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ORIGINAL ARTICLE

Global and Regional Efforts in Preventing Gastric Cancer

Hope Hp-GC Project—Program Implementation for Primary and Secondary Prevention of Gastric Cancer in Latin America

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Received: 8 December 2025 | **Revised:** 2 February 2026 | **Accepted:** 7 February 2026

Keywords: early detection of cancer | gastric cancer | *Helicobacter pylori* | long-term effects | premalignant conditions | prevention | screen-and-treat

ABSTRACT

Introduction: Gastric cancer (GC) is the fifth leading cause of cancer-related mortality globally; its main burden is concentrated in East Asia and some areas of Europe and Latin America. This study aims to develop an organized and structured GC prevention pilot program in intermediate-to-high-incidence countries in Latin America.

Methods: This study involved two strategies: (a) primary prevention for *screen-and-treat H. pylori* infection among individuals aged 30–39 years ($n = 7500$, 500 in 15 sites), and (b) primary and secondary prevention for individuals aged 40–75 years ($n = 9600$, 600 in 16 sites) with tiered risk stratification using an algorithm developed and validated in Chile (Gastrocalc: priority 1 to 6; age, sex, hypertension, IgG *H. pylori*, pepsinogen I and II, and Gastrin-17b), and high-quality esophagogastroduodenoscopy (EGD) evaluation.

Results: Pilot phases were successfully conducted in Chile and Colombia during 2023–2025. In Chile (Molina), 4152 asymptomatic individuals were tested with *H. pylori* prevalence of 46% ($n = 113/246$) in 2023, 34% ($n = 504/1484$) in 2024, and 32% ($n = 609/1904$) in 2025. The *H. pylori* prevalence among individuals aged 30–39 years (592/4152; 14.3%) was 37.8%. In Colombia, 1250 asymptomatic individuals were screened across four regions; in 2025, the prevalence of *H. pylori* among individuals aged 30–39 years was 69% ($n = 895/1250$). The validation of Gastrocalc included 866 individuals from 5 regions in Chile. The algorithm successfully identified 80.6% of OLGA III–IV patients and 100% of GC patients (Priority 1–4). Other countries will start activities in 2026.

Conclusions: This pioneering study will advance understanding and feasibility of urgently needed primary and secondary prevention for GC in Latin America.

Javier Uribe, José Darío Portillo-Miño, Mauricio Pizarro, and Arnoldo Riquelme equally contributed to this manuscript.
The members of the Task Force HOPE Hp-GC Project Consortium are listed in Appendix A.
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1 | Study Rationale: Why Was the Cohort Set up?

Gastric cancer (GC) is the fifth leading cause of cancer-related mortality worldwide. Latin America and the Caribbean rank among the highest incidence and mortality rates, with more vulnerable populations concentrated in Andean and Central American countries [1, 2]. GC is usually diagnosed at advanced stages, limiting treatment options and impacting survival, which ranges from 10% to 35% in Latin America, contrasting with the 70% 5-year survival in countries in East Asia with established screening programs [3]. In the Correa histopathological cascade model [4], non-cardia gastric adenocarcinoma develops from multifocal chronic atrophic gastritis (CAG), gastric intestinal metaplasia (GIM), and dysplasia, which are considered gastric premalignant conditions (GPMC). GPMC surveillance may enable earlier detection of GC, but its risk cannot be eliminated (as with colorectal adenomas); therefore, it requires surveillance with regular-interval endoscopy. Chronic *Helicobacter pylori* (*H. pylori*) infection is a major driver of this process, with an attributable risk for GC of 75%–88% [5, 6]. GPMC are observed in high GC incidence regions beginning at age 30 years, and its prevalence increases significantly after the age of 40 years [7, 8]. The risk of GC rises primarily from the fifth decade of life [9–12]. Therefore, secondary prevention strategies should prioritize high-quality esophagogastroduodenoscopy (EGD) to detect and stage GPMC and to identify early-stage GC in high-risk areas. Using the updated Sydney system to standardize gastric biopsies enables risk stratification based on the Operative Link for Gastritis Assessment (OLGA) and Operative Link on Gastric Intestinal Metaplasia Assessment (OLGIM) classifications [13–17].

Globally, various initiatives aim to reduce the incidence and mortality of GC. In Asia, population-based screening and *H. pylori* eradication programs have significantly reduced GPMC and GC incidence, as demonstrated in Taiwan's Matsu Islands [18, 19]. In South Korea and Japan, nationwide organized screening programs have shown a substantial reduction in GC mortality [9, 20]. Bhutan recently implemented comprehensive *H. pylori* testing, eradication, and endoscopic screening programs [21]. In Europe, prevention initiatives include EUROHELICAN, GISTAR, and TOGAS, which focus on screening and treating for *H. pylori* infection and non-invasive screening for GPMC in high-risk individuals aged 40 to 64 years [22, 23].

In Chile, GC had the fifth-highest mortality rate, with 15 deaths per 100,000 inhabitants in 2022 [24, 25]. Notably, the Chilean Ministry of Health introduced National Clinical Practice Guidelines in 2006 for the opportunistic detection of GC. Still, these guidelines were limited to symptomatic individuals and thus are not an accurate '*screening*'. These guidelines also addressed *H. pylori* eradication in individuals with GPMC and a family history of GC among first-degree relatives. To support *H. pylori* eradication, government policy provided coverage for standard triple therapy (STT; clarithromycin-based) [26]. Further efforts were made in 2025 when the Chilean Association of Digestive Endoscopy (ACHED, per acronym in Spanish) established recommendations for *H. pylori* eradication, including detection of GPMC, classification, and endoscopic follow-up using high-quality EGD and standardized biopsies [27]. However, financial coverage for EGD remains limited, particularly among low-income and rural populations. Disparities related to EGD access are also evident between the public and private healthcare systems [8, 28]. The public system faces long waiting lists (e.g., 2000 per endoscopy unit), resulting in delays of nearly 1 year, even for high-risk individuals [29, 30]. Optimizing primary and secondary prevention strategies is crucial for effectively targeting the highest-risk areas.

Population-based GC screening programs are lacking in Latin America due to resource limitations and fragmented healthcare systems [28, 31]. This study aims to develop an organized and structured GC pilot program in intermediate-to-high-incidence and high-mortality areas among Latin American countries, laying the groundwork for implementing these preventive measures in accordance with regional and national consensus.

2 | Study Methods

2.1 | How Is the Study Designed?

The HOPE study comprises adults from moderate to high-risk areas for GC (age-standardized rate [ASR] > 10 per 100,000 inhabitants-years) residing in Latin America [7, 32, 33]. Clinical recommendations are primarily based on Chilean guidelines and consensus, as they are the most comprehensive and have the best available local data. According to the ACHED consensus, endoscopic screening for GC (and GPMC) in intermediate-high-risk areas should be performed every 2 years for individuals with OLGA/OLGIM III-IV and every 4 years for OLGA/OLGIM II [27]. Accordingly, two strategies are proposed, targeting age groups of 30–39 years (primary prevention) and 40–75 years (primary and secondary prevention).

2.2 | Primary Prevention Among Individuals 30–39 Years

Individuals aged 30–39 will be enrolled, in line with the ACHED consensus on the primary and secondary prevention of GC [27, 33]. Non-invasive testing will be used, either the *H. pylori* stool antigen (HpSA) or the urea breath test (UBT) for active *H. pylori* infection; each site will determine the optimal test based on the local technical feasibility and availability of the tests [32]. This approach is supported by current evidence, which has reported that the "*screen-and-treat*" strategy with non-invasive testing for prevention of GC is a cost-effective strategy in this age group [34, 35] (Figure 1).

Each study site has a target enrollment of 500 individuals, with a projected total sample of 7500 across the 15 study centers. Individuals who test positive will receive *H. pylori* eradication treatment in accordance with local guidelines [33]. Confirmation of *H. pylori* eradication at 4–6 weeks after treatment is mandatory, based upon recent guidelines [33, 36]. All individuals will be registered in the Latin American Registry on *H. pylori* Management (Hp LATAM-Reg) for follow-up.

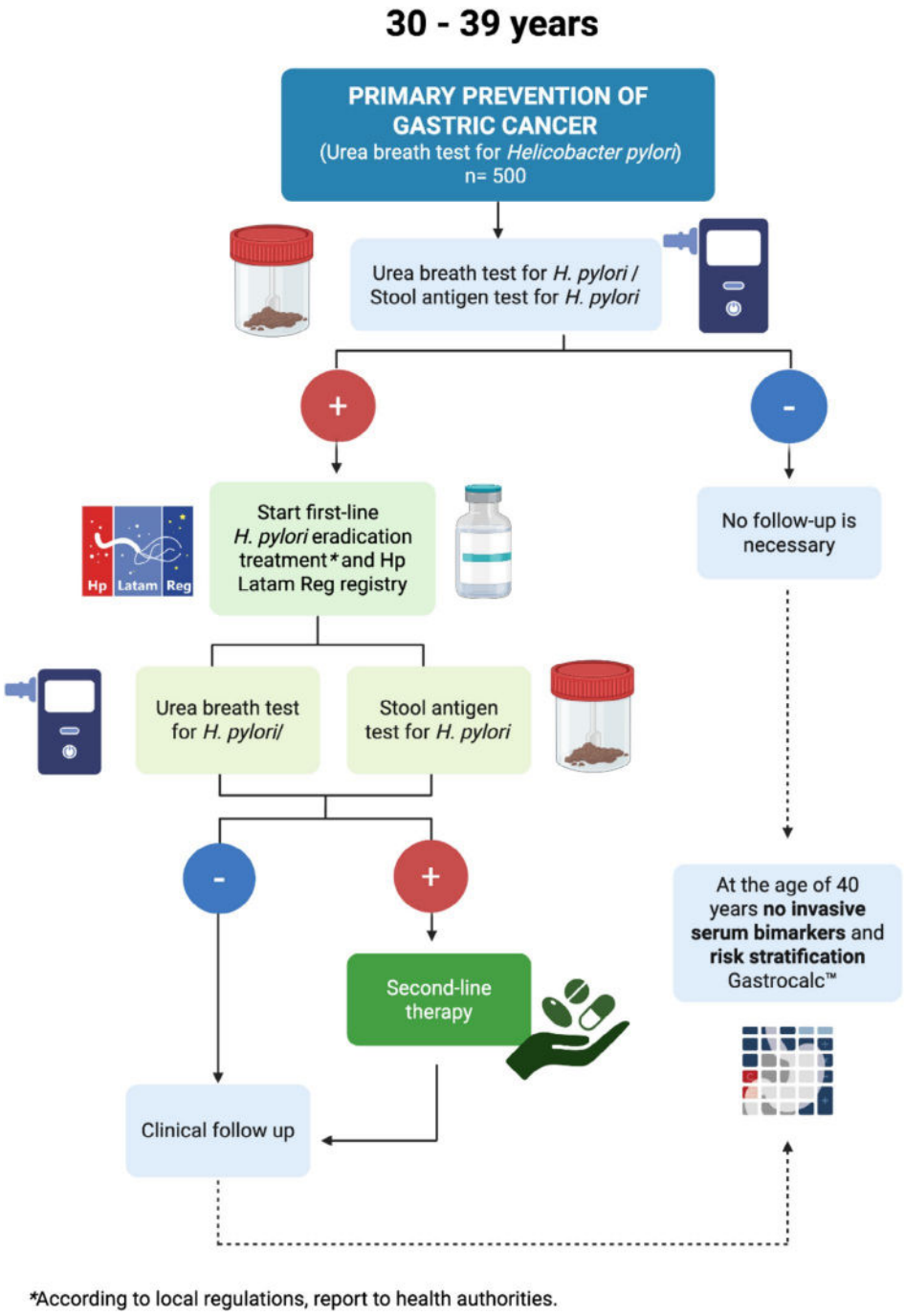

FIGURE 1 | Primary prevention strategy for individuals ages 30–39 years. *Source:* The authors. Created with www.bioRender.com.

2.3 | Primary and Secondary Prevention (Individuals Between 40 and 75 Years)

The primary prevention strategy will be the same as that detailed in Section 2.2. Individuals aged 40–75 years will be eligible for screening/surveillance endoscopy as part of secondary prevention.

2.3.1 | Phase I: Standardization of Endoscopy Quality

Each center will implement the prespecified standardized endoscopy protocol with quality measures. Each center will perform 100 endoscopies per protocol, using standardized, high-quality criteria, including classifications such as Kimura-Takemoto, EGGIM, Yagi, Kyoto, MESDA-G, and Toronto (see S1). The requirements for a high-quality EGD include: (1) informed consent, which clearly explains the risks and benefits, sedation plan and adequate patient preparation; (2) pre-procedure assessment of GC risk; (3) standardized EGD procedure with at least 7 min of gastric exploration, systematic visualization examining all anatomical areas, the use of cleansing and insufflation techniques to ensure clear visualization, the use of high-definition white-light endoscopy (HDWLE) (versus standard-definition white-light endoscopy),

and when possible, the use of image enhancement endoscopy (IEE) (e.g., virtual chromoendoscopy) to improve the diagnostic yield for preneoplasia and neoplasia, and collection of directed biopsies. (4) The standard post-procedure patient assessment and recovery [27, 37]. The EGD will be performed using the updated Sydney system protocol, and biopsies will undergo OLGA/OLGIM histopathological staging by expert pathologists in gastrointestinal neoplasms [13–17]. The total Phase I enrollment is projected to be 1600 individuals (40–75 years old) from the 16 study sites.

2.3.2 | Phase II: Site Validation of the Chilean GC Risk Assessment Algorithm

Phase II includes non-invasive screening and risk assessment. Plasma testing includes IgG antibodies against *H. pylori*, pepsinogen I (PGI), pepsinogen II (PGII), pepsinogen I and II ratio (PGI/II ratio), and Gastrin 17b. All centers will collect sociodemographic variables (e.g., age and sex), lifestyle habits (e.g., smoking, and alcohol), family history of GC, and pertinent clinical records (comorbidities, such as body mass index). Preliminary data from the HOPE study are available in Chile, covering five regions, and include 866 patients with EGD and Sydney protocol biopsies, with an accuracy of 80.6% for OLGA III/IV and 100% for GC cases. This study and PREVECAN (Prevention Cancer of Chile) studies from CECAN-MINSAL (Center of Control and Prevention for Cancer-Health Ministry of Chile) provided data for the Chilean GC Risk Assessment Algorithm, which utilizes the age, clinical, and plasma biomarker inputs (Gastropanel by Biohit). The calculator is available at www.gastrocalc.cl. (Figure 3).

For this phase, each center will recruit 250 individuals ages 40–75 years who meet the inclusion criteria, with the goal of approximately 4000 subjects from the 16 centers. Most study sites will utilize convenience sampling, while some sites may use population-based sampling as local priorities and resources permit. Based upon the plasma biomarkers and GC risk algorithm, individuals are assigned priorities ranging from 1 to 6, with 1 being the highest priority. Endoscopy will be performed in sequential groups as follows: high risk (priority 1–2), moderate risk (priority 3–4), and low risk (priority 5–6). The individuals who are *H. pylori* positive will be provided with standard-of-care *H. pylori* treatment and then have eradication confirmation as outlined in Section 2.2. All individuals participating in this stage will undergo Sydney protocol gastric biopsies, which will be assessed using the OLGA/OLGIM classification. OLGA/OLGIM III-IV will undergo follow-up every 2 years, and OLGA/OLGIM II will undergo EGD follow-up every 4 years. Individuals diagnosed with OLGA/OLGIM stage 0-I will not require endoscopy follow-up.

2.3.3 | Phase III: Risk Stratification for Precision Endoscopy Screening

Phase III includes risk stratification using the GC Risk Assessment Algorithm to select high-risk individuals for endoscopy screening. As in Phase II, each site will recruit 250 individuals ages 40–75 who meet the inclusion criteria, with the goal of approximately 4000 subjects from the 16 centers in Phase II. Most study sites will utilize convenience sampling, while some study sites may use community or population-based sampling as local priorities and resources permit. The GC Risk Assessment Algorithm (*Gastrocalc*) is described in Section 2.3.2. Individuals are classified into high-risk priority (1–2 score), moderate-risk (3–4 score), and low-risk (5–6 score). The moderate and high-risk groups (priority score 1–4) are scheduled for endoscopy screening. Low-risk individuals (5-6 priority score) are not scheduled for endoscopy and will receive clinical follow-up per local usual care. All individuals who test positive for *H. pylori* will be treated along with eradication confirmation as outlined in Section 2.2 (Figure 2).

This strategy focuses resources on the highest risk individuals. The use of these non-invasive biomarkers, however, has some limitations, including a rate of up to 20% false negatives. Despite this, there is evidence of their usefulness in risk stratification [38–40].

The primary and secondary prevention strategy, including Phases I, II, and III (40–75 years-old individuals) will include 600 individuals in 16 sites ($n = 9600$).

The centers of the HOPE Hp-GC project will store samples of individuals (40–75 years-old participating in phases II and III including: serum, EDTA plasma, and buffy coat). The blood samples will be stored locally at −80°C for future biomarkers (e.g., ferritin, trefoil family factor-3 [TFF3], and anti-parietal cell antibodies [APC]), which may be helpful to improve the GC risk Assessment Algorithm. The storage standards samples include: sample processing to −80°C storage of plasma, serum, buffy coat, and red cell aliquots; labelling by country and site; number of patients recruited; and a RedCAP platform anonymized register. Moreover, paraffin blocks will be stored in the pathology departments of each site for further analyses. The whole process of blood extraction, centrifugation, processing, and storage was performed in less than 2 h. The process was standardized in Perú, Chile, and Colombia at first, and 10% of the samples will be analyzed in duplicates for quality control process at the Central Clinical Laboratory, Red Salud UC Christus, Santiago, Chile. Tissue samples will also be stored for possible *H. pylori* resistance testing (e.g., frozen rapid urease test) (Figure 3).

2.4 | Ethics Considerations

The study in Chile was approved (registry number: 230703003) by the Institutional Review Board (IRB) of the Ministry of Health of Chile (MINSAL) and Pontificia Universidad Católica de Chile for the pilot study in Molina. Each participating center will have local ethics and IRB approvals. In Colombia, the study was approved by the IRB with this ID protocol (VII-OFIE-0195-2024 and Acta No. 6) at Fundación Hospital San Pedro and Fundación Universitaria Catolica del Sur (Pasto, Nariño).

Each participant will sign an informed consent form to authorize their participation in this study and the storage of biological samples.

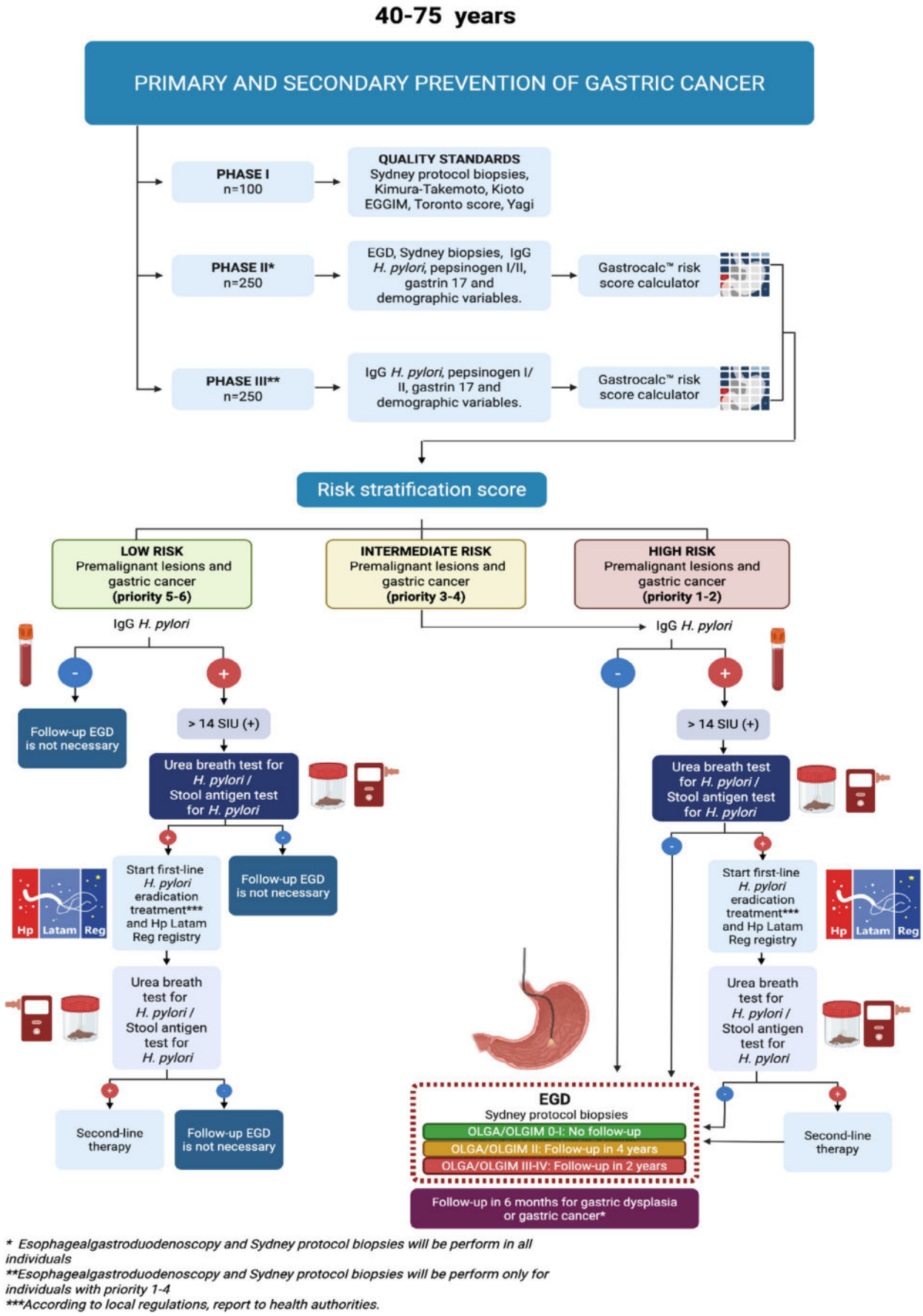

FIGURE 2 | Legend on next page.

FIGURE 2 | Secondary Prevention of individuals ages 40–75 years. The secondary prevention strategy is based upon risk stratification and endoscopy screening. First, sociodemographic and clinical variables are combined with non-invasive testing (Gastropanel) within the Chilean Risk Assessment algorithm (priority scale 1–6) to classify individuals into high, moderate, and low priority categories. All individuals undergo *H. pylori* screening, treatment, and eradication confirmation (prior to endoscopy, if performed). High-quality endoscopy with the Updated Sydney biopsy protocol and OLGA/OLGIM staging is performed in all Phase II subjects and in all moderate and high priority Phase III subjects. Surveillance endoscopy is determined by the OLGA classification: Patients undergo endoscopic follow-up every 2 years for stages III and IV, and every 4 years for stage II, according to the ACHED consensus. The low-risk individuals (5–6 points) receive usual clinical care follow-up without surveillance endoscopy. *Source:* HOPE Hp-GC Consortium Project. Created with www.bioRender.com.

FIGURE 3 | Countries with centers contributing to the project. It describes the countries and cities that correspond to Argentina (Buenos Aires, Neuquen), Bolivia (Tarija), Chile (Villarrica, Molina, Santiago, Antofagasta), Colombia (Pasto, Bogota DC), Costa Rica (Grecia, San Jose), Ecuador (Manta), Guatemala (Antigua), Mexico (Veracruz), and Peru (Lima). *Source:* HOPE Hp-GC Consortium Project. Created with www.bioRender.com.

3 | Current Outcomes

3.1 | Primary Prevention

In Chile, the primary prevention strategy reported 4152 tested individuals between the 2023–2025 period with a *H. pylori* prevalence rate of 46% ($n = 113/246$) in 2023, 34% ($n = 504/1484$) in 2024, and 32% ($n = 609/1904$) in 2025. In Sant Rosa Hospital of Molina 592 out of 4152 individuals were between 30 and 39 years (14.3%). The regimens used were 118 with dual therapy, 4 with triple therapy, 6 with bismuth quadruple therapy, 106 with fexuprazam quadruple therapy, and 19 with other therapies, including 13 with tetracycline or doxycycline regimens.

In Colombia, asymptomatic individuals tested between 30 and 39 years old in four regions (Southwest, Eje Cafetero, Caribe, and Bogotá city), with an *H. pylori* prevalence of 69% ($n = 895/1250$) in 2025, from high-and low-risk incidence of GC. The regimens for *H. pylori* eradication are as follows: (a) tegoprazan, amoxicillin, and bismuth (first regimen); and (b) esomeprazole, amoxicillin, levofloxacin, and bismuth (second regimen).

3.2 | Secondary Prevention

This model is currently in its pilot phase at the Santa Rosa de Molina Hospital (Maule region, Chile), which has provided

preliminary data. Our pilot study has demonstrated an 87% reduction in the endoscopic waiting list at Santa Rosa de Molina Hospital. This study examines risk stratification using a GC Risk Assessment Algorithm to select high-risk individuals for endoscopy screening at multiple sites in Latin America.

3.2.1 | Validation of Gastrocalc

Initially, data were extracted from a previous study of plasma biomarkers in GC conducted in Santiago (Chile), conducted by Latorre and colleagues [41]. From this cohort, serological data and demographic variables were analyzed to derive the predictive algorithm based on a logistic regression model and multivariable analysis. The evaluation of combined data from this so-called "*discovery cohort*" allowed for the construction of a combined predictive model, which was adjusted to achieve the best diagnostic performance in terms of its predictive capacity for advanced GPMC and GC. The original discovery cohort consisted of 220 patients over 18 years of age of both sexes, with 64.1% ($n = 141$) being women, and a mean age of 60 years. Data collection for the discovery cohort took place between 2017 and 2022. After analyzing the data obtained from the discovery cohort, the consolidated predictive model in *Gastrocalc* was generated, which integrated clinical-demographic variables such as sex (male/female), age (years), background of hypertension (yes/no), and quantitative variables (biomarkers from the gastric serological panel: PGI, PGII, IgG antibodies against *H. pylori*, and G-17b). The diagnostic values from the discovery cohort ($N = 220$), with CG $N = 23$, and the ROC curve for CG: area under curve [AUC] 0.87, sensitivity 96%, and specificity 94%. In the Premalignancy (OLGA II–IV $N = 83$), with the receiver operating characteristic (ROC) curve: AUC 0.67, sensitivity 61%, and specificity 68%.

3.3 | Validation Cohort for Risk Predictive Algorithm

In 2024, an external validation analysis was conducted for the secondary prevention strategy based on the *Gastrocalc* risk algorithm. The strategy was applied to patients on the waiting list in the municipality of Molina. A total of 187 patients were included (70.1% women), with a mean age of 59 ± 4 years. The average gastric evaluation time was 10.52 min (range 6–22 min); Toronto score average 10.5 points (range 4–12 points); Virtual chromoendoscopy (BLI) was performed in 99.2% of the patients and magnification used in 8.3%. In 2025, a joint initiative was undertaken with the Chilean Ministry of Health to establish a large-scale validation of the predictive model. The implementation phase was carried out using *Gastrocalc* risk algorithm to evaluate its diagnostic performance in the Chilean adult population using the public health system, who were on the waiting list for EGD in five regions of the country (Metropolitan, Antofagasta, Maule, Ñuble, and Los Ríos Regions). The average gastric evaluation time was 11.8 min (range 6–27 min); Toronto score average 11 points (range 4–12 points); BLI was performed in 100% of the patients, and magnification used in 13%. After analyzing the data extracted from the five participating regions, with a total of 866 individuals, it was observed that cases of high-grade dysplasia (HGD) and GC, as well as low-grade dysplasia (LGD), were concentrated mainly in the Metropolitan region. Applying the risk *Gastrocalc* risk algorithm to the entire Chilean cohort revealed an 80.6% ($n = 697$) capture rate for cases with advanced premalignant gastric involvement (OLGA III and IV), which were grouped into the categories of "*high risk*" (priorities 1–2) and "*intermediate risk*" (priorities 3–4), so would qualify for EGD. Most notably, no cases of LGD, HGD, and GC were identified in any patient categorized as "*low risk*" (priorities 5–6) (see Table 1). These nationwide results support the use of the risk predictive algorithm as a useful and rational tool for ordering endoscopic waiting lists, by allowing prioritization of EGD in people with a higher potential risk of presenting advanced premalignant conditions and GC, thus optimizing the allocation of resources and waiting times in the health system [42]. In the MINSAL cohort, the *Gastrocalc* risk algorithm achieved a sensitivity of 81%, specificity of 37%, positive predictive value (PPV) of 14%, and most notably, a high negative predictive value (NPV) of 93% for ruling out OLGA stages III and IV if a calculated priority of 5 or 6 was obtained (LR+ 1.29; LR− 0.51, 95% CI). The area under the ROC curve (AUC) for premalignancy was 0.65 (95% CI 0.59–0.7).

TABLE 1 | Chile's Government guideline for prevention of gastric cancer. Preliminary results from the Chilean cohort pilot study revealed a predictive algorithm and a priority level for endoscopy access.

	Priority gastrocalc						
	High-risk		Intermediate risk		Low-risk		
Histological diagnosis	1	2	3	4	5	6	Total
OLGA 0-I	46 (43.8%)	47 (61.8%)	120 (64.2%)	154 (74.8%)	75 (77.3%)	165 (84.6%)	607 (70.1%)
OLGA-II	27 (25.7%)	17 (22.4%)	32 (17.1%)	26 (12.6%)	13 (13.4%)	20 (10.3%)	135 (15.6%)
OLGA III-IV	24 (22.9%)	10 (13.2%)	26 (13.9%)	19 (9.2%)	9 (9.3%)	10 (5.1%)	98 (11.3%)
Low-grade dysplasia	1 (1.0%)	0 (0.0%)	1 (0.5%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	3 (0.3%)
High-grade dysplasia/gastric cancer	7 (6.7%)	2 (2.6%)	8 (4.3%)	6 (2.9%)	0 (0.0%)	0 (0.0%)	23 (2.7%)
TOTAL	105 (12.1%)	76 (8.8%)	187 (21.6%)	206 (23.8%)	97 (11.2%)	195 (22.5%)	866 (100%)

Note: Taken and adapted from the MINSAL-CECAN. Technical guideline for implementation of prevention strategy for digestive neoplasms. Ministry of Health, Chile [42].

Regarding HGD and GC, *Gastrocalc* risk algorithm demonstrated a sensitivity of 100%, specificity of 35%, PPV of 5%, and an NPV of 100%. The AUC was 0.72 (95% CI 0.64–0.79), the most noteworthy finding being that there were no LGD, HGD, or GC events in any patient classified as priority 5 or 6. This would allow postponing 292 of the 866 patients whose priorities are 5 and 6, thus capturing 100% of the LGD/HGD/GC cases and 80.6% of the OLGA III-IV cases in priorities 1 to 4. In Colombia and Peru, the validation of the secondary prevention strategy started in November 2025.

3.4 | Matched Biomarkers: ELISA Versus Gastric Serologic Non-Invasive Test (Gastropanel Quick Test NT)

In the discovery cohort in the Metropolitan region of Chile, a correlation was established between the measurements of the different biomarkers, comparing the results obtained through formal laboratory analysis using ELISA and the results reported by the "*Quick test NT*" measurement of the commercial Gastric Serological Panel (Gastropanel). In all measurements performed, a very high Pearson's correlation of the results was established: PGI, with 43 valid measurements and 2 discrepancies ($R^2 = 0.9998$), PGII with 43 valid measurements and 3 discrepancies ($R^2 = 0.9989$), Gastrin 17b with 43 valid measurements and 2 discrepancies ($R^2 = 0.9995$), and IgG *Hp* with 47 valid measurements and 8 discrepancies ($R^2 = 0.9712$ for a cutoff point kappa ≥ 14 SIU).

3.5 | Expected Outcomes

The primary prevention outcomes for long-term follow-up and a large population-based strategy are to reduce prevalence to 20% and to expect a 30% reduction in GC incidence. On the other hand, the outcomes for the secondary prevention strategy include a reduction of the endoscopy waiting list by 60%, surveillance of patients at higher risk of GC (OLGA II-IV) with 80% coverage, and increasing the proportion of early-stage GC to 60% among individuals with endoscopy follow-up [18, 36].

4 | Discussion

The HOPE study is being conducted at 15 centers across Latin American countries, with an estimated total enrollment of 7500 individuals for primary prevention and 9600 for secondary prevention (Figure 2). This model is designed to be flexible to adapt to the local conditions and resources through a standardized framework that guides implementation across diverse settings.

Dissemination is an essential objective for participating centers in the HOPE study. Local and international reports will contribute to a broader understanding of GPMC and GC epidemiology, as well as *H. pylori* infection rates, treatment responses, and antimicrobial resistance patterns. Study findings will also support HpLATAM-Reg in promoting high-quality clinical practice for the diagnosis and treatment of *H. pylori* infection. This registry represents a collaborative effort across Latin American countries to characterize *H. pylori* infection, document commonly used antibiotic regimens, surveillance adverse effects, and track trends in antimicrobial resistance. As noted, antimicrobial resistance (e.g., clarithromycin and levofloxacin) will be assessed using PCR-based assays with gastric biopsies from the urease tests; other approaches will also be considered (e.g., NGS).

The HOPE study was modeled after key GC prevention initiatives in East Asia and Europe. The Matsu Islands in Taiwan have demonstrated that a population-based *H. pylori*-screen-to-treat strategy is effective for GC prevention [18, 19]. Our study has been guided by the EUROHELICAN, and Matsu Islands in Taiwan initiatives on population-based *H. pylori* test-and-treat in high-risk areas [22]. The EUROHELICAN is best suited to the Latin American context because it aims to eradicate *H. pylori* before GPMC development and is highly cost-effective in limited-resource settings. The TOGAS project seeks to generate evidence to support the implementation of cancer prevention programs in Europe. It focuses more on the analysis of feasibility, sustainability, and transfer of results, making it a good complement to the GISTAR study [22, 23]. The GISTAR study is noteworthy because it demonstrates that a hybrid strategy—*H. pylori* eradication plus targeted endoscopic surveillance—can effectively and cost-efficiently reduce the GC mortality in high-and-intermediate-risk areas, offering a replicable model for regions such as Nariño (Colombia) and Molina (Chile).

Unlike organized programs in South Korea and Japan, endoscopic screening with defined intervals for early GPMC and localized GC is the primary objective of reduced GC mortality [9, 20]. It is less adaptable to Latin American high-risk areas because population endoscopy is challenging to implement due to costs, limited installed capacity, advanced endoscopist training, quality protocols, and follow-up. Therefore, the HOPE study intends to implement health operatives within secure health systems, leveraging each country's context. The HOPE study is innovative because it combines primary and secondary prevention through risk stratification to prioritize access to endoscopy in high-and-intermediate risk areas.

4.1 | Program Strengths and Limitations

The major strengths of this project include: (1) a strategy that optimizes resource allocation to reduce low-yield procedures and lower overall healthcare costs; (2) a flexible framework for implementation across a wide variety of clinical settings; (3) an evidence-based program design for GC prevention. This study lays the groundwork for public health policy in each country by enabling stakeholders to inform local and national decision-making institutions.

The potential limitations of this program include local resource and funding challenges, which may limit some centers from completion all study goals.

5 | Conclusions

This study on GC prevention provides a structured framework for strategically allocating healthcare resources, leading to tangible improvements in outcomes for high-and-intermediate risk areas. Furthermore, we anticipate that the model's flexibility will enable seamless integration into the range of hospitals and clinical systems, potentially yielding comparable results.

Thus, our proposed model strikes a balance between feasibility and cost-effectiveness by integrating non-invasive biomarkers for initial risk stratification, thereby guaranteeing priority endoscopy for individuals in high-and-intermediate risk areas.

Affiliations

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Acknowledgments

Biohit Oyj (biohithealthcare.com), in collaboration with Gebrax (Chile distributor), offered support with kits and Biohit Gastropanel and provides logistical resources (Ultra freezer −80°) for their support with logistics related to gastrocalc implementation in Chile and Latin American countries. The Church of Jesus Christ of Latter-day Saints (For their support with equipment and kits for the endoscopy unit and the clinical laboratory in Molina Hospital), Division de Prevencion y Control de Enfermedades (DIPRECE) and Division de Atencion Primaria (DIVAP), from the Ministry of Health (MINSAL) in Chile for their support with the Gastrocalc validation cohort in Chile.

Funding

Chile Centro para la Prevención y Control del Cáncer (CECAN) ANID-FONDAP 152220002 (A.R.). Fondecyt 1230504 (A.R., G.L.), and Biohit Oyj (biohithealthcare.com) with Gebrax (Chile distributor), which provides support with Biohit Gastropanel and logistical resources. The HOPE study has no commercial relationship with Biohit Oyj and Gebrax, and the design, decision-making, and outcomes derived from this study are independent.

Disclosure

The authors alone are responsible for the content herein, and do not represent the opinions or policies of their respective institutions. In particular, the authors are identified as personnel of the International Agency for Research on Cancer/World Health Organization; the authors alone are responsible for the expressed views. The contributions of the NIH author are considered Works of the United States Government. The findings and conclusions presented in this paper are those of the author and do not necessarily reflect the views of the NIH or the U.S. Department of Health and Human Services.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** Supporting Information.

Appendix A

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