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Burden and diagnostic capacity of intestinal parasitic infections in Argentina: Analysis of national surveillance and laboratory data

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Abstract Intestinal parasitic infections (IPIs) remain an important public health concern in many low- and middle-income countries. In Argentina, these infections persist in rural and peri-urban areas, with marked regional and age-related disparities. This study describes the national epidemiological situation since IPIs were included among notifiable diseases, and assesses diagnostic capacity based on routine surveillance and laboratory network data. We conducted an analysis of aggregated records from the National Health Surveillance System (SNVS 2.0) for epidemiological weeks (EW) 1-2023 to 11-2025, complemented by an online survey of laboratories in the National Laboratory Network for Intestinal Parasites (RENLEP). A total of 73 320 individuals were tested, with 14 885 confirmed positive (mean weekly positivity 20%). Pathogenic protozoa predominated (62.2%), mainly *Blastocystis* (32%) and *Giardia duodenalis* (21%), followed by helminths (13.5%), mainly *Enterobius vermicularis* (18%). Children aged 2–9 years showed the highest positivity rates (25–29%). Regional variation was marked, with the Central region recording the highest positivity (24%) and the Northwestern region the largest number of cases. Diagnostic capacity was heterogeneous. IPIs remain endemic in Argentina, with a heavy burden in children and socioeconomically disadvantaged areas. These findings highlight the need for integrated control strategies, interventions in water, sanitation and hygiene, school-based health education, standardization of diagnostic protocols, and incorporation of molecular tools into RENLEP. A strengthened national surveillance system is essential to reduce this preventable disease burden.

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Magnitud y capacidad diagnóstica de las infecciones parasitarias intestinales en Argentina: análisis de los datos nacionales de vigilancia y de laboratorios

Resumen Las infecciones parasitarias intestinales (IPI) continúan siendo un importante problema de salud pública en numerosos países de ingresos bajos y medianos; en Argentina, estas persisten en áreas rurales y periurbanas, con marcadas disparidades regionales y etarias. En este estudio se describe la situación epidemiológica nacional desde que las IPI se incluyeron en los eventos de notificación obligatoria y se evalúa la capacidad diagnóstica utilizando datos de vigilancia rutinaria y de la red de laboratorios. Se analizaron los registros agregados del Sistema Nacional de Vigilancia de la Salud (SNVS 2.0) correspondientes a las semanas epidemiológicas 1-2023 a 11-2025, complementando con una encuesta en línea dirigida a los laboratorios de la Red Nacional de Laboratorios de Enteroparásitos (RENLEP). Se evaluaron 73.320 personas y se confirmaron 14.885 casos positivos (positividad media semanal: 20%). Predominaron los protozoos patógenos (62,2%), sobre todo, *Blastocystis* (32%) y *Giardia duodenalis* (21%), seguidos por helmintos (13,5%), principalmente *Enterobius vermicularis* (18%). Los niños de 2 a 9 años mostraron la mayor positividad (25-29%). La variación regional fue marcada: la región central presentó la mayor positividad (24%) y el noroeste el mayor número de casos. La capacidad diagnóstica fue heterogénea. Las IPI continúan siendo endémicas en Argentina, con una carga significativa en la infancia y en áreas socioeconómicamente desfavorecidas. Se requieren estrategias integradas de control, intervenciones en agua, saneamiento e higiene, educación sanitaria escolar, estandarización de los protocolos diagnósticos e incorporación de herramientas moleculares en la RENLEP. Una vigilancia nacional fortalecida es esencial para reducir la carga de esta enfermedad prevenible.

Introduction

Intestinal parasitic infections (IPIs) remain a major public health concern globally, particularly in areas where poverty, insufficient sanitation and limited access to clean water persist. The World Health Organization estimates that more than 1.5 billion people are infected with soil-transmitted helminths worldwide[48], with the greatest burden in tropical and subtropical resource-limited settings, while protozoan parasites, especially *Giardia duodenalis*, *Entamoeba histolytica* and *Cryptosporidium* spp., collectively cause several hundred million symptomatic infections each year, contributing substantially to the global burden of diarrheal disease[15,34,36,47]. These infections not only cause gastrointestinal symptoms such as diarrhea and abdominal pain, but also lead to chronic conditions such as malnutrition, developmental delays, and poor school performance[45].

In Latin America, these infections disproportionately affect vulnerable populations[10,17,22,24,34,38–40], and Argentina reflects this epidemiological pattern. Despite improvements in infrastructure and healthcare coverage, IPIs remain endemic in rural and peri-urban Argentina, with prevalence rates exceeding 50% in some areas, particularly among children[5,7,12,37]. The main etiological agents identified in Argentina include protozoa (*G. duodenalis*, *Blastocystis*, and *Entamoeba histolytica/dispar*) and helminths (*Enterobius vermicularis*, *Ascaris lumbricoides*, *Trichuris trichiura*, and *Strongyloides stercoralis*)[9,19,32,33]. Their distribution is influenced by geographic, climatic, socioeconomic, and environmental variables, with pronounced burdens in northern provinces and marginalized settlements[43,49].

Health surveillance refers to the systematic collection, analysis, and dissemination of relevant, timely, and high-quality information to support public health actions aimed at preventing or mitigating the impact of diseases and health risks, and ensuring access to healthcare services for affected populations. In Argentina, a range of health surveillance strategies has been developed to integrate diverse sources of information and to coordinate efforts across governmental and social sectors at the local, provincial, and national levels. In 1960, a legal framework for notifiable diseases was implemented. In 2007, the list of notifiable events and the mechanisms of surveillance within the National Health Surveillance System (SNVS) were redefined[31]. This update also introduced the Laboratory Surveillance System, which plays a key role in generating timely and reliable information to guide appropriate clinical and public health interventions.

As in many countries, laboratory surveillance in Argentina operates through two key components: National Reference Laboratories and the Thematic Laboratory Network. A national system structure enables laboratories to perform technical and administrative procedures in an integrated and standardized manner, facilitating the production of timely and accurate diagnoses required for effective epidemiological surveillance. The network-based strategy, which includes provincial public health laboratories and healthcare services, enhances system capacity by harmonizing diagnostic methods and interpretation criteria, promoting technology transfer, generating new knowledge, and strengthening human resource development to ensure diagnostic quality.

In 2014, the National System of Reference Laboratories and Networks was created in Argentina[30], formally recognizing its responsibilities in reference diagnostics, epidemiological surveillance, standardization and quality assurance, scientific advice and cooperation, and research, development, and production. The Department of Parasitology at the National Institute of Infectious Diseases (ANLIS ''Dr Carlos G. Malbrán'') serves as Argentina's National Reference Laboratory for Intestinal Parasitic Infections and coordinates the National Laboratory Network for Intestinal Parasites (RENLEP). A major step forward was achieved in November 2022, when IPIs were officially included as notifiable conditions in the SNVS 2.0 system under the laboratory-based reporting pathway, with the goal of strengthening surveillance quality and enhancing the national public health response[29].

Between 2019 and 2024, a total of 137 819 samples were processed through Argentina's SNVS 2.0 system for the detection of intestinal parasites, with 51 563 samples (37.4%) testing positive. The highest number of positive samples was recorded in 2019, accounting for 29.4% (n = 15 183) of the total. This was followed by a sharp decline in both the number of notifications and the positivity rate during 2020 and 2021 – years marked by the COVID-19 pandemic – with 8.9% (n = 4684) and 11.1% (n = 5101) positive results, respectively. From 2022 to 2024, the number of positive notifications ranged between 7890 and 10 298 per year. The total number of samples analyzed followed a similar pattern, peaking in 2019 (n = 37 219), reaching a minimum in 2020 (n = 12 206), and then gradually increasing from 2021 onwards, though remaining below pre-pandemic levels[20].

Despite progress in surveillance, underreporting and regional disparities in laboratory capacity would continue to pose challenges to fully capturing the epidemiological burden of IPIs in Argentina. These infections – although both preventable and treatable – remain a marker of entrenched structural health inequities. Their ongoing presence reflects the need for sustained, multisectoral interventions that integrate healthcare provision, diagnostic infrastructure, sanitation, surveillance, and community education.

This paper aims to provide a comprehensive overview of the current status of IPIs in Argentina, describing recent epidemiological trends and highlighting the main challenges and opportunities related to diagnostic capacity and the national public health response.

Methods

A descriptive study was conducted using two primary sources of information: records from the SNVS 2.0 system and a structured survey administered to laboratories participating in RENLEP. Information from research laboratories or other diagnostic or surveillance activities operating outside these systems was not included.

SNVS 2.0 data

Data recorded in the SNVS 2.0 system were analyzed covering epidemiological week (EW) 1 of 2023 to EW 11 of 2025. The laboratory-based aggregated reporting for the event ''intestinal parasitic infections'' (IPIs) includes, on a weekly basis, both the total number of samples analyzed and the number of positive samples.

The standard diagnostic method employed is stool examination, allowing the simultaneous detection of multiple parasitic infections. As a single stool sample may contain more than one parasite species (polyparasitism), the system also records the number of samples tested and found positive for each individual parasitic infection included in the group. In addition, samples analyzed using molecular techniques for intestinal parasites were also included in the analysis.

The following organisms form part of the registry of the SNVS 2.0 system: *Entamoeba histolytica/dispar/moshkovskii/bangladeshi*, *E. histolytica* (identified by molecular methods), *Entamoeba coli*, *Entamoeba hartmanni*, *Endolimax nana*, *Iodamoeba bütschlii*, *G. duodenalis*, *Dientamoeba fragilis*, *Chilomastix mesnili*, *Balantidium coli*, *Blastocystis*, *Cryptosporidium* spp. (by staining or molecular methods), *Cystoisospora belli*, *Cyclospora cayetanensis* (by staining or molecular methods), *Microsporidia* (by staining or molecular methods), *E. vermicularis*, *A. lumbricoides*, *T. trichiura*, Hookworms (*Ancylostoma duodenale* and *Necator americanus*), *S. stercoralis*, *Trichostrongylus* spp., Anisakids (*Anisakis*, *Pseudoterranova*, *Hysterothylacium*, *Contracaecum*), *Taenia* spp., *Hymenolepis nana*, *Hymenolepis diminuta*, *Dipylidium caninum*, *Diphyllobothriids*, *Fasciola hepatica*, *Schistosoma mansoni*. All organisms listed are included in the SNVS 2.0 registry because diagnostic stages may be identified in fecal samples by concentration, staining or molecular methods, including *Microsporidia*, which are currently classified by several authors as unicellular fungi, as well as organisms that are not strictly intestinal, such as *Fasciola hepatica* and *Schistosoma mansoni*.

Data were analyzed using descriptive statistics based on absolute and relative frequencies, overall and weekly positivity rates, and stratified by parasite genus/species, geographic region, and age group.

For this analysis, protozoa under surveillance were categorized into two categories: pathogenic and commensal. Pathogenic protozoa included: *B. coli*, *Blastocystis*, *D. fragilis*, *E. histolytica/dispar/moshkovskii/bangladeshi*, *E. histolytica* (identified by molecular methods), *G. duodenalis*, *C. belli*, *Cryptosporidium* spp., *C. cayetanensis*, and *Microsporidia*. Commensal protozoa included: *C. mesnili*, *E. nana*, *E. coli*, *E. hartmanni*, and *I. bütschlii*.

RENLEP survey

To complement the SNVS data, an online structured survey was administered to laboratories in the RENLEP, to collect information not captured by SNVS 2.0 regarding operational practices, diagnostic capacity, and barriers to case reporting.

The survey was conducted between EW 35 of 2023 and 36 of 2024, targeting provincial focal points for intestinal parasitic infections across the country. The questionnaire included both closed and open-ended questions organized around the following themes: sample collection methods, preservatives used, diagnostic techniques employed, perceived barriers to notification, and the number of samples analyzed and confirmed positive for intestinal parasite genus and/or species.

Data were processed and visualized using Microsoft Excel®.

Results

Analysis of surveillance data from SNVS 2.0

A total of 73 320 patients were tested for IPIs in Argentina between EW 1 of 2023 and EW 11 of 2025, of whom 14 885 were confirmed positive. Figure 1 shows the weekly distribution of tested individuals, confirmed cases, and the weekly positivity rate. The weekly number of individuals tested ranged from 144 to 1251, with noticeable fluctuations. A gradual decline in the testing volume was observed from mid-2023 to early 2025, with intermittent peaks. Trends in confirmed positive cases largely mirrored testing frequency. Despite these fluctuations, the weekly positivity rate remained relatively stable, ranging from 12% to 30%, with a median of approximately 20%.

A total of 20 902 positive samples were reported from 14 885 patients. The most frequently detected parasitic agents included *Blastocystis*, *G. duodenalis*, *E. vermicularis*, *E. histolytica/dispar/moshkovski/bangladeshi*, *D. fragilis*, *A. lumbricoides* and various other protozoa and helminths. Weekly variation in the number of positive cases was evident, with recurring peaks particularly during 2023 and 2024. Weekly case counts ranged from 24 to 494 (Fig. 2).

When analyzing the proportion of each parasite detected in positive samples throughout the surveillance period, the most frequently identified organisms were *Blastocystis* (32%), *G. duodenalis* (21%), *E. histolytica/dispar/moshkovskii/bangladeshi* (5%), *D. fragilis* (4%), *E. vermicularis* (18%), and *A. lumbricoides* (3%). Together, these six agents accounted for 83% of all reported infections. The remaining 17% comprised a range of protozoa and helminths, most of which were of clinical and public health relevance (Supplementary file 1).

Figure 3 displays the weekly distribution of positive samples, categorized by major parasitic groups: pathogenic protozoa, commensal protozoa, and helminths. Across the full period, pathogenic protozoa accounted for 62.2% of infections, followed by commensal protozoa (24.3%) and helminths (13.5%). These proportions remained relatively consistent week to week, with minor variations during peak notification periods.

Among the pathogenic protozoa, *Blastocystis* (51.37%) and *G. duodenalis* (33.46) were the predominant organisms, representing nearly all cases in this group. Less frequent agents included *E. histolytica* (8.33%), *D. fragilis* (5.57%), *Cryptosporidium* spp. (0.73%), *B. coli*, *C. cayetanensis*, *C. belli* and *Microsporidia*, each contributing fewer than 0.2% of the total pathogenic protozoan cases (Supplementary file 2).

For commensal protozoa, *E. coli* accounted for 70.59% of detections, followed by *E. nana* (23.74%) and *C. mesnili* (3.56%). Other species such as *I. bütschlii* and *E. hartmanni* were rarely reported (2.01% and 0.10%, respectively).

Helminth infections were dominated by *E. vermicularis* (76.21%), followed by *A. lumbricoides* (14.19%) and *H. nana* (4.98%). Less frequently reported species included hookworms (1.54%), *S. stercoralis* (1.52%), *T. trichiura*, *Taenia* spp., *H. diminuta*, *D. caninum*, Diphyllobothriids, *F. hepatica*, and *S. mansoni*, each comprising less than 1% of the total helminth cases (Supplementary file 2).

Figure 4 shows the distribution of individuals tested, confirmed positive cases, and the positivity rate by age group. The highest numbers of tested individuals were observed in the 2–4-year (15 490) and 5–9-year (20 713) age groups, which also showed the greatest number of positive cases. Positivity rates peaked in these same groups, reaching 25% and 29%, respectively. Infants aged under 6 months, 6–11 months, and 12–23 months had relatively low testing and case numbers, though positivity remained around 20%. In adults ($\geq$20 years), both the number of individuals tested and absolute positive cases were lower compared with the younger age groups, though positivity rates remained stable between 16% and 22%.

Among children under 5 years of age, *G. duodenalis* (29.26%), *Blastocystis* (26.62%), *D. fragilis* (4.30%), *E. histolytica/dispar* complex (3.46%), *E. vermicularis* (18.52%) and *A. lumbricoides* (4.45%) were most frequently detected. In the 5–14-year age group, *Blastocystis* (32.20%), *G. duodenalis* (18.77%), *D. fragilis* (4.10%), *E. histolytica/dispar* complex (2.35%), and *E. vermicularis* (22.54%) predominated. In older individuals, *Blastocystis* (37.71%), *G. duodenalis* (15.12%), *E. histolytica/dispar* complex (12.76%) were the most common (Supplementary file 3).

The geographic distribution of testing and positivity is depicted in Figure 5. The Northwestern region reported the highest testing volume (34 670 samples), the highest number of positive cases (7066), and a positivity rate of 20%. The Northeastern region recorded 13 537 tests and 2500 confirmed cases, with a positivity rate of approximately 19%. The Central region had a similar number of tests (12 632), but the highest regional positivity rate (24%). The Cuyo region reported the lowest number of tests and positives, and the lowest positivity rate (16%). The Southern region conducted 8745 tests and recorded 1653 positives, with a moderate positivity rate of around 19%.

Blastocystis was the most prevalent organism in all regions, particularly in the Northeastern (47.33%) and Central (30.95%) regions. *G. duodenalis* was the second most common parasite, especially in the Northwestern (26.75%) and Cuyo (21.85%) regions. *E. vermicularis* was frequently detected across all regions (13–38%). Soil-transmitted helminths such as *A. lumbricoides* were less commonly reported (less than 1% to 5%) (Supplementary file 4).

Analysis of data from the RENLEP survey

The national survey was completed by thematic focal points from 15 jurisdictions across Argentina. These individu-

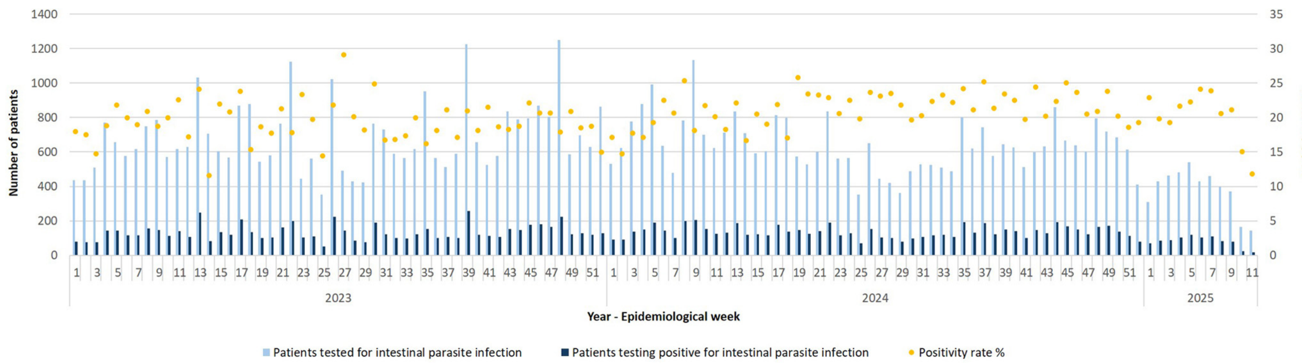

Figure 1 National situation of intestinal parasitic infections (SNVS 2.0). Number of patients tested and confirmed positive for intestinal parasites, and positivity rate (%) by year and epidemiological week in Argentina, 2023–2025 (for 2025, data are presented up to epidemiological week 11) (n = 73 320). Light blue bars represent patients tested, dark blue bars indicate patients testing positive, and yellow dots show the positivity rate.
Source: Compiled from SNVS 2.0 datasets.

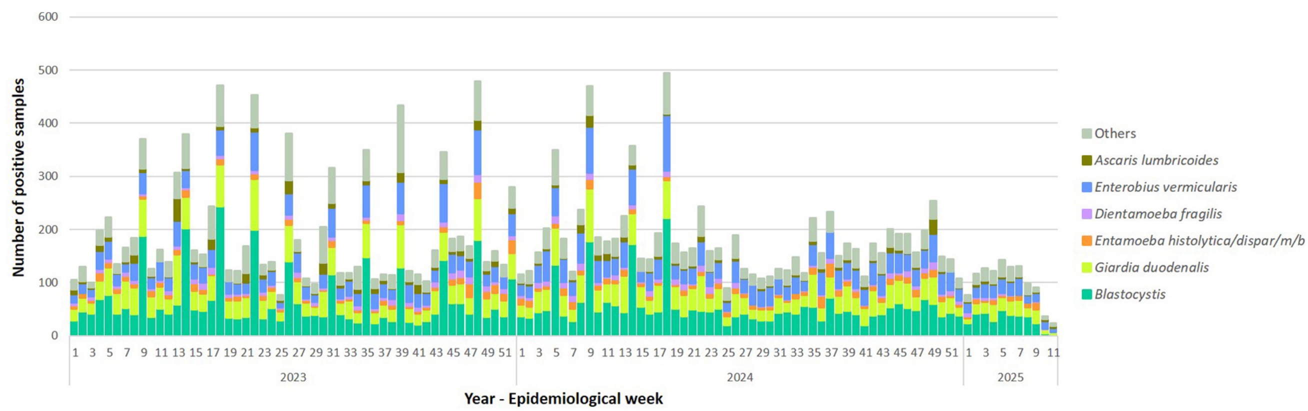

Figure 2 Distribution of intestinal parasites identified from EW1-2023 to EW11-2025 (SNVS 2.0). The left pie chart shows the main species, and the right pie chart details the composition of the group classified as ''Others''.

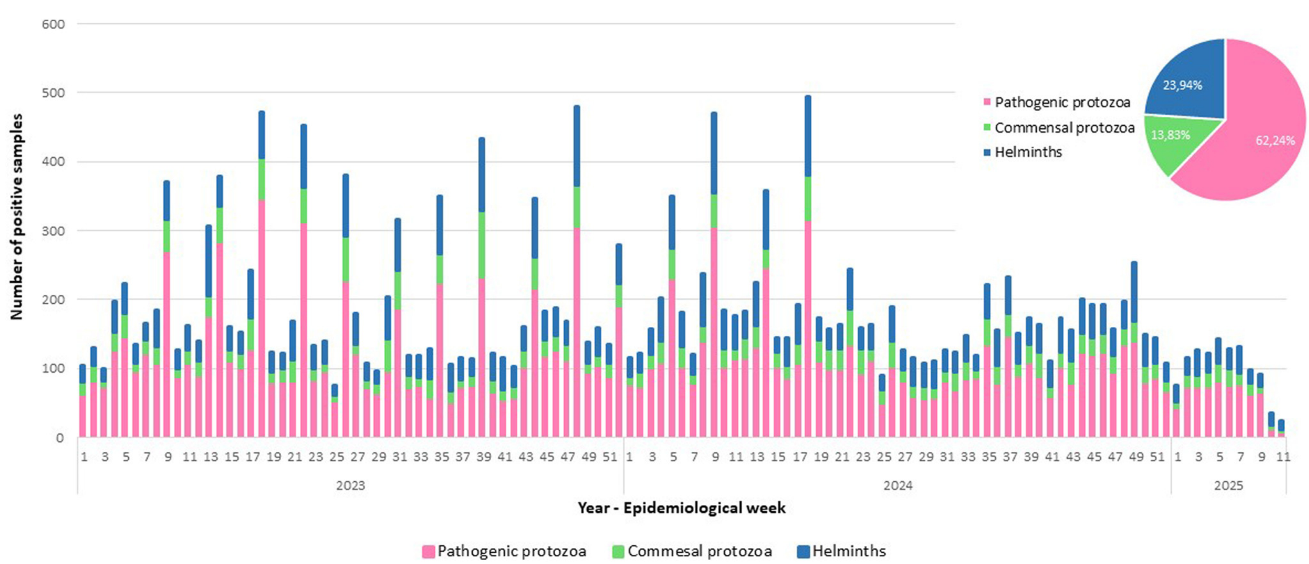

Figure 3 Distribution of pathogenic protozoa, commensal protozoa, and helminths from EW1-2023 to EW11-2025 (SNVS 2.0). The bar chart shows the number of positive samples per epidemiological week, while the pie chart indicates the overall proportions of each group.

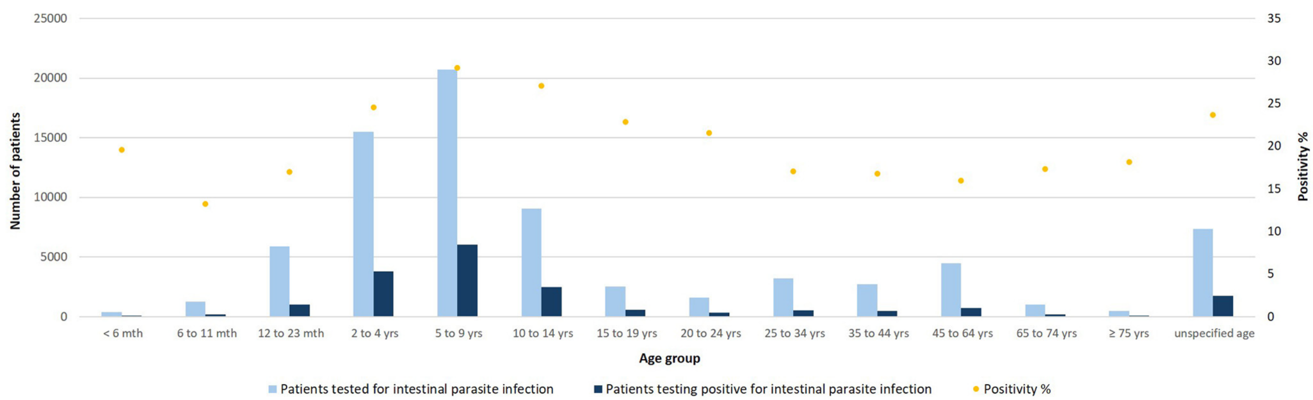

Figure 4 Intestinal parasite testing by age group from EW1-2023 to EW11-2025 (SNVS 2.0). Bars represent the number of patients tested and those confirmed positive, and yellow dots indicate the positivity rate (%).

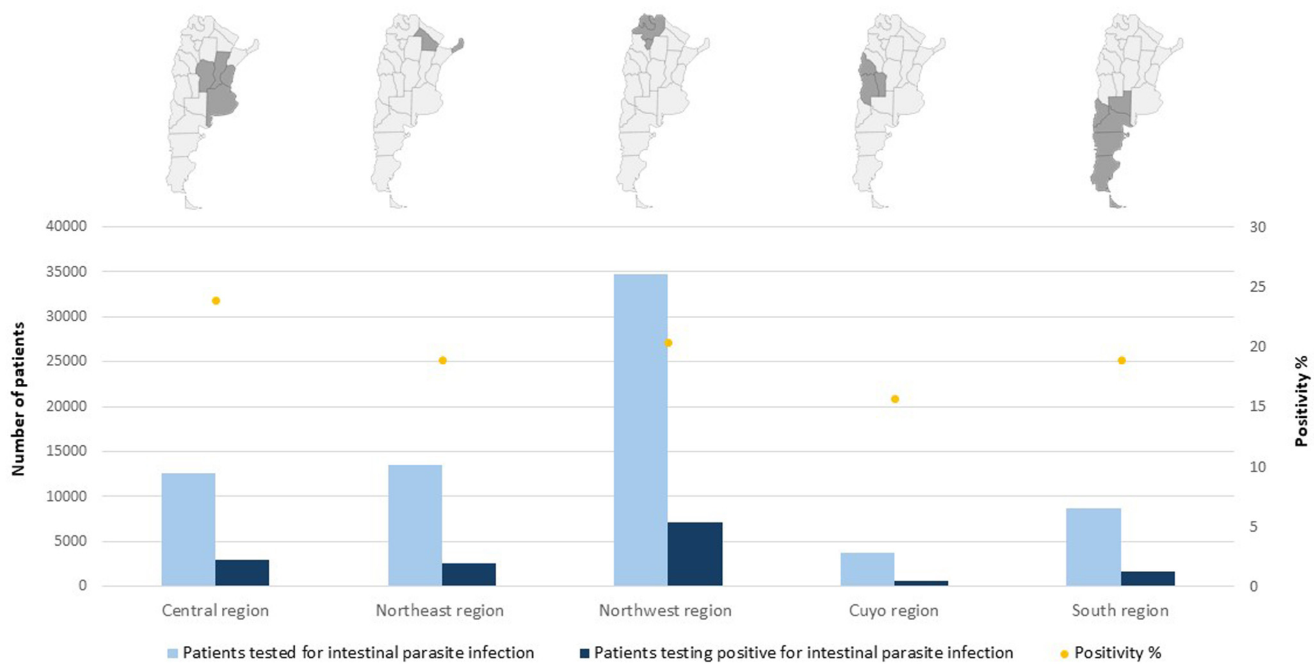

Figure 5 Intestinal parasite testing by region in Argentina from EW1-2023 to EW11-2025 (SNVS 2.0). Maps indicate provinces by region. Bars represent the number of patients tested and those confirmed positive, and yellow dots show the positivity rate (%).

als represent reference authorities in parasitology at the provincial level, providing a reliable overview of laboratory practices in their respective areas.

Table 1 summarizes the diagnostic procedures reported for the detection of intestinal parasites. Sample collection methods included fresh stool samples, preserved samples (fixed), and perianal samples (adhesive tape or Graham method). Thirteen of the fifteen jurisdictions reported using all three methods; only one jurisdiction used a single method exclusively. Regarding collection duration, 67% reported collecting samples over four or more days, 7% over three days, and 27% over two days. Most jurisdictions (60%) used 5–10% formalin as a preservative. Others reported that preservatives included 5% formalin saline solution (20%), sodium acetate–acetic acid–formalin (SAF) (13%), and no preservatives (7%).

Various stool concentration techniques by centrifugation were employed. The modified Telemann method was the most widely used (46%), followed by the Ritchie method (13%) and the Carles–Barthelemy technique (7%). Twenty-seven per cent of respondents did not specify a concentration method, and 7% reported not using any such technique.

The Willis method was the most commonly used (40%) flotation technique, followed by the Sheather sugar flotation method (13%). Thirteen per cent of laboratories used both methods. Notably, 34% reported not using flotation techniques.

The Kinyoun stain was the most frequently reported staining method (14/15 laboratories), followed by Lugol iodine (5/15), Giemsa (3/15), iron hematoxylin (1/15), auramine (1/15), and Calcofluor white (1/15). Use of the

Table 1 Reported diagnostic procedures for the detection of intestinal parasites in the RENLEP survey.

Laboratory practice	Condition	Number of thematic focal points that use the condition
Sample collection method	Fresh	13
	Preserved	14
	Perianal	14
Collection duration	2 days	4
	3 days	1
	≥4 days	10
Preservative solution	5% formalin saline	3
	5–10% formalin	9
	Sodium acetate-acetic acid-formalin	2
	No preservative	1
Concentration technique	Modified Telemann	7
	Ritchie	2
	Carles–Barthelemy	1
	Not specified	4
	Not employed	1
Flotation technique	Willis	6
	Sheather	2
	Willis + Sheather	2
	Not employed	5
Staining	Lugol	5
	Kinyoun	14
	Iron hematoxylin	1
	Giemsa	3
	Calcofluor white	1
	Auramine	1
	Modified trichrome	0
Non-traditional diagnostic method	PCR	2
	FilmArray	2
	Larval culture	2
	Serology	1

modified trichrome stain was not reported. Additional, non-conventional diagnostic tools included FilmArray (used by 2 laboratories), PCR (2 laboratories), larval culture (2 laboratories), and serological methods (1 laboratory).

The frequency of parasitic agents detected in positive samples was represented by *Blastocystis* as the most frequently reported organism (35%), followed by *G. duodenalis* (15%) and *D. fragilis* (10%). The *E. histolytica/dispar* complex accounted for 1% of detections. *E. vermicularis* was reported in 18% of samples, and *S. stercoralis* in 1%. Other protozoa and helminths, both pathogenic and commensal, collectively accounted for 20% of positive findings (Supplementary file 5).

Discussion

This study provides a comprehensive overview of IPIs and constitutes the first nationwide assessment in Argentina since these infections became notifiable under the national health surveillance system in 2022. By integrating aggregated data from the SNVS 2.0 system with operational and diagnostic insights derived from the RENLEP laboratory survey, this analysis offers a robust picture of current epidemiological trends, diagnostic practices, and health system challenges in addressing IPIs at a national scale.

The findings indicate that IPIs remain a persistent public health burden in Argentina, characterized by the predominance of protozoa, pronounced geographical and age-related disparities, and significant diagnostic limitations. These patterns reflect those observed in other countries undergoing similar epidemiological transitions, where improvements in sanitation have not uniformly translated into reduced parasitic prevalence.

Pathogenic protozoa accounted for the majority (62%) of positive samples reported through SNVS 2.0, with *Blastocystis* (32%) and *G. duodenalis* (21%) being the most frequently identified organisms. This distribution aligns with international data including studies from Latin America[41,44,46], while studies from sub-Saharan Africa and Asia have reported comparable trends[1,28]. By contrast, helminths, excluding *E. vermicularis*, were detected in only 6% of positive cases, markedly lower than the global burden of soil-transmitted helminthiasis, which continues to affect over 1.5 billion individuals worldwide, approximately 24% of the global population[48].

Blastocystis emerged as the most commonly detected parasite. Its prevalence in Latin America ranges widely, from 5.8% to 94%, with subtypes ST1–ST4 being the most frequently reported[16]. The high detection rate in this study may reflect poor water quality, direct fecal–oral transmission, and the underrecognition of its potential clinical relevance in routine diagnostic protocols[42]. Likewise, *G. duodenalis* was particularly prevalent among children under 5 years of age, reaching up to 29% positivity. This finding is consistent with global evidence identifying *G. duodenalis* as one of the principal protozoan pathogens affecting children[11]. The prevalence of giardiasis commonly ranges from 20 to 30% in developing countries and 3 to 7% in developed countries[27].

Although helminth infections were less frequent overall, the high proportion of *E. vermicularis* (18% of all infections and 76% of helminthic cases) is noteworthy, exceeding pooled global estimates of pinworm infections in children (12.9%)[26].

The spatial distribution of intestinal parasite cases shows a marked concentration in Argentina's Northwestern region, where the highest testing volumes, likely reflecting greater adherence to reporting, were recorded, along with the highest number of positive cases and high positivity rates. These findings are consistent with evidence from other Latin American countries, where regional disparities in access to clean water and adequate sanitation infrastructure are associated with increased parasitic burden[8].

The predominance of protozoan infections underscores fecal–oral transmission – particularly through contaminated water or food – as the primary exposure pathway. The frequent detection of commensal protozoa, though not inherently pathogenic, may indicate broader environmental contamination and hygiene deficiencies, which in turn facilitate the transmission of more virulent enteropathogens. Although helminths were detected less frequently, their continued presence indicates that transmission persists in certain socioeconomically or environmentally vulnerable contexts[4,23]. Taken together, the sustained detection of intestinal parasites across the surveillance period highlights the ongoing need for expanded and consistent surveillance, combined with equitable access to diagnostic services nationwide.

In this context, it is important to note that surveillance-based data may underestimate the true burden of intestinal parasitic infections. Several studies from Argentina and other endemic countries have demonstrated that community-based surveys, academic research groups, and reference laboratories operating outside formal notification systems frequently report substantially higher prevalences of intestinal parasites, particularly in socioeconomically vulnerable populations[18,35]. Similar discrepancies between official surveillance data and field-based studies have been described in Latin America, sub-Saharan Africa and Asia, where limited access to diagnostics, underreporting, and heterogeneous laboratory practices contribute to an incomplete epidemiological picture[2,3,6].

The age-stratified analysis further reveals that both testing efforts and the highest positivity rates were concentrated among children aged 2–9 years, a group widely recognized in the global literature as particularly susceptible to both protozoan and helminthic infections[21]. This pattern aligns with established behavioral and environmental risk factors in early childhood[13], including underdeveloped hygiene practices, frequent exposure to contaminated surfaces, and close contact within institutional settings such as schools and childcare centers. Notably, although fewer tests were conducted in children under 2 years of age, the positivity rate in this group was high. Furthermore, the continued detection of parasitic infections among adults suggests ongoing community-wide transmission. These findings support the need for diagnostic and educational interventions targeting all age groups, particularly in endemic and resource-limited regions[1,25].

Responses from 15 RENLEP laboratories revealed heterogeneity in diagnostic approaches. While most laboratories employed multiple stool preservation techniques and sedimentation methods, 34% reported not using flotation techniques, and only two laboratories had access to PCR-based molecular diagnostics. These limitations are likely to reduce the sensitivity of parasite detection, especially for protozoa[14]. The detection of *D. fragilis* is highly dependent on the use of permanent stained smears or molecular methods; however, within RENLEP only one laboratory reported using iron hematoxylin staining and two applied PCR, suggesting that the frequency of *D. fragilis* reported by SNVS 2.0 is likely underestimated. The integration of molecular tools and standardized concentration methods is essential for improving diagnostic accuracy, particularly in endemic settings where traditional microscopy may lack sufficient resolution.

Based on the national surveillance data and laboratory-level insights, several priority actions are warranted. First, WASH (Water, Sanitation, and Hygiene) interventions must be strengthened by improving access to clean water, sanitation infrastructure, and hygiene education, particularly in high-burden regions, to reduce protozoan transmission. Second, school-based health programs should be expanded to include structured hygiene education for children aged 2–14 years, targeting not only helminths but also protozoa such as *G. duodenalis* and *Blastocystis*, which are highly prevalent in this group. Third, laboratory diagnostic capacity needs to be enhanced through the implementation of standardized flotation techniques and the introduction of low-cost molecular tools, such as PCR assays for *E. histolytica*, *Cryptosporidium* spp., and *S. stercoralis*, which are frequently underdiagnosed. Lastly, surveillance of *Blastocystis* subtypes should be strengthened to explore their potential associations with gastrointestinal symptoms, microbiota alterations, and transmission dynamics.

Conclusions

This study represents a novel integration of routine national surveillance data and laboratory-based operational insights. Nevertheless, several limitations must be acknowledged. Potential underreporting, differences in laboratory capacity, and variability in diagnostic protocols may have affected the detection of certain parasites. The limited availability of molecular diagnostic tools in most laboratories restricts species-level identification, particularly for morphologically indistinguishable organisms such as the *E. histolytica* complex. Additionally, the design of this study limits causal inference regarding environmental and social determinants of infection.

The diversity of parasitic species identified – including protozoa, helminths, and opportunistic coccidia – reflects a complex and broad parasitic burden. These findings underscore the need for integrated, multisectoral parasite control strategies that address environmental determinants such as hygiene, sanitation, water quality, and diagnostic infrastructure.

IPIs remain endemic in Argentina, particularly among children and in socioeconomically and ecologically vulnerable regions. The predominance of protozoa, persistence of *E. vermicularis*, and gaps in diagnostic capacity highlight the urgent need for sustained national strategies. Importantly, heterogeneity in diagnostic capacity and technical expertise across laboratories may compromise case detection, leading to an underestimation of the true burden of intestinal parasitic infections.

Based on the national surveillance data and laboratory-level insights, several priority actions are warranted. First, WASH (Water, Sanitation, and Hygiene) interventions must be strengthened by improving access to clean water, sanitation infrastructure, and hygiene education, particularly in high-burden regions, to reduce protozoan transmission. Second, school-based health programs should be expanded to include structured hygiene education for children aged 2 to 14 years, targeting not only helminths but also protozoa such as *G. duodenalis* and *Blastocystis*, which are highly prevalent in this group. Third, laboratory diagnostic capacity needs to be enhanced through the implementation of standardized flotation techniques and the introduction of low-cost molecular tools, such as PCR assays for *E. histolytica*, *Cryptosporidium* spp., and *S. stercoralis*, which are frequently underdiagnosed. Lastly, surveillance of *Blastocystis* subtypes should be strengthened to explore their potential associations with gastrointestinal symptoms, microbiota alterations, and transmission dynamics.

Enhancing laboratory capacity within RENLEP, integrating WASH and school-based health interventions, and reinforcing subtype-specific surveillance constitute essential, complementary actions to overcome diagnostic gaps, reduce underestimation, and address the persistent public health burden of intestinal parasitic infections in Argentina.

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Conflicts of interest

The authors declare no conflicts of interest.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found in the online version available at https://doi.org/10.1016/j.ram.2026.100718.

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