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# Ideal Cardiovascular Health in the southern cone of Latin America

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ABSTRACT

*Objective:* The American Heart Association developed the concept of 'Ideal Cardiovascular Health', which is based on the presence of ideal levels across seven health factors. The goal of this study is to assess the prevalence of Ideal Cardiovascular Health in the Southern Cone of Latin America.

*Study design:* We conducted a cross-sectional analysis as part of CESCAS I cohort.

*Methods:* This report included 5458 participants aged between 35 and 75 years who were selected using stratified multistage probability sampling in Argentina, Chile and Uruguay. Interviews included demographic information, the International Physical Activity Questionnaire, and a food frequency questionnaire on dietary habits. Participants were classified as current, former or non-smokers. Weight, height and blood pressure were measured by trained personnel, and fasting cholesterol and glucose plasma levels were measured.

*Results:* Only 0.1% (95% confidence interval [CI]: 0.0–0.2) met the seven criteria that define the Ideal Cardiovascular Health. The least prevalent healthy behaviour was having a healthy diet: 0.5% (95% CI: 0.3–0.7), while the least prevalent health factor was having blood pressure < 120/80 mmHg: 23.6% (95% CI: 22.1–25.0).

*Conclusions:* The prevalence of Ideal Cardiovascular Health is very low in a representative sample of population from the Southern Cone of Latin America, and the levels of healthy lifestyle behaviours are even lower than ideal biochemical parameters. These results highlight the challenge of developing strategies to improve the levels of Ideal Cardiovascular Health at primary prevention levels.



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## Introduction

Cardiovascular conditions are the leading cause of morbidity and mortality worldwide, with ischaemic heart disease as the leading cause of premature mortality and disability-adjusted life years (DALYs).[1] Several studies have identified the same risk factors for myocardial infarction or stroke across different populations, though different regions present a different prevalence and disease burden.[2,3] For a long time, initiatives have focused on measuring the extent of the problem and lowering risk factors.

To improve cardiovascular health, it is necessary to promote healthy lifestyles and to take a more positive approach. This is why the American Heart Association's (AHA) Strategic Impact Goal Through 2020[4] created the Ideal Cardiovascular Health construct as a way to emphasise primary prevention. AHA defines Ideal Cardiovascular Health as the simultaneous presence of four favourable cardiovascular behaviours (non-smoking, body mass index (BMI) < 25 kg/m2, physical activity at target level and a diet consistent with current guideline recommendations) and three ideal health factors (untreated total cholesterol <200 mg/dL, untreated blood pressure <120/<80 mmHg and untreated fasting glucose <100 mg/dL).

Since the introduction of this construct, many US studies have reported on the prevalence,[5,6] and association with cardiovascular disease[7,8] and other risk factors or conditions like cancer,[9] subclinical vascular disease,[10,11] disability,[12,13] and mortality.[14,15]

Several other studies have described the levels of Ideal Cardiovascular Health in European[16–19] and Asian[20–24] countries, but there are no reports from South America.

The aim of this study is to assess the prevalence of Ideal Cardiovascular Health in an adult population from the Southern Cone.

## Methods

This report is part of the CESCAS I study (Detection and follow-up of cardiovascular disease and risk factors in the Southern Cone of Latin America). CESCAS I methodology has been described earlier.[25,26] Below, we present a summary of aspects of CESCAS I (study design, sampling methods and measurements techniques) that are relevant to this analysis.

CESCAS I is a prospective cohort study with participants from four small and medium-size cities: two Argentine cities (Bariloche and Marcos Paz), one Chilean city (Temuco) and one Uruguayan city (Pando—Barros Blancos). Cohort recruitment involved a first cross-sectional stage between 2011 and 2012. Participants from all four cities were selected through a four-stage stratified sampling method. In the first stage, census radii were randomly selected, stratified by socio-economic level. In the second stage, a number of blocks proportional to the radius size were randomly selected. In the third stage, a systematic random sampling to select households within each block was performed. All household members aged between 35 and 74 years were included in the final sampling frame. Finally, during the fourth stage, only one member per household, stratified by gender (50% women and 50% men) and age category (35–44, 45–54, 55–64, and 65–44 years), was randomly selected to be included in the study. The overall response rate was 73.4%, and the response rates were similar in men and women and across different locations.

Inclusion criteria: (i) aged between 35 and 74 years; (ii) living as a permanent resident of the city for at least 6 months per year; (iii) being able to respond autonomously to the questionnaires; and (iv) being willing to sign an informed consent to participate in the study.

Each site sent a letter to all subjects identified during the sampling process inviting them to take part in the study. An interviewer contacted candidates and arranged a home visit. During this visit, the interviewer explained the details of the study. Those who agreed to participate in the study signed an informed consent form.

Study participants responded to questionnaires administered by a trained interviewer. Interviewers scheduled a visit to the clinic to obtain physical measurements and overnight fasting blood samples.

Questionnaires gathered information on participants' demographics, socio-economic level, healthcare utilisation and personal and family history of cardiovascular disease and risk factors.

Dietary habits were assessed with a 126-item food frequency questionnaire (FFQ), which recall food consumed in the last year. This questionnaire was adapted from the National Cancer Institute's Diet History Questionnaire and has been validated for its use in Argentina, Chile and Uruguay.[27] First, we excluded participants with reported extreme energy intake (defined as ≤300 kcal/d or ≥7000 kcal/d). All variables were energy-adjusted and referred to a diet of 2000 kcal/d. Then, we categorised the achievement of the four components of an ideal diet as follows:

- ≥4.5 cups/d of fruits and vegetables (approximately ≥400 g/d; fruits included whole fruits; vegetables included orange and green leafy vegetables, tomatoes and other vegetables excluding root and starchy vegetables);
- ≥two 3.5 oz servings/wk of fish (approximately ≥200 g/wk of fish and seafood);
- less than 1500 mg of sodium/day (estimated according to nutrient intake—as per FFQ—without including salt added at the table or while cooking); and
- ≤36 oz/wk of sugar-sweetened beverages (approximately ≤36 oz/wk, including soda, juice and flavoured water with sugar).

Physical activity was evaluated using the transcultural adaptation of the International Physical Activity Questionnaire (IPAQ)[28] used in the Hispanic Community Health Study / Study of Latinos (HCHS/SOL Study).[29,30] The IPAQ includes questions on frequency and duration of moderate and vigorous intensity activities over the last 7 days in three domains: work, leisure time and active transportation. Recorded activities were converted into metabolic equivalents and then into min/week of moderate or vigorous intensity physical activity.

Information about current and former cigarette smoking, age of onset, years of smoking and number of cigarettes smoked per day were evaluated using the Global Adult Tobacco Survey.[31]