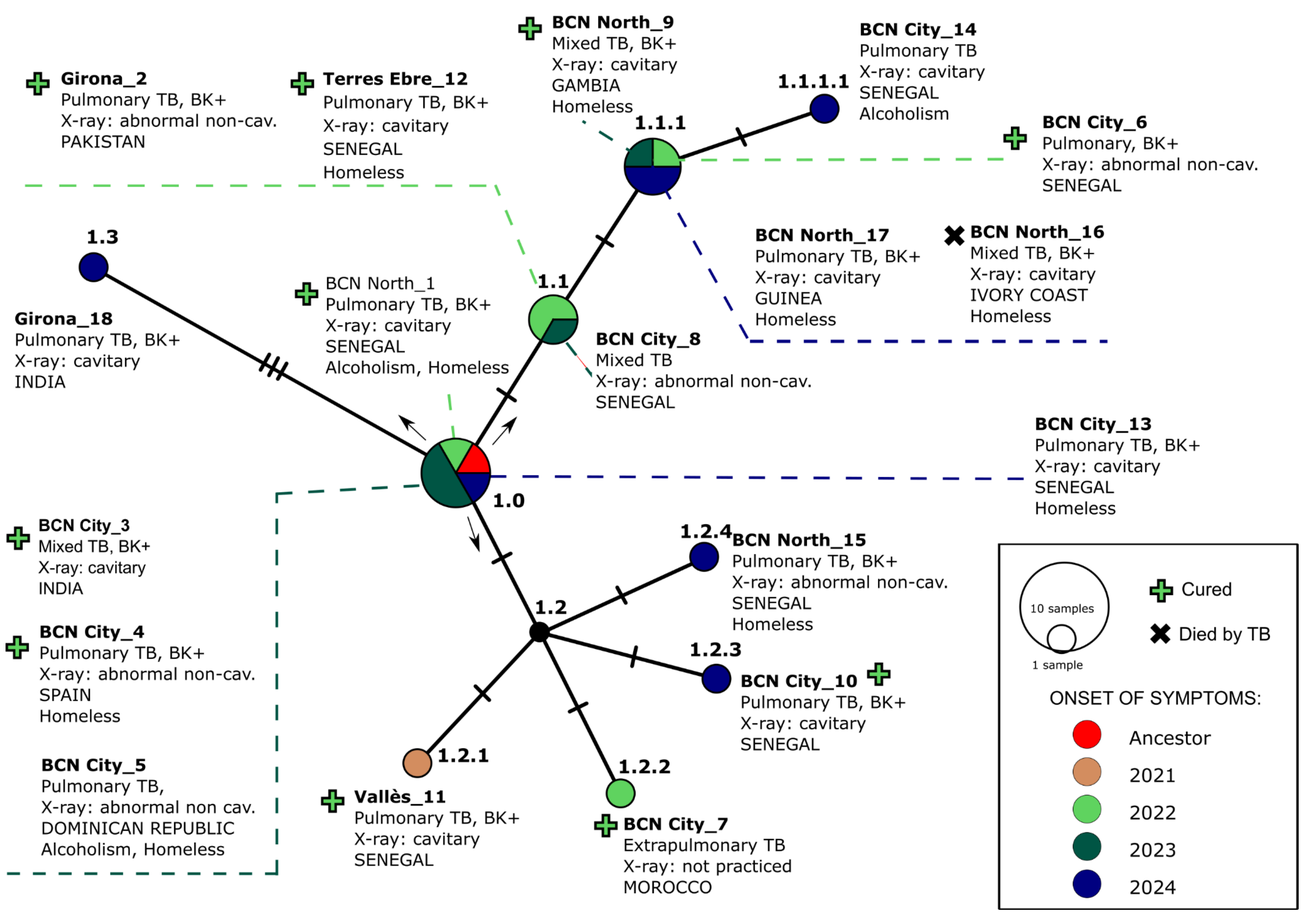


Figure 1. **Median Joining Network of the genomic cluster A31-5-L4 and reconstructed from an alignment of 14 SNPs.** Each circle represents a node, and the adjacent number is its identifier. The size of the node indicates the number of samples with identical genomes. The black circle (node 1.2) denotes the presence of one or more unsampled cases. Gray arrows indicate the estimated directionality of transmission. Crossbars indicate the number of SNPs between nodes. Ancestor, reconstructed ancestor of the genomic cluster; Mixed TB, cases with both pulmonary and extrapulmonary TB; BK+, positive bacilloscopy for *M. tuberculosis.* Country of origin, X-ray findings and vulnerability factors are also specified for each case.

Conclusion

WGS enabled early detection and monitoring of an active TB cluster, highlighting community transmission settings and informing targeted interventions. The TB-SEQ strategy offers crucial insights into TB transmission dynamics, particularly within hard-to-reach and vulnerable populations, supporting more effective control efforts from public health.

Funding: TB-SEQ was funded by CIBERESP intramural project ESP22PI06 (ISCIII) and Departament de Salut (Generalitat de Catalunya).

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Hepatitis A in Spain: Evolution of hospitalization in the period 2000-2021

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Introduction: Hepatitis A is an acute disease of the liver caused by the hepatitis A virus. The presence of sexually transmitted infections before or during the disease course has been reported.

Objective: We investigated the evolution of hepatitis A hospitalizations and in-hospital deaths during 2000-2021 in Spain according to demographic characteristics, presence of other sexually transmitted infections, and vaccination strategy (universal or risk-group vaccination).

Methods: Using data from the Spanish National Health System's Minimum Basic Data Set, we calculated age-standardized cumulative hospitalization incidence and 95% confidence interval (CI), factors associated with hospital stay, and hospitalization deaths. Adjusted OR (aOR) values were calculated using a multivariate logistic regression model.

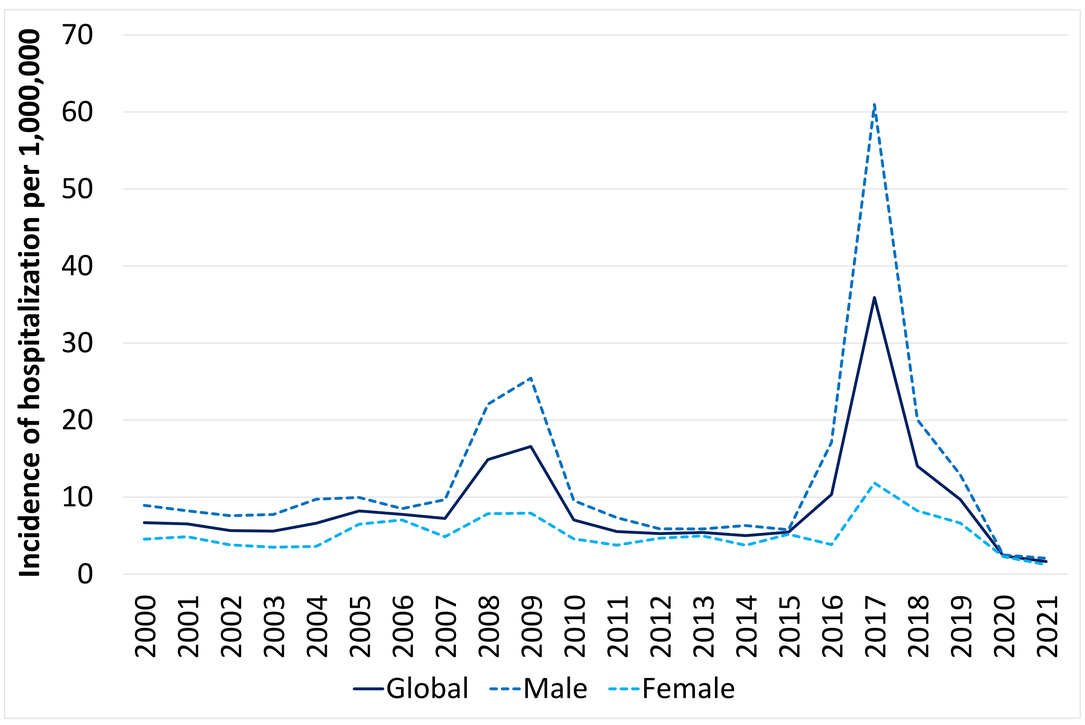
Results: The Spanish cumulative hospitalization incidence for hepatitis A over the 22-year period was 8.84 per 1,000,000 globally and 12.54 and 5.26 per 1,000,000 for men and women, respectively (RR 2.38; 95% CI: 2.28-2.50).

Factors associated with hospitalization >7 days were age groups 40-59 (aOR 1.58; 95% CI: 1.37-1.82), ≥60 years (aOR 5.09; 95% CI: 4.01-6.47), cirrhosis (aOR 6.11; 95% CI: 2.59-14.43), and presence of HIV and HBV (aOR 1.65; 95% CI: 1.15-2.38 and 2.01; 95% CI: 1.03-3.63, respectively).

In-hospital deaths were associated with age ≥60 years (aOR 35.23; 95% CI: 11.12-111.58), hospitalization >7 days (aOR 4.37; 95% CI: 1.80-10.58), cirrhosis (aOR 8.84; 95% CI: 2.37-32.99), and HCV infection (aOR 8.66; 95% CI: 1.57-47.87).

The cumulative hospitalization incidence was lower in regions implementing universal vaccination (RR 0.79; 95% CI: 0.75-0.84).

Cumulative incidence of hepatitis A hospitalization



Factors associated with death during hepatitis A hospitalization

	Death N=29	No death N=8812	aOR (95% CI)	P value
Age group				
<1 year	0 (0%)	12 (0.1%)	-	
1-4 years	0 (0%)	333 (3.8%)	-	
5-19 years	1 (3.4%)	1892 (21.5%)	0.63 (0.07-5.76)	0.68
20-39 years	4 (13.8%)	4472 (50.7%)	Ref.	
40-59 years	4 (13.8%)	1799 (20.4%)	2.08 (0.51-8.55)	0.31
≥60 years	20 (69.0%)	304 (3.4%)	**35.23 (11.12-111.58)**	**<0.001**
Sex				
Male	13 (44.8%)	6157 (69.9%)	0.46 (0.21-1.04)	0.06
Female	16 (55.2%)	2655 (30.1%)	Ref.	
LOS				
LOS >7 days	21 (72.4%)	1486 (16.9%)	**4.37 (1.80-10.58)**	**0.001**
LOS ≤7 days	8 (27.6%)	7326 (83.1%)	Ref.	
Cirrhosis	4 (13.8%)	23 (0.3%)	**8.84 (2.37-32.99)**	**0.001**
HCV	2 (6.9%)	65 (0.7%)	**8.66 (1.57-47.87)**	**0.01**

Conclusions: Results of studies based on characteristics of hospitalized hepatitis A cases taking into account the existing prevention policies can be useful to have a better knowledge about its evolving epidemiology and to improve the prevention and control of the disease.

Methodological and reporting quality of Clinical Practice Guidelines for prenatal care on nutritional counselling in high-income countries: A systematic review

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1 INTRODUCTION

Maternal nutrition during pregnancy influences health outcomes for both mother and child[1].

Clinical Practice Guidelines (CPGs) aim to provide evidence-based recommendations for prenatal care, including nutritional counselling[2]. However, the methodological quality and reporting of these guidelines vary considerably among high-income countries (HICs)[3], which may affect their usefulness and implementation in clinical practice.

2 OBJECTIVE

To assess the methodological and reporting quality of CPGs for prenatal care from HIC on nutritional counselling.

3 METHODS

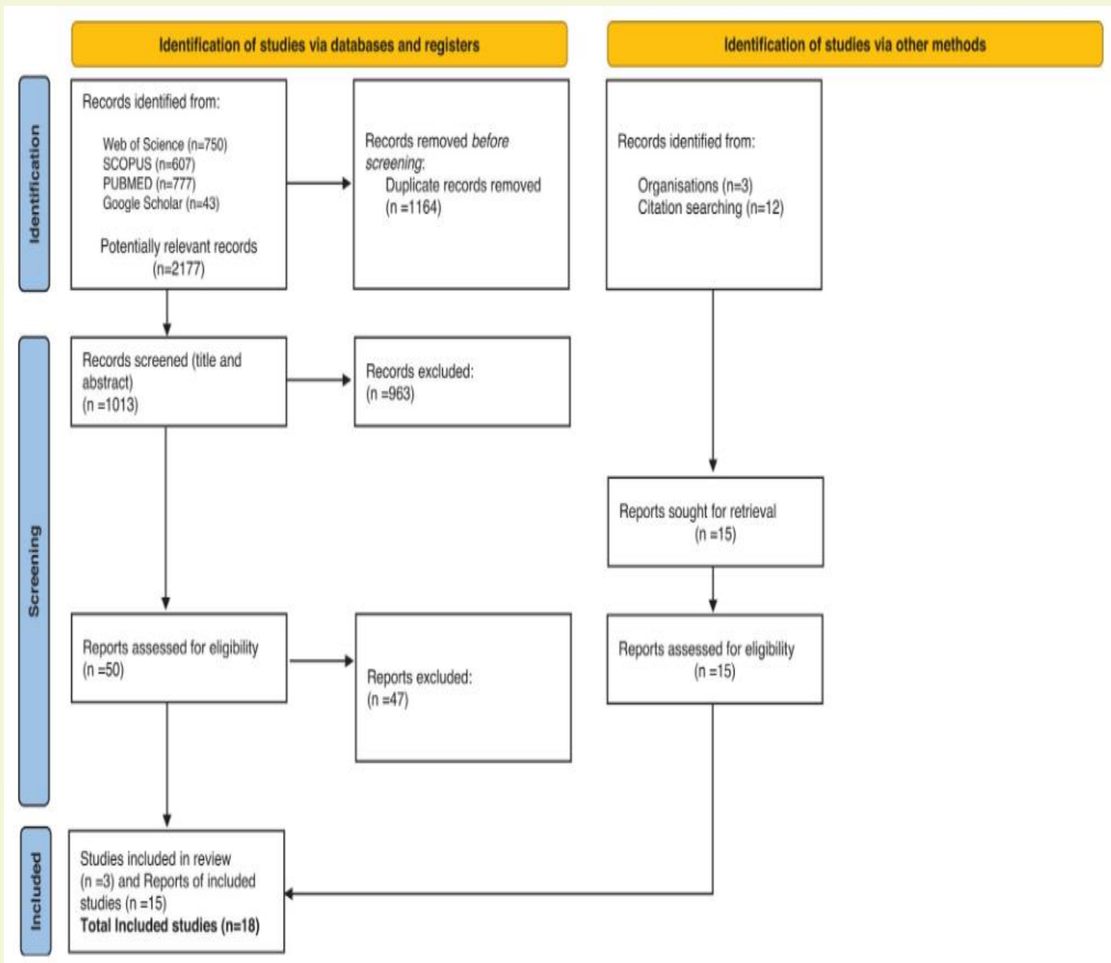
Following registration in PROSPERO (CRD42023397756), searches in PubMed, Scopus, Web of Science, and Google Scholar covered the last decade. CPGs for prenatal care from HIC with nutritional counselling, without language restriction, were selected. Data extraction and quality assessment were independently conducted in duplicate, with discrepancies resolved by a third reviewer.

The methodological and reporting quality was evaluated in institutional CPGs and professional societies using the AGREE II tool[4] (score range 22-161), while reporting quality was evaluated with RIGHT tool[5] (score range 0-35).

4 RESULTS

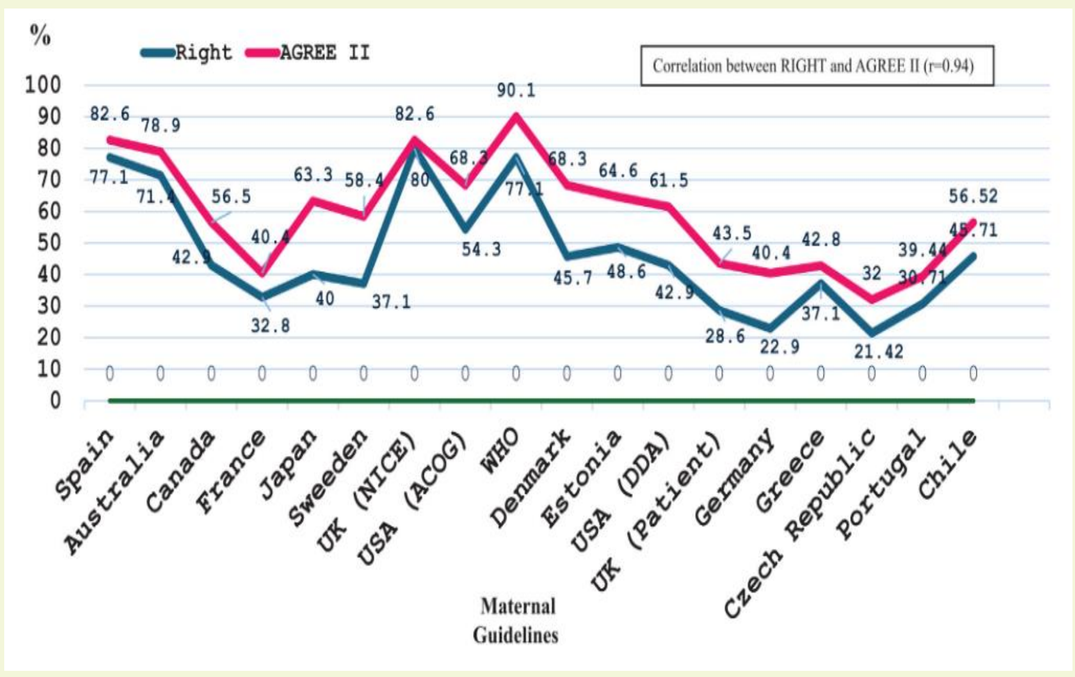
A total of 2177 citations were screened, resulting in 18 CPGs recommendations on nutritional counselling (published 2014-2024), primarily from Europe (n=11, 61.1%) and the USA (n = 2, 11.1%).

Figure 1. PRISMA 2020 flow diagram



High-quality CPGs were 6 (33.4%) using AGREE II (Spain, Australia, UK-NICE, U.S.A.-ACOG, WHO, and Denmark) and 4 (22.2%) using RIGHT (Spain, Australia, UK-NICE, and WHO). The AGREE II and RIGHT observed score ranges were 51.5-145 and 7.5-28, respectively.

Figure 2. Percentage scores of the Clinical Practice Guidelines according to the AGREE II and RIGHT tools



Mean scores for institutional CPGs were higher than those for professional societies (AGREE 107.4 ± 26.8 vs. 86.2 ± 26.1, p = 0.0218; RIGHT 19.1 ± 6.2 vs. 14.1 ± 6.1, p = 0.0201).

5 CONCLUSION

The quality of nutritional counselling in CPGs from HICs varies widely. Institutional CPGs showed significantly higher methodological and reporting quality than those from professional societies. Standardized evaluation is needed to ensure clear, evidence-based recommendations.

6 REFERENCES

Mixtures of chemicals in pregnancy and their effects on cognitive and fine motor abilities in childhood

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BACKGROUND

Many pregnant women are exposed to chemical toxicans that can harm the developing brain of the child. This study aims to assess the effects of a mixture of 29 chemicals in pregnancy (organochlorine compounds, per – and polyfluoroalkyl substances, phenols, and phthalates) on cognitive abilities (working memory, attentional function, visuomotor attention, cognitive flexibility, verbal and non-verbal intelligence, information processing speed, risky decision making) and fine motor function in childhood.

METHODS

Data from 2270 mothers and their children that take part in the INfancia y Medio Ambiente in Spain were analyzed. Maternal samples for chemical exposure assessment were collected during the first trimester (blood for organochlorine compounds, per – and polyfluoroalkyl substances, and urine for phenols and phthalates) and the third trimester (urine for phenols and phthalates). Cognitive abilities and fine motor function were assessed at the average ages of 7, 9, or 11 years old with a battery of standardised tests: The N-back Test (working memory), Attention Network Test (attentional function), Trail Making Test (visuomotor attention and cognitive flexibility), animal naming test (verbal intelligence), Raven´s Coloured Progressive Matrices (non-verbal intelligence), fourth edition of Wechsler Intelligence Scale for Children (information processing speed), Roulettes Task (risky decision making), Finger Tapping Test (fine motor function). Quantile-based g-computation estimated joint effects of chemical mixtures on the outcomes, adjusting for confounders and using inverse probability weights to mitigate selection bias.

RESULTS

We studied 2270 mothers and their children (Table 1). The mothers were approximately 30 years old when pregnant and 33 % of them had university education or higher. The overall mixture of chemicals was linked to lower visuomotor attention (+ 0.2 min., 95 % CI 0.0 to 0.4 for the second; + 0.4 min., 95 % CI 0.0 to 0.8 for the third; and + 0.7 min., 95 % CI 0.0 to 1.3 for the fourth quartile, relative to the first quartile). Counterintuitively, the overall mixture of chemicals was related to higher verbal intelligence (+ 1.5 points, 95 % CI 0.1 to 3.0 for the second; + 3.0 points, 95 % CI 0.1 to 6.0 for the third; and + 4.6 points, 95 % CI 0.2 to 9.0 for the fourth quartile, relative to the first quartile). However, neither of these associations survived multiple testing correction.

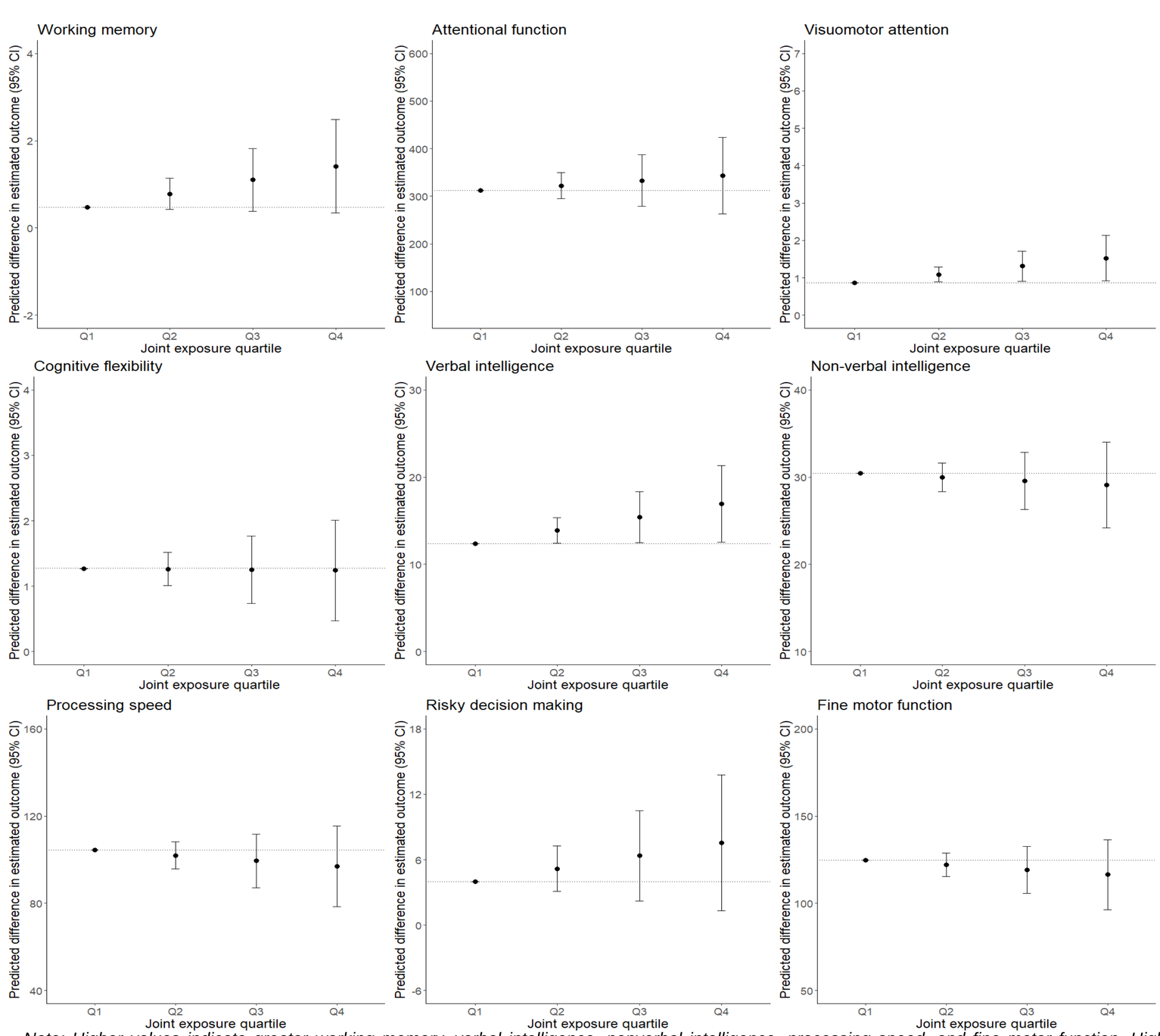
Table 1 Characteristics of participants

	Distribution
Offspring´s sex: female	1037 (48.5)
Mother´s age at pregnancy, years	30.4 ± 4.4
Father´s age, years	32.5 ± 5.0
Mother´s educational attainment	
Up to primary	563 (26.6)
Secondary	862 (40.7)
University	691 (32.7)
Father´s educational attainment	
Up to primary	783 (37.3)
Secondary	894 (42.5)
University	425 (20.2)
Social class of parents	
I+II (higher)	403 (19.5)
III (middle)	349 (16.9)
IV+V (lower)	1313 (63.5)
Mother´s parity	
No child	1168 (55.1)
One child	793 (37.4)
Two or more children	157 (7.4)
Mother's smoking during pregnancy	651 (32.6)

Note: Values are frequency numbers and percentages for categorical variables, mean and standard deviation for continuous variables. Missing data on covariates were not imputed but were less than 12 %.

We observed non-significant trends into the expected direction for the outcomes attentional function, non-verbal intelligence, processing speed, risky decision making, and fine motor function. Additionally, there was a counterintuitive insignificant trend in the association of overall mixture of chemicals with working memory. Further, we observed virtually null effects for the association of the overall mixture of all chemicals with cognitive flexibility. Figure 1 shows results of the quantile-based g-computation.

Figure 1 Estimated Outcome Differences Across Exposure Quartiles Compared to the Lowest Quartile in Fully Adjusted Weighted Models



Note: Higher values indicate greater working memory, verbal intelligence, nonverbal intelligence, processing speed, and fine motor function. Higher values indicate lower attentional function, visuomotor attention, cognitive flexibility, and risky decision making. All models were adjusted for mother´s age, mother´s educational attainment, mother´s parity, mother´s smoking, father´s age, father´s educational attainment, parental social class, offspring´s sex, offspring´s age at outcome assessment, and sub-cohort. All models were weighted using inverse probability weighting with the covariate balancing propensity score technique.

CONCLUSIONS

Our study does not provide strong evidence that prenatal exposure to a mixture of organochlorine compounds, per – and polyfluoroalkyl substances, phenols, and phthalates affects cognitive abilities or fine motor function in childhood.

FUNDING

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Mpox in people living with and without HIV, including people on PrEP, during a multistate outbreak in Spain in 2022

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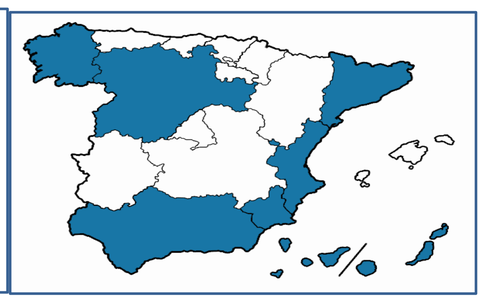
Background: In 2022, Europe became the epicenter of the first mpox outbreak outside Africa, with Spain reporting the highest cumulative incidence worldwide

Objective: The aim was to analyse the epidemiological, clinical, and disease progression characteristics of mpox in persons living with HIV (PLWH), HIV-negative persons, and in users and non-users of pre-exposure prophylaxis (PrEP) in Spain

Methods: We conducted a cross-sectional epidemiological multicentre study based on data reported from June 2022 to January 2023 in seven Spanish Regions. We compared the epidemiological, clinical, and disease progression characteristics for a Spanish mpox outbreak, considering PLWH, HIV-negative persons, and users and non-users of PrEP. Adjusted OR and the corresponding 95% CI were calculated by multivariate logistic regression analysis



Results:

Analyses were conducted on men aged ≥18 years (N=1148): 35.6% were PLWH, 36.5% HIV-negative PrEP users and 27,9% were HIV-negative non-PrEP users.

HIV-Positive vs. HIV-Negative:

Having sex only with men (aOR= 10.92; 95%CI:3.76-31.69), chemsex (aOR= 2.02; 95%CI:1.38-2.97), another type of immunosuppression (aOR= 2.57; 95%CI:1.07-6.21) and non-anogenital and non-oral exanthems (aOR= 1.64; 95%CI:1.23-2.19) were more frequent in PLWH than in HIV-negative cases

HIV-Positive vs. HIV-Negative PrEP users:

PLWH were more likely to have lower education levels (aOR= 23.21; 95%CI:2.87-187.52), fever (aOR= 1.42; 95%CI:0.98-2.06), non-anogenital and non-oral exanthems (aOR= 2.40; 95%CI:1.67-3.45), and other types of immunosuppression (aOR= 9.32; 95%CI:1.16–75.16)

PrEP users vs non-Prep users:

Having sex only with men (aOR= 17.88; 95%CI:3.94-81.19), in leisure settings (aOR= 2.07; 95%CI:1.24-3.46), chemsex (aOR= 2.17; 95%CI:1.16-4.12) and a concurrent STI (aOR= 2.25; 95%CI:1.31-3.85) were more common in PrEP users than non-PrEP users

	aOR PLWH/ HIV-negative	P-value	aOR PLWH/ PrEP users	P-value	aOR PrEP users/Non-PrEP users	P-value
Age group (years)						
18-34	1		1			
35-49	1.90 (1.40-2.57)	<0.001	1.74 (1.20-2.53)	0.004		
>=50	2.64 (1.64-4.26)	<0.001	3.25 (1.67-6.34)	<0.001		
Country of birth						
Spain	1		1		1	
Other[a]	1.87 (1.40-2.50)	<0.001	1.51 (1.06-2.16)	0.02	1.58 (1.07-2.33)	0.02
Education level						
Low	2.43 (1.23-4.79)	0.01	23.21 (2.87-187.52)	0.003	0.08 (0.01-0.61)	0.02
Intermediate	1.17 (0.88-1.56)	0.29	1.49 (1.05-2.12)	0.03	0.55 (0.37-0.80)	0.002
High	1		1		1	
Travel exposure[b]			0.62 (0.36-1.08)	0.09		
Healthcare/social worker					3.39 (0.67-17.07)	0.14
Leisure setting exposure[b]	0.62 (0.33-1.16)	0.13				
Sexual activity[b]						
None	1.53 (0.12-19.34)	0.74			-	-
With men	10.92 (3.76-31.69)	<0.001			17.88 (3.94-81.19)	<0.001
With women	1				1	
With both	7.24 (1.60-32.84)	0.01			7.30 (0.79-67.83)	0.08
Not especified	6.73 (1.73-26.13)	0.006			10.37 (1.57-68.72)	0.02
Leisure setting sex[a]					2.07 (1.24-3.46)	0.005
Chemsex[b]	2.02 (1.38-2.97)	<0.001	1.52 (0.97-2.39)	0.07	2.19 (1.16-4.12)	0.02
Mass event attendance[b]	0.75 (0.55-1.03)	0.07	0.58 (0.40-0.84)	0.004	1.64 (1.10-2.45)	0.01
Other immunosuppression	2.57 (1.07-6.21)	0.04	9.32 (1.16-75.16)	0.04	0.19 (0.02-1.77)	0.14
Previous STI (one month)					2.25 (1.31-3.85)	0.003
Fever	1.48 (1.10-1.98)	0.009	1.42 (0.98-2.06)	0.06		
Asthenia			0.65 (0.45-0.93)	0.02	1.65 (1.10-2.49)	0.02
Muscle pain					0.60 (0.38-0.95)	0.03
Generalized LAP			0.57 (0.33-0.98)	0.04	2.74 (1.31-5.74)	0.01
Anogenital exanthems					0.66 (0.43-0.99)	0.05
Oral exanthems					1.52 (0.93-2.49)	0.10
Other exanthems	1.64 (1.23-2.19)	<0.001	2.40 (1.67-3.45)	<0.001	0.67 (0.45-1.00)	0.05
Mouth ulcer	2.38 (0.84-6.75)	0.10				
Other sequelae	0.40 (0.14-1.17)	0.09				
Hospitalization			5.07 (1.09-23.62)	0.04	0.22 (0.04-1.06)	0.06

Conclusions: PLWH did not experience more severe mpox than HIV-negative persons. Epidemiological and clinical differences were observed between PLWH and PrEP users. PrEP users showed more risk factors related to sexual activity and concurrent sexually transmitted infections than non-PrEP users. These findings underscore the need for tailored prevention and clinical approaches

NEUTRALIZATION OF THE B3 AND D8 GENOTYPES OF THE MEASLES VIRUS

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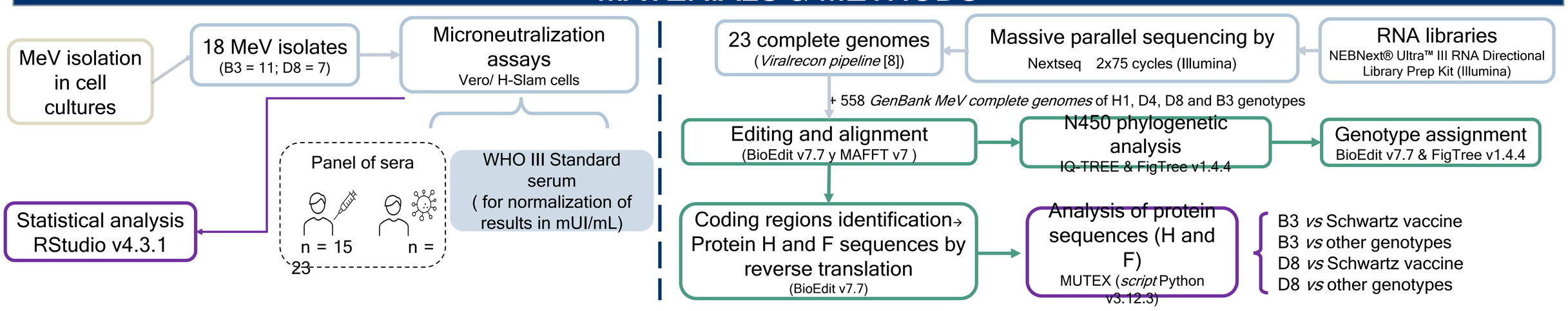
BACKGROUND

- ✓ The global circulation of measles virus (MeV) genotypes has decreased to B3 and D8 [1]. The B3 genotype has been described as more transmissible [2] and less susceptible to neutralization by vaccine-induced antibodies [3].
- ✓ In elimination settings, the frequency of cases in vaccinated individuals increases, as is the case in Spain [4].
- ✓ Several hypotheses have been proposed, including the evanesce of the immunity induced by the MeV vaccine and the possibility of antigenic drift of the circulating MeV, which could allow certain immune escape from the neutralizing antibodies induced by the vaccine [5].
- ✓ There are five neutralizing epitopes described in the H protein: HNE, RBE, SSE, LE and NE [6, 7], but none in the F protein.

OBJECTIVES

- To evaluate the neutralization of B3 and D8 MeV genotypes by vaccine and natural infection induced antibodies.
- To identify specific mutations of the B3 and D8 genotypes of the MeV in the H and F proteins.

MATERIALS & METHODS



RESULTS & DISCUSSION

1- Greater neutralization of both genotypes (B3 and D8) by antibodies (Ab) induced by natural infection than by vaccination, for both MeV genotypes ($p < 0.001$) (Fig. 1), as previously described [9].

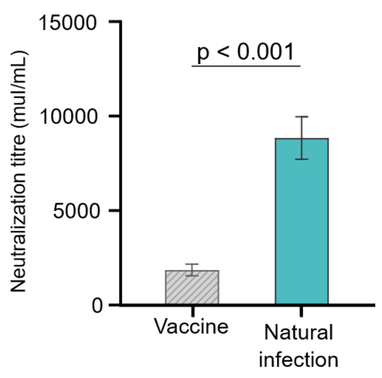


Figure 1. Comparison of neutralization titres between both natural and vaccine induced Ab. Mann-Whitney U test (mean ± confidence intervals).

2- MeV of genotype B3 were less neutralized than those of genotype D8 by both natural and vaccine induced Ab ($p < 0.001$) (Fig. 2), as described in previous comparisons of genotype B3, D4 and H1 by other authors [3].

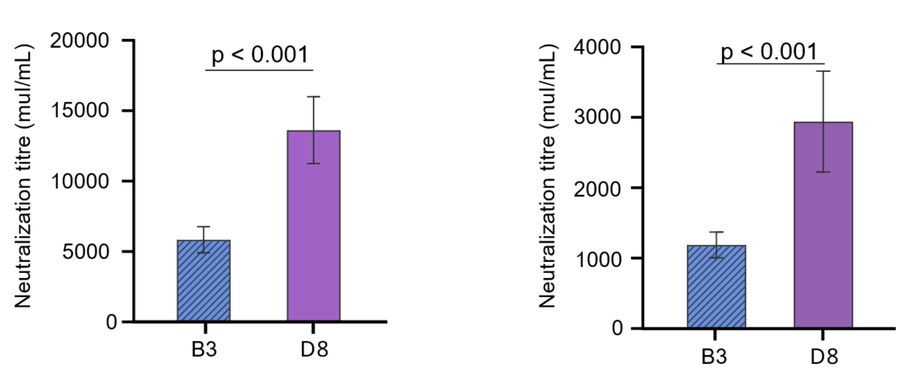


Figure 2. Comparison of neutralization titres between both B3 and D8 genotypes by antibodies induced by a) natural infection b) vaccination. Mann-Whitney U test (mean ± confidence intervals).

3- Genotype B3 MeV present a greater number of specific mutations than genotype D8 of MeV in both the H and F proteins (Fig. 3). Two of genotype B3 mutations are present in previously described neutralizing epitopes of the H protein (outlined in red).

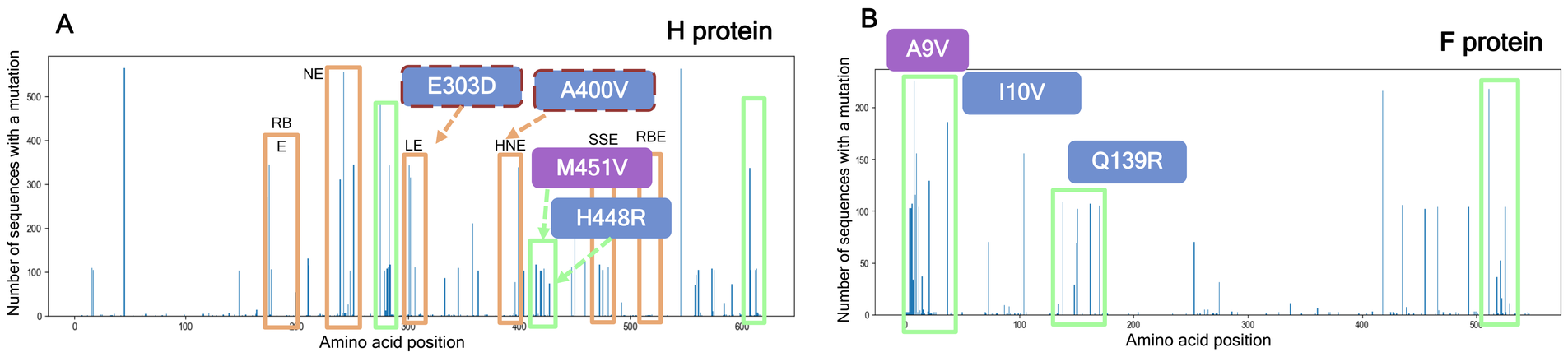


Figure 3. Variability and amino acid changes in A) H protein B) F protein. The Edmonston strain (AF266288) of MeV is used as a reference for the analysis. Previously described neutralization epitopes are marked in orange. Other regions of high variability are marked in green. Specific amino acid changes for the B3 and D8 genotypes are marked in blue and purple, respectively.

CONCLUSIONS

1. Both natural infection-induced and vaccine-induced antibodies neutralize genotype B3 isolates of MeV less effectively than genotype D8 isolates.

2. In both MeV genotypes studied, several amino acid changes have been found in proteins involved in the immune response (H and F), compared to the vaccine strain (A genotype). This could support the hypothesis of antigenic drift and a lack of cross-reactivity between genotypes as the cause of these viruses circulating in highly immunized populations.

3. MeV of genotype B3 exhibit a greater number of amino acid changes than isolates of genotype D8, which could confer a degree of immune evasion. This finding is consistent with the results of the neutralization assays.

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Pediatric vaccination failures in the era of pneumococcal conjugate vaccination in Catalonia (Spain)

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BACKGROUND: 13-valent pneumococcal conjugate vaccine (PCV13) was included in the vaccination schedule for prevention invasive pneumococcal disease (IPD) in July 2016, with high vaccination coverage (92.5–95.5%). Before 2016, vaccination coverage was intermediate (50.0–73.0%). Recently, PCV15 and PCV20 replaced PCV13 in children and adults, respectively.

OBJECTIVE: To analyze PCV13 vaccination failures (VF) in children <18 years during 2018-2023 and compare VF in children <5 years with those registered in 2012-2016.

METHODS: A prospective study was conducted between 2018-2023 in children <18 years with IPD treated in three pediatric hospitals representing 35.6% of Catalan pediatric population. IPD was defined as isolation or PCR detection of *S. pneumoniae* at normally sterile site.

Vaccine protection period (VPP) was defined as the median difference in months between diagnosis of IPD and the last PCV13 dose administered.

Categorical variables were compared using Pearson's chi-square test or Fisher's exact test. Odds ratios (OR) and 95% CIs were calculated to estimate association of variables with VF.

RESULTS: During 2018-2023, 237 IPD cases were reported in PCV13 vaccinated patients; 179 (75.5%) were ≥12 months-≤17 years, of whom 88 (49.2%) were VF, being serotype 3 the most common (74/88; 84.1%) in all ag group (Figure 1).

VF was associated with complicated pneumonia (OR: 2.74; 1.03-7.33) and PCR diagnosis (OR: 2.78; 1.11-6.93).

In children <5 years there were 15.5% (17/110) VF in 2012-2016 and 83.0% (73/88) VF in 2018-2023 (p<0.001).

Comparing those periods, differences in VPP in children 24–35 months (11 vs. 18 months; p=0.009) and 36–47 months (24.5 vs. 28.5 months; p=0.039) were observed.

In 2012–2016 there were more IPD cases with 2+0 schedule (23.5% vs. 1.4%; p=0.003) and 3+1 schedule (64.7% vs. 5.5%; p< 0.001) regimens than in 2018–2023 (Table 1).

Figure 1: Serotype distribution of VF by age group in children 12 months-17 years. 2018-2023, Catalonia, Spain

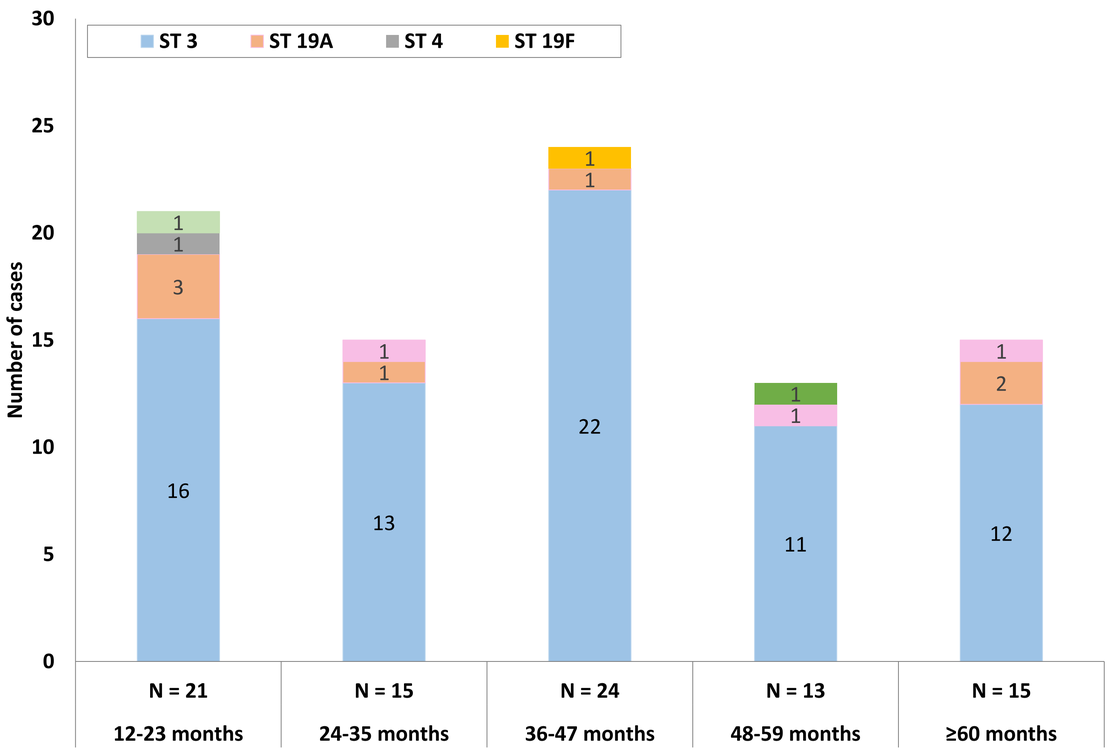

Table 1: Comparison of VF in children 12-59 months of IPD between 2012–2016 and 2018-2023. Catalonia, Spain

	2012-2016 n (%)	2018-2023 n (%)	pvalue	2012-2016 VPP (months) Median (Range)	2018-2023 VPP (months) Median (Range)	pvalue
Age						
12-23 months	2 (11.8)	21 (28.8)	0.255	6.5 (5-8)	6.0 (1-11)	0.956
24-35 months	6 (35.3)	15 (20.5)	0.329	11,0 (2-17)	18.0 (12-24)	**0.009**
36-47 months	4 (23.5)	24 (32.9)	0.568	24.5 (7-28)	28.5 (19-34)	**0.038**
48-59 months	5 (29.4)	13 (17.8)	0.459	35.0 (24-41)	40.0 (13-46)	0.125
Clinical entity						
Complicated pneumonia	16 (94.1)	58 (79.5)	0.289	20.5 (2-41)	20.5 (1-46)	0.773
Occult bactereamia	1 (5.9)	2 (2.7)	1	7.0 (---)	20.0 (14-26)	0.667
Uncomplicated pneumonia		6 (8.2)				
Meningitis		3 (4.1)				
Others		4 (5.5)				
Serotype						
3	15 (88.2)	62 (84.9)	1	24.0 (2-41)	24.0 (1-46)	0.757
19A	1 (5.9)	5 (6.8)	1	5.0 (---)	11.0 (2-26)	0.667
14	1 (5.9)	2 (2.7)	1	11.0 (---)	27.0 (14-40)	0.667
4		1 (1.4)				
9V		1 (1.4)				
19F		1 (1.4)				
7FA		1 (1.4)				
Schedule						
1+0	2 (11.8)	1 (1.4)	0.161	15.5 (7-24)	13.0 (---)	1
2+0	4 (23.5)	1 (1.4)	0.003	31.0 (2-41)	26.0 (---)	0.800
2+1	0 (0)	67 (91.8)	<0.001	---	19.0 (1-46)	---
3+1	11 (64.7)	4 (5.5)	<0.001	17.0 (5-37)	38.0 (18-42)	**0.036**

CONCLUSIONS: PCV13 vaccination offers good protection against IPD, although a high rate of serotype 3 VF was detected in both periods. VPP was longer in 2018-2023 than 2012-2016 in <5 years. Vaccination status of IPD cases should be monitored in the era of different valences PCVs.

TITLE: Postnatal maternal bonding and children's cognitive development at 5 years of age in the INMA Project

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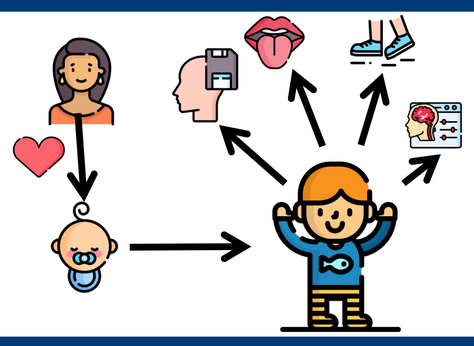
BACKGROUND

Bonding is the emotional connection a mother feels toward her infant and can play a role in child development. Strong maternal bonding has been linked to improved memory, language, motor, and executive outcomes.



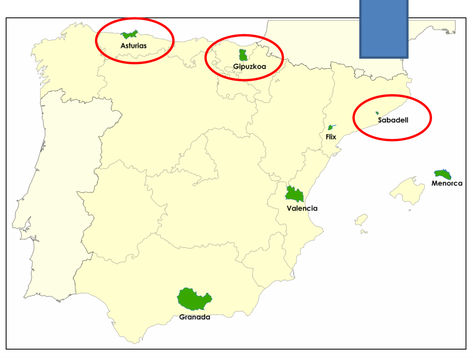
OBJECTIVES

To examine the association between maternal bonding at one year and neurodevelopment at five years in the INMA Project.

METHODS

SAMPLE

1,007 children from the INMA Project (start: 2003-2006) (Asturias, Gipuzkoa and Sabadell cohorts)



KEY VARIABLES

Maternal bonding was assessed with the Maternal Postnatal Attachment Scale (MPAS) **(age=1)** (scales: Bond Quality (BQ), Absence of Hostility (AH), and Pleasure-Interaction (PI)).

Neurodevelopment was evaluated with the McCarthy Scales of Children's Abilities (MSCA) **(age=5)** (scales: verbal, perceptive-performance, numerical, memory, motor, executive function, and posterior cortex).

ANALYSES

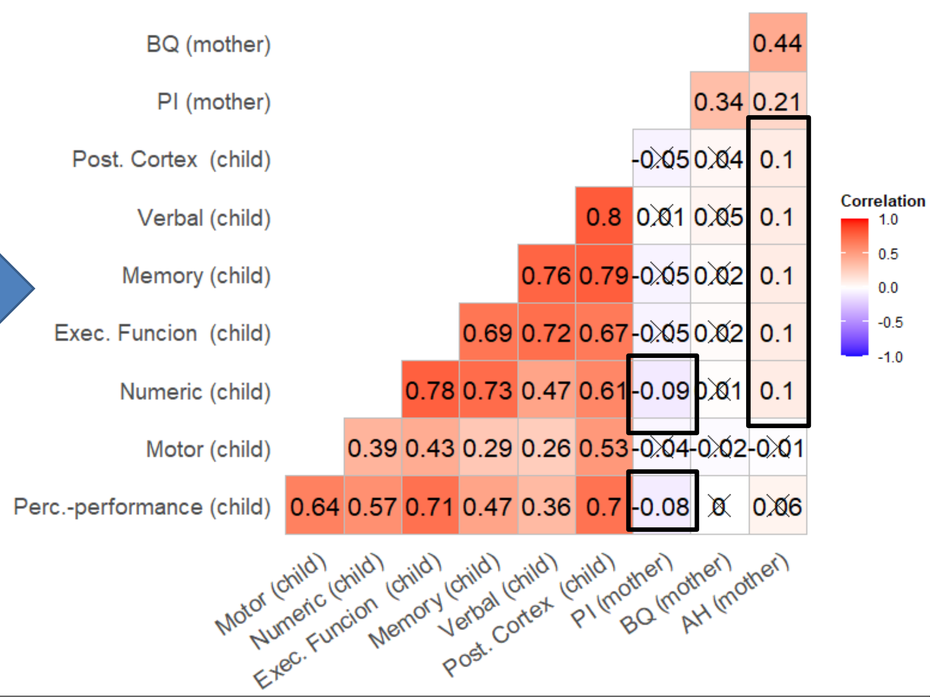
Descriptive, bivariate, and multivariate analyses were performed. The latter were conducted using **inverse probability weighted** linear models with **false discovery rate** (FDR) correction and adjustment for sociodemographic, family, and clinical variables.

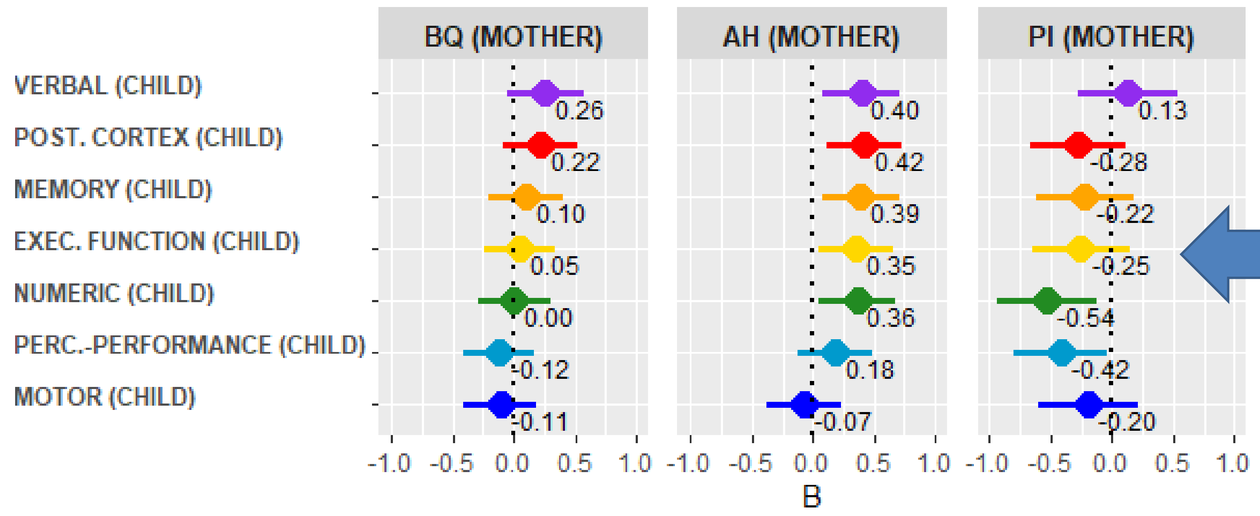
RESULTS

Descriptive: The Me(DT) for **maternal** BQ, AH and PI were 40(3), 20(3) and 22(2), respectively. Cohort differences were found in AH (p=0.001) and PI (p=0.026), with **higher scores in Gipuzkoa and Asturias.**

Child scores of development were around Me(DT) of 100(15), with **no differences among cohorts.**

Bivariate: **weak correlations** were observed (<|0.2|), being **significant and positive** between **maternal AH** and **child** verbal, numerical, memory, executive functions and posterior cortex scales; and **significant and negative** between **maternal PI** and **child** perceptive-performance and numerical development.





Multivariate: After adjusting the p-values with the FDR test, borderline significance was shown for all the associations previously observed. **Maternal AH** was directly related to **verbal, posterior cortex, memory, executive function and numeric child development**. **Maternal PI** was inversely associated with child **numeric** development (p-value=0.082).

CONCLUSIONS

The **absence of hostility** is positively associated with multiple areas of cognitive development. However, a **high desire for interaction** may be related to lower numerical development. Positive parenting programmes may improve cognitive development.

FUNDING

CIBERESP, ATHLETE (874583), ENDOMIX (101136566)

Prenatal nutrition with (wall)nuts and fish, omega-3 fatty acids and cognitive trajectories from 4 to 15 years of age

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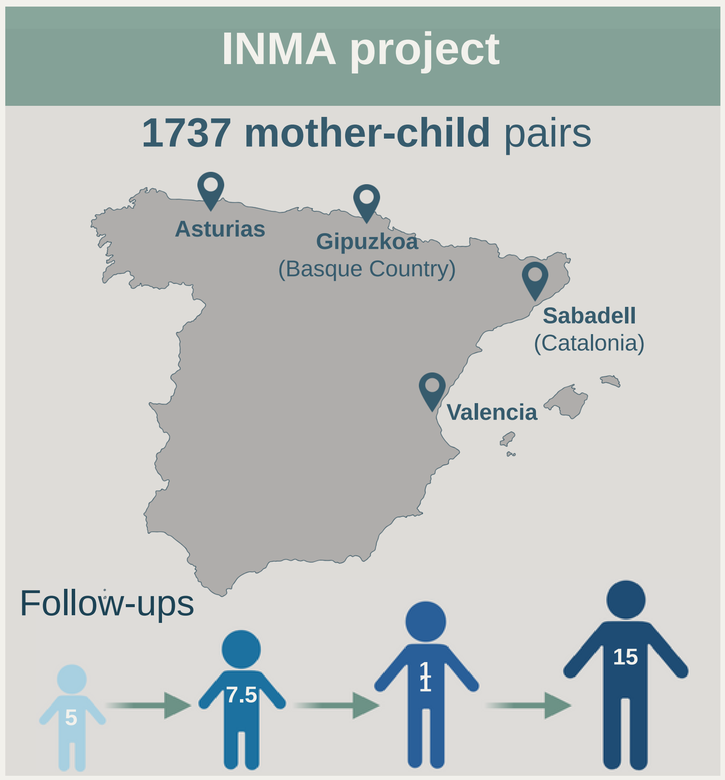
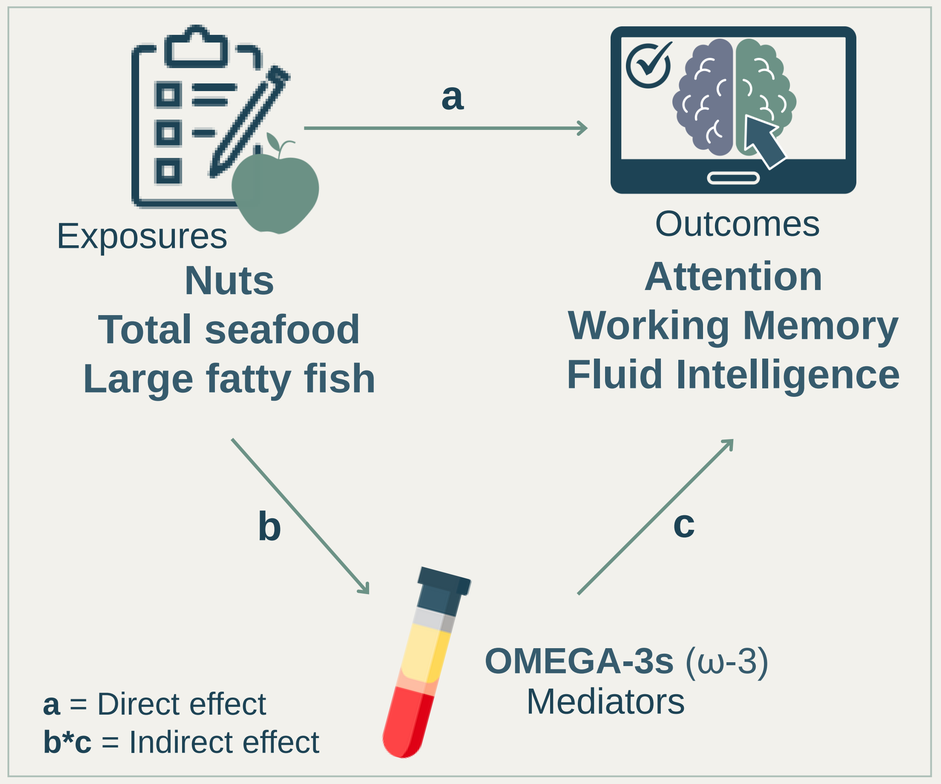
Scan me!

01. Introduction

- Understanding the **role of maternal diet in early brain development** is critical, as **pregnancy** represents a period of significant **vulnerability** and **growth** for the **developing brain**
- **Omega-3** fatty acids (found in fish and nuts) are **essential** for **neuropsychological development** and **function**

02. Methods





AIM

Determine the **association between prenatal intake of nuts and seafood and offspring's neuropsychological function** over time, and the **mediating role of omega-3 fatty acids** (DHA+EPA+ALA)

03. Results

Table 1. Association between **nut** consumption during pregnancy and offspring neuropsychological function up to 15 years of age.

	β Coef·	*p*-for-trend
Attention (ms) [a] HRT-SE	**-0.05**	**0.041**
HRT-mean	-0.03	0.226
Working memory [b] d2'	**0.05**	**0.043**
d3'	**0.06**	**0.007**
Fluid Intelligence [b]	0.05	0.085

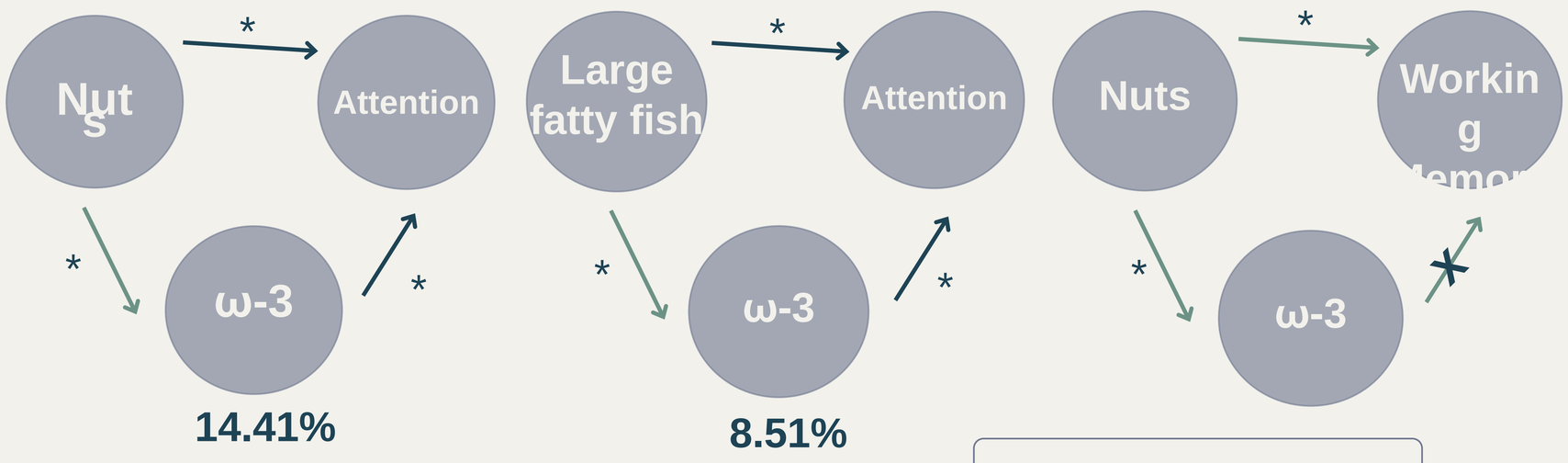
Table 2. Association between **large fatty fish*** consumption during pregnancy and offspring neuropsychological function up to 15 years of age.

* No significant results for total seafood

	β Coef·	*p*-for-trend
Attention (ms) [a] HRT-SE	**-0.06**	**0.004**
HRT-mean	**-0.04**	**0.032**
Working memory [b] d2'	0.03	0.222
d3'	0.01	0.501
Fluid Intelligence [b]	**0.08**	**0.006**

[a] Lower scores indicate better performance; [b] Higher scores indicate better performance.
Data was calculated using linear mixed models with cohort as random effect and individuals as random intercept, treating visit number as nested within individuals, and adjusted by selected confounders.

Figure 1. Direct and indirect effects of nut and large fatty fish intake during pregnancy on child's cognitive development mediated by omega-3 fatty acids (EPA+DHA+ALA) cord blood levels at delivery.



Data was calculated using generalized structural equation modelling.

Conclusions

- Higher **nut consumption** was associated with better **working memory** development and **attention**
- Greater intake of **large fatty fish** was associated with enhanced **attention** and **fluid intelligence**
- **Omega-3s** seem to **partially mediate** the **positive associations** with **attention**

AFILIATIONS

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PREVALENCE OF ACQUIRED RESISTANCE TO ANTIRETROVIRALS IN CHILDREN AND ADOLESCENTS LIVING WITH HIV UNDER CLINICAL FOLLOW-UP AT THE ROOSEVELT HOSPITAL IN GUATEMALA.

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BACKGROUND

Insufficient HIV drug resistance (HIVDR) monitoring in Central America has resulted in widespread circulation of HIV-strains with drug resistance mutations (DRM), compromising antiretroviral therapy (ART).

OBJECTIVE

This study aimed to assess the first HIVDR data and DRM patterns in the only HIV-infected pediatric population with resistance information in Guatemala (Figure 1).

FIGURE 1. DISTRIBUTION OF MEDICAL CARE UNITS PROVIDING MEDICAL CARE FOR THE HIV-INFECTED POPULATION IN GUATEMALA.

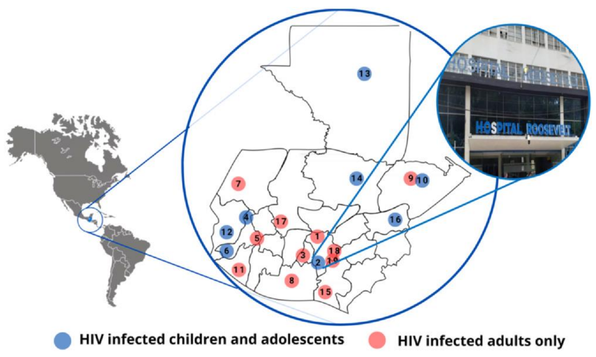


TABLE 1. EPIDEMIOLOGICAL AND VIROLOGICAL FEATURES OF 99 HIV-1 INFECTED CHILDREN AND ADOLESCENTS.

Epidemiological and clinical features	Total cohort (2013-2021)
Total No. (%)	99 (100 %)
ART-experienced	99 (100 %)
With resistance clinical file	99 (100 %)
With available FASTA Pr and/or RT sequences	66 (66.7 %)
Male, No. (%)	56 (56.5 %)
Median age, years [IQR]	
At HIV diagnosis	2 [1 - 6.25]
At first ART experience	4 [1 - 8]
At sampling for DRM study	11 [7 - 15]
Route of infection, No. (%)	
Vertical	92 (93 %)
Sexual	0 (0 %)
Transfusion	1 (1 %)
Unknown	6 (6 %)
Prophylaxis, No. (%)	
Yes	7 (7.1 %)
No	84 (84.8 %)
Unknown	8 (8.1 %)
Median CD4 count at HIV diagnosis, cells/mm3 [IQR]	498 [196–1045]
Median CD4 at ARV start, cells/mm3 [IQR]	398 [182–912]
Delayed HIV diagnosis (CDC immunological stage 2 or 3), No. (%)	
Not delayed	17 (17.1 %)
Delayed	60 (60.6 %)
Unknown	22 (22.2 %)
Therapeutic delay, No. (%)	
ART start	
Inmediate	40 (40.4%)
1 month - 6 months	30 (30.3%)
7 months - 11 months	1 (1%)
1 - 3 years	5 (5%)
> 3 years	9 (9.1%)
Unknown data	14 (14.1%)
Viral load at resistence testing cp/mL	
≤40	0 (0 %)
41–199	2 (2 %)
200–999	8 (8.1 %)
≥1000–9999	29 (29.3 %)
≥10,000	58 (58.6 %)
Unknown data	2 (2 %)
ARV experience at first sampling, No (%)	
NRTI experience	99 (100 %)
NNRTI experience	77 (77.8 %)
PI experience	32 (32.3 %)
INSTI experience	4 (4 %)
Patients with available pol HIV-1 sequence, No (%)	
PR	62 (62.6 %)
RT	66 (66.7 %)
IN	0 (0 %)
Only PR	0 (0 %)
Only RT	4 (4 %)
Only IN	0 (0 %)
PR + RT	62 (62.6 %)
HIV-1 variants prevalence, No./total (%)	
B subtype	68/68 (100%)
Non-B variants	0 (0%)

METHODOLOGY

All HIV-1 infected children and adolescents tested for HIVDR between 2013 and 2021 at Roosevelt Hospital (Guatemala) were retrospectively selected. Their first HIV-1 protease and/or partial retrotranscriptase sequence, when available, was recovered to detect acquired DRMs to three antiretroviral families, and predict resistance to 20 antiretrovirals against HIV using the Stanford HIVdb Algorithmv9.5 (https://hivdb.stanford.edu/). We compared results with previously recorded DRM data from clinical files. The HIV infecting variant was characterized by phylogeny in those with available sequence.

RESULTS

Ninety-nine children/adolescents were selected, most perinatally-infected (93%) and without neonatal prophylaxis (92.3%) (Table 1). The 66 with available sequences harbored HIV-1 subtype B. At first DRM genotyping, all had detectable viral loads (>40cp/ml), 58.6% experienced virological failure (>1,000cp/ml) despite prior antiretroviral exposure (100% to NRTI, 77.8% to NNRTI, 32.3% to PI and 4% to INSTI). Most (77.9%) experienced delayed HIV diagnostic (Figure 2). Half received ART within the first month post-diagnosis (Figure 3). Seventy-nine (81.4%) harbored viruses with DRM: 61 (61.6%) to NRTIs, 70 (70.7%) to NNRTIs and 6 (6%) to PIs (major DRMs) (Figure 4). Half (52.5%) presented dual resistance (NRTI+NNRTI) and 5.3% triple (NRTI+NNRTI+PI). The most frequent DRM to NRTIs were M184V/I/M (47.5%), to NNRTI K103N/R (48.5%), and to PIs M46I/L/V (5.3%) (Figure 5). Most (88.4%) carried PI-susceptible viruses (Figure 6).

FIGURE 2. CLINICAL AND IMMUNOLOGICAL STAGE AT DIAGNOSIS (ACCORDING TO CDC CRITERIA) OF THE PATIENTS IN THE COHORT BY YEAR OF SAMPLING FOR RESISTANCE TESTING.

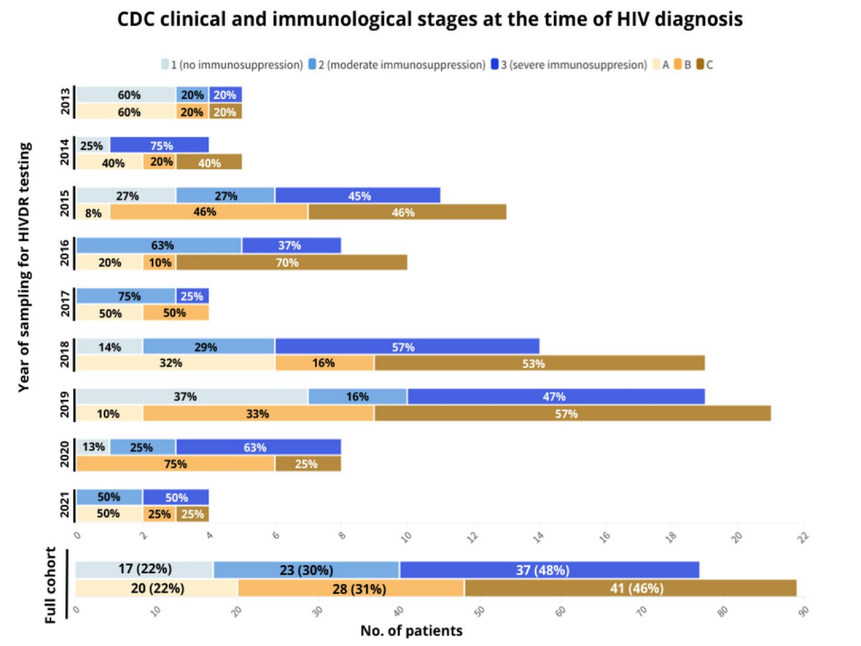
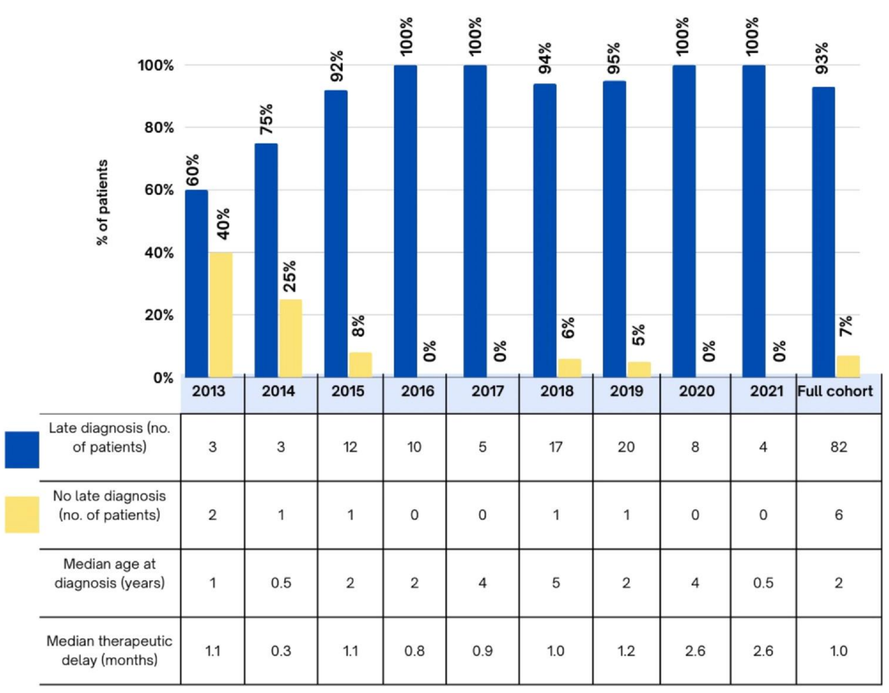


FIGURE 3. PATIENTS IN THE COHORT WITH LATE HIV DIAGNOSIS, MEDIAN AGE AT DIAGNOSIS AND MEDIANT THERAPEUTIC DELAY BY YEAR OF SAMPLING.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	Full cohort
Late diagnosis (no. of patients)	3	3	12	10	5	17	20	8	4	82
No late diagnosis (no. of patients)	2	1	1	0	0	1	1	0	0	6
Median age at diagnosis (years)	1	0.5	2	2	4	5	2	4	0.5	2
Median therapeutic delay (months)	1.1	0.3	1.1	0.8	0.9	1.0	1.2	2.6	2.6	1.0

FIGURE 4. PERCENTAGE OF SUBJETS CARRYING DRM TO 3 ANTIRETROVIRAL FAMILIES IN ARV TREATED CHILDREN AND ADOLESCENTS FROM GUATEMALA (2013-2021).

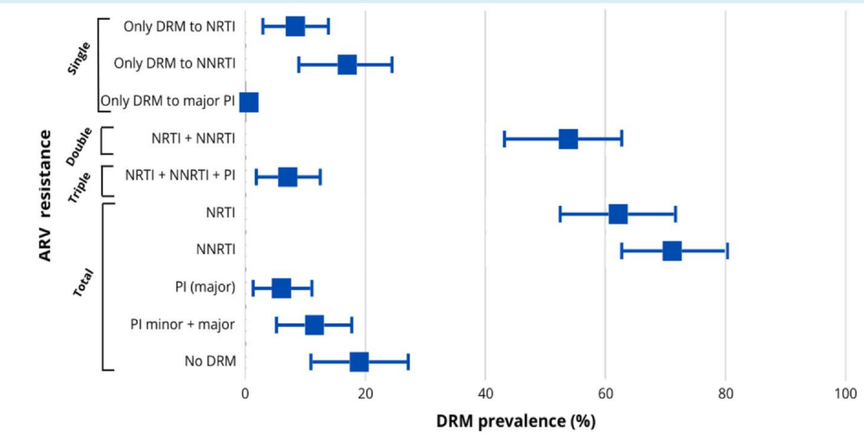


FIGURE 5. MAIN DRM DETECTED IN BOTH POL HIV-1 SEQUENCE AND OR/RESISTANCE TESTING CLINICAL FILE.

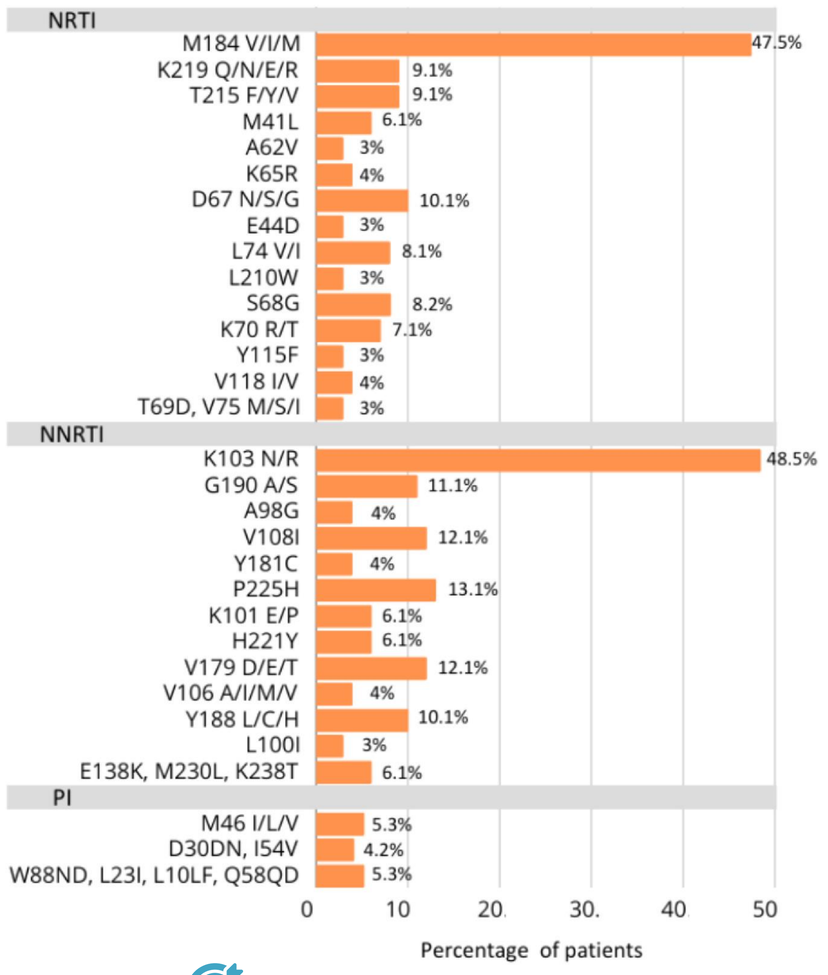
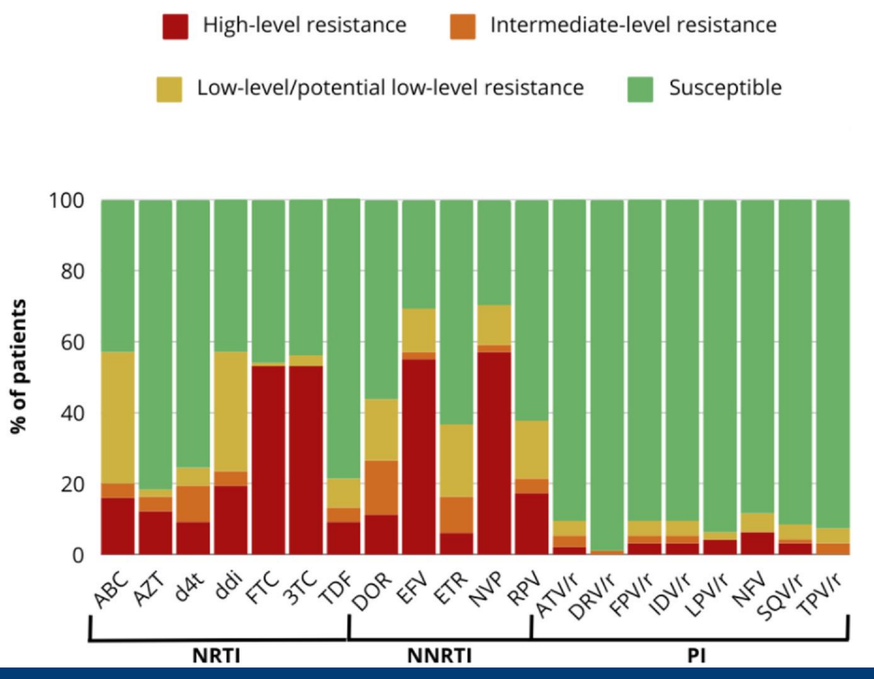


FIGURE 6. PREDICTED ARV SUSCEPTIBILITY BY STANDFORD HIV DRUG RESISTANCE DATABASE IN HIV-1 INFECTED CHILDREN AND ADOLESCENTS IN GUATEMALA WITH AVAILABLE POL SEQUENCE.



CONCLUSIONS

This study updates HIVDR and HIV-1 variant data in Guatemala, offering the first resistance insights for HIV-infected children and adolescents, showing than PI and INSTI-based regimens may enhance HIV management in this vulnerable pediatric group. Periodic HIVDR monitoring is crucial to control the HIV epidemic in Guatemala.

Prevalence of HCV and HIV in People Who Inject Drugs: Transmission Determinants

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Background

People who inject drugs (PWID) are at high risk for infection by blood-borne viruses such as HCV and HIV. Transmission occurs mainly through the sharing of needles, syringes, and other injecting equipment. Moreover, PWID often face structural barriers such as stigma, marginalization, and limited access to healthcare services, which further exacerbate their vulnerability to infection and hinder timely diagnosis and treatment. Monitoring the prevalence of HCV and HIV according to individual, social, and structural factors is crucial to inform targeted harm reduction interventions, optimize treatment strategies, and reduce transmission at both the individual and community level.

Objectives

To estimate the prevalence of HIV and HCV antibodies (Ab) and HCV RNA among PWID, and to identify gender-specific determinants of transmission.

Methods

Cross-sectional study of current PWID (N=533) attending harm reduction services in Catalonia (October 2024 - January 2025). Dried blood spot (DBS) samples were collected for HIV and HCV serology testing. A subsample of 287 DBS were also tested for HCV RNA. Data on individual, social, and structural factors were analysed. Prevalence estimates were age-adjusted and stratified by gender [cis-men (n=439), cis-women (n=78) and non-binary (NB) (n=16)].

Results

HCV and HIV seroprevalence were **57%** and **35.2%**, with **18.8%** showing active HCV infection. Prevalence of both infections was generally higher among cis-women and non-binary individuals (Figures 1 and 2).

Figure 1. Prevalence of HIV and HCV antibodies (Ab).

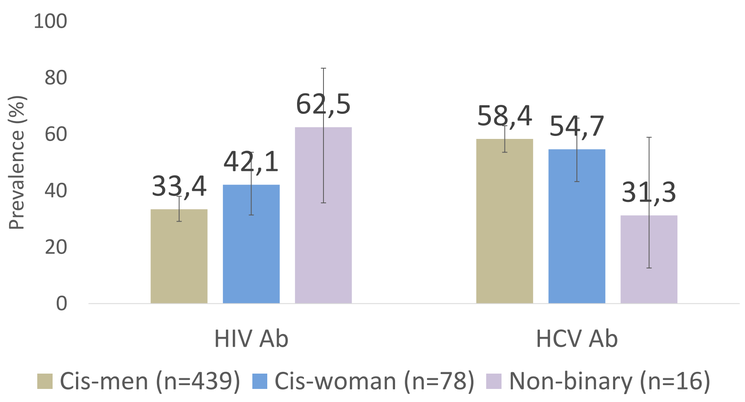


Figure 2. Prevalence of HCV RNA.

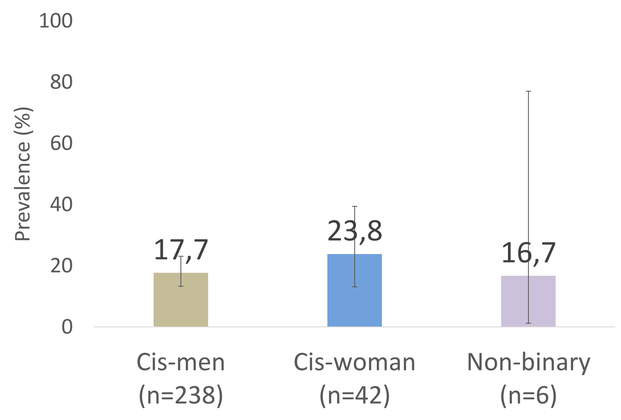


Table 1. Sociodemographic and equipment-sharing characteristics of the sample (n=533).

	N (%)
Age in years ($\bar{x}$, sd)	45.86 (8.93)
Origin, n (%)	
Spain	285 (53.5%)
Eastern Europe	119 (22.3%)
Others	129 (24.2%)
Years of injection, n (%)	
5 or less	61 (11.7%)
More than 5	462 (88.3%)
Housing situation, n (%)	
Homeless	260 (48.8%)
Own house or flat	151 (28.3%)
Others	122 (22.9%)
Sharing syringes in the last 6 months, n (%)	
No	445 (84.1%)
Yes	84 (15.9%)
Sharing injection equipment in the last 6 months, n (%)	
No	366 (68.9%)
Yes	165 (31.1%)

HIV Ab prevalence was significantly higher among cis-men who were homeless, used cocaine/amphetamines, had experienced sexual violence, had recent hospital contact, or had been incarcerated (no significant differences were observed for cis-women/NB) (Figure 3). HCV Ab prevalence was significantly higher among people from Eastern Europe, those injecting for more than five years; among cis-women/NB, it was also higher in those who had recently shared injection equipment, those without a health card, and those recently incarcerated (Figure 4).

Figure 3. Age-adjusted prevalence of HIV Ab according to individual, social, and structural factors, in cis-men.

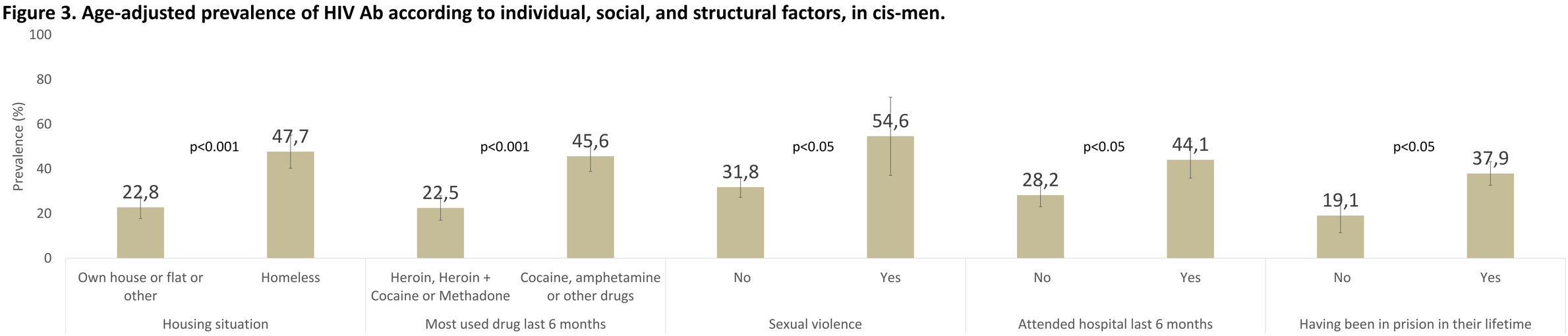
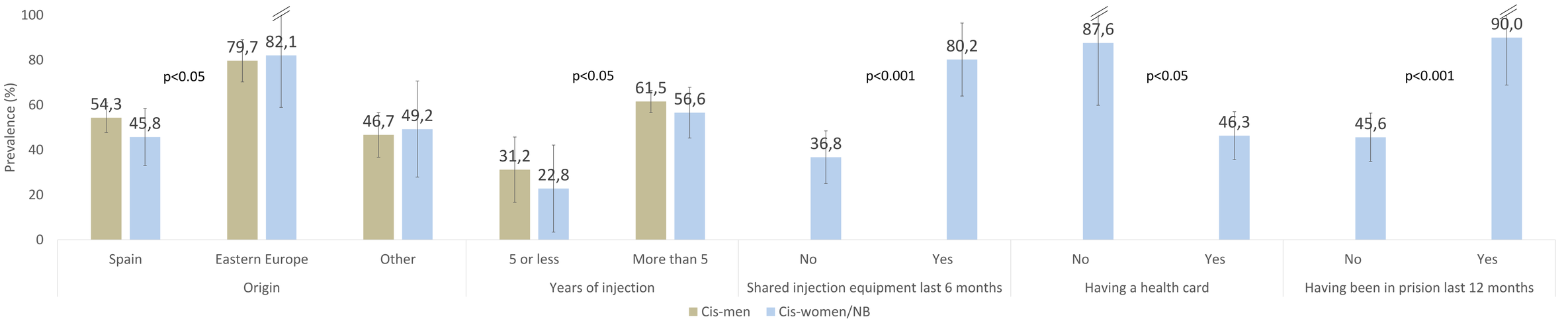


Figure 4. Age-adjusted prevalence of HCV Ab according to individual, social, and structural factors, in cis-men and cis-women/NB individuals.



Conclusions

High prevalences of HIV and HCV among PWID in Catalonia highlight the urgent need for **gender-responsive harm reduction and healthcare strategies**. Women and non-binary individuals may face a disproportionate burden, while social and structural circumstances (such as incarceration, homelessness, lack of healthcare access, or migration background) are associated with higher prevalence levels. Interventions should not only address **individual injection practices**, but also **broader social and structural vulnerabilities**, to more effectively reduce transmission and improve health outcomes.

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30-days post-discharge mortality following RSV-associated hospitalizations in older adults: insights from four Spanish regions (2023-2024)

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BACKGROUND AND OBJECTIVE

Respiratory syncytial virus (RSV) poses a major healthcare burden among children and older adults. Growing evidence shows that RSV can lead to substantial hospitalizations among older adults, especially among those with comorbidities[1]. Yet **data on outcomes after an RSV hospitalization remain limited**.

This study aimed to assess **the 30-day post discharge mortality among patients aged ≥65 years hospitalized with RSV** across four Spanish regions during the 2023-2024 season.

METHODS

Design: retrospective observational study based on the review of medical records of hospitals, primary care, and/or other specialists, depending on the region

Study population: adults above 65 years of age hospitalized due to RSV and/or with a laboratory-confirmed RSV infection by RT-PCR

Study period: October 27, 2023 to May 3, 2024

Regions: Catalonia, Navarre, Seville, Valencia

Covered population: ~2 mill. adults ≥65 years of age

Outcomes: any death occurring during hospitalization or within 30-days post-hospital discharge

Analysis: A descriptive analysis of the case fatality rates overall, by region and age group. A Kaplan-Meier survival analysis was performed in R, to estimate overall survival probabilities

RESULTS

A total of **547** RSV hospitalizations were included, ranging from 113 in Navarre to 162 in Seville with a median age of 81 (IQR 74, 88) years.

Case fatality rates ranged from **8.8% to 12.4%,** with overall differences in the mortality setting (8.6% in-hospital vs. 2.6% post-discharge) observed across regions (**Table 1**).

Table 1. Deaths and case fatality rates in individuals aged 65 years or older hospitalized due to RSV or with a laboratory-confirmed infection.

	Catalonia	Navarre	Seville	Valencia	Total
N	137	113	162	135	547
Age (median (IQR))	84 (76, 89)	81 (74, 88)	81 (73, 87)	80 (74, 87)	81 (74, 88)
Deaths , n (%)	12 (8.8%)	14 (12.4%)	20 (12.3%)	15 (11.1%)	61 (11.1%)
In-hospital , n (%)	8 (5.8%)	13 (11.5%)	17 (10.5%)	9 (6.7%)	47 (8.6%)
Within 30-days post-discharge , n (%)	4 (2.9%)	1 (0.9%)	3 (1.9%)	6 (4.4%)	14 (2.6%)

Patients aged **≥85 years showed higher mortality**. However, the proportion of deaths that occurred in-hospital versus post-discharge within each age group differed by region (**Figure 1**). The **probability of death was around 2.5% within 30 days post-discharge,** with younger age groups having higher survival rates than older age groups (**Figure 2**).

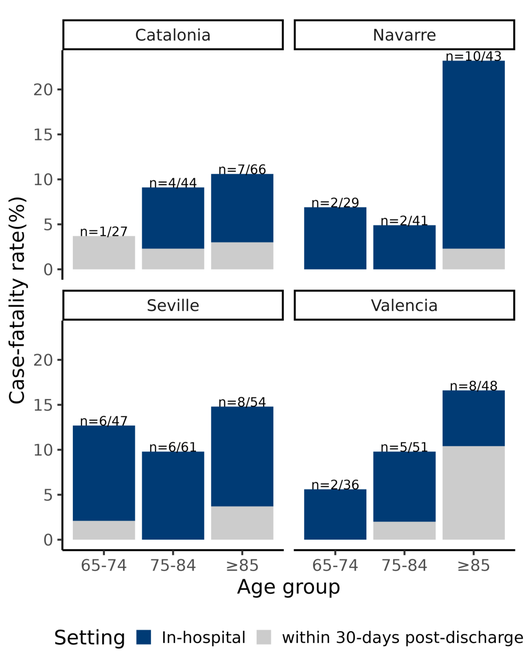

Figure 1. Case-fatality rates (%) in individuals aged 65 years or older hospitalized due to RSV or with a laboratory-confirmed infection, stratified by age group and setting: in-hospital, blue bars and within 30-days post-discharge, grey bars. The numbers on top of each bar indicate the total number of deaths and the total number of included patients by age group in each region.

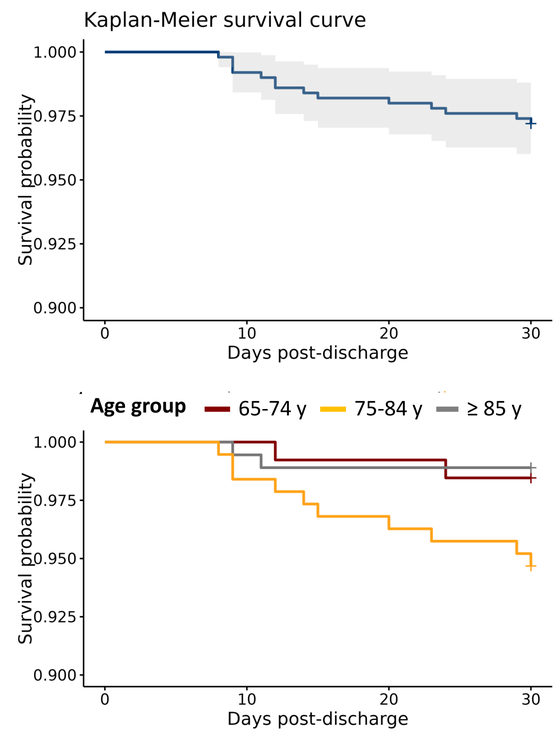

Figure 2. Kaplan-Meier survival curves showing overall survival probability over time post-discharge (upper panel), and stratified by age groups (65-74, 75-84, and 85+) (bottom).

DISCUSSION

RSV case-fatality rates were similar across all regions, with an **average of 11%** of the hospitalizations resulting in death **(8.6% in-hospital and 2.6% within 30 days post-discharge)**. These numbers are in line with other published studies in other countries[2,3]. Variations in the case-fatality rate between **settings (in-hospital vs. post-discharge)** and **by age group** were observed across regions. This could reflect differences in the granularity between the data sources, as well as clinical practice differences in palliative care between the regions, but further research is needed to understand these differences.

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Unravelling GII.17[P17] Norovirus transmission clusters in two consecutive outbreaks in a Spanish hospital: a retrospective whole-genome analysis with implications for infection prevention and control

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INTRODUCTION

- Noroviruses (NoV) are the leading cause of acute gastroenteritis.
- NoV outbreaks have high attack rates and are difficult to contain, complicating infection prevention and control (IPC) measures.
- Identifying transmission clusters, especially differentiating community introductions from ongoing in-hospital transmission, is challenging using classical epidemiological investigations alone.

AIM

Perform **whole-genome sequencing** (WGS) to retrospectively elucidate **transmission clusters** within two consecutive **NoV outbreaks** (February and May 2024) that affected patients and healthcare workers (HCW) in a Spanish hospital.

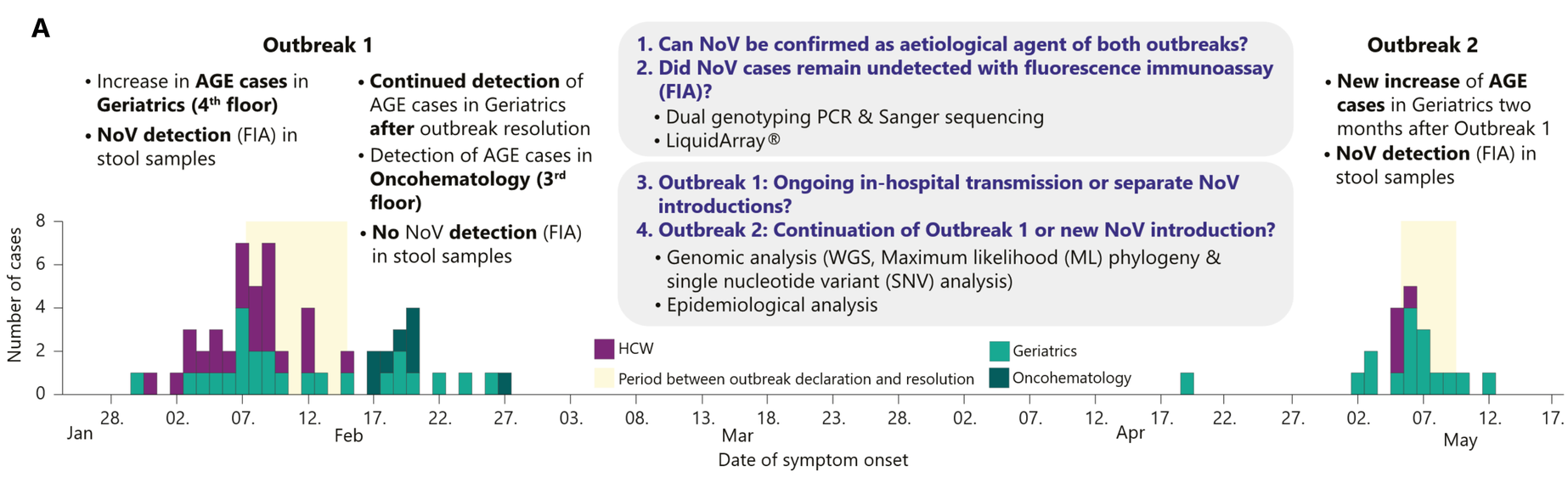

Figure 1. | Background information and methods. A. Epicurve illustrating both outbreaks. Major events, research questions, and **methods** are described above. Case definition: Patients and HCWs with NoV-typical symptoms (vomiting, diarrhoea, fever) between February and May 2024. **B.** Pie chart showing the number of symptomatic and laboratory-confirmed (FIA) patients in each ward (n_{total} = 54). Samples of HCWs could not be obtained.

RESULTS & DISCUSSION

1. NoV was detected in stool samples of 30/54 (55.6%) patients (LiquidArray®) and was **confirmed** as the **aetiological agent** of both outbreaks. All NoV infections were caused by NoV **GII.17[P17]**.

2. With **FIA**, only **one-third** of the NoV cases detected by LiquidArray® were identified and NoV-positive patients in Oncohematology were missed. Hence FIA may be useful for preliminary screenings, but negative samples need to be confirmed with molecular methods to identify outbreak patients.

3. Outbreak 1 was caused by **two separate NoV introductions** (Transmission cluster **1** and **2**). The strains were from two different infection sources and co-circulated in Geriatrics and Oncohematology.

4. Outbreak 2 stemmed from a **third NoV introduction** (Transmission cluster **3**), and was **not a continuation** of Outbreak 1, demonstrating the **effectiveness of the IPC measures** implemented during Outbreak 1.

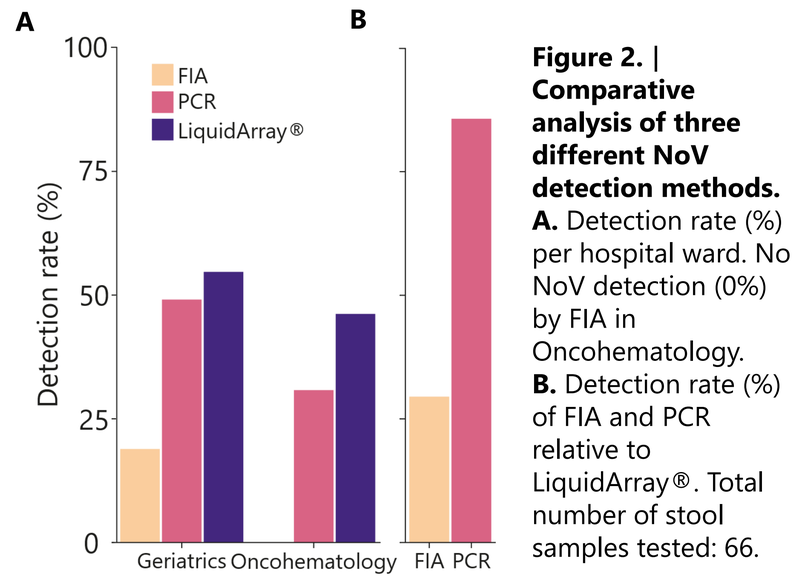

Figure 2. | Comparative analysis of three different NoV detection methods. A. Detection rate (%) per hospital ward. No NoV detection (0%) by FIA in Oncohematology. **B.** Detection rate (%) of FIA and PCR relative to LiquidArray®. Total number of stool samples tested: 66.

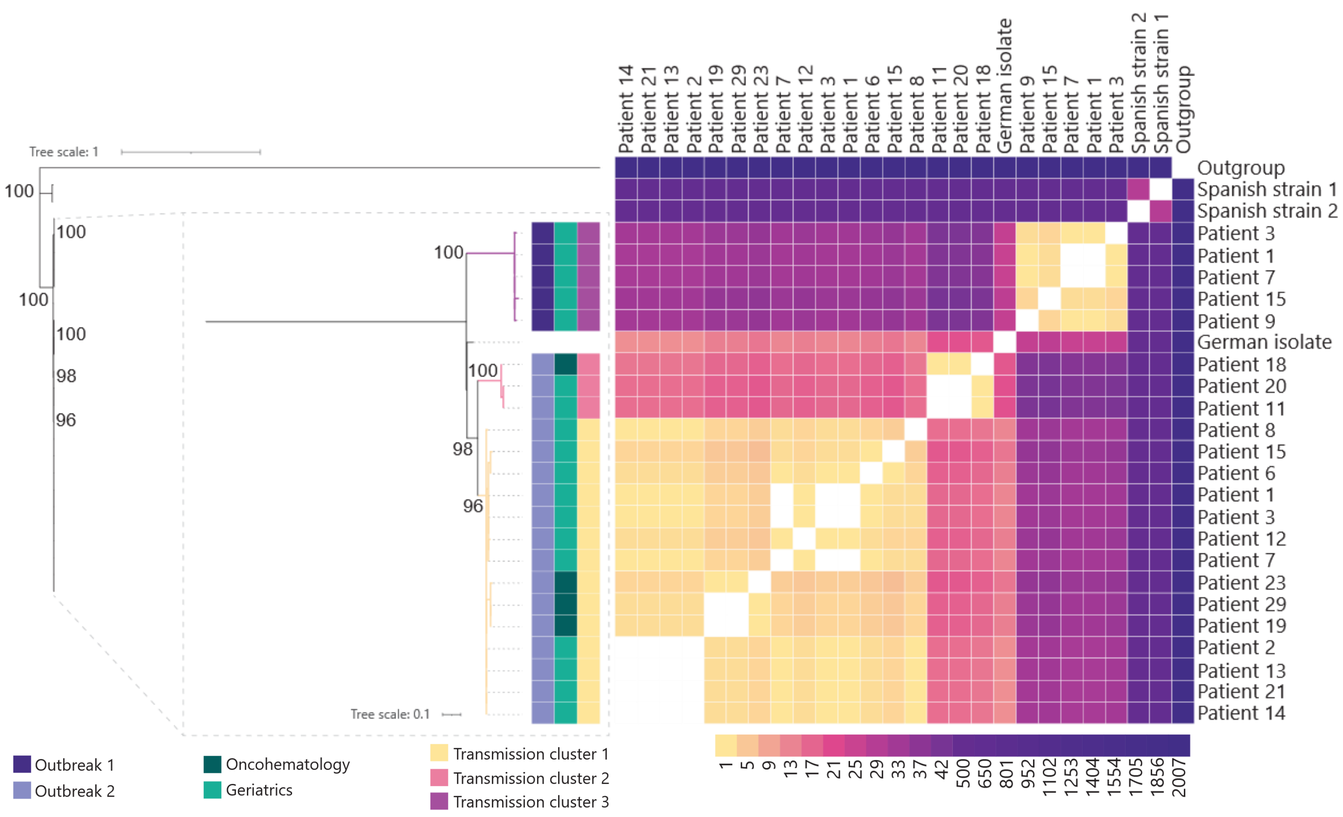

Figure 3. | Genomic analysis. ML phylogenetic tree (1000 bootstraps) and SNV pairwise distance (number of nucleotides) of GII.17[P17] whole-genome sequences obtained from 22 patients. Two GII.17[P17] strains from Spain (2022) and one from Germany (2024, PQ310522) were included as reference. A GII.4[P16] strain from Canada (2023, PP661667) served as outgroup. Bootstrap values ≥95% are displayed at the respective nodes.

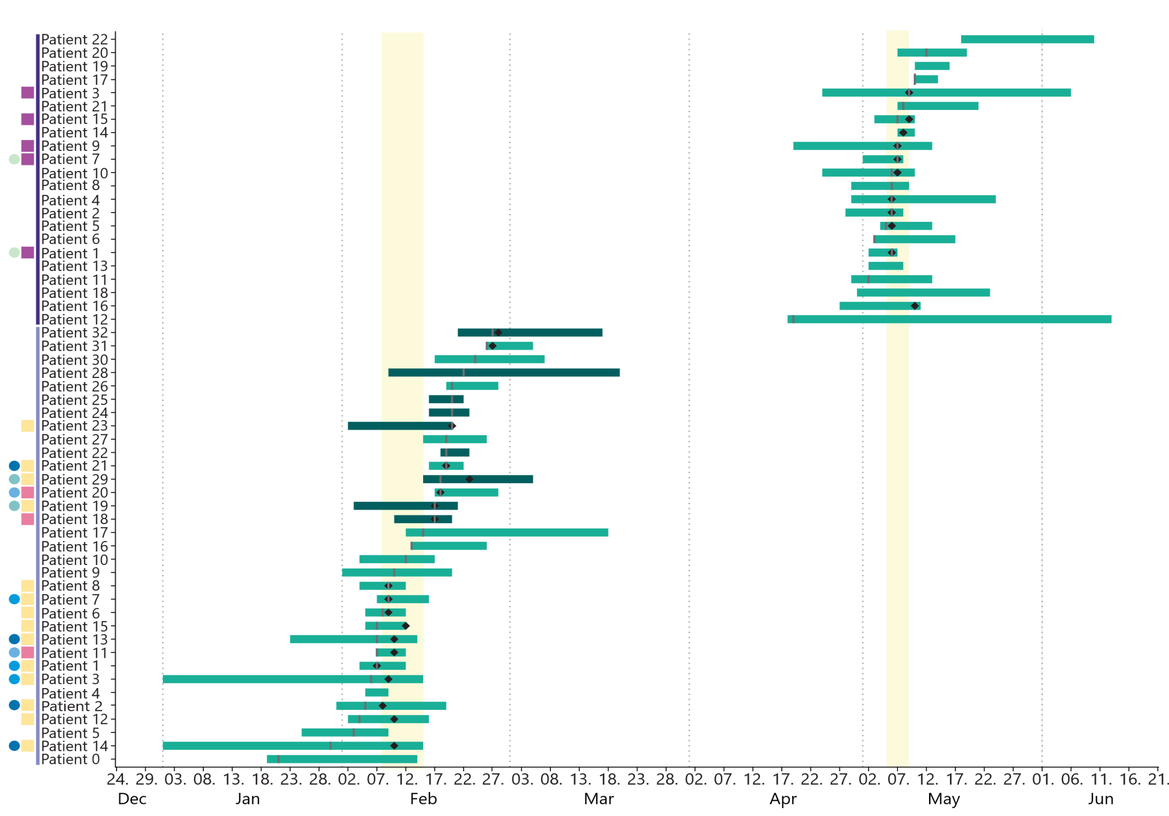

Figure 4. | Epidemiological analysis. Gantt chart illustrating the hospitalization period of each patient. Vertical grey lines represent date of symptom onset. Black diamonds indicate the collection date of a NoV-positive stool sample. Coloured circles indicate identical sequences (SNV=0). Light yellow rectangles indicate the period between outbreak declaration and resolution.

CONCLUSIONS

- **FIA's low sensitivity** led to missed cases, highlighting the need for molecular confirmation for accurate outbreak management.
- **Genomic analyses** are **invaluable** in hospital-associated outbreak investigations. They provide insight into **infection sources** and **transmission chains** that would have **remained unknown** using epidemiological investigations alone, thereby helping to improve targeted IPC resource allocation and intervention strategies.

CB06/02/1014
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Walking promotion in healthy pregnancy and perinatal outcomes: A multivariate analysis comparing active and sedentary mothers

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Background

Physical activity (PA) during pregnancy has been shown to reduce medical risks.

Is it helpful in promoting better obstetric and perinatal outcomes at birth?

Objective

We explored the relationship between **walking activity,**

in the third trimester of pregnancy, and **mother and neonatal outcomes**.

Methodology

Secondary analysis of the **Walking Preg Project** (WPP), a randomized clinical trial (NCT03735381)

Study Highlights:

- **Who?** Healthy, low-risk pregnant women (ages 18–39) with low prior physical activity.
- **How?** Step counts tracked by pedometer at key pregnancy stages.

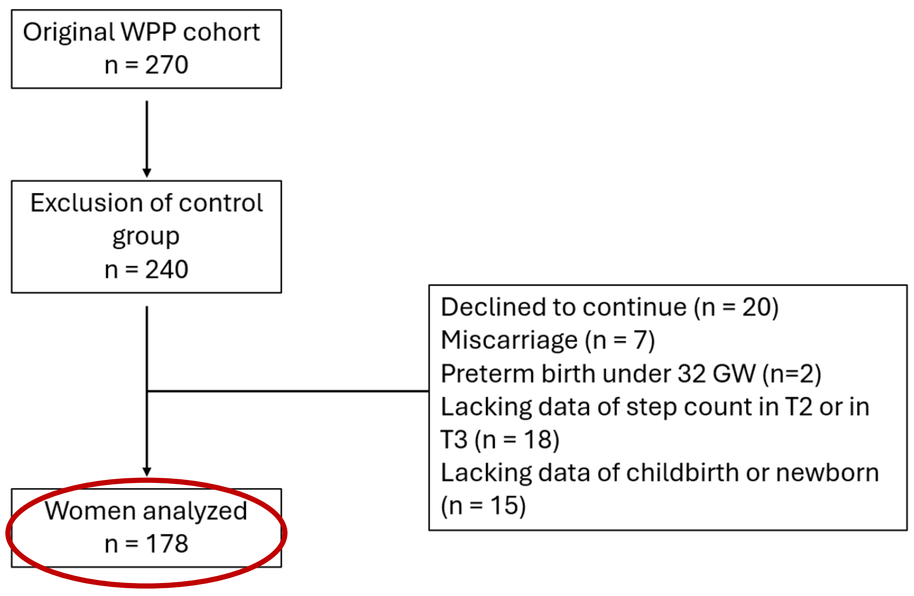
  Activity groups, measured at 32th GW, (Tudor-Locke & Bassett inde

  Physically Active: ≥7,500 steps/day

  Sedentary: <7,500 steps/day
- **Outcomes**: Obstetric and neonatal results compared between groups.
- **Analysis**: Chi-square test, t-test and **Multivariable analyses (**adjusted for *age, pre-pregnancy BMI, gestational weight gain (GWG), social class, smoking, second-trimester walking*, and *insomnia)*. **Stata v.15**

Results

Women selected from WPP trial



Sample size

Variable	Overall sample (n = 178)	Sedentary women (n = 137)	Active women (n = 41)
Age; Mean (SD)	32.02 (5.20)	31.89 (5.40)	32.41 (4.51)

Outcomes

Variable	Overall sample (n = 178)	Sedentary women (n = 137)	Active women (n = 41)	p value[1]
LABOR				
Gestational week; Mean (SD)	39.15 (1.44)	39.05 (1.49)	38.73 (4.75)	0.484
Labor induction; n (%)	56 (31.46)	44 (32.12)	12 (29.27)	0.730
Elective cesarean delivery; n (%)	10 (5.62)	6 (4.38)	4 (9.76)	0.190
Spontaneous vaginal delivery; n (%)	111 (62.36)	84 (61.31)	27 (65.85)	0.599
Instrumental vaginal delivery; n (%)	37 (20.78)	29 (21.17)	8 (19.51)	0.819
Emergency cesarean delivery, n (%)	20 (11.23)	18 (13.13)	2 (4.87)	0.142
NEONATAL				
Neonatal weight in grams; Mean (SD)	3267.88 (438.34)	3260.45 (446.67)	3292.73 (413.62)	0.680
Apgar score at 1 minute; Mean (SD)	8.70 (0.78)	8.72 (0.70)	8.60 (0.99)	0.387
Apgar score at 5 minutes; Mean (SD)	9.19 (0.42)	9.20 (0.43)	9.14 (0.35)	0.441

[1]p value: Chi-square test for qualitative variables and T-test for continuous variables.

Walking ≥7,500 steps/day vs < 7,500 in the third trimester of pregnancy

NO ASSOCIATION WITH

- ✓ **Labor induction** (aOR=0.27, 95% CI 0.52-1.47)
- ✓ **Emergency caesarean delivery** (aOR=1.10, 95% CI 0.46-2.61)
- ✓ **Neonatal weight** (adjusted ß= 97.55, 95% CI -64.03-259.14)

Conclusion

In healthy pregnant women, **walking activity during the third trimester did not alter obstetric or neonatal** outcomes. Therefore, it is in accordance with the World Health Organization's recommended physical activity for healthy pregnant women.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